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URGENT INTERACTIONS

"Everything is about probabilities. The pretest probability for an emergency is usually low simply by virtue of the patient walking into urgent care."

— Joshua W. Russell, MD, MSc, ELS, FCUCM, FACEP
JUCM Editor in Chief

"Shared decision making needs to occur between reasonable alternative pathways."

— Michael Weinstock, MD
JUCM Senior Clinical Editor

"We have a tendency to rely on procedural sedation to manage pediatric forearm fractures. Hematoma blocks, however, can be a reliable and a far more practical alternative while providing adequate analgesic effect in the right clinical situation. Hematoma blocks can be readily utilized in urgent care to provide definitive care to patients and avoid referrals to emergency services."

— Shomel Gauznabi, MBChB, FRNZCGP, FRACGP, FRNZCUC, MD
Author of "Systematic Rapid Review: Efficacy of Hematoma Blocks for Pediatric Forearm Fractures" (page 42)

A WORD OF THANKS

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'Health Data Obsessive Disorder'—A Modern Epidemic

"Low blood sugar" was his chief complaint, but Thomas was in my urgent care (UC) mostly because he was feeling anxious. It wasn't hypoglycemia that was making him nervous either. Thomas didn't have diabetes or take any medication for high blood sugar. Regardless, he was wearing a continuous glucose monitor (CGM), which he lifted his shirt to show me when I entered the room.

Thomas explained his primary care physician (PCP) had prescribed the device somewhat reluctantly earlier that week, and Thomas had deployed the sensor in his abdominal subcutaneous tissue the night before. He requested a CGM, he explained, because he had heard a podcast about how fluctuations in glucose might increase his risk of dementia. Thomas was 32 years old.

"By labeling the issue, we take the necessary first step in mitigating its effects on the unsuspecting patients."

Beginning that morning, he noticed that his glucose readings began to fall after his workout. He ate a normal breakfast, but the values continued to decline. They hit 75...60...55...and then the device just read "low." He drank orange juice throughout our conversation. I asked how he felt. "Anxious," he told me as his phone beeped and the device continued to flash "low." I could understand why.

Strongly suspecting erroneous readings, I asked our medical assistant to check capillary blood glucose (CBG) while I looked Thomas over. His CBG reading was 141 mg/dL from our device. I reassured him. This was what I expected: his device wasn't reading accurately. I told him it should be removed, and with some reluctance, he agreed. With only a short pause, he asked me, "But isn't 141 pretty high?"

Increasingly Affordable Devices

This story is not unique. The use of home health data monitoring devices of many varieties has increased rapidly over recent years, many without clear clinical indications. The COVID-19 pandemic fueled affordable finger pulse oximeters for home use with sales increasing by over 500% during the first quarter of 2020.[1] Similarly, in 2022, as many as 45% of Americans responding to a survey reported wearing a smartwatch (eg, AppleWatch, FitBit) regularly.[2] And, like Thomas, more non-diabetic patients are using CGM devices to track their glucose levels throughout the day.[3]

On initial appraisal, it's understandable that the lay public sees mostly, if not exclusively, upsides to the trend of increasingly affordable and portable health data monitoring devices. Certainly, there is an aspect of democratization with these trends; patients are now empowered to collect data that, until recently, was only obtainable with specialized equipment restricted to medical professional use. As these patient-facing devices have rapidly improved in both cost and accuracy, the question most often asked by device manufacturers, clinicians, and patients alike seems to be "How *can* we use these devices?" Yet, "How *should* we use these devices?" is discussed less frequently.

When it comes to data, the belief that more is automatically better is so widespread that few even recognize its presence.

Sigmund Freud introduced the psychoanalytical notion of defense mechanisms, which are unconscious behaviors we use to mitigate the pain of difficult feelings.[4] The urge to collect more data clearly is used by those like Thomas as a means of soothing fears about threats to health and death. Psychologists refer to this defense mechanism as intellectualization, and intellectualization can manifest in many forms.[5]

I share Thomas's story because it so clearly illustrates this phenomenon that has emerged as a predictable, natural result of this confluence of human psychology and technological progress. It's a situation that any clinician working in UC has undoubtedly encountered. Given

its increasing incidence, there's wisdom and value in developing a precise term for the experience I'm describing. As the adage goes in the mental health community, "you have to name it to tame it," and this form of neurosis has become so rapidly widespread that it deserves a label. I propose "health data obsessive disorder."

While health data obsessive disorder (HDOD) may not enter the next revision of the Diagnostic and Statistical Manual of Mental Disorders (DSM), I'll offer a provisional definition here. HDOD would be classified as a subtype of obsessive-compulsive disorder, whereby those afflicted have persistent compulsions to monitor health data (eg, weight, blood pressure, heart rate, blood glucose etc.) in the absence of any clinically meaningful indication. Like other disorders defined by the DSM, HDOD can only be diagnosed if it matches the definition given, and the behaviors cause distress and/or impair function. Arguably, if the patient is sitting in front of you and fretting over data that you've assured them isn't worrisome, this would meet the criterion of distress.

Choosing Wisely

In 2012, the American Board of Internal Medicine Foundation launched the Choosing Wisely campaign aimed at "just distribution of finite healthcare resources" and avoidance of "superfluous tests and procedures." The movement has since spread through over 20 countries, and over 80 specialty societies have created their own Choosing Wisely lists of things that are not recommended. The movement was born from a recognition that unnecessary testing and treatment is very common and—worse than wasteful—it harms patients.[6]

While the Choosing Wisely movement has gained traction among clinicians, patient awareness of the potential harms of unnecessary testing is lagging. Think about the befuddled look on many patients' faces when you suggest that imaging for their acute low back strain is not helpful.

Catalyzed by the pandemic, on-demand, choose-your-own imaging study centers and mail-in kits for home lab testing have become growing trends in the United States.[7] This phenomenon is neither categorically good nor bad, however, the patients who utilize these services rarely become aware of the drawbacks of directing their own health data collection until they're alerted to "abnormal" results of uncertain significance. The more self-directed data gathering patients engage in, the more likely they are to get an unexpected result; hence, patients with HDOD, who are already more anxious about their health, are at the highest risk of such predicaments.

Given these trends, it is time for a sister campaign to Choosing Wisely directed exclusively at patients to raise awareness of the risks of excessive health data tracking without clinician guidance. At present, outside of individual interactions with clinicians, patients are only presented with marketing campaigns from the businesses promoting these products and services. A more balanced perspective is sorely needed.

Upsides of Widely Available Health Data Monitoring

Lest you think I have an entirely revisionist position on remote health data monitoring technology, I do feel it is worthwhile to define the benefits I see in these devices as well.

In the era before ubiquitous digitization, data collection and analysis were labor-intensive enough to be impractical, if not frankly disincentivizing. Challenges associated with patient data management, however, were not the only reasons why clinicians before the mid-20th century would have been dissuaded from emphasizing clinical metrics. The ability to accurately, affordably, and quickly measure vital parameters, such as blood glucose and oxygen saturation, which we now take for granted, were pipe dreams until recent decades. The pulse oximeter and glucometer, for example, weren't widely available until the 1980s and, as is the case with new technologies in medicine, early versions were costly and inaccurate.[8,9] Furthermore, the term "evidence-based medicine" was only coined in 1991, and the notion of using data collected in clinical research to inform clinical practice has only been widely accepted in the medical community in this century.[10]

During the pandemic, countless patients with chronic conditions who contracted COVID-19 were able to avoid seeking care in person by monitoring their respiratory status with pulse oximetry from home.[11] Patients with history of atrial fibrillation who wear AppleWatches can now determine when they've fallen out of sinus rhythm with reasonable accuracy.[12] And patients with type 1 diabetes who use CGMs have been found to have 30% fewer episodes of hypoglycemia than similar patients without continuous monitoring devices.[13]

Each of these examples represents specific clinical situations whereby patients, armed with easily accessible and relatively reliable data for clear indications, can make better informed decisions about treatments and care seeking. Given the recency and promise of these developments, enthusiasm for our capability to measure health data accurately outside of clinical settings is understandable. However, like any form of progress, there cannot be exclusively associated upsides.

Where Health Data Becomes Problematic

The first principle of diagnostics dictates that when we (or our patients) collect data that lacks actionable and meaningful value, attempts at interpreting this data will necessarily draw focus away from metrics with known significance.

To illustrate this, let's dissect an example we frequently encounter in UC and emergency medicine: lumbosacral imaging for acute, atraumatic low back pain (LBP). In the 20th century, with the advent of diagnostic radiography (XR) and even more so with cross-sectional imaging, such as magnetic resonance imaging (MRI), clinicians and patients saw hope for solving the ancient riddle of why people's backs hurt so often. And while such imaging studies have given clinicians and patients an abundance of data about the state of the spine, determining the significance of these findings has remained elusive. Clinicians' less-than-discriminate use of lumbar MRI in cases of LBP has generated abundant data, which tells a cautionary tale of the dangers of measuring before we know how to interpret.

New Data, Not New Insights

Degenerative disc disease (DDD) was a term scarcely used before MRI allowed vivid visualization of the intervertebral discs. I doubt doctors heard patients blame "degenerative disc disease" for their backaches before recent decades. But as the medical community began studying the issue, we discovered that degenerating discs are to the back as wrinkles are to the skin—evidence of aging and wear and tear, yes, but not necessarily the cause of pain. This insight, however, took years of real-world experience and focused research before we realized that the appearance of a patient's discs had very little correlation with location or severity of their back pain.[14]

This points to a fundamental challenge of data interpretation: differentiating signal from noise. When we receive data, we need to categorize each value as meaningful (signal) or meaningless (noise). Differentiating signal from noise, however, is not easy; it takes prolonged, intentional observation and analysis. We must continuously integrate our clinical experience with objective data from research studies. With this combination over time, we develop competence in identifying which of the countless datapoints available to us in each patient encounter we should be paying attention to and which we can safely ignore. For instance, it was long believed that chest pain relieved by nitroglycerin (NTG) was necessarily cardiac in etiology, however when investigated specifically, it turns out that pain radiating to both shoulders is the most predictive characteristic of chest pain presentations. Relief with NTG conversely has been shown to have no value for predicting whether acute chest pain is cardiac in etiology.[15] Without specific investigations into predictors of cardiac chest pain, we would likely continue to misclassify this data point, which itself only exists as the result of the use of specific healthcare technology (ie, sublingual NTG).

GIGO

You've probably heard the axiom "garbage in, garbage out," or GIGO. If we misinterpret data as signal rather than noise, it will likely result in errors in clinical judgment. Taking a patient for emergent coronary stenting despite a normal electrocardiogram because their chest pain is relieved with NTG, for instance, or performing a laminectomy on a patient because they have low back pain and a badly bulging disc on MRI are examples of how you may have seen GIGO play out clinically. In UC, I've seen GIGO drive many ED referrals related to erroneously collected or interpreted vital signs, such as a falsely low pulse oximetry reading in a patient with dark skin and nail polish or an erroneous determination of hypotension due to an over-sized blood pressure cuff.

A key facet of the examples above is that harm occurs without malice. In each case, a well-intentioned clinician misleads a trusting patient. The Hippocratic oath compels us to "...first, do no harm." There's no caveat for unintentional harm being excusable. But this is exactly the risk we take with our patients' well-being if we incorporate data of uncertain value into our clinical assessment.

What Makes Data Dangerous

In the evaluation of undifferentiated patients in UC, it is particularly tempting to grasp for as much data as possible, especially if seeking the particularly unlikely outcome of making a definitive diagnosis in a patient with vague complaints. This is the clinician-version of HDOD. I've previously discussed the pernicious and insidious nature of ordering non-specific tests (eg, complete blood count, metabolic panels) in the hopes of sorting out non-specific complaints (eg, dizziness, fatigue).[16] Such testing may reveal results outside the reference ranges, but these results rarely point to a cause for the patient's symptoms. The flagged results, however, do create situations where we feel compelled to act. This compulsion toward action is termed "intervention bias," and we face it both from within ourselves and from our patients.[17]

Let's consider a 2020 retrospective study of older adults with low back pain. The investigators found that patients who underwent early lumbar MRI (<6 weeks of pain) had

1300% higher risk of having spinal surgery and experienced worse pain scores a year later compared to similar patients who did not have an MRI.[18] This is a perfect example of how intervention bias plays out and leads to patient harms.

A patient has back pain and wants it "fixed." The clinician obtains data by imaging where the patient hurts. The MRI shows "degenerative changes" and "disc bulges." Since wanting to feel better generally is what motivates patients to seek care, they usually have a strong preference that something should be actively done to address their symptoms. We as clinicians are therefore motivated to act on abnormal data for several reasons: We want to do something to help our patients feel better, meet their expectations, and avoid blame from colleagues for not responding to abnormal findings. These factors dangerously converge to create a situation where patients are inadvertently put at risk for unnecessary hassle and expense; this is actually the best-case scenario. More commonly, however, the risks involve morbidity because the actions clinicians are compelled towards so commonly involve exposing the patient to more risks (eg, invasive procedures, surgery).

The United States Preventive Services Task Force (USPSTF) recommendations are largely based on a keen appreciation for this reality. For instance, serum prostate-specific antigen (PSA) testing was used for years to screen for prostate cancer. Observational studies, however, demonstrated that universal PSA screening led to increases in prostate biopsies and high-risk treatments for low-grade prostate cancer without corresponding improvements in morbidity or mortality. In fact, routine PSA screening was found to increase downstream harms associated with the understandable pressures to respond aggressively to abnormal results. This led the USPSTF to revise their guidelines and specifically recommend *against* the use of PSA for cancer screening, especially in men >70 years of age.[19] The harms of these false positive results aren't limited to the risks associated with subsequent testing and treatment either. Just ask any man who's received notification of a slightly elevated PSA. There is also considerable anxiety that patients face when confronted with an ambiguous, but potentially ominous, piece of data.

The Negativity Bias

With the development of new diagnostic equipment, both patients and clinicians are confronted with new types of data. When continuous telemetry devices became prolific in the 1970s and 80s, premature ventricular contractions (PVCs) were identified commonly in patients hospitalized for heart disease. Cardiologists presumed PVCs portended a poor prognosis and therefore should be treated with newly available anti-arrhythmic drugs like lidocaine. However, this assumption regarding PVCs was proven incorrect when the issue was formally studied years later—after many patients were exposed to unjustified risks of these potent intravenous medications.[20]

Not only is the intervention bias clearly at play when clinicians are confronted with new, abnormal, and ambiguous data, but another form of bias also contributes in a significant way: the negativity bias. Negativity bias refers to the tendency of humans to give disproportionate weight to anything which might be perceived as dangerous.[21] This bias probably conferred a survival advantage to our ancestors who assumed an unexpected rustling represented a hazard compared to those who ignored such possibility of peril.[22] This neurotic hypervigilance does, in fact, offer some protection against catastrophe, even if it is at the expense of peace of mind. A compulsion for certainty about the lack of danger when presented with ambiguous data, however, can quickly become a liability.

Indication Creep's Role

A relatively small subset of the potential clinical questions in medicine have been answered definitively–the value of aspirin for secondary prevention of myocardial infarction is one example. However, what about the healthy 45-year-old man sitting in front of you who's concerned because his father died of a heart attack? Would 81mg of aspirin a day be a good thing for him? The data is less clear.[23] Yet, we face these clinical conundrums continuously. This is where indication creep–extrapolating that testing or treatment proven beneficial in one group of patients will benefit a related, but separate group of patients–begins to influence our care.

Many factors predict the likelihood of indication creep, but perhaps the most impactful are affordability and accessibility. Let's focus on how these factors impact the use of diagnostic testing. Pulmonary embolism (PE) is a common consideration in a variety of acute presentations. Before the 1990s, testing for PE involved invasive pulmonary angiography or the use of the inconvenient and unreliable ventilation-perfusion scan. However, as computed tomography pulmonary angiography (CT-PA) became increasingly available, the use of this imaging study increased dramatically.[24,25] Ironically, despite increased testing and detection in the era of CT-PA, overall mortality related to PE has not correspondingly improved.[26] Indication creep, in this instance, has been facilitated through increasingly frictionless access

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to CT-PA. Consequently, we've exposed lower and lower risk patients to large amounts of diagnostic radiation and questionably necessary anticoagulation and hospitalization (and, of course, worry) associated with the increasing number of irrelevant incidental findings and false positives.

The Hidden Cost of Higher Sensitivity

The rise in CT-PA use corresponding to increased diagnoses of small (ie, subsegmental) PEs also points to the final important factor contributing to the data problem we're discussing. Increasing the sensitivity of any test will not only decrease the rate of false negatives (the goal) but also, by mathematical law, necessarily increase the rate of false positives as well (the unintended consequence).[27] While optimizing for sensitivity to avoid missing diagnoses is prioritized by clinicians and patients alike for various psychological reasons, we are less inclined to appreciate the dangers of false positives until they are staring us in the face.

Perhaps nowhere is this phenomenon more apparent than in the practice of whole-body MRI for cancer screening. Patients, often those afflicted with HDOD, pursue this form of MRI imaging to allay anxieties about their health under the auspices of being proactive. However, incidental findings, which are rarely of clinical significance, are discovered with tragic frequency.[28,29] The same negativity bias that compels patients to undergo highly sensitive whole-body imaging in an effort to "miss nothing," usually will then compel those same patients to undergo invasive biopsy.

HDOD is a complex and novel problem that emerges from maladaptive psychological idiosyncrasies, advances in diagnostic technology, and elaborate direct-to-consumer marketing campaigns for health data monitoring devices. However, by labeling the issue, we take the necessary first step in mitigating its effects on the unsuspecting patients, like Thomas, who seek our assistance at the inevitable moments of perceived crisis. ■

References

1. Grand View Research. Pulse Oximeter Market Size, Share & Trends Analysis Report By Product (Handheld, Fingertip), By Type, By Age Group, By End-use, By Region, And Segment Forecasts, 2023 - 2030. Grand View Research. Accessed October 28, 2024. https://www.grandviewresearch.com/industry-analysis/pulse-oximeter-market
2. Grand View Research. Fitness Tracker Market Size, Share & Trends Analysis Report By Device (Smart Watches, Fitness Bands), By Display Type, By Compatibility, By Distribution Channel, By Application, By Region, And Segment Forecasts, 2023 - 2030. Grand View Research. Accessed October 28, 2024. https://www.grandviewresearch.com/industry-analysis/fitness-tracker-market
3. Klonoff DC, Nguyen KT, Xu NY, Gutierrez A, Espinoza JC, Vidmar AP. Use of Continuous Glucose Monitors by People Without Diabetes: An Idea Whose Time Has Come? *J Diabetes Sci Technol.* 2023;17(6):1686-1697. doi:10.1177/19322968221110830
4. Cramer P. Understanding Defense Mechanisms. *Psychodyn Psychiatry.* 2015 Dec;43(4):523-52
5. Cariola L. Intellectualization (Defense Mechanism). In: Zeigler-Hill, V., Shackelford, T. (eds) Encyclopedia of Personality and Individual Differences. Springer, Cham. 2020. https://doi.org/10.1007/978-3-319-28099-8_1389-2
6. Born KB, Levinson W. Choosing Wisely campaigns globally: A shared approach to tackling the problem of overuse in healthcare. *J Gen Fam Med.* 2018;20(1):9-12. doi:10.1002/jgf2.225
7. Deloitte Insights. Trends in the diagnostic industry. Deloitte. Published 2023. Accessed October 28, 2024. https://www2.deloitte.com/us/en/insights/industry/health-care/diagnostics-industry-trends.html
8. Bhattacharya K. Takuo Aoyagi-a Tribute to the Brain Behind Pulse Oximetry. *Indian J Surg.* 2020;82(6):1332-1333. doi:10.1007/s12262-020-02365-x
9. Hirsch IB. Introduction: History of Glucose Monitoring. Role of Continuous Glucose Monitoring in Diabetes Treatment. Arlington (VA): American Diabetes Association; 2018 Aug. Available from: https://www.ncbi.nlm.nih.gov/books/NBK538968/ doi: 10.2337/db20181-1
10. Ratnani I, Fatima S, Abid MM, Surani Z, Surani S. Evidence-Based Medicine: History, Review, Criticisms, and Pitfalls. *Cureus*. 2023;15(2):e35266. doi:10.7759/cureus.35266
11. Shah S, Majmudar K, Stein A, Gupta N, Suppes S, Karamanis M, et al. Novel Use of Home Pulse Oximetry Monitoring in COVID-19 Patients Discharged From the Emergency Department Identifies Need for Hospitalization. *Acad Emerg Med.* 2020;27(8):681–692. doi: 10.1111/acem.14053.
12. Wasserlauf J, Vogel K, Whisler C, et al. Accuracy of the Apple watch for detection of AF: A multicenter experience. *J Cardiovasc Electrophysiol.* 2023;34(5):1103-1107. doi:10.1111/jce.15892
13. Riddlesworth T, Price D, Cohen N, Beck RW. Hypoglycemic Event Frequency and the Effect of Continuous Glucose Monitoring in Adults with Type 1 Diabetes Using Multiple Daily Insulin Injections. *Diabetes Ther.* 2017;8(4):947-951. doi:10.1007/s13300-017-0281-4
14. Kasch R, et al. Association of Lumbar MRI Findings with Current and Future Back Pain in a Population-based Cohort Study. *SPINE.* 2022; 47(3):p 201-21. doi: 10.1097/BRS.0000000000004198
15. Swap CJ, Nagurney JT. Value and Limitations of Chest Pain History in the Evaluation of Patients With Suspected Acute Coronary Syndromes. *JAMA*. 2005;294(20):2623–2629. doi:10.1001/jama.294.20.2623
16. Russell J. 'As Little as Necessary…' A Mantra for Urgent Care. *J Urgent Care Med.* 2024; 18(9).
17. Foy AJ, Filippone EJ. The case for intervention bias in the practice of medicine. *Yale J Biol Med.* 2013;86(2):271-280. Published 2013 Jun 13.
18. Jacobs JC, Jarvik JG, Chou R, et al. Observational Study of the Downstream Consequences of Inappropriate MRI of the Lumbar Spine. *J Gen Intern Med.* 2020;35(12):3605-3612. doi:10.1007/s11606-020-06181-7
19. United States Preventive Services Task Force. Prostate Cancer: Screening. US Preventive Services Task Force. Published 2018. Accessed October 28, 2024. https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/prostate-cancer-screening
20. Prasad V, Cifu A. Medical reversal: why we must raise the bar before adopting new technologies. *Yale J Biol Med.* 2011;84(4):471-478.
21. Kahneman D. Tversky A. Prospect Theory: An Analysis of Decision under Risk. Econometrica. 1979; 47 (2): 263–291.
22. Norris CJ. The negativity bias, revisited: Evidence from neuroscience measures and an individual differences approach. *Soc Neurosci.* 2021;16(1):68-82. doi:10.1080/17470919.2019.1696225
23. Lin et al. Rethinking Aspirin for the Primary Prevention of Cardiovascular Disease. *Am Fam Physician.* 2019;99(11):670-671
24. Higashiya K, Ford J, Yoon HC. Variation in Positivity Rates of Computed Tomography Pulmonary Angiograms for the Evaluation of Acute Pulmonary Embolism Among Emergency Department Physicians. *Perm J.* 2022;26(1):58-63. Published 2022 Apr 5. doi:10.7812/TPP/21.019
25. Molaee S, Ghanaati H, Safavi E, Foroumandi M, Peiman S. Computed Tomography Pulmonary Angiography for Evaluation of Patients With Suspected Pulmonary Embolism: Use or Overuse. *Iran J Radiol.* 2015;12(3):e22383. doi:10.5812/iranjradiol.12(2)2015.22383
26. Wiener et al. Time Trends in Pulmonary Embolism in the United States: Evidence of Overdiagnosis *Arch Intern Med.* 2011;171(9):831-837. doi:10.1001/archinternmed.2011.178
27. Bentley TG, Catanzaro A, Ganiats TG. Implications of the impact of prevalence on test thresholds and outcomes: lessons from tuberculosis. *BMC Res Notes.* 5, 563 (2012). https://doi.org/10.1186/1756-0500-5-563
28. Kwee RM, Kwee TC. Whole-body MRI for preventive health screening: A systematic review of the literature. *J Magn Reson Imaging*. 2019;50(5):1489-1503. doi:10.1002/jmri.26736
29. Richter A, Sierocinski E, Singer S, et al. The effects of incidental findings from whole-body MRI on the frequency of biopsies and detected malignancies or benign conditions in a general population cohort study. *Eur J Epidemiol.* 2020;35(10):925-935. doi:10.1007/s10654-020-00679-4

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QUALITY EVOLUTION

Community

Lou Ellen Horwitz, MA

Every time I am able to gather in person with other Urgent Care professionals, I come away enriched and invigorated for the future of our practice. No matter the challenges that we may be facing as an industry or a specialty, there is a stubborn optimism that infuses these events and the people that participate as speakers, exhibitors, planners or attendees. These events are perfect examples of what the Urgent Care Association (UCA) stands for, which I described in last month's column: We Commit, We Collaborate, We Advance.

In September, October, and November, I was honored to join UCA's Chapters—the North East Regional Urgent Care Association (NERUCA), the Southeast Regional Urgent Care Association (SERUCA), and the California Urgent Care Association (CalUCA)—for their annual conferences. Each one of them was a thoughtfully curated experience tailored to local needs that also kept an eye on the national stage. These smaller meetings allow for deep conversations about regional issues, hands-on learning for clinicians, and the great networking and exhibits you have come to count on at the UCA Urgent Care Convention. The shorter timeframe and lesser travel also make them ideal for sending team members who cannot get away for the national Convention. If you have never attended a Chapter conference, I strongly suggest you plan on it for next year in addition to joining UCA in Dallas, May 3-6, 2025.

Speaking of Dallas, registration will be open by the time you read this! The team has been hard at work creating something special and unique for you to enjoy, and we'll look forward to seeing everyone in May at the gorgeous Hilton Anatole for the Convention and Foundation Celebration. Register early and tell your friends!

As I write my December columns, I always look back at the previous December to see where we ended that year and evaluate what progress we've made. Last year's column focused on work that was underway in our Commission on Diversity to create a new commitment statement and Commendation for our Certification and Accreditation programs. As you look around your centers, do you see an environment that's more welcoming to all than it was a year ago? I hope you do. In 2025, we'll be launching that new Commendation and look forward to awarding it often.

We have other grand plans for 2025 that should directly benefit your clinical practice and operations, and we want you to be part of those plans. If you'd like to solve your staffing challenges, have better benchmark data for negotiating with payers, or improve the recognition of the value of what you do, we have ways to make that happen.

The Urgent Care Association and the Urgent Care Foundation will both be running end-of-year fundraising campaigns to make sure we can continue our work to change legislation that's holding you back, create new payment structures to get you paid more fairly, and fund research to establish Urgent Care as a recognized specialty. I hope that when you get the "call to action" to support us that you will look around at your workplace challenges and be moved to contribute to our efforts to fix them together.

To close out this year, it's also time to congratulate our colleagues at the Urgent Care College of Physicians and College of Urgent Care Medicine. Their tireless efforts to find creative ways to represent the value of all clinicians practicing Urgent Care medicine have resulted in 2 excellent, collaborative organizations. The good news coming from the clinical corners of our world is just getting started.

It's been a year of accomplishments for Urgent Care. Momentum is starting to build and spread, and I know there is more to come in 2025 and beyond. As we head into the new year, we look forward to sharing all of the happenings together and continuing to be inspired by all of you every day. If you aren't yet a member of UCA, please make 2025 the year that you join us and be a part of the great collective evolution of Urgent Care into the future. ■

Lou Ellen Horwitz, MA is the chief executive officer of the Urgent Care Association.

CONTINUING MEDICAL EDUCATION

Release Date: December 1, 2024
Expiration Date: November 30, 2025

Target Audience
This continuing medical education (CME) program is intended for urgent care physicians, primary-care physicians, resident physicians, nurse-practitioners, and physician assistants currently practicing, or seeking proficiency in, urgent care medicine.

Learning Objectives
1. To provide best practice recommendations for the diagnosis and treatment of common conditions seen in urgent care
2. To review clinical guidelines wherever applicable and discuss their relevancy and utility in the urgent care setting
3. To provide unbiased, expert advice regarding the management and operational success of urgent care practices
4. To support content and recommendations with evidence and literature references rather than personal opinion

Accreditation Statement
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- **Alan A. Ayers, MBA, MAcc**
  Member reported no financial interest relevant to this activity.
- **Steve Weinman, MSc, RN, CEN, TCRN**
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CONTINUING MEDICAL EDUCATION

JUCM CME subscribers can submit responses for CME credit at **UrgentCareCME.com**. Post-test questions are featured below for your convenience. This issue is approved for up to *3 AMA PRA Category 1 Credits™*. Credits may be claimed for 1 year from the date of this issue.

Urgent Care Diagnosis and Management of Midshaft Ulnar (Nightstick) Fractures (page 23)

1. **What imaging is recommended for evaluation of midshaft ulnar fractures?**
   a. X-ray series including wrist and/or elbow
   b. Computed tomography
   c. Magnetic resonance imaging
   d. No imaging is required

2. **Which option is appropriate for midshaft ulnar fractures presenting to urgent care?**
   a. Modified ulnar gutter slab and sling
   b. Sugar tong splint
   c. Muenster orthosis
   d. All of the above

3. **Which of these is typically not a strong indicator for immediate emergency department referral for midshaft ulnar fractures?**
   a. Instability of either the wrist or elbow joint
   b. Pain that worsens with movement of the wrist
   c. Concerns for possible compartment syndrome
   d. Evidence of neurovascular compromise

Urgent Care Assessment of Patients with Possible Diverticulitis (page 29)

1. **Which of these may increase the incidence of diverticulitis?**
   a. Age 60 years or older
   b. Low-fiber diet
   c. Obesity
   d. All of the above

2. **Which of these may be present in cases of complicated diverticulitis?**
   a. Abscess
   b. Perforation
   c. Phlegmon
   d. All of the above

3. **Which severity classification system is most often used for acute diverticulitis?**
   a. Hinchey Scale
   b. Heathrow Scale
   c. ICD-10 Scale
   d. MIS-C Scale

Abdominal Pseudohernia and Urinary Retention Due to Spinal Nerve Root Compression From Disc Herniation: A Case Report (page 37)

1. **What clinical resolution is typical for patients with acute atraumatic back pain?**
   a. Resolution without intervention
   b. Resolution with surgical intervention
   c. Resolution with opioids for 5-7 days
   d. Resolution with immobilization for 10-12 days

2. **Which of these is not a known etiology for abdominal pseudohernia?**
   a. Herpes zoster
   b. Diabetic neuropathy
   c. Rib fracture
   d. End stage renal disease

3. **It's worthwhile to include abdominal pseudohernia in the differential diagnosis when patients present with which of these?**
   a. Shortness of breath
   b. Abdominal bulging
   c. Previous abdominal hernia
   d. Fracture of the femur

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Rural Urgent Care Growth Continues, But Challenges Remain

Urgent Message: Rural urgent care is the industry's fastest growing segment, influenced by rural primary care shortages, hospital closures and extended ED wait times, but operational staffing and reimbursement complexities must be navigated.

Alan A. Ayers, MBA, MAcc

Citation: Ayers A. Rural Urgent Care Grows, But Challenges Remain. *J Urgent Care Med.* 2024; 19(3): 17-21

As access to care in rural areas continues to decline, urgent care (UC) can play a pivotal role in the market to fill that gap. Many rural hospitals are facing financial strain as well as pressure to consolidate with larger urban healthcare systems, while the need for accessible alternatives such as urgent care is greater than ever.[1]

Today, rural UC is the fastest-growing and perhaps most operationally complex of all geographic segments—a fact previously outlined in the December 2019 edition of *JUCM*.[2] Understanding the underlying dynamics of rural healthcare provides essential context that may help UC operators successfully navigate expansion into these underserved areas.

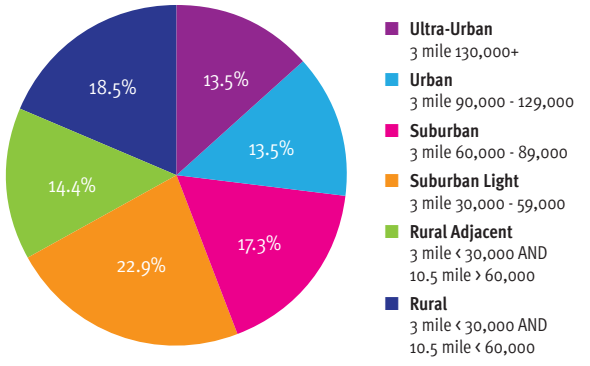
Fastest-Growing Segment of Urgent Care

When considering localities, "rural" areas (in which fewer than 30,000 people live in a 3-mile radius, and fewer than 60,000 people live in a 10-mile radius) and "rural adjacent" areas (in which fewer than 30,000 people live in a 3-mile radius, but more than 60,000 live in a 10-mile radius) collectively comprise 32% of all UC centers, according to National Urgent Care Realty (**Figure 1**). The rural segments are second only to "suburban" settings (areas in which 60,000 to 89,000 people live in a 3-mile radius).

Rural UC is an enticing go-to-market strategy, and data from National Urgent Care Realty reveals the 10 largest non-hospital operators that are embracing this approach (**Figure 2**). Notably, the data also shows that rural UC is the fastest-growing segment among all settings, accounting for 26% of new rooftops in 2024 (**Figure 3**). Overall this year, rural UC is adding rooftops 40% faster than suburban areas through June 2024, while urban growth is flat. Despite this surge, forecasts suggest that 2025 will see a modest slowdown in the rural segment as urban growth accelerates (**Figure 4**).

Author affiliations: Alan A. Ayers, MBA, MAcc, is President of Urgent Consultants and is Senior Editor of *The Journal of Urgent Care Medicine*.

Figure 1. Urgent Care Centers By Population Density



Source: National Urgent Care Realty, July 2024

Rural America's Access Crisis

Over the past decade, more than 100 rural hospitals have closed, leaving residents with fewer options for care.[3] Beyond that, more than 700 rural hospitals currently are at risk of closing because of serious financial distress, according to the Center for Healthcare Quality & Payment Reform.[3]

A separate study by health analytics and consulting firm Chartis found that half of rural hospitals in the United States lost money last year—an increase from 43% the year prior.[1] This trend disproportionately affects states like West Virginia, Alabama, Mississippi, and Ohio, where between one-third and one-half of rural hospitals are at risk of closing.[1]

As urban health systems expand their reach and pull resources away from small community hospitals, the access imbalance grows. Larger health systems have acquired many rural hospitals in recent years, and the effect the transactions have had on quality, services, prices, or closure of clinical specialties remains unclear, according to the Kaiser Family Foundation.[4]

Rather than offering a full slate of services in rural communities, urban healthcare networks tend to focus on primary care outposts that can refer rural patients to urban locations for specialty care when needed. In West Virginia, for example, the specialty needs of large segments of the population are served by academic medical centers 3-4 hours away in Columbus, Ohio. The distance may create hardship for families in terms of transportation, child care, and time off work, for example.

As urban healthcare networks grow, their rural community counterparts may have fewer strategic options for timely, comprehensive care. Telemedicine is often touted as a solution, but many health services require in-person visits, especially for urgent needs.

For urgent care developers, the widening gap between urban and rural healthcare presents an opportunity. By establishing new UC centers in rural areas, it's possible to fill some of the void left by struggling or shuttered community hospitals. Providing essential services and reducing residents' need to travel long distances positions urgent care as a cornerstone of healthcare delivery in these underserved areas.

Challenges for Rural Urgent Care

While rural UC is well-positioned to fill a crucial healthcare gap, staffing shortages—particularly for x-ray technicians—and the loss of scale economies are among the major operational obstacles.

For example, Ohio law mandates that x-rays may only be captured by a certified radiology technologist (RT) or a general x-ray machine operator (GXMO). RTs

Figure 2. Largest Rural Urgent Care Operators, 2024

Operating Platform	Private Equity Investor(s)	Center Count
Fast Pace Health	Revelstoke	269
Community Care Partners	Shore Capital Partners	99
Urgent Team	Petra, Crestline	82
Access Medical	(None)	62
Xpress Wellness	Goldman Sachs	61
MainStreet Family Urgent Care	Trinity Hunt Partners	58
ConvenientMD	Bain Double Impact	42
Carolina QuickCare, Low Country UC	Rock Oak Capital Partners	39
Emergence Health Holdings	Iron Path Partners	32
Med First Urgent Care & Family Practice	Sverica International	27

Source: National Urgent Care Realty, September 16, 2024

Figure 3. New Urgent Care Rooftops, 2024

	Percent of Centers			
	Average Trade Area Population	Existing Centers	2024 De Novos	2024 De Novo Rate*
Rural	27,209	17%	26%	10.0%
Rural Adjacent	41,881	14%	13%	6.0%
Suburban	73,058	17%	16%	6.2%
Suburban Light	95,386	23%	19%	5.5%
Ultra Urban	155,477	15%	13%	5.6%
Urban	105,557	13%	13%	6.5%

*Annualized. National Average is 6.6%. Source: 2024 National Urgent Care Realty Data through June 2024

Figure 4. Urgent Care Openings, Additions, Planned Openings, 2024

	Openings Net of Closures	Percent of Net Additions	Percent of Planned Openings
Rural	1.40%	55%	23%
Suburban	1.00%	48%	46%
Urban	-0.10%	-3%	31%

Source: 2024 National Urgent Care Realty Data through June 2024

hold an associate's degree and must pass an American Registry of Radiologic Technologists exam. With typical centers performing as few as 3 x-rays per day, RTs might be expected to take on medical assisting or administrative tasks, making urgent care a less attractive career setting for them. Ohio GXMOs, meanwhile, must work under the direct supervision of an on-site physician. Yet, over 85% of urgent care visits today are delivered in a center that doesn't have a physician routinely present, limiting the options for GXMOs, thus reducing the availability of x-ray services.

One-third of rural counties in Ohio lack access to after-hours x-ray services outside of emergency departments (EDs), so an urgent care that is able to provide x-rays after-hours would be an important resource that offers value to the community (**Figure 5**). Rural urgent care centers across the United States could help address not only everyday access issues if adequately staffed but also the after-hours access challenges as well.

Rural urgent care started gaining traction in Southeastern states like Tennessee, Alabama, and Georgia before expanding through Kentucky, Indiana, and the Midwest. As the market growth moves westward into Texas and beyond, scale economies become more challenging to maintain in states with larger geographic spreads of rural landscapes.

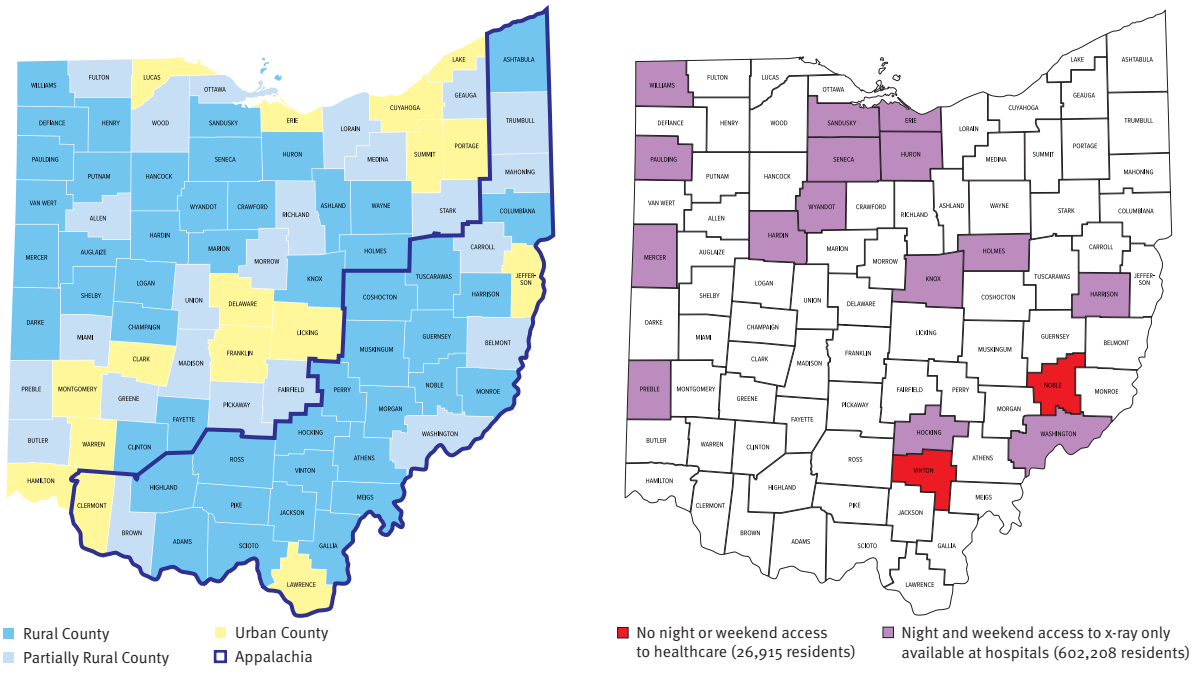
In states like Ohio and South Carolina, county seats are typically 30 to 45 minutes apart, which enables sharing of staff and makes staffing urgent care centers from the suburbs of larger cities like Columbus or Charlotte feasible. However, in regions like West Texas and the Great Plains, towns can be 100 miles apart, making it especially difficult to ask staff to travel that far to cover resource shortages among other centers in the network. Without the benefit of a regional staffing pool, these more remote centers are vulnerable to unexpected closures when key staff members are unavailable due to turnover, illness, or paid time-off. This loss of scale makes rural urgent care operations riskier as the model moves into more sparsely populated regions.

"Rural urgent care started gaining traction in Southeastern states like Tennessee, Alabama, and Georgia before expanding through Kentucky, Indiana, and the Midwest."

Higher Reimbursement With a Catch

According to Experity data, 83% of urgent care centers bill as Place of Service 20 (POS 20, urgent care center), 11% bill as POS 11 (primary care provider office), and

Figure 5. Rural Ohio Counties, Access to After-Hours X-Ray Services



Source: Counties designated as rural, partially rural, or urban under definition used by the Federal Office of Rural Health Policy, 9/2009

just 2% bill as POS 72 (rural health clinic). Although an urgent care center in a rural area can be contracted and bill as any of the 3, only a federally designated Rural Health Clinic (RHC) may bill its services under POS 72. The RHC designation can offer adjusted revenue for clinics in underserved rural areas—albeit with a few drawbacks. Along with completing an on-site inspection, which requires adherence to operational standards, organizational functions, and processes, to qualify for RHC status, a clinic must be:

- Located in a state-designated Medically Underserved Area
- Owned by a provider or provider entity
- Staffed by nurse practitioners or physician assistants more than 50% of the time
- Intended as access for Medicare and Medicaid patients (but can still see commercial populations)[5]

A Centers for Medicare & Medicaid Services (CMS) policy enacted in 2021 gradually increases per-visit Medicare rates for RHCs from $100 in 2021 to $139 in 2024, eventually reaching $190 in 2028. While this promise of increasing reimbursement may be enticing, it has several important caveats.

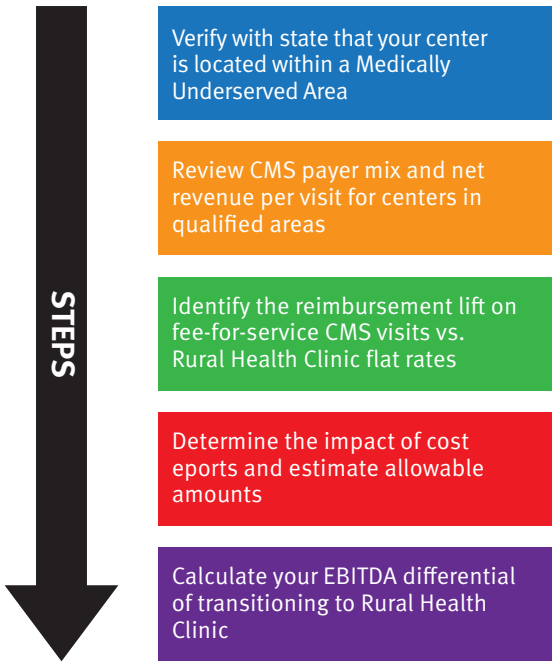
The RHC reimbursement is effectually an all-inclusive rate, but it also functions like a cost-plus model from the standpoint that Medicare reimbursement is determined by a cost report—a summary of allowable expenses that must be filed by the provider annually.

Unlike private insurance "case rates," the cost report does enable the RHC to recapture some losses due to bad debt and the added costs of preventive care and wellness screenings typically not reimbursed in UC. Even so, withholds and claw-backs can occur. Because payment is the lesser of actual cost or the CMS rate (the "limit"), many RHCs actually lose money on Medicare patients.

The challenges associated with RHC designation include:

- **Complex billing requirements:** RHCs must handle split billing on UB04 forms for RHC services and CMS1500 for commercial claims, increasing the administrative workload.
- **Upgraded point-of-care lab capabilities:** Clinics must invest in upgraded lab equipment to perform "moderately complex" tests on-site, such as metabolic panels, which can be a significant financial burden not just in start-up costs but also in ongoing maintenance.
- **Cost reporting and reconciliation:** RHC reimbursement is tied to the clinic's annual cost report. While this allows clinics to recapture some costs related to bad debt and added preventive care, it

Figure 6. Rural Health Clinic Model Evaluation



Source: Urgent Care Consultants

doesn't guarantee financial sustainability or surplus.

For urgent care centers—where volume and efficiency have long been the key to profitability—the RHC model presents a paradox. Considering 85% of costs (including labor) are fixed, profits in UC are driven by throughput and efficiency. By contrast, RHC cost reconciliation disincentivizes high efficiency and throughput, instead rewarding cost maximization to reach the prescribed limit.

Urgent care owners must be diligent about these factors and the associated billing complexities to ensure financial stability (**Figure 6**).

"The continued growth of rural urgent care will be a function of the risks and opportunities within rural healthcare markets."

ED Wait Times Drive UC Volume

An analysis conducted for *JUCM* recently found that nearby hospitals can have an impact on rural UC performance. Urgent Care Consultants experts examined a sample of 93 urgent care centers across 4 primarily rural states. They compared 2023 urgent care metrics from Experity EMR data (visit volume, visit time length, net promoter score, and average patient age) to published CMS data for the nearest hospital ED. Psychiatric hospitals, children's hospitals, and specialty facilities were eliminated from the dataset, and the next-closest general hospital was considered.

The average wait time in the ED was the most significant correlation in the data. When patients have an extended wait time in the ED, they are more likely to leave and seek care elsewhere. What the data analysis revealed in effect is that when the ED length of stay was longer, the incidence of patients leaving the ED without being seen was higher, and when an urgent care center was close by, those urgent cares saw greater patient volumes. Notably, while ED wait time was the greatest driver of patients leaving without being seen, distance to the nearest urgent care was the second most impactful factor.

Practical Implications for Urgent Care

There are many factors to assess for UC operators considering rural site selection. RHC eligibility, staffing availability, and ED wait times at nearby hospitals significantly influence a center's prospects for success.

The continued growth of rural urgent care will be a function of the risks and opportunities within rural healthcare markets. In addition, growth could easily reach a tipping point as rural locations inch closer to saturation. By focusing on efficient operations, strategic site selection, and local healthcare dynamics, rural urgent care centers can thrive in today's evolving healthcare landscape. ■

References

1. Chartis website. Unrelenting Pressure Pushes Rural Safety Net Crisis into Uncharted Territory. February 15, 2024. Accessed at: https://www.chartis.com/sites/default/files/documents/chartis_rural_study_pressure_pushes_rural_safety_net_crisis_into_uncharted_territory_feb_15_2024_fnl.pdf.
2. Ayers A. Rural and Tertiary Markets: The Next Urgent Care Frontier. *J Urgent Care Med.* 2019;14(3):34-39. Accessed at: https://www.jucm.com/rural-and-tertiary-markets-the-next-urgent-care-frontier/.
3. Center for Healthcare Quality & Payment Reform website. Rural Hospitals at Risk of Closing. July 2024. Accessed at https://chqpr.org/downloads/Rural_Hospitals_at_Risk_of_Closing.pdf
4. Kaiser Family Foundation website. Ten Things to Know About Consolidation in Health Care Provider Markets. April 19, 2024. Accessed at: https://www.kff.org/health-costs/issue-brief/ten-things-to-know-about-consolidation-in-health-care-provider-markets/
5. Centers for Medicare & Medicaid Services website. State Operations Manual Appendix G - Guidance for Surveyors: Rural Health Clinics (RHCs). June 7, 2024. Accessed at: https://www.cms.gov/files/document/appendix-g-state-operations-manual.

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Urgent Care Diagnosis and Management of Midshaft Ulnar (Nightstick) Fractures

Urgent Message: Fractures of the midshaft ulna, commonly referred to as "nightstick fractures," typically occur after direct injury to a forearm outstretched above the head as a protective mechanism. Evaluation includes inquiry into the circumstances of the assault, assessment for any other areas of trauma, examination of the skin, wrist and elbow joints, and radiography of the forearm. Management of closed, nondisplaced midshaft ulnar fractures centers around splint immobilization and arrangement of appropriate follow-up.

Chandrika Janumpalli, BS; William Bradley Strauch, MD

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Clinical Scenario

A healthy, left hand dominant, 14-year-old girl presented to the urgent care (UC) complaining of left forearm pain that started the previous evening after a reported fall. The pain was worsened with movement. She denied any numbness in the hand, wrist, or elbow or any other injuries.

On physical examination, she winced with passive movement of the left arm. There was mild swelling and ecchymoses over the midforearm on the ulnar aspect. There was moderate to severe pain on palpation to this area of bruising and swelling. There were no abrasions, lacerations, or other skin defects. She had no pain with palpation over the left wrist or elbow and the left arm was neurovascularly intact with normal sensation and movement of the hand and fingers as well as strong radial and ulnar pulses.

X-rays (XR) of the forearm were obtained reveaing a midshaft ulnar fracture (**Image 1-2**).

Questions for the Clinician at the Bedside

1. What defines a nightstick fracture?
2. When should a nightstick fracture be suspected?
3. What other considerations are important when a nightstick fracture is identified based on common mechanisms of injury?
4. What physical exam findings are suggestive of nightstick or other types of ulnar fracture?
5. When is same-day closed reduction appropriate and which cases are more likely to require emergency department referral and immediate surgical fixation?

Discussion

Isolated midshaft ulnar shaft fractures are commonly called "nightstick fractures" because historically such fractures were associated with a self-defense reaction to bludgeoning from a truncheon (or nightstick) with an outstretched forearm.[1] Midforearm fractures (not isolated specifically to the midshaft of the ulna) are the third most common type of long bone fracture in chil-

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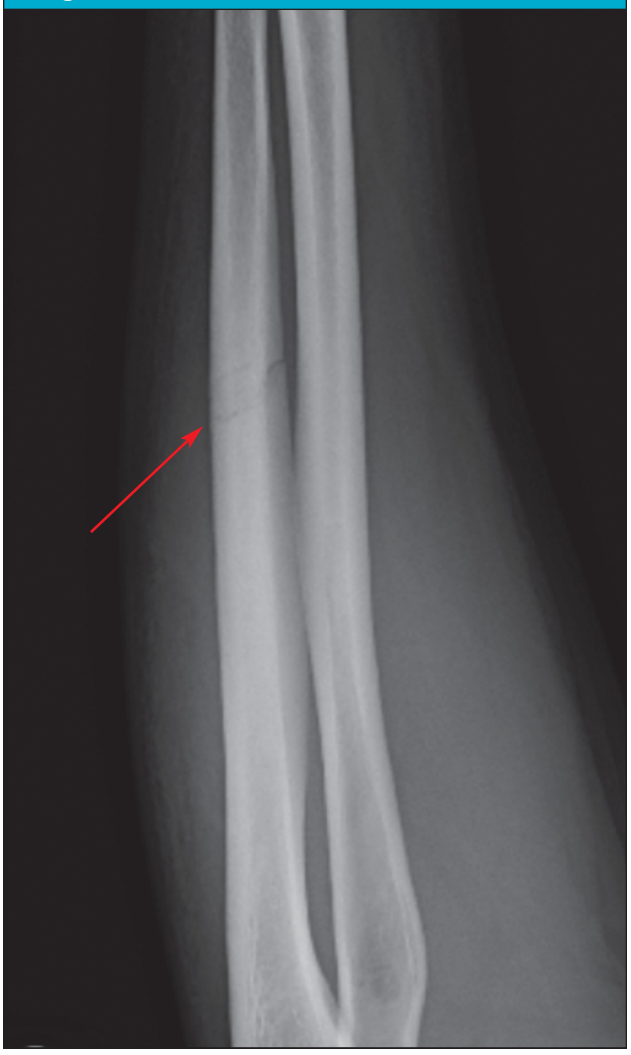
Image 1. Midshaft Ulnar Fracture

Image 2. Midshaft Ulnar Fracture



Images provided by Experity Teleradiology

dren,[2] whereas the forearm is generally the most common site of all pediatric fractures and comprises 17% of fractures in children.[3]

Relevant Forearm Anatomy

The forearm consists of the radius and ulna. Rotation of these bones produces supination and pronation of the hand. The ulna forms an important component of the elbow joint and forms 2 of the 3 main points of articulation that allow for elbow stability: the ulnar-humeral joint and the proximal radio-ulnar joint. It is a component of the wrist joint proximally along with 8 carpal bones and distal radius. The proximal and distal articulation of the ulna are important to evaluate on physical examination to associated injuries beyond nightstick fractures.

Clinical History

Midshaft ulnar fractures commonly occur when the forearm is stretched above the head as a defense mechanism and sustains a direct blow.[4] As this injury pattern is suggestive of self-defense, it is important to explore the potential of assault or abuse and inquire about other areas of pain which may indicate associated injuries also occurred during an assault.

Self-defense against assault, while common, is not the only potential mechanism for nightstick fractures. A 2015 case series of 70 consecutive nightstick fractures found that 57% of midshaft ulnar fractures in adults occurred after motor vehicle accidents (MVA). Falls (13%) were the next most common mechanism, and direct impact comprised only 11% of cases.[5] Little information regarding the etiology of pediatric isolated

midshaft ulnar fractures is available in literature, perhaps due to the rarity. One epidemiological study in the United Kingdom found combined ulna-radius midshaft fractures (not isolated midshaft ulnar) in children under 16 to make up about 5% of all pediatric fractures, with a fall onto a hand stretched outward being the most common etiology.[6]

It is important to inquire about pain either proximal or distal to the ulna to determine likelihood of fracture or dislocation of the elbow or wrist. Inquire with nonjudgmental and open-ended inquiry about the possibility of nonaccidental trauma (NAT), altercation, or intimate partner violence. Additional history gathering should screen for symptoms such as paresthesia or pain out of proportion, which could indicate neurovascular injury or compartment syndrome.

"Additional history gathering should screen for symptoms such as paresthesia or pain out of proportion, which could indicate neurovascular injury or compartment syndrome."

Physical Examination

Perform a standard and stepwise physical exam of the extremity including: inspection, palpation, range of motion (ROM) of the joint proximal and distal, and a neurovascular assessment.

Inspection focuses on examination of the skin for erythema, swelling, lacerations or other skin defects, or ecchymoses. Palpate beginning with the distal extremity (ie, finger and hands) far from area of greatest pain and gradually move toward the area where expected pain would be greatest (ie, the ulnar metaphysis). ROM testing should include active assessment of the movements of the elbow and wrist to determine points of maximum tolerable flexion, extension, supination, pronation, and radial/ulnar deviation. Finally, evaluate neurovascular status including pulses and distal sensation. In the forearm, the ulnar nerve and artery run superficial to the ulna and deep to the flexor carpi ulnaris, but if the pain includes more distal or proximal areas, then it is recommended to assess the radial pulse as well.

Imaging

To evaluate for suspected midshaft ulnar fractures in the UC setting a 3-view XR of the forearm is recommended. Additionally, 3 views of the wrist and/or elbow are recommended if significant pain or tenderness extends to these areas. While the wrist and elbow may be visible in a forearm series, distortion occurs with radiographs as the distance from the center point, or "central ray," increases. Therefore, both the wrist and elbow joint are suboptimally resolved on forearm radiographs.[7] The preferred views for the standard forearm series are lateral, anteroposterior (AP), and oblique.

Management in Urgent Care

UC management of midshaft ulnar fractures includes proper immobilization with a rigid splint and appropriate analgesia. Early mobilization is increasingly preferred, however, it is prudent to treat conservatively in the absences of real-time orthopedic consultation from UC. Orthopedic specialist follow-up should be arranged within 5-7 days.

Splinting to immobilize the forearm should ensure that supination and pronation of the wrist are restricted. This can be achieved with any of the following methods:

1. **Modified ulnar gutter slab and sling:** This splint allows for immobilization of forearm pronation and supination as well as wrist flexion and extension while leaving elbow flexion and extension intact.[8] Preserving elbow motion helps patients maintain activities of daily living.
2. **Sugar tong splint:** This splint is similar to the ulnar gutter slab, however because elbow flexion and extension are also immobilized, there is risk of elbow stiffness and loss of ROM.[8]
3. **Prefabricated or fashioned Muenster orthosis:** This splint/brace is similar to the sugar tong splint but allows for elbow flexion and extension while immobilizing forearm pronation and supination.[9]

Analgesia should be individualized for the patient and their pain severity. The World Health Organization Analgesic Ladder is a reasonable paradigm to use for pain associated with nightstick fractures as it emphasizes sequentially using agents beginning with the safest options.[10] Common oral agents such as acetaminophen and non-steroidal anti-inflammatory drugs can be used alone or in combination. A short duration of opioids may be appropriate based in cases of more severe pain. Non-pharmacologic agents include appropriate immobilization and splint fitting, elevation to reduce swelling, and applying ice to the midulna.

When to Mobilize

To evaluate the practice of early mobilization, Cai et al performed a systematic review of 27 studies with over 1,600 patients with nightstick fractures and found that those managed non-operatively with early mobilization had shorter time to fracture union and lower rates of non-union compared to patients with traditional immobilization.[1] Based on the findings of the review, the authors recommend starting with a below-elbow brace (which as described above could include the modified ulnar gutter slab and sling) for 1-2 weeks before implementing mobilization, however, they do recognize the need for prospective, randomized controlled trials before this can confidently be adopted as a standard of care.[1]

Considerations For Surgical Treatment

A 2008 retrospective case-control study by Coulibaly et al compared outcomes among 70 adults with nightstick fracture after non-operative treatment compared to operative internal fixation (ORIF). In this study, the investigators found that older age, female gender and non-compliance with weight-bearing restrictions were associated with anatomical nonunion or malunion after non-operative treatment, however functional recovery was similar in both treatment groups.[5] Similarly, a 2017 prospective randomized controlled trial by Hussain et al, assigned patients to non-operative treatment (immobilization with above elbow cast for 6 weeks) or ORIF with intramedullary nails or plates and found no effect of age or gender on functional outcomes. However, there was a significantly shorter time to union (13 vs. 18 weeks) in the surgical treatment group.[11] Therefore, in clinical practice, surgical decision making for a nightstick fracture may take into account age and gender of the patient for prevention of anatomical complications.

Necessity of Closed Reduction

Understanding the degree of displacement and/or angulation that is acceptable for various fracture patterns is important for UC clinicians because inadequate initial reductions may increase the need for surgery and adversely affect long-term outcomes.[12] Recommendations for midshaft ulnar fractures suggest that angulation >10 degrees in children >10 years of age can impede forearm rotation, however, in younger patients, up to 20 degrees of angulation and 1cm of shortening is acceptable.[13]

In adults, there is currently no literature supporting necessity of closed reduction of nightstick fractures. Although the prospective study by Hussain et al involved closed reduction of the fracture to less than 50% displacement before applying an above elbow cast, there was not a comparison group with application of cast without reduction, and this study was limited by a small sample size of 30 subjects. Additionally, this study included subjects who presented with the nightstick fracture within 2 weeks of injury, so even if the fracture was initially fixed with closed reduction, immediate timing was not prioritized.[11] Though there are multiple studies that discuss hematoma block to address pain before conducting closed reduction of distal radial fractures and traction as a method to facilitate closed reduction of distal radial fractures, there is no literature supporting effectiveness in the case of a nightstick fracture.[12,14]

"In adults, current evidence does not support the benefit of closed reduction for isolated ulnar shaft fractures; either they are treated conservatively or with ORIF."

Considerations for Emergency Department Referral

Indications for immediate emergency department (ED) referral for urgent orthopedic surgery consultation of midshaft ulnar fractures include the following:[11,15]

- Concerns for possible open fracture
- Instability of either the wrist or elbow joint
- Concerns for possible compartment syndrome
- Evidence of neurovascular compromise
- Fracture of the proximal third of the ulna with associated dislocation of the radial head (ie, Monteggia fracture)

Importantly, a nightstick fracture characterized by less than 50% displacement often will be treated non-operatively.[1]

Next Level Urgent Care Pearls

- Early mobilization (ie, within 2 weeks of injury) is increasingly recommended to optimize outcomes, however, initial full immobilization with a splint is prudent unless UC clinicians have specific guidance otherwise from an orthopedic specialist.
- Consider assault or NAT especially in pediatric patients. If this history is not available from the patient, explore further history with friends, parents, or care-

givers.[16] If the details about the mechanism of injury are not consistent with the characteristics or timing of the injury or with the developmental stage of a child, this should raise suspicion of abuse.[16]

- If the fracture is less than 50% displaced or involves <10 degrees of angulation, splint the patient and help arrange for non-emergent orthopedic follow-up within 5-7 days.
- While many nightstick fractures may be treated surgically in delayed fashion, the only indication for emergent ORIF is an open fracture.
- In adults, current evidence does not support the benefit of closed reduction for isolated ulnar shaft fractures; either they are treated conservatively or with ORIF.
- In pediatrics, closed reduction can be appropriate depending on the patient's age and degree of angulation.

Clinical Scenario Conclusion

The patient's radiographs showed an acute midshaft ulnar fracture. The UC clinician requested an opportunity to speak to the patient with her mother out of the room. At that time, the patient stated that her mother's new boyfriend had assaulted her, and the injury occurred as she protected her head and face with the forearm. The patient was gently splinted without attempts at closed reduction in UC. Child protective services was notified, and the patient was immediately referred with her mother to the nearest pediatric emergency department for further NAT evaluation and assessment of her social situation.

Takeaway Points

- A nightstick fracture is a midulna fracture commonly caused by a protective positioning of the arm in the setting of an assault. Other mechanisms of injury, such as MVA and falls, can also cause this injury pattern and are more common in adults.
- Ensure an adequate history and physical exam is performed to screen for associated injuries.
- A 3-view XR series of the forearm is appropriate initial imaging. If there are concerns for wrist or elbow injury, additional dedicated radiographs are indicated of the joint(s) of concern.
- Initial options for immobilization include a modified ulnar gutter or sugar tong with a sling for arm support.
- Early mobilization (ie, within 2 weeks of fracture) after a brief period of splinting has been shown to improve functional outcomes, namely more rapid fracture union.
- Consider attempting closed reduction in children over 10 years of age if the degree of angulation is >10 degrees or >20 degrees in those under age 10. ■

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References

1. Cai XZ, Yan SG, Giddins G. A systematic review of the non-operative treatment of nightstick fractures of the ulna. *Bone Joint J*. 2013;95-B(7):952-959. doi:10.1302/0301-620X.95B7.31669
2. Bae DS. Pediatric distal radius and forearm fractures. *J Hand Surg Am*. 2008;33(10):1911-1923. doi:10.1016/j.jhsa.2008.10.013
3. Naranje SM, Erali RA, Warner WC Jr, Sawyer JR, Kelly DM. Epidemiology of pediatric fractures presenting to emergency departments in the United States. *J Pediatr Orthop*. 2016;36(4). doi:10.1097/BPO.0000000000000595
4. Handoll HH, Pearce P. Interventions for treating isolated diaphyseal fractures of the ulna in adults. *Cochrane Database Syst Rev*. 2012;2012(6):CD000523. Published 2012 Jun 13. doi:10.1002/14651858.CD000523.pub4
5. Coulibaly MO, Jones CB, Sietsema DL, Schildhauer TA. Results of 70 consecutive ulnar nightstick fractures. *Injury*. 2015;46(7):1359-1366. doi:10.1016/j.injury.2015.02.012
6. Patel A, Li L, Anand A. Systematic review: Functional outcomes and complications of intramedullary nailing versus plate fixation for both-bone diaphyseal forearm fractures in children. *Injury*. 2014;45(8):1135-1143. doi:10.1016/j.injury.2014.04.020
7. Allen CM. Digital Radiographic Exposure: Principles & Practice. University of Missouri; 2022. Accessed August 16, 2022. Chapter 9. https://umsystem.pressbooks.pub/digitalradiographicexposure/chapter/radiographic-angulations
8. Tawonsawatruk T, Phoophiboon P, Kanchanathepsak T, Tuntiyatorn P. Comparative Analysis of Treatment Outcomes: Modified Ulnar Gutter Slab vs. Sugar Tong Slab for Distal Radioulnar Joint Instability Following Triangular Fibrocartilage Complex Repair. *Journal of Clinical Medicine*. 2023; 12(20):6574. https://doi.org/10.3390/jcm12206574
9. Jo YH, Lee MK, Lee YS, et al. Radiographic and clinical outcomes of muenster and sugar tong splints for distal radius fractures: a comparative study. *BMC Musculoskelet Disord*. 2024;25(1):261. Published 2024 Apr 3. doi:10.1186/s12891-024-07362-9
10. Ahmadi A, Bazargan-Hejazi S, Heidari Zadie Z, et al. Pain management in trauma: A review study. *J Inj Violence Res*. 2016;8(2):89-98. doi:10.5249/jivr.v8i2.707
11. Hussain A, Nema SK, Sharma D, Akkilagunta S, Balaji G. Does operative fixation of isolated fractures of ulna shaft result in different outcomes than non-operative management by long arm cast? *J Clin Orthop Trauma*. 2017;9:86-91. doi:10.1016/j.jcot.2017.12.004
12. Handoll HH, Madhok R. Closed reduction methods for treating distal radial fractures in adults. Cochrane Database Syst Rev. 2003;(1). doi:10.1002/14651858.CD003763
13. Patel A, Li L, Anand A. Systematic review: Functional outcomes and complications of intramedullary nailing versus plate fixation for both-bone diaphyseal forearm fractures in children. *Injury*. 2014;45(8):1135-1143. doi:10.1016/ j.injury.2014.04.020
14. Maleitzke T, Plachel F, Fleckenstein FN, Wichlas F, Tsitsilonis S. Haematoma block: a safe method for pre-surgical reduction of distal radius fractures. *Journal of orthopaedic surgery and research*. 2020;*15*(1), 351. https://doi.org/10.1186/s13018-020-01819-y
15. Smith WR, Stahel PF, Suzuki T, Gabrielle P. Musculoskeletal trauma surgery. In: Skinner HB, McMahon PJ, eds. *Current Diagnosis & Treatment in Orthopedics*. 5th ed. The McGraw-Hill Companies; 2014: Chapter 2.
16. Christian CW; Committee on Child Abuse and Neglect, American Academy of Pediatrics. The evaluation of suspected child physical abuse [published correction appears in Pediatrics. 2015 Sep;136(3):583. doi: 10.1542/peds.2015-2010]. *Pediatrics*. 2015;135(5):e1337-e1354. doi:10.1542/peds.2015-0356

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Urgent Care Assessment of Patients with Possible Diverticulitis

Urgent Message: Diverticulitis is a prevalent condition characterized by localized inflammation most commonly of the sigmoid colon. It is often diagnosed with a computed tomography scan with intravenous contrast. Uncomplicated cases are most common and require only monitoring, however complicated cases can require hospitalization and emergent surgical intervention. Urgent care clinicians should be comfortable assessing patients with possible diverticulitis and recognizing features that suggest the possibility of more complicated disease.

Naushair Hussain DO; Shahmeer Hussain DO; Michael Weinstock MD

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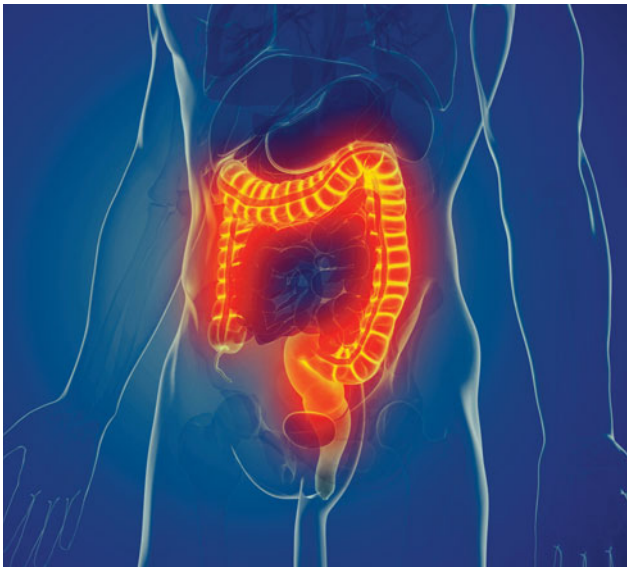
Introduction

The most common presenting symptom of diverticulitis is left lower quadrant abdominal pain, with associated symptoms of fever, nausea, and a change in bowel habits.[1] About 20% of patients who experience diverticulitis will have at least 1 recurrence.[2] The incidence of diverticulitis increased over 60% from 1980-2007,[3] and as management guidelines have become increasingly conservative, the rate of emergent surgical intervention has steeply declined.[2]



Diverticular Disease vs Diverticulosis vs Diverticulitis

Diverticulitis and diverticulosis are related conditions involving diverticula, small herniations that can form in areas of weakness in the muscular layer of the wall of the bowel, most commonly the colon. Diverticulosis refers to the presence of these pouches without inflammation or infection. Diverticulosis is often asymptomatic and may be discovered incidentally during diagnostic tests for other conditions (eg, colonoscopy, computed tomography [CT] scan). In contrast, diverticulitis occurs when these pouches become inflamed or infected, leading to characteristic symptoms.[1] Diverticulosis alone does not require treatment unless complications arise; diverticulitis, however, may necessitate medical intervention, including antibiotics, dietary modifications, and in severe cases, surgery.[1]

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Causes of Diverticular Disease

The pathophysiology of diverticular disease is complex, multifactorial, and incompletely understood. Western nations experience higher rates of diverticular disease, which is hypothesized to be related to dietary factors primarily, such as low fiber intake. This leads to higher intracolonic pressure, which predisposes to herniations of the colonic mucosa through the muscular layer, resulting in the formation of diverticula. Fecal stasis in the colon increases the risk of diverticular inflammation, culminating in diverticulitis.[2] Patients with diets rich in fiber, low in red meat (less than 51g/day), and higher levels of physical activity have lower rates of diverticulitis.[4,5]

While dietary choices influence the likelihood of developing diverticular disease, environmental, microbiome, and genetic factors are also believed to play significant roles with a heightened prevalence of diverticular disease among obese individuals[2] and smokers.[5] This association may be attributed to the inflammatory effects induced by smoking and obesity. Diverticular disease affects men more often than women, and incidence peaks in the 6th decade of life. In elderly populations, diverticulitis becomes more common among women.[2]

Uncomplicated vs Complicated Diverticulitis Disease

It is important to distinguish between complicated and uncomplicated diverticulitis, as treatment differs considerably. Uncomplicated diverticulitis involves localized inflammation, whereas complicated diverticulitis—which represents <15% of cases of acute diverticulitis—involves progression to abscess, perforation, or phlegmon. Late complications include peritonitis, bowel obstruction, and fistulae formation.[6]

Clinical History and Physical Exam

In the urgent care (UC) setting, laboratory testing and advanced imaging is often not available, therefore bedside clinical assessment is important for assessing the likelihood of diverticulitis. Acute diverticulitis often involves a gradual onset of progressive lower abdominal pain.[6] The presence of localized pain solely in the left lower quadrant is the most common symptom of diverticulitis with other possible symptoms including fever, change in bowel habits, and nausea without vomiting.[1]

Additional history gathering should include history of diverticulitis or diverticulosis, therapies attempted prior to evaluation (eg, acetaminophen, non-steroidal anti-inflammatory drugs [NSAIDs] etc.), exacerbating and relieving symptoms, history of past colonoscopy and any relevant findings, and unintentional weight loss. Other potentially helpful information may include comorbid conditions such as immunocompromise, known abdominal aortic aneurysm or history of kidney stones. Dietary habits, history of smoking, and family medical history may also be helpful to discuss.[3]

As with all UC presentations, objective assessment begins with reviewing the patient's vital signs. The presence of fever, hypotension, and/or tachycardia in patients with lower abdominal pain significantly increase the likelihood of complicated diverticulitis.[7] Examination of the abdomen should include inspection for distention, surgical scars, hernias etc. Palpation of the abdomen should assess for areas of focal tenderness. Focal tenderness in the left lower quadrant is the most suggestive physical exam finding with a positive likelihood ratio of 10.4 when present.[6] Presence of peritoneal signs such as rebound tenderness, Rovsing's sign, and/or guarding should raise suspicion for other diagnoses or complicated diverticulitis.[7] A screening genitourinary (GU) examination is also prudent to ensure there are no obvious hernias or other scrotal abnormalities.

Differential Diagnosis for Acute Lower Abdominal Pain

Gastrointestinal[3]

- Bowel obstruction
- Colitis
- Colon cancer
- Appendicitis
- Inflammatory bowel disease
- Irritable bowel syndrome
- Hollow viscus perforation
- Pancreatitis

Gynecologic[3]

- Ectopic pregnancy
- Endometriosis
- Ovarian cyst
- Pelvic inflammatory disease
- Ovarian torsion
- Tubo-ovarian abscess

Vascular[3]

- Abdominal aortic aneurysm

Urinary[3]

- Ureterolithiasis
- Cystitis

Diagnostic Evaluation

The UC assessment focuses on clinical assessment (ie, history and physical). Urinalysis can be helpful if considering GU diagnoses, such as urinary tract infection. Laboratory testing and imaging are not required for the diagnosis if history and exam are strongly suggestive of acute diverticulitis but may occasionally be suggestive

of alternate diagnoses. A complete blood count (CBC), basic metabolic panel, liver function tests, lipase, and/or inflammatory markers can be considered, but it's important to note that these lab tests are neither sensitive or specific for diverticulitis.[6] For example, approximately 45% of patients with diverticulitis will not have leukocytosis[3]. A C-reactive protein (CRP) level can offer some augmentation of clinical assessment. A level exceeding 20mg/dL is suggestive of perforation, and a combination of CRP level above 5mg/dL with isolated left lower quadrant tenderness and absence of vomiting has a specificity of 93-98% for diverticulitis, albeit with a sensitivity of only 37%.[3]

A qualitative urine β-HCG for women of child-bearing age is an easy test and relatively reliable for excluding the possibility of pregnancy, including ectopic.[8] In cases where uncertainty persists or complicated diverticulitis is suspected, immediate imaging is warranted. Intravenous (IV) contrast-enhanced CT is the study of choice and has a sensitivity of 94% and specificity of 99%.[3] Abdominal CT is not only helpful to "rule in" diverticulitis but is also highly sensitive and specific for alternative diagnoses that may require alternate management strategies (eg, appendicitis, ureterolithiasis).[9] Abdominal magnetic resonance imaging (MRI) is an alternative to CT and has similar sensitivity, however, obtaining rapid MRI is often more challenging in most clinical settings.[10] Ultrasound (US) as diagnostic modality relies heavily on the operator's experience, and its ability to assess for free air or the extent of large abscess is limited. Additionally, US is unable to detect other pathologies as readily.[1] In experienced hands, it may be reasonable to get an US if it is the only advanced imaging immediately available, as an emergency department (ED) study demonstrated sensitivity similar to that of CT (90% vs 95%).[9] In cases of inconclusive US, CT is often necessary for patients with concerning signs and symptoms of complicated diverticulitis or other acute abdominal pathology that may necessitate intervention.[9]

Classification of Diverticulitis Based on the Hinchey Scale

The Hinchey Scale has been the most widely utilized severity classification system for acute diverticulitis over the past 30 years.[9] The modified Hinchey classification (**Table 1**), which includes CT findings, such as signs of inflammation, abscess, and perforation, may further help to risk stratify diverticulitis presentations and ensure appropriate treatment.[11] Recommendations for the management of uncomplicated diverticulitis (ie, modified Hinchey stage 0/1a) are for conservative treatment and discretionary use of oral antibiotics based on patient factors (eg, underlying health status, immunocompromise). Importantly, the American Gastroenterological Association (AGA) does not use the Hinchey Scale in their clinical practice guidelines updated in 2021 and favors grading severity from mild to severe. The AGA similarly advocates for selective use of antibiotics in mild, uncomplicated diverticulitis in immunocompetent patients.[1] Complicated cases of diverticulitis, typically falling within modified Hinchey stage 1b-IV, require appropriate antibiotic therapy and often inpatient admission. Procedural intervention depends on evaluation from a surgeon to determine if abscess drainage or exploratory laparoscopic or open laparotomy may be indicated depending on severity of illness, patient factors, and the presence of peritonitis.[12]

Table 1. Modified Hinchey Classification of Diverticulitis[11]

Stage 0: • Patient has mid-clinical diverticulitis, uncomplicated • CT finding shows diverticula with colonic wall thickening
Stage 1A: • Patient has confined pericolic inflammation or phlegmon • CT finding shows pericolic soft tissue changes
Stage 1B: • Patient has a pericolic or mesocolic abscess • CT finding shows changes that are consistent with 1a and a pericolic or mesocolic abscess
Stage 2: • Patient has a pelvic, distant intra-abdominal, or retroperitoneal abscess • CT finding shows 1a changes and distant abscess, usually deep pelvic abscess
Stage 3: • Patient has generalized purulent peritonitis • CT finding shows localized or generalized ascites, pneumoperitoneum, and or peritoneal thickening
Stage 4: • Patient has generalized fecal peritonitis • CT finding will be similar to Stage 3

Red Flag Symptoms

Red flag symptoms of diverticulitis warranting surgical intervention include but are not limited to peritoneal signs indicative of perforation. Additional concerning symptoms may involve fecaluria, pneumaturia, and pyuria, which raise suspicion for a colo-vesical fistula.

Similarly, the presence of stool in the vagina may suggest a potential colo-vaginal fistula.[1]

Management

Uncomplicated Diverticulitis

Patients with uncomplicated acute diverticulitis who can tolerate oral intake should be placed on a clear liquid diet initially and then treated conservatively as outpatients with follow-up arranged within 7 days of diagnosis to ensure condition is improving.[5,9]

Antibiotics have traditionally served as the cornerstone of treatment for patients presenting with acute diverticulitis, whether complicated or not. However, recent research has cast doubt on their necessity, particularly in cases of uncomplicated diverticulitis. Multiple specialty societies, such as the American Society of Colorectal Surgery and AGA, have concluded that there is no obvious improvement in outcomes between patients treated with or without antibiotics.[2,13] In the DIABOLO trial, the long-term effects of managing patients without antibiotics in uncomplicated acute left-sided diverticulitis were assessed after 24 months, finding no difference in rates of recurrent diverticulitis.[9] Similar findings were demonstrated in the Antibiotics Uncomplicated Diverticulitis (AVOD) trial where no difference in long-term outcomes were noted for patients treated with or without antibiotics.[14]

If antibiotic therapy is deemed clinically appropriate by the diagnosing clinician, it is also noteworthy that IV antibiotics have not been shown to be more effective than oral antibiotics, and oral antibiotics offer obvious advantages of decreased cost and outpatient treatment.[9] A small randomized controlled trial comparing oral vs IV therapy with ciprofloxacin and metronidazole for clinically diagnosed uncomplicated diverticulitis showed no difference in resolution with all patients in both groups recovering without complication.[7]

It's important to note that the recommended antibiotic therapies are broad spectrum to cover for gram-negative and anaerobic organisms. Either a fluoroquinolone plus metronidazole or amoxicillin-clavulanate at standard doses for as little as 4 days (or up to 7 days in higher risk patients) is acceptable.[1] Given inherent risks of broad-spectrum antibiotic therapy (eg, *C. difficile* colitis, antibiotic-associated diarrhea) and neurologic toxicities associated with metronidazole and fluoroquinolones, as well as limited evidence of benefit of antibiotic therapy in uncomplicated diverticulitis, it is prudent to prescribe the shortest course of appropriate antibiotics to minimize risk of unnecessary harms.[15,16]

Complicated Diverticulitis

Intra-abdominal abscess formation occurs in 15-40% of patients who present with acute sigmoid diverticulitis.[13] All patients in which there is concern for complicated diverticulitis warrant immediate ED referral. Patients in whom complicated diverticulitis is confirmed are placed on complete bowel rest (NPO) and hydrated with IV fluids.[5] Treatment options differ based on the size of the abscess. In cases where an abscess is >3cm, then antibiotics with image-guided percutaneous drainage is recommended.[13]

Immunocompromised Patients With Acute Diverticulitis

In immunocompromised patients, diverticulitis can become complicated rapidly as these patients are more likely to fail nonoperative treatment.[9] Immunocompromised patients may present with more subtle findings even in complicated cases because of blunted responses to infection and inflammation (eg, fever, signs of peritoneal irritation).[1]

One study examined 5 types of immunocompromised patient populations: chronic corticosteroid users; transplant patients; patients undergoing cancer treatment; patients with chronic kidney disease; and other immunosuppressant treatments. The results demonstrated that immunosuppressed patients had higher rates of emergency surgery and postoperative mortality.[9] Since immunocompromised patients are at higher risk of more subtle and delayed presentation, antibiotic treatment is recommended for these patients, even in apparently mild cases.[9] Caution should be exercised in relying on clinical assessment alone for such patients, and it is appropriate to have a lower threshold to refer these patients to an ED if CT imaging is not immediately available.[1] Additionally, even in cases of mild or uncomplicated diverticulitis, the duration of antibiotic therapy recommended is longer (10-14 days), albeit similar agents can be used to ensure gram-negative and anaerobic coverage.[1]

Evaluation After Recovery From Acute Diverticulitis

The AGA best practice guidelines from 2021 reiterate the critical nature of colonoscopy after many cases of diverticulitis.[1] Specifically, colonoscopy is recommended following the resolution of any episode of complicated diverticulitis or a first episode of uncomplicated diverticulitis, unless a full, high-quality colonoscopy was done in the prior year.[1] The basis for this recommendation is that occult colonic neoplasms can be mistakenly diagnosed on CT as diverticulitis with relatively high frequency.[1,13] To minimize the risk of procedure-related

perforation, this evaluation is typically scheduled after 6-8 weeks from the acute episode.[1]

Elective Surgery for Recurrent Diverticulitis

In the landscape of diverticulitis management, elective segmental colectomy emerges as a strategy to temper rather than eliminate the risk of recurrence. Though surgical intervention has its merits, and some guidelines do recommend interval elective surgery, there is an emerging sentiment that a more conservative and personal approach may be safer.[1] Insight from longitudinal studies underscores this point, revealing that at the 5-year follow-up interval, recurrent diverticulitis was documented in only 15% of patients who underwent elective surgery, in stark contrast to the 61% recurrence rate observed in those managed nonoperatively.[1] However, despite the intervention, lingering symptoms following recovery from acute diverticulitis persist as a notable concern. Intriguingly, colectomy often falls short in addressing these symptoms, as indicated by findings from 2 separate studies where 22% to 25% of patients continued to grapple with ongoing abdominal discomfort post-surgery.[1] From a UC perspective, clinicians should avoid any specific suggestion that surgery may or may not be appropriate and instead focus on ensuring timely referral to a colorectal surgeon who can outline the risks and benefits for the individual patient.

Diagnostic Case Scenarios

Case 1

- **History and Physical Exam:** A 40-year-old woman presented to UC with 3 days of dull, progressive, crampy left lower quadrant abdominal pain with intermittent episodes of nausea but no vomiting. She denied fever, dysuria or frequency, vaginal bleeding or discharge, blood in the urine or stool. Her past medical history was noncontributory. Her temperature was 37.5°C and heart rate (HR) was 95 beats per minute (bpm). Exam shows localized tenderness in the left lower quadrant with no rebound or guarding.
- **UC Testing:** Her dip urinalysis and urine human chorionic gonadotropin were negative.
- **Diagnosis and Management:** She was diagnosed clinically with uncomplicated acute diverticulitis and was managed with recommendations for a clear liquid diet until pain resolved. Through shared decision making, it was decided to defer antibiotics given the mild nature of her symptoms. She was discharged from the UC with recommendations to follow-up with primary care in a week to monitor for progression and discuss referral for colonoscopy as well as going to the ED for worsening pain or fever.

Case 2

- **History and Physical Exam:** A 55-year-old man with history of prior episodes of diverticulitis presented to UC with 2-3 days of generalized abdominal pain, which had started in the left lower quadrant. He reported nausea without vomiting. His temperature was 38.1°C with a HR of 103 bpm. He appeared uncomfortable, and his abdominal exam revealed moderate to severe generalized tenderness with associated guarding and rebound.
- **Diagnosis and Management:** Due to concern of perforation or abscess, he was referred to the ED, where a CT of the abdomen/pelvis with contrast revealed a 2 cm abscess around the sigmoid colon. He was diagnosed with complicated diverticulitis and started on IV antibiotics. Drainage was not required due to the size of the abscess (<3cm). The patient's pain improved over the next 2 days, and he was discharged on oral antibiotics, plus recommendations to follow up with primary care in 1 week. He had a normal colonoscopy 9 months earlier, and therefore he was not referred to gastroenterology.

Counseling For Patients With Acute Diverticulitis

Constipation and increased colonic intramural pressure contribute significantly to the risk of diverticular formation and diverticulitis.[1] Contrary to prior dogmatic teaching, it does not appear that nuts, seeds, corn, or other forms of fibrous dietary intake contribute to the risk of diverticulitis. Patients should be encouraged that a diet high in natural sources of fiber from fruits, vegetables, and legumes is helpful for reducing recurrence risk.[17] Physical activity, similarly, significantly reduces the risk of diverticulitis recurrence.[18] Patients should be counseled to quit smoking, reduce meat consumption, and attempt to lose weight if these risk factors are present.[1]

Both opioids and NSAIDs increase the risk of diverticulitis recurrence, and as such, acetaminophen is the recommended first line analgesic option for pain management.[1,19] For patients with pain severe enough that acetaminophen offers insufficient analgesia, consider ED referral to ensure that the patient is not suffering from a more complicated episode of diverticulitis or other serious intraabdominal pathology.

"CT imaging with contrast is the study of choice in cases where there is diagnostic uncertainty or concern for complicated disease."

Takeaway Points

- Diverticulitis is a common condition marked by inflammation or infection of small, herniated pouches of mucosa, diverticula, in the colon with incidence increasing with age, low-fiber diet, and microbiome/genetic predispositions.
- Management of diverticulitis centers around identification and risk stratification of acute episodes, identifying patients with signs and symptoms of complicated cases, and appropriate ED referral.
- Patients should be encouraged to adhere to a clear-liquid diet during the acute episode and monitor symptoms closely; counseling to seek immediate ED evaluation for increasing pain and/or fever is important for patients discharged from UC.
- Antibiotics are recommended selectively in patients with immunosuppression or more significant disease. In patients with mild, uncomplicated diverticulitis, antibiotics may be used selectively for a short duration (4-7 days), and risks vs benefits should be discussed with patients, ensuring that the shortest and lowest risk therapies are used when prescribing antibiotics for mild cases.
- Improving long-term outcomes and reducing risk of recurrence relies on counseling to increase dietary fiber intake and physical activity. NSAIDs, opioids, red meat consumption, and obesity all increase the risk of recurrence.
- In more severe/complicated cases, abscess formation, fistulae, or peritonitis may occur requiring surgical intervention.
- CT imaging with contrast is the study of choice in cases where there is diagnostic uncertainty or concern for complicated disease.
- Colonic neoplasms can be misdiagnosed as diverticulitis. Patients with diverticulitis who have not had a colonoscopy in the last year should be referred to a colorectal specialist to determine if colonoscopy and/or elective partial colectomy is indicated after the resolution of the acute episode. ■

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References

1. Peery AF, Shaukat A, Strate LL. AGA Clinical Practice Update on Medical Management of Colonic Diverticulitis: Expert Review. *Gastroenterology*. 2021;160(3):906-911.e1. doi:10.1053/j.gastro.2020.09.059
2. Strate LL, Morris AM. Epidemiology, Pathophysiology, and Treatment of Diverticulitis. *Gastroenterology*. 2019;156(5):1282-1298.e1. doi:10.1053/j.gastro.2018.12.033
3. Bailey J, Dattani S, Jennings A. Diverticular Disease: Rapid Evidence Review. Am Fam Physician. 2022 Aug;106(2) 150-156. PMID: 35977135
4. Garfinkle R, Sabboobeh S, Demian M, Barkun A, Boutros M; Management of Uncomplicated Diverticulitis (MUD) Collaborative. Patient and Physician Preferences for Antibiotics in Acute Uncomplicated Diverticulitis: A Delphi Consensus Process to Generate Noninferiority Margins. *Dis Colon Rectum*. 2021;64(1):119-127. doi:10.1097/DCR.0000000000001815
5. Koprowski MA, Affleck A, Tsikitis VL. Emerging evidence and recent controversies in diverticulitis: a 5-year review. Ann Gastroenterol. 2022 Jan-Feb;35(1):8-16. doi: 10.20524/aog.2021.0677. Epub 2021 Nov 11. PMID: 34987283; PMCID: PMC 8713340.
6. Laméris W, van Randen A, van Gulik TM, et al. A clinical decision rule to establish the diagnosis of acute diverticulitis at the emergency department. *Dis Colon Rectum*. 2010;53(6):896-904.
7. Al-Saadi H, Abdulrasool H, Murphy E. Evaluation of Clinical Assessment in Predicting Complicated Acute Diverticulitis. *Cureus*. 2023;15(2):e34709. Published 2023 Feb 6. doi:10.7759/cureus.34709
8. Larraín D, Caradeux J. *β*-Human Chorionic Gonadotropin Dynamics in Early Gestational Events: A Practical and Updated Reappraisal. *Obstet Gynecol Int*. 2024;2024:8351132. Published 2024 Mar 7. doi:10.1155/2024/8351132
9. Sartelli M, Weber DG, Kluger Y, et al. 2020 update of the WSES guidelines for the management of acute colonic diverticulitis in the emergency setting. *World J Emerg Surg*. 2020;15(1):32. Published 2020 May 7. doi:10.1186/s13017-020-00313-4
10. Jerjen F, Zaidi T, Chan S, et al. Magnetic Resonance Imaging for the diagnosis and management of acute colonic diverticulitis: a review of current and future use. *J Med Radiat Sci*. 2021;68(3):310-319. doi:10.1002/jmrs.458
11. Andeweg CS, Mulder IM, Felt-Bersma RJ, et al. Guidelines of diagnostics and treatment of acute left-sided colonic diverticulitis. *Dig Surg*. 2013;30(4-6):278-292. doi:10.1159/000354035
12. Tochigi T, Kosugi C, Shuto K, Mori M, Hirano A, Koda K. Management of complicated diverticulitis of the colon. *Ann Gastroenterol Surg*. 2017;2(1):22-27. Published 2017 Sep 28. doi:10.1002/ags3.12035
13. Hall J, Hardiman K, Lee S, et al. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Treatment of Left-Sided Colonic Diverticulitis. *Dis Colon Rectum*. 2020;63(6):728-747. doi:10.1097/DCR.0000000000001679
14. American College of Surgeons website. Evolving Approaches to Diverticulitis Give Surgeons a Gut Check in Management Options. Bulletin of the American College of Surgeons. 2023; 108(11). Retrieved from https://www.facs.org/for-medical-professionals/news-publications/news-and-articles/bulletin/2023/november-december-2023-volume-108-issue-11/evolving-approaches-to-diverticulitis-give-surgeons-a-gut-check-in-management-options/
15. Morales D, Pacurariu A, Slattery J, Pinheiro L, McGettigan P, Kurz X. Association Between Peripheral Neuropathy and Exposure to Oral Fluoroquinolone or Amoxicillin-Clavulanate Therapy. *JAMA Neurol.* 2019;76(7):827–833. doi:10.1001/jamaneurol.2019.0887
16. Quickfall D, Daneman N, Dmytriw AA, Juurlink DN. Metronidazole-induced neurotoxicity. *CMAJ*. 2021;193(42):E1630. doi:10.1503/cmaj.201671
17. Strate LL, Liu YL, Syngal S, Aldoori WH, Giovannucci EL. Nut, corn, and popcorn consumption and the incidence of diverticular disease. *JAMA*. 2008;300(8):907-914. doi:10.1001/jama.300.8.907
18. Strate LL, Liu YL, Aldoori WH, Giovannucci EL. Physical activity decreases diverticular complications. *Am J Gastroenterol*. 2009;104(5):1221-1230. doi:10.1038/ajg.2009.121
19. Humes DJ, Fleming KM, Spiller RC, West J. Concurrent drug use and the risk of perforated colonic diverticular disease: a population-based case-control study. *Gut*. 2011;60(2):219-224. doi:10.1136/gut.2010.217281

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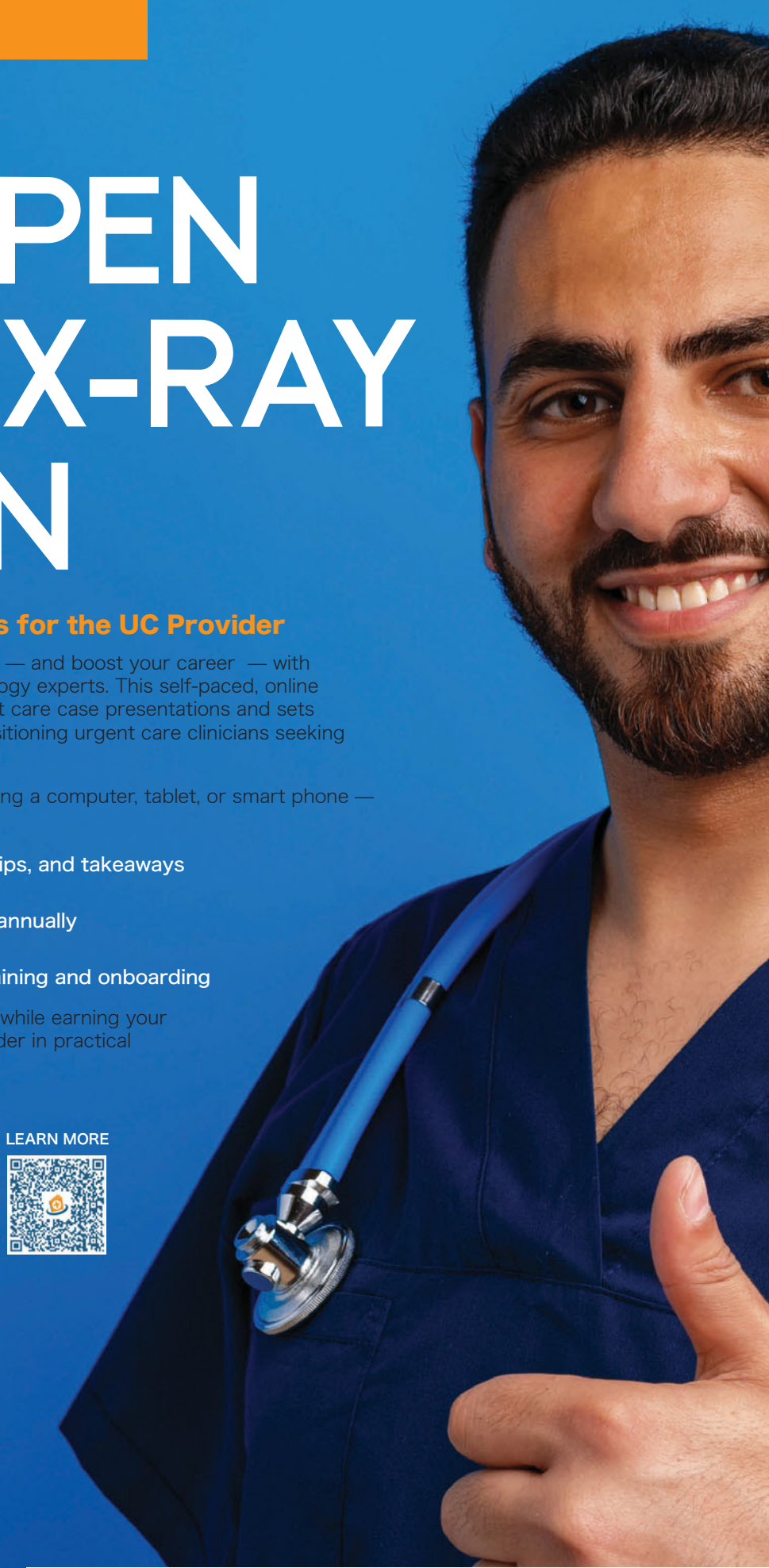

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Case Report

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Abdominal Pseudohernia and Urinary Retention Due to Spinal Nerve Root Compression From Disc Herniation: A Case Report

Urgent Message: Abdominal pseudohernia is a rare diagnosis with variable presentation. Urgent care clinicians who are familiar with the condition and its presentations can reduce the risk of diagnostic errors and unnecessary or inappropriate diagnostic testing.

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Key Words: abdominal pseudohernia, spinal nerve root compression, abdominal mass

Abstract

Introduction: Most patients presenting to urgent care (UC) with back pain, flank pain, and/or urinary symptoms do not have a serious diagnosis. However, in patients with worrisome associated symptomatology (eg, neurological deficits) a broader differential must be considered. Abdominal pseudohernia is a condition in which there is an outward bulging of a portion of the abdominal wall that resembles a hernia but without an actual anatomical fascial defect. Such pseudohernia, while rare in UC, may suggest serious underlying pathology.

Clinical Presentation: A 47-year-old man presented to UC with right flank pain and bulging of the abdomen for 2 days.

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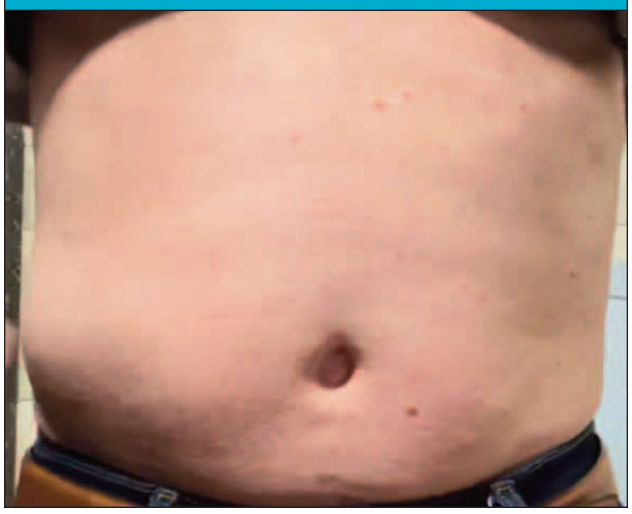
Figure 1. Patient's Pseudohernia In Right Lower Quadrant of Abdomen



Physical Exam: The patient had normal vital signs. He had a soft, non-tender bulge of his right lower quadrant. He had no underlying mass or tenderness along the spine or costovertebral angle.

Diagnosis: He was referred to the emergency department (ED) where blood work, urinalysis, and a computed tomography (CT) scan of the abdomen and pelvis was interpreted as without significant abnormality. A right T12-L1 disc herniation was later noted on closer review of the CT and subsequent magnetic resonance imaging (MRI). The disc herniation was concerning for spinal nerve root compression causing the abdominal pseudohernia presentation.

Resolution: The patient's symptoms spontaneously improved over time with resolution of the abdominal pseudohernia symptoms.

Conclusion: This case highlights the importance of considering both common and uncommon spinal pathology in patients with back pain, neurologic symptoms, and other less common findings, such as a new abdominal bulge. In particular, abdominal pseudohernia is a rare condition that can present with new onset abdominal bulging related to abdominal wall paresis.

Introduction

Acute low back pain is among the most common reasons for patients to seek acute unscheduled care in UC and ED settings, with a pooled estimated prevalence of 4.39%.[1] The overwhelming majority of patients with acute atraumatic back pain will experience resolution without intervention, although it commonly will recur.[2] Because the natural history of acute mechanical back pain is so often benign, both the American College of Radiology and the American Academy of Family Practice as part of the Choosing Wisely campaign recommend against spinal imaging in the first 6 weeks in the absence of red flag symptoms.[3,4]

"Abdominal pseudohernia is a rare clinical condition consisting of bulging of the abdominal wall that resembles a hernia, but without an underlying defect of musculature or fascia."

UC clinicians typically will have familiarity with common red flag symptoms for concerning back pain presentations, including new or progressive neurologic symptoms such as bowel and bladder dysfunction. However, focal abdominal wall paresis, or abdominal pseudohernia (AP), is a less obvious nerve deficit.

AP is a rare clinical condition consisting of bulging of the abdominal wall that resembles a hernia, but without an underlying defect of musculature or fascia.[5] It was first described by Loewe in 1936 after the injection of local anesthetic into the abdominal walls of guinea pigs caused bulging that resembled a hernia.[6] Any pathology that causes neuromuscular disruption of the abdominal wall has the potential to cause AP. Reported etiologies include herpes zoster, diabetic neuropathy, rib fracture, and spinal surgery.[5,7-14] Rarely, AP can occur due to direct spinal nerve root compression from spinal disc herniation, with only 10 reported cases in the existing literature.[15] We present a case of AP secondary to herniation of the T12-L1 intervertebral disc.

Case Presentation

A 47-year-old male endurance athlete with no past medical history presented to UC with right flank pain since the prior afternoon. He reported that he developed unprovoked pain while attending a sporting event as a spectator. He was able to get some relief with ibuprofen,

however, the right flank pain returned the following day and began radiating into the right lower abdomen. He also had complained of new urinary urgency. Additionally, he noticed a bulge to the right side of his abdomen, which ultimately prompted his decision to present for evaluation.

Physical Exam

The patient was afebrile and had normal vital signs. A bulging of his right lower quadrant was noted on exam and was accentuated by Valsalva (**Figure 1**). The area and abdomen generally was soft and non-tender. No underlying mass was appreciated. While the patient endorsed right sided flank pain, he had no spinal or costovertebral angle tenderness. He was fully ambulatory and grossly neurologically intact.

Medical Decision Making

The UC clinician was concerned for a hernia or abdominal mass that might require surgical intervention. Additionally, with flank pain radiating to the right lower quadrant and the patient's subjective urinary urgency there was concern for possible urinary tract pathology. The patient was, therefore, referred to the ED for further evaluation.

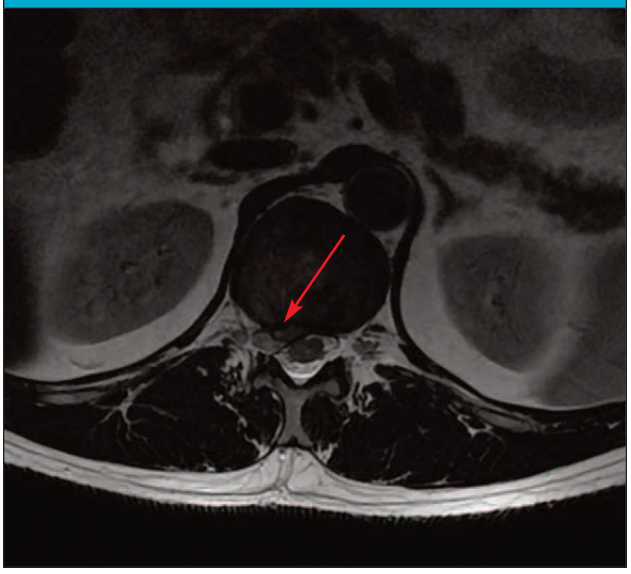
In the ED, he underwent computed tomography (CT) with intravenous contrast of the abdomen/pelvis and laboratory evaluation including a complete blood count, basic metabolic panel, liver function tests, and urinalysis. His CT was interpreted as normal and specifically there was no report of hernia, ureterolithiasis, hydronephrosis, or bladder distention. The laboratory tests also revealed no significant abnormality. Hence, he was discharged home with reassurance.

"Because most cases of AP resolve spontaneously, AP management generally focuses on symptom control."

Differential Diagnosis

This patient presented with multiple complaints including flank pain and a bulge of the abdominal wall. Flank pain with urinary symptoms is suggestive of renal pathologies, including ureterolithiasis or upper urinary tract infections (ie, pyelonephritis). However, a new lateralized abdominal bulge or mass would be unexpected in the these cases.

Figure 2. MRI of Spine, Demonstrating T12-L1 Disc Herniation



True hernias and abdominal masses should be considered in patients presenting to UC with an abdominal bulge, particularly if they present with symptoms of ileus (eg, obstipation, vomiting), which might suggest a possible small bowel obstruction. Additionally, if suspected hernia is present, tenderness to the bulge—which might suggest incarceration or strangulation—also warrants immediate ED referral. Other causes of abdominal bulging should be considered, including intra-abdominal or abdominal wall tumors, cysts, abscesses, and hematomas. Other considerations include abdominal aortic aneurysm, diastasis recti, bladder distention from urinary retention, or organomegaly. Depending on the suspected etiology of the abdominal bulge, referral may be indicated for acute or routine workup.

Final Diagnosis and Case Conclusion

The patient's symptoms persisted several days following his ED visit, so he self-referred to a general surgeon. At the follow-up visit, the surgeon reviewed his CT imaging and noticed a right T12-L1 disc herniation which was concerning for spinal nerve root compression causing the AP. Subsequently, an MRI without and with contrast of the thoracic and lumbar spine was ordered, which revealed spinal nerve root compression from a right T12-L1 disc herniation (**Figure 2**).

Disposition and Patient Perspective

The patient opted for expectant management of his condition. His presumed nerve impingement symptoms spontaneously improved over a matter of weeks with resolution of the AP symptoms. He has been asymptomatic with no abdominal pain or muscle wall weakness since.

Discussion

AP is a rare clinical condition causing bulging of the abdominal wall without an associated abdominal wall defect. The bulging is secondary to denervation of one or more lower thoracic nerve root resulting in abdominal wall paresis. Causes of AP include herpes zoster, complications of spine surgery, rib fracture, and diabetic neuropathy.[5,7-14] Additionally, there are 10 cases of AP secondary to spinal disc herniation reported.[15] AP are generally self-limited conditions, but autonomic dysfunction such as ileus and constipation have been reported in certain cases.[10]

Because most cases of AP resolve spontaneously, AP management generally focuses on symptom control. In cases of AP caused by disc herniation, initially deferring surgical therapy is reasonable, unless symptoms are causing significant gastrointestinal motility dysfunction.[16] In the case presented, the patient's symptoms followed the most common trajectory and resolved without any further intervention.

At the end of the first visit, this patient was initially reassured of the results of his workup. AP and its underlying etiologies should be considered if the patient endorses associated sensory deficits, dermatomal rash, and/or autonomic dysfunction. While an emergent condition may not be present, it is important to ensure patients are aware of red flag symptoms, which should prompt immediate reassessment and appropriate follow-up with primary care or an appropriate specialist.

Ethics Statement

The patient presented in this case provided verbal and written consent for the creation of this case report and discussion regarding his care. In the interest of patient privacy, certain patient details were omitted from this case.

Takeaways for Urgent Care Providers

- Consider spinal pathologies of back and flank pain when accompanied by common and uncommon neurological deficits, such as focal abdominal wall paresis, as well as other associated symptoms like urinary retention and urgency.
- Though AP is a rare clinical condition, it is important to include in the differential diagnosis when working up patients presenting with abdominal bulging.
- In patients who present with symptoms consistent with an abdominal hernia or pseudohernia, referral from the UC to the ED, while not absolutely indicated, is often reasonable in order to rule out other potentially emergent pathologies in the differential diagnosis.
- AP is most commonly self-limited. Complications of autonomic or gastrointestinal dysfunction may occur and, if caused by mechanical spinal nerve root compression, surgical intervention may be warranted. ■

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References

1. Edwards J, Hayden J, Asbridge M, Gregoire B, Magee K. Prevalence of low back pain in emergency settings: a systematic review and meta-analysis. *BMC Musculoskelet Disord.* 2017;18(1):143. doi:10.1186/s12891-017-1511-7
2. Heuch I, Foss IS. Acute low back usually resolves quickly but persistent low back pain often persists. *J Physiother.* 2013;59(2):127. doi:10.1016/S1836-9553(13)70166-8
3. American Association of Family Physicians website. Imaging for Low Back Pain. Accessed September 26, 2024. https://www.aafp.org/family-physician/patient-care/clinical-recommendations/all-clinical-recommendations/cw-back-pain.html
4. American College of Radiology website. ACR Appropriateness Criteria Low Back Pain. Accessed September 26, 2024. https://acsearch.acr.org/docs/69483/Narrative/
5. Butensky AM, Gruss LP, Gleit ZL. Flank pseudohernia following posterior rib fracture: a case report. *J Med Case Rep.* 2016;10(1):273. doi:10.1186/s13256-016-1054-9
6. Loewe S. Pseudohernia, a visible manifestation of local anesthetic action. *J Pharmacol Exp Ther.* 1936;56:238-251.
7. Ohno S, Togawa Y, Chiku T, Sano W. Postherpetic pseudohernia: delayed onset of paresis of abdominal muscles due to herpes zoster causing an ipsilateral abdominal bulge. *BMJ Case Rep.* 2016;2016. doi:10.1136/bcr-2016-215377
8. Mizumoto J. Abdominal pseudohernia due to herpes zoster. *Cleve Clin J Med.* 2021;88(9):480-481. doi:10.3949/ccjm.88a.20178
9. Tsukita K, Sakamaki-Tsukita H. Abdominal wall pseudohernia and colonic pseudo-obstruction as complications of herpes zoster. *Clin Gastroenterol Hepatol.* 2019;17(4). doi:10.1016/j.cgh.2018.04.051
10. Lee TH. Unusual case of abdominal wall pseudohernia in a patient with acute constipation. Korean J Intern Med. 2021;36(1):228-229. doi:10.3904/kjim.2020.106
11. Chiu HK, Trence DL. Diabetic neuropathy, the great masquerader: truncal neuropathy manifesting as abdominal pseudohernia. Endocr Pract. 2006;12(3):281-283. doi:10.4158/EP.12.3.281
12. Chakraborty PP, Singha A, Bhattacharjee R, Chowdhury S. Abdominal pseudohernia: a manifestation of diabetic truncal radiculoneuropathy. *BMJ Case Rep.* 2016;2016. doi:10.1136/bcr-2016-215605
13. Nadirov N, Vissarionov S, Khusainov N, Filippova A, Sazonov V. Abdominal pseudohernia in a child after surgical correction of congenital scoliosis: case report. *Front Pediatr.* 2024;11:1211184. doi:10.3389/fped.2023.1211184
14. Yasukawa T, Ohya J, Kawamura N, et al. Abdominal pseudohernia after extreme lateral interbody fusion procedure: a case report. *Spine Surg Relat Res.* 2020;5(3):218-220. doi:10.22603/ssrr.2020-0085
15. Cho WJ, Kim KW, Kim BH, Ryu JH. Monoradiculopathy-induced abdominal pseudohernia caused by T11-12 soft disc herniation: a case report and literature review. *BMC Musculoskelet Disord.* 2023;24(1):428. doi:10.1186/s12891-023-06536-1
16. Fitzpatrick J, Birch N, Botchu R. Abdominal wall pseudohernia - One secondary to a thoracic extraforaminal disc herniation and other due to thoracic paracentral disc protrusion. *J Clin Orthop Trauma.* 2022;30:101897. doi:10.1016/j.jcot.2022.101897

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Original Research

Systematic Rapid Review: Efficacy of Hematoma Blocks for Pediatric Forearm Fractures

Urgent Message: There is literature supporting that regional anesthesia, specifically hematoma blocks, is a safe, effective, and well tolerated alternative to procedural sedation for the management of pediatric forearm fractures.

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Key Words: pediatric forearm fractures, anesthesia, hematoma blocks, urgent care

Abstract

Introduction: Forearm fractures are a common injury, especially in the pediatric population. There is significant variation in the use of anesthesia and analgesia techniques used to facilitate closed reduction of pediatric forearm fractures. In recent decades, there has been a trend towards favoring procedural sedation (PS) for reducing such fractures. As procedural sedation is not generally feasible in urgent care (UC), it is worthwhile to understand if current available evidence supports its use in terms of better outcomes for reduction and patient and caregiver experience compared to various methods of regional anesthesia, specifically hematoma blocks (HB).

Aim: The objective of this study was to conduct a rapid literature review of studies looking at the efficacy of the use of HB for pediatric forearm fractures.

Methods: A systematic rapid literature search with predefined key terms was performed in December 2023 assessing the relevant peer-reviewed articles from the databases of PubMed, ERIC, Embase, and PsycINFO that met the inclusion criteria. Only journal articles in English with full texts were included. Utilizing the Preferred Reporting Items for Systematic Reviews and Meta-Analyses framework (PRISMA), data extraction was systematically structured, and the included studies were appraised systematically.

Results: Four of the initial 19 studies returned from the search met the inclusion criteria for this study. The results of all 4 studies were consistent in finding HB adequate for providing sufficient analgesia and allowing for non-inferior closed reductions of pediatric forearm fractures when compared to PS.

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Discussion: This literature review supports use of HB in achieving successful analgesia and non-inferior results in closed reduction of forearm fractures in the pediatric population. However, most pediatric forearm fractures are initially managed with PS for anesthesia. In comparison to PS, hematoma blocks require fewer resources and have a lower risk of complication. The included studies demonstrated that HB provides adequate analgesia for closed reduction of pediatric forearm fractures without compromising radiographically determined outcomes of reduction success. We propose, especially in a UC setting where PS is largely unavailable, use of HB is worthy of consideration as a first-line method of anesthesia for pediatric forearm fractures warranting reduction. Emergency department referral for specialist consultation and/or PS therefore can be reserved for patients in whom this lower risk, lower resource strategy proves unsuccessful.

"Pain during reduction is disconcerting for patients and caregivers and may also impede the mechanics of successful reduction."

Introduction

Distal radius fractures (DRFs) are the most common fracture of the upper extremity with a bimodal peak incidence among children and older adults.[1] DRFs account for 45% of all pediatric fractures and are commonly treated in the emergency department (ED) with closed reduction facilitated by procedural sedation.[2-4] In contrast to adults, pediatric DRFs require less precise reduction, as children's bones have better remodeling potential, which declines with increasing age.[5,6] Closed reduction and immobilization is typically definitive treatment for children who sustain DRF, even if significantly displaced or angulated; surgical open reduction and internal fixation (ORIF) is therefore performed much less commonly than in adults.[7, 8, 9] For this reason, performing an adequate initial closed reduction shortly after injury is critical for angulated and displaced pediatric forearm fractures to have optimal outcomes without surgery.[7] Despite children's ability to recover normally with a greater degree of post-reduction deformity, outcomes are best when as near anatomical alignment is achieved by the closed reduction procedure.[5] Pain during reduction is disconcerting for patients and caregivers and may also impede the mechanics of successful reduction.[10] Conversely, adequate levels of analgesia and/or anesthesia facilitate successful closed reduction and minimize pain and anxiety for both the child and parent.[7, 11]

A variety of anesthesia strategies may be employed when attempting closed fracture reduction, including various non-sedating regional anesthesia techniques (eg, hematoma blocks [HB], Bier block [BB], axillary, or supraclavicular block), or procedural sedation (PS) using agents such as ketamine, propofol, opioids, and/or midazolam.[12-16] Procedural sedation is defined as use of sedatives or dissociative agents with/without analgesics to induce a state that allows the patient to tolerate a procedure without compromising cardiorespiratory function—differentiating it from general anesthesia. PS remains among the most commonly employed strategies for DRF reduction in children in the ED setting, however, it is a less common option in urgent care (UC) settings.[11, 17, 18] Although PS has been shown to allow for good outcomes with closed DRF reductions, it carries risks, such as vomiting, dysphoria, hallucinations, respiratory depression, airway obstruction, and laryngospasm.[11,19] Furthermore, PS requires extensive healthcare resources and prolonged monitoring, which makes it impractical for use in the UC setting.

An ideal anesthetic agent for UC would be easy to administer, effective, safe, inexpensive, agreeable to patients and parents, rapidly provided, and not require monitoring or special equipment.[20] Regional anesthesia (RA) such as HB meets most of these criteria and can be performed in the ED or UC as an alternative to PS.[21] A HB is defined as a procedure where local anesthetic is injected directly into the fracture site.[10] However, many clinicians have less confidence in the appropriateness and efficacy of HB in children compared to adults,[10] despite limited evidence to inform an opinion on the matter. This perception allows for continued preferential use of PS over alternative, less resource intensive means of achieving anesthesia that may be equally effective.

The objective of this study was to review the available literature regarding the use of HB in children with acute forearm fractures requiring manipulation and compare relative analgesic efficacy, anxiolytic effects, adverse effects (AE) of the procedure, and the outcomes of reduction when compared to PS.

Methods

Search Strategy

A systematic literature search was conducted in December 2023 following international guidelines.[22] This

rapid review protocol follows the PRISMA guideline.[23] The MeSH terms used in conjunction with Boolean operators were *Regional anesthesia OR regional block OR hematoma block AND *Forearm OR Ulnar OR Radius Fracture* AND *Pediatric OR Children*. These MeSH terms provided focused and appropriate article results without returning irrelevant articles. No date ranges of publications were used given the few number of studies returned in the preliminary search. Snowballing, a research technique used to identify eligible studies from the references of included studies, was used to identify further eligible articles to include in the review.

Study Collection Criteria

Only journal articles were included in the review; grey literature such as reports and documents that were not published in academic journals were excluded. The studies included ranged from quasi-experimental, retrospective medical record review, prospective cohort design, and randomized controlled trial.

The inclusion criteria were: exclusively pediatric subjects (defined as an age <18 years); endpoints of efficacy and adverse effects of the use of HB for forearm fracture reduction; ED or outpatient setting; full text available; and English language publication. The exclusion criteria were: grey literature; non-peer reviewed publications; and case reports.

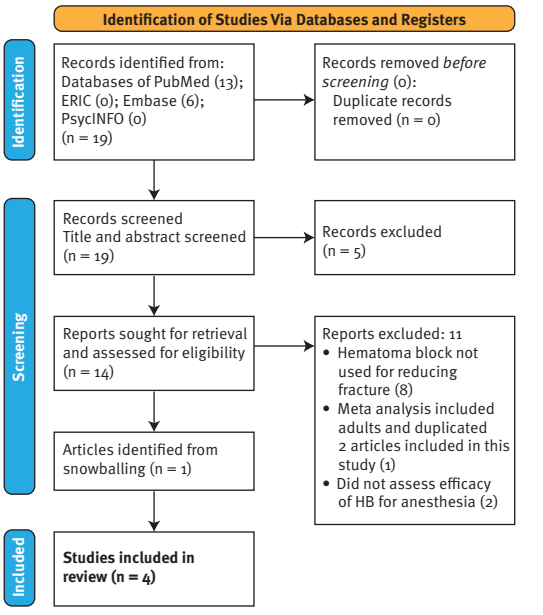
Data extraction

After removing duplicate articles, the abstracts of results returned were reviewed to ensure they met the eligibility criteria of this review. The full texts of each were then further analyzed to confirm that it met inclusion criteria. Data extraction was standardized to compare each study's aims, design methods, setting, participant demographics, outcomes, quality review, and suitability for inclusion.

Quality Appraisal

Study quality assessment was completed for each publication meeting the initial screening for inclusion criteria. Joanna Briggs Institute's Critical Appraisal Tools were used to evaluate the quality of publications.[24] There was collaboration of the analysis of eligible articles and validating the findings, but all the preceding steps were completed systematically by a sole author (SG). Rapid reviews usually involve peer review throughout the literature review, but it can be completed by a sole researcher that follows a systematic approach with a predetermined search protocol, predefined inclusion criteria and systematic data extraction.[24-26] This review was carried out in a structure consistent with this approach.

Figure 1: The PRISMA Diagram



Results

A PRISMA flow chart was used to record the data extraction process (**Figure 1**).

From the initial search, 19 studies were identified. The studies contained the following databases : PubMed (n=13 results), ERIC (n=0 results), Embase (n=6 results), and PsycINFO (n=0 results). Of these 19 studies, the abstracts were screened to ensure they fully met the eligibility criteria for inclusion. The full texts of these 14 articles then underwent further analysis to determine if articles met the determined inclusion criteria. The reference lists of all studies that underwent full-text analysis were then reviewed to identify further potential eligible studies. This identified 1 additional eligible study, leading to 4 studies total included in the final review.

The systematic literature review established 4 articles in the wider literature that meet the study eligibility criteria.

The included articles were highly heterogenous in their study populations, design, and geography. Three studies were conducted in the United States, and 1 was conducted in India. Two of the studies reviewed the use of HB in comparison to PS for DRFs specifically.[7, 15] These studies were interventional studies. One compared the use of RA for diaphyseal forearm fractures.[25]

One study, Sulton et al., included all pediatric forearm fractures but defined RA as either BB or HB, and compared this to PS.[25] This was the only retrospective electronic medical record (EMR) review.

The studies each used different medications for the PS group. The HB groups also had some variability with the doses ranging from 5-15 mL of 1% lidocaine without epinephrine. There was also heterogeneity in the average subject age and the ages included in the study. Similarly, the eligibility criteria varied between studies. The majority of the studies evaluated procedural success (ie, adequacy of reduction), efficacy of analgesia, and proceduralist, patient, and parental satisfaction between the interventional arms. However, the validated scoring tools used to measure these outcomes varied as well. The overall participant numbers included in each study were not significant, however, this was particularly small for Sulton et al. as they included both BB and HB under the RA arm.

"This literature review confirms a consensus of evidence supporting the adequacy of HB for achieving sufficient analgesia to allow for appropriate closed reduction of forearm fractures in the pediatric population."

Despite these differences between studies, the results were consistent across all publications: HB provided excellent reduction outcomes; excellent analgesia and anxiolysis; and was found to be satisfactory by the proceduralist, patient, and their family.[7, 15, 19, 25] Additionally, the aggregate results suggest that analgesia provided by HB is comparable to that of PS and did not compromise the immediate likelihood of successful reduction or long-term outcomes.[19, 25]

In all studies, adverse effects in the RA groups were statistically less frequent than in the PS groups. All studies demonstrated that the RA groups had significantly shorter length of stay (LOS) during their ED visit. The largest time difference, found in the Bear et al. study, was an average reduction of 2 hours in the ED LOS for the RA group.[7] Refer to **Table 1** for a summary of the literature review findings.

Discussion

Although there are relatively few articles that explore the use of HB for facilitating reduction of forearm fractures in children, this literature review confirms a consensus of evidence supporting the adequacy of HB for achieving sufficient analgesia to allow for appropriate closed reduction of forearm fractures in the pediatric population.[7, 10, 15, 19, 25]

Although not all forearm fractures are amenable to RA or HB, HB would be reasonable for most pediatric forearm fractures that require closed reduction.[7] Furthermore, many pediatric forearm fractures, such as buckle/torus fractures or minimally displaced fractures, do not require any manipulation.[9] The efficacy and safety of BB and HB approaches to RA have been well studied in adult populations[12, 13, 17] and also show a low risk of AE or toxicity with appropriate dosing.[26] However, as this review demonstrates, the use of RA prior to closed reduction of pediatric forearm fractures is less well studied.[27] This lack of evidence may contribute to limited use of these anesthesia techniques in children with forearm fractures in favor of PS.[11, 17, 18]

For example, in a survey of U.S. and Canadian pediatric orthopedic and emergency physicians, 42% of respondents reported they used RA for pediatric forearm fractures "rarely" or "never." Among the 22% of respondents who reported never using RA, there was a pervasive belief reported that it would provide insufficient analgesia.[27] This belief, however, is not substantiated by prior studies [7] or by the findings of this literature review.

HB anesthesia represents a less resource intensive alternative to PS for analgesia in the reduction of pediatric forearm fractures and existing evidences suggest it is not inferior to PS.[7] The findings of this review also confirm the obvious benefits of HB in UC. The anesthetic agent used is widely available, easy to administer, effective, safe, and inexpensive. It can be provided rapidly and is agreeable to patients and parents, while not requiring monitoring or special equipment.[20] HB satisfies these criteria for the majority of cases of forearm fractures.[7] PS has its own limitations, including an exposure to numerous medications with potential side effects, need for physicians with competence in airway management and registered nurses to provide continuous monitoring due to the risk of hypotension and airway compromise. The medications, equipment, and staff required to perform such PS is rarely available in UC settings, nor does the time required for PS and recovery fit into the UC model of patient flow. The articles included in the literature review demonstrated that using RA reduced ED LOS up to 2 hours.[7] This benefit is ex-

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Table 1. Literature Review Findings Summary – Systematic Rapid Review: Efficacy of Hematoma Blocks for Pediatric Forearm Fractures

Article: Hematoma Block Versus Sedation for the Reduction of Distal Radius Fractures in Children, 2015 **Author:** Bear et al.[7]	
Aim: Hematoma block (HB) vs. procedural sedation (PS) for distal radius fractures (DRF). **Method:** Quasi-experimental study Pittsburgh, Penn., USA; 2012 to 2014. **PS regime** - Initial intravenous (IV) ketamine, midazolam, and atropine. **HB regime** – 10 mL of 1% lidocaine (100 mg). IV morphine or oral midazolam provided at doctor's discretion.	**Findings:** 52 children, 26 each in each arm. Ages 5-16. Similar demographic in both groups. No difference between groups with overall patient satisfaction or satisfaction with anesthesia. Patients receiving HB spent an average ED LOS of 134 min less than the PS group (P < .001). No significant differences in reduction outcome.
Strengths: Prospective, interventional study, similar subject characteristics in both groups.	**Weaknesses:** Single center trial. Lack of randomization and blinding. Majority of patients were age 9 and older.
Article: Regional Anesthesia as an Alternative to Procedural Sedation for Forearm Fracture Reductions in the Pediatric Emergency Department, 2023 **Author:** Sulton et al.[19]	
Aim: Regional anesthesia (RA) Bier block or HB vs. PS for reducing forearm fractures. **Method:** Retrospective EMR review of pediatric DRF in 2 urban pediatric EDs in the USA. Ages 2 to 18 years between 2016 to 2021. Cohorts were matched to reduce selection bias. **PS regime** - ketamine +/- propofol. **HB regime** - 1% lidocaine without epinephrine	**Findings:** 642 in RA group (636 received BB, 6 received HB). Similar characteristics between the matched cohorts. 13% of PS encounters had an AE with only 0.2% in the RA cohort, P<0.001. Most common AE was hypoxia (9.8%) and upper airway obstruction (3.2%) only occurring in the PS. No reduction failures in either group. LOS was on average 27 minutes less for the RA group. (p<0.001).
Strengths: Research procedure well-detailed. Large number of patients.	**Weaknesses:** Retrospective cohort analysis. Only 6 patients received a HB.
Article: Reduction of Forearm Diaphyseal Fractures In Children Under Hematoma Block In Emergency: A Prompt and Cost-Effective Approach, 2021 **Author:** Mander et al.[25]	
Aim: Review closed reduction of radius or ulnar diaphyseal fractures under HB. **Method:** Prospective cohort study in India. 5-11 years with diaphyseal forearm fracture; 2019 to 2020. **HB group** – 5mL of 2% lidocaine (100 mg).	**Findings:** Total of 20 patients. 70% had both radius and ulnar diaphyseal fractures. 4 cases (20%) lost alignment and required repeat intervention. The remaining had no issues with reduction.
Strengths: Prospective, Interventional study. Follow-up available up to 6 months post-treatment.	**Weaknesses:** Small sample. Only included diaphyseal forearm fractures.
Article: A Randomized Comparison of Nitrous Oxide Plus Hematoma Block Versus Ketamine Plus Midazolam for Emergency Department Forearm Fracture Reduction in Children, 2006 **Author:** Luhmann et al.[15]	
Aim: Compare PS vs. RA - nitrous oxide and hematoma block (N_2O/HB), for forearm fracture reduction. **Method:** Randomized controlled trial. Ages 5 to 17 ED in St. Louis, USA; patients who required reduction of mid- to distal forearm fractures. **PS group**: midazolam + ketamine. **HB regime**: 50% N_2O and O2 before HB with a maximum of 150 mg (15 mL of 1% lidocaine).	**Findings:** 102 children, 55 in PS and 47 in RA group. Similar demographics across both cohorts. Both groups had very little distress during procedure. Mean recovery time was significantly shorter for children who received N_2O/HB (16 minutes) compared with PS (83 minutes). More parents of those children who underwent N_2O/HB would opt to repeat this method. Orthopedic surgeon assessment reported no difference in satisfaction of reductions both groups.
Strengths: Randomized design. Blinded evaluator of pain and distress levels. Reasonably sized study population.	**Weaknesses:** True blinding was not possible given study methodology. Singler center study. Follow-up to only 24 hours post-discharge. HB block group also received nitrous oxide for anxiolysis

actly why HB is particularly appealing for use in UC settings and may prevent the need for ED referrals, especially given unanimous support for its safety and efficacy in the existing literature.

Although we did not assess cost-effectiveness of HB compared with PS, there are reduced direct and indirect costs such as staffing, costs of medications, and opportunity costs of seeing other patients during PS and mon-

itoring.[9,10] HB can also be performed much more rapidly, does not require IV access, has decreased demands of clinicians' time, and has fewer risks. HB importantly also provides adequate analgesia (which extends into the post-procedure period) without compromising radiographic outcomes of reduction adequacy.[13, 28, 29]

Although RA is generally well tolerated, in younger children (<6 years) the anxiolytic benefits of PS may be superior.[16, 27,20, 30] This may limit the utility of RA in the management of pediatric forearm fractures in preschool aged children.

Strengths of Literature Review

This literature review, the first of its kind on this topic, was conducted systematically, with clearly specified search parameters, inclusion and exclusion criteria. A systematic approach to quality appraisal was applied as well to limit researcher bias.

Several studies compared HB directly to PS, which helps increase the applicability of the findings to the clinical question the review aimed to address. All studies included had similar outcome measures: quality of reduction; adequacy of analgesia and anxiolysis in patients, parents and clinician; LOS; and AE.

Limitations of Literature Review

All steps in a "rapid review" approach are completed with collaboration from multiple authors, however, it is still possible to undertake the review with a sole researcher if a systematic process is undertaken.[23] In this review, all authors participated in determination of eligible articles, but subsequent steps were completed systematically by a sole author (SG).

Overall, the small number of studies on this specific topic is the main limitation in interpreting the results of this review. The aggregate number of patients across all 4 studies was small (<800 children), and the study design was unsurprisingly somewhat heterogenous. Only a single study used a randomized, blinded, and prospective design, which would be ideal for increasing certainty as to the lack of confounding.

This literature review did not explore other forms RA, such as periosteal nerve blocks, axillary nerve or other peripheral nerve blocks, or BB. These forms of RA were intentionally not included because these forms of RA are generally outside the scope and training of many UC clinicians.[19] As previously mentioned, due to the ages of subjects included in the studies reviewed, the applicability of the findings of this review in patients less than 6 years is uncertain.

Recommendations

When encountering situations where closed reduction of pediatric forearm fractures is indicated, HB would be appropriate to consider as the first-line method of anesthesia, especially in UC settings.[7, 25] When RA does not provide adequate anesthesia, use of PS would remain an option although it may involve referral to an ED setting.[7]

Future studies on this topic should use prospective design and randomization as much as able to limit bias and confounding. Additionally, UC-based studies could confirm that this approach is safe, effective, and feasible outside of ED settings.

Although less extensively studied, for middle to distal forearm fractures, lidocaine HB can augment the benefits of N_2O based sedation and analgesia, [31] and this could be further studied as N_2O requires fewer staff and resources than IV medication based PS. Luhmann et al. demonstrated the efficacy of the combination of N_2O/HB in fracture reduction outcomes, analgesia, anxiolysis, and acceptability for parents, patients, and interventionalists.[15] However, there may be disadvantages of using the N_2O/HB combination compared to using HB alone or PS and this should be further explored.[15]

Conclusion

Overall, this literature review summarizes the existing evidence on the use of HB to facilitate closed reduction forearm fractures in children. While studies are few in number, there are consensus results which indicate that RA, and specifically HB, is a safe, effective, and well tolerated alternative to PS for the management of pediatric forearm fractures. ■

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References

1. Alluri RK, Hill JR, Ghiassi A. Distal Radius Fractures: Approaches, Indications, and Techniques. *The Journal of Hand Surgery*. 2016;41(8):845-854. doi:https://doi.org/10.1016/j.jhsa.2016.05.015.
2. Wiik AV, Patel P, Bovis J, et al. Use of ketamine sedation for the management of displaced paediatric forearm fractures. *World Journal of Orthopedics*. 2018;9(3):50-57. doi:https://doi.org/10.5312/wjo.v9.i3.50.
3. Rimbaldo KM, Fauteux-Lamarre E, Babl FE, Kollias C, Hopper SM. Deformed pediatric forearm fractures: Predictors of successful reduction by emergency providers. *The American Journal of Emergency Medicine*. 2021;50:59-65. doi:https://doi.org/10.1016/j.ajem.2021.06.073.
4. Chinta SS, Schrock CR, McAllister JD, Jaffe DM, Liu J, Kennedy RM. Rapid Administration Technique of Ketamine for Pediatric Forearm Fracture Reduction: A Dose-Finding Study. *Annals of emergency medicine*. 2015;65(6):640-648.e2. doi:https://doi.org/10.1016/j.annemergmed.2014.12.011.
5. Bin K, Rony L, Henric N, Moukoko D. Pediatric fracture reduction in the emergency department. *Orthopaedics & Traumatology: Surgery & Research*. 2022;108(1, Supplement):103155. doi:https://doi.org/10.1016/j.otsr.2021.103155.
6. Waters PM, S.D., Flynn JM, *Fractures in Children*. Lippincott Williams&Wilkin, 2019.
7. Bear, D.M., et al., Hematoma block versus sedation for the reduction of distal radius fractures in children. *J Hand Surg Am*. 2015. 40(1): p. 57-61.

8. Flynn JM, Skaggs DL, Waters PM. Rockwood & Wilkins Fractures in Children Print. Wolters Kluwer Health; 2014.
9. Clinical Practice Guidelines : Distal radius and or ulna metaphyseal fractures - Emergency Department. www.rch.org.au. Accessed July 23, 2024.
10. Tseng PT, Leu TH, Chen YW, Chen YP. Hematoma block or procedural sedation and analgesia, which is the most effective method of anesthesia in reduction of displaced distal radius fracture? *Journal of Orthopaedic Surgery and Research*. 2018;13(1). doi:https://doi.org/10.1186/s13018-018-0772-7.
11. McCarty EC, Mencio GA, Green NE. Anesthesia and Analgesia for the Ambulatory Management of Fractures in Children. *Journal of the American Academy of Orthopaedic Surgeons*. 1999;7(2):81-91. doi:https://doi.org/10.5435/00124635-199903000-00001.
12. Singh GK, Manglik RK, Lakhtakia PK, Singh A. Analgesia for the reduction of Colles fracture. A comparison of hematoma block and intravenous sedation. *Online J Curr Clin Trials*. 1992;Doc No 23:.
13. Funk L. A prospective trial to compare three anaesthetic techniques used for the reduction of fractures of the distal radius. *Injury*. 1997;28(3):209-12. doi:https://doi.org/10.1016/s0020-1383(96)00183-0.
14. Kriwanek KL, Wan J, Beaty JH, Pershad J. Axillary Block for Analgesia During Manipulation of Forearm Fractures in the Pediatric Emergency Department A Prospective Randomized Comparative Trial. *Journal of Pediatric Orthopaedics*. 2006;26(6):737-740. doi:https://doi.org/10.1097/01.bpo.0000229976.24307.30.
15. Luhmann JD, Schootman M, Luhmann SJ, Kennedy RM. A Randomized Comparison of Nitrous Oxide Plus Hematoma Block Versus Ketamine Plus Midazolam for Emergency Department Forearm Fracture Reduction in Children. *Pediatrics*. 2006;118(4):e1078-e1086. doi:https://doi.org/10.1542/peds.2005-1694.
16. Aarons C, Fernandez MD, Willsey M, Peterson BC, Key CR, Fabregas J. Bier Block Regional Anesthesia and Casting for Forearm Fractures. *Journal of Pediatric Orthopaedics*. 2014;34(1):45-49. doi:https://doi.org/10.1097/bpo.0b013e31829fff47.
17. Godambe SA, Elliot V, Matheny D, Pershad J. Comparison of Propofol/Fentanyl Versus Ketamine/Midazolam for Brief Orthopedic Procedural Sedation in a Pediatric Emergency Department. *Pediatrics*. 2003;112(1):116-123. doi:https://doi.org/10.1542/ peds.112.1.116.
18. Mitchell L, Archer E, Middleton S, et al. Paediatric distal radial fracture manipulation: multicentre analysis of process times. *Emergency Medicine Journal*. 2009;26(1):41-42. doi:https://doi.org/10.1136/emj.2007.057208.
19. Sulton CD, Fletcher N, Murphy J, Gillespie S, Burger RK. Regional Anesthesia as an Alternative to Procedural Sedation for Forearm Fracture Reductions in the Pediatric Emergency Department. *Pediatric Emergency Care*. 2023;40(2):83-87. doi:https://doi.org/10.1097/pec.0000000000002993.
20. Blasier RD. Anesthetic Considerations for Fracture Management in the Outpatient Setting. *Journal of Pediatric Orthopaedics*. 2004;24(6):742-746. doi:https://doi.org/10.1097/01241398-200411000-00027.
21. Constantine E, Tsze DS, Machan JT, Eberson CP, Linakis JG, Steele DW. Evaluating the Hematoma Block as an Adjunct to Procedural Sedation for Closed Reduction of Distal Forearm Fractures. *Pediatric Emergency Care*. 2014;30(7):474-478. doi:https://doi.org/10.1097/pec.0000000000000164.
22. Smela B, Toumi M, Świerk K, Francois C, Biernikiewicz M, Clay E, Boyer L. Rapid literature review: definition and methodology. *J Mark Access Health Policy*. 2023 Jul 28;11(1):2241234. doi: 10.1080/20016689.2023.2241234.
23. Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Annals of Internal Medicine*. 2018;169(7):467-473.
24. Joanna Briggs Institute (JBI). Critical appraisal tools. JBI. Published 2020. Access 25/07/2024. https://jbi.global/critical-appraisal-tools.
25. Mander H, Ashraf A, Singh GP, Gupta N, Vaibhav B, Verma S. Reduction of forearm diaphyseal fractures in children under haematoma block in emergency: A prompt and cost-effective approach. *International Journal of Orthopaedics Sciences*. 2021;7(4):760-763. doi:https://doi.org/10.22271/ortho.2021.v7.i4k.2965.
26. Meinig RP, Lynette Lobmeyer AQ. Plasma Lidocaine Levels Following Hematoma Block for Distal Radius Fractures. *Journal of Orthopaedic Trauma*. 1989;3(3):187-191. doi:https://doi.org/10.1097/00005131-198909000-00001.
27. Constantine E, Steele DW, Eberson C, Boutis K, Amanullah S, Linakis JG. The Use of Local Anesthetic Techniques for Closed Forearm Fracture Reduction in Children. *Pediatric Emergency Care*. 2007;23(4):209-211. doi:https://doi.org/10.1097/pec.0b013e31803e1792.
28. Case RD. Haematoma block—a safe method of reducing Colles' fractures. *Injury*. 1985;16(7):469-470. doi:https://doi.org/10.1016/0020-1383(85)90168-8.
29. Johnson PQ, Noffsinger MA. Hematoma block of distal forearm fractures. Is it safe? *Orthop Rev*. 1991 Nov;20(11):977-9.
30. Kennedy RM, Luhmann JD, Luhmann SJ. Emergency department management of pain and anxiety related to orthopedic fracture care: a guide to analgesic techniques and procedural sedation in children. *Paediatr Drugs*. 2004;6(1):11-31. doi: 10.2165/00148581-200406010-00002.
31. Hennrikus WL, Simpson RB, Klingelberger CE, Reis MT. Self-administered nitrous oxide analgesia for pediatric fracture reductions. *J Pediatr Orthop*. 1994 Jul-Aug;14(4):538-42. doi: 10.1097/01241398-199407000-00023.

ECG Interpretation: Humans Vs Machines

Take Home Point: In this study, cardiologists and emergency physicians (EP) had greater accuracy for electrocardiogram (ECG) interpretation than current versions of ChatGPT and Gemini.

Citation: Günay S, Öztürk A, Yiğit Y. The accuracy of Gemini, GPT-4, and GPT-4o in ECG analysis: A comparison with cardiologists and emergency medicine specialists. *Am J Emerg Med*. 2024 Oct:84:68-73. doi: 10.1016/j.ajem.2024.07.043.

Relevance: Artificial Intelligence (AI) is rapidly evolving and becoming an integral part of clinical medicine and research with large-language models (LLM) being evaluated for many novel applications traditionally performed by computers.

Study Summary: This study evaluated the performance of GPT-4, GPT-4o, and Gemini LLMs in ECG interpretation compared their accuracy to cardiologists and emergency medicine (EM) specialists. The authors of the study selected 20 routine ECGs and 20 "challenging" ECGs from a book of ECG cases (*150 ECG Cases*). The ECGs were presented with multiple choice responses and given to 12 cardiologists and 12 EM specialists to evaluate. The same questions were entered into GPT-4, GPT-4o, and Gemini Advanced on separate chat interfaces for review.

Importantly, the authors found there was no statistically significant difference between cardiologists and EM specialists in routine ECG interpretation or more challenging ECG questions. Cardiologists performed better than GPT-4, GPT-4o, and Gemini Advanced in routine ECG questions and the more challenging ECG questions. EM specialists outperformed the LLMs in routine ECG and overall ECG question, but not "challenging" ECGs specifically.

Among the LLMs, GPT-4o was the most accurate for ECG interpretation, especially among the more challenging cases.

Editor's Comments: The LLMs evaluated were not developed or specifically trained for ECG interpretation. It is unclear how more specifically trained algorithms may have compared to others and human experts. The study design also used multiple choice questions, which does not mimic real-world clinical practice. Time taken to interpret ECGs was not measured and change in performance based on time of day and ECGs were read without the normal distractions clinicians face in practice settings. For these reasons, these results should be taken with a grain of salt. Future studies should focus on comparing task specific LLMs to clinicians in more realistic settings since this is ultimately the most relevant question for what their role might be in patient care. ■

Laughter is the Best Medicine for Dry Eyes

Take Home Point: Laughter exercises were found to be non-inferior to 0.1% sodium hyaluronic acid in relieving symptoms of patients with dry eye disease.

Citation: Li J, Liao Y, Zhang S, et. al. Effect of laughter exercise versus 0.1% sodium hyaluronic acid on ocular surface discomfort in dry eye disease: non-inferiority randomized controlled trial. *BMJ*. 2024 Sep 11;386: e080474. doi: 10.1136/bmj-2024-080474

Relevance: Dry eye disease is a common and frustrating chronic condition. While many possible treatments exist, 0.1% sodium hyaluronic acid is among the most widely used forms of artificial tears and has been to relieve ocular discomfort. Prior studies have suggested mechanisms whereby laughter may increase tear production, including through the action of oxytocin.

Study Summary: This was a 2 arm, non-inferiority randomized controlled trial (RCT) in a tertiary care center in Southern China. Participants with symptomatic dry eye disease were recruited and block randomized in a 1:1 ratio to receive either "laughter exercise" or 0.1% sodium hyaluronic acid for 8 weeks. The laughter exercise group was instructed to perform the laughter exercise 4 times daily. The exercises required participants to repeat the phrases: "Hee hee hee, hah hah hah, cheese cheese cheese, cheek cheek cheek, hah hah hah hah hah hah." They completed 30 rounds each time, lasting for at least 5 minutes (videos

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"There's also no reason not to recommend adding this to other therapies for dry eyes as there may be additional benefits for mood and other aspects of health."

of the exercise are included in online version of the *BMJ* article). The control group applied artificial tears, 0.1% sodium hyaluronic acid eyedrops, to both eyes 4 times daily for 8 weeks.

The authors included and randomized 299 adult participants. The average age was 29 years old and 74% of the subjects were women. They found improvement in ocular surface disease index scores from baseline (after a washout period) to 8 weeks in both groups –10.5 points (95% CI –13.1 to –7.82) in the laughter exercise group and –8.83 (–11.7 to –6.02) in the control group (i.e., hyaluronic acid drops). These changes were statistically significant for both groups compared to baseline measurements after the 2-week washout period. Additionally, they found that laughter exercise improved tear film stability and the meibomian gland function.

Editor's Comments: Blinding was not possible in this study given that participants needed to either perform the exercises or use a pharmaceutical agent. There may be limited generalizability due to the small sample size and single center setting in an ethnically homogenous location.

The upshot of this study is its use of a non-pharmacologic intervention in a well-designed RCT. Such studies are relatively rare given difficulty securing funding for behavioral interventions. Additionally, laughter has limited side effects (although it may not always be practical, especially in public, to perform these exercises). There's also no reason not to recommend adding this to other therapies for dry eyes as there may be additional benefits for mood and other aspects of health. ■

Arm Position in Blood Pressure Measurements: Does it Really Matter?

Take Home Point: This study showed that common misplacements of the arm during blood pressure (BP) measurement (ie, on the lap or by the side) somewhat overestimates blood pressure, which may result in misdiagnosis of hypertension or erroneously missing hypotension. The differences were small on average but could be clinically significant in certain cases.

Citation: Liu H, Zhao D, Sabit A, et. al. Arm Position and Blood Pressure Readings: The ARMS Crossover Randomized Clinical Trial. *JAMA Intern Med.* 2024 Oct 7: e245213. doi: 10.1001/jamainternmed.2024.5213.

Relevance: BP measurement, like all objective data collection, requires standardized measurement approaches to ensure precise and accurate BP measurements. Guidelines for BP measurement include selecting the appropriate cuff size, cuff position, and measurement with the arm supported on a desk or table at the level of the heart level. Appropriateness of arm position is commonly overlooked when performing BP measurements.

Study Summary: This was a randomized crossover trial conducted among adults in Baltimore, Maryland. Each subject had measurements taken in 3 positions in random order: arm supported on a desk with mid-cuff at approximately mid-heart level (desk 1); hand supported on the lap (lap); and arm hanging at the side (side). All participants underwent a 4th set of triplicate BP measurements with the arm supported on a desk with mid-cuff at mid-heart level (desk 2), which is the same condition as desk 1 to account for any variability. Participants were recruited via BP screening program at a public food market, direct mail to previous study participants and information brochure placed in hypertension clinics at John Hopkins University. Measurements took place during daytime clinic hours using a validated oscillometric BP device (ProBP 2000 Digital Blood Pressure Device [Welch Allyn])

The authors enrolled 133 participants. They found average BP measurements were: 126/74 mm Hg for each of the desk 1 and desk 2 positions; 130/78mm Hg for the lap position; and 133/78mm Hg for the side position with results consistent across subgroups. The lap position overestimated systolic blood pressure (SBP) and diastolic blood pressure (DBP) by approximately 4 mmgHg, whereas the side position overestimated SBP by 6 mmHg and DBP by approximately 4 mmHg.

Editor's Comments: This study was limited to a single urban center and had relatively small numbers in each group. Additionally, they examined only a single, automatic BP cuff. It's unclear to what extent these trends may have

been observed with manual BP measurement or other automatic devices. Regardless, this study does highlight the importance of standardized arm positioning to ensure BP measurements are recorded accurately and the values are comparable between occasions and locations. ■

Factors Driving Increased Pediatric Urgent Care Demand

Take Home Point: A combination of declining primary care access, circulating viral infections, and changing patterns of chief complaints were associated with increases in frequency and duration of visits to pediatric UC.

Citation: Lehan E, Briand P, O'Brien E, et. al. Synergistic patient factors are driving recent increased pediatric urgent care demand. *PLOS Digit Health.* 3(8): e0000572

Relevance: As UC services evolve, understanding factors that drive presentations and affect patient volumes is necessary for UC administrators and clinicians to be best prepared for surges in patients presenting to pediatric UC centers. Such data will also help UC to choose appropriate levels of staffing.

Study Summary: This was a retrospective cohort study reviewing a local healthcare center's National Ambulatory Care Reporting System data in Canada, with data collected from their electronic health record database. The authors looked to use high-fidelity NACRS data to model and identify factors contributing to the increased demand for pediatric urgent care (PUC). Data included aggregate PUC visits from April 2006 to December 2022 in this region of Canada.

The authors retrospectively analyzed a total of 164,660 visits during the study period. There was an increase in the number of visits per day on average, with daily volumes increasing in 2015. This trend abated in 2020 at the start of the COVID-19 pandemic and then rapidly resumed to previous levels in 2021 and 2022. The authors found an increase in the absolute numbers of all levels of acuity across the study period. The trend is most notable for "urgent" level presentations with more than triple the urgent presentations in 2022 when compared to 2007. Patients without identified primary care clinicians were more likely to present with both "emergent" level and "non-urgent" level presentations and were also more often diagnosed with mental health conditions. The authors also noted that increased levels of circulating infectious diagnoses, and shifts in chief complaints were driving increased frequency and duration of visits.

Editor's Comments: This study lacks granular data analysis given its retrospective design and use of aggregated data. There also may be limited generalizability as the PUC center data was obtained from a medium size city in Canada. The study does suggest that PUC in particular relies on an understanding of infectious disease epidemiology and primary care access to best predict patient volumes and needs. Emergency medicine organizations have cited the need for primary care access for years as a strategy to mitigate overcrowding and improve healthcare outcomes for patients. This study provides data suggesting UC is susceptible to similar crowding and decreased efficiency when access to primary care for children is insufficient. ■

What Would Happen if We Didn't Treat Strep Throat?

Take Home Point: In this small Swiss RCT, treatment for group A streptococcal (GAS) pharyngitis in children with placebo was non-inferior to treatment with amoxicillin for reducing fever duration, while pain intensity and risk of complications were similar in this study.

Citation: Gualtieri R, Verolet C, Mardegan C, et. al. Amoxicillin vs. placebo to reduce symptoms in children with group A streptococcal pharyngitis: a randomized, multicenter, double-blind, non-inferiority trial. *Eur J Pediatr.* 2024 Nov;183(11):4773-4782. doi: 10.1007/s00431-024-05705-1.

Relevance: Pharyngitis is among the most common UC complaints for both children and adults. Current guidelines suggest antibiotics should be used almost exclusively for GAS pharyngitis. Over recent decades, however, controversy has emerged about the necessity and benefit of antibiotic treatment, even in confirmed cases of GAS pharyngitis.

Placebo-controlled trials require that there is reasonable belief in clinical equipoise between treatment and non-treatment of a certain condition. As growing evidence emerges over the various risks of antibiotics, doubt also

"Current guidelines suggest antibiotics should be used almost exclusively for GAS pharyngitis."

has grown over the benefit of antibiotics in GAS pharyngitis treatment for symptom improvement and prevention of suppurative and non-suppurative complications. This study aims to sort out what benefit (if any) exists for prescribing antibiotic therapy for children with GAS pharyngitis in high-income countries.

Study Summary: This was a prospective, double-blind, randomized, non-inferiority clinical trial in children with GAS pharyngitis who presented to the emergency departments of 2 pediatric university hospitals and 1 regional hospital in Switzerland. Children were randomly assigned in a 1:1 ratio to receive either a 6-day placebo regimen (intervention group) or amoxicillin tablets (control group). Randomization was stratified by weight groups (<18 kg, 18–24 kg, and >24 kg) and study centers. Amoxicillin dosing was weight-based to achieve the recommended dose of 50 mg/kg/day divided in 2 doses (BID). All patients had a rapid strep test and culture to confirm the diagnosis of GAS. The primary outcome was the difference in the fever duration with the threshold for non-inferiority of 12 hours difference. Secondary outcomes included pain intensity, use of analgesics, treatment failure (defined as any complication or clinical deterioration that the treating clinician felt warranted starting an antibiotic), persistence of symptoms on day 3, GAS pharyngitis complications, and GAS eradication rate at 1 month after enrollment.

The authors recruited and randomized 88 children. However, only 65 children (31 in amoxicillin group and 35 in treatment group) adhered to the treatment schedule. The mean duration of fever was 21.7 hours in the amoxicillin group and 24.6 hours in the placebo group with a mean difference in fever duration of only 2.8 h (95% CI, −6.5 to 12.2). The authors observed no statistically significant difference between the 2 groups regarding the use of symptomatic treatment (acetominophen or non-steroidal anti-inflammatory drugs, or NSAIDs) at day 3.

Treatment failure occurred in 13% (6 patients) in the placebo group and 5% (3 patients) in the antibiotics group. "Treatment failure" in both groups was most commonly otitis media or scarlet fever. One case of retropharyngeal abscess was diagnosed in the placebo group. The relative risk (RR) of treatment failure, therefore, was 2.15, but was not statistically significant (95% CI, 0.44 to 10.57). No subsequent suppurative or non-suppurative complications were observed in either group in the 12-month follow-up period.

There was a significantly higher rate of persistently positive throat culture in the placebo group compared to the amoxicillin group at 30-days after the initial visit, (67% vs. 15%, p=0.002; RR = 4.44 for positive culture at one month.

Editor's Comments: While this was a very small study, it was well designed. Unfortunately, there were issues enrolling more patients related to parental consent and acceptance as well as factors that arose related to the COVID-19 pandemic. Regardless, this study is a landmark study of sorts and will likely garner attention for years to come. Given concerns for complications from untreated GAS pharyngitis, it has been deemed unethical for decades to randomize patients to not receive antibiotics. However, based on more recent data, definitive benefit of using antibiotics for treating this condition has become less clear, especially in the developed world. These results should be interpreted with extreme caution by clinicians in lower income countries and areas with rates of rheumatic fever as these results are likely not generalizable to these settings. Notwithstanding, this study does open the door for further study and even shared-decision making within UC for patients and parents whose values favor medication avoidance. Additionally, despite its small size, we can glean some insights from this small pediatrics study: in the developed world, antibiotics don't seem to do much to shorten the course of illness or reduce symptoms, and children who are not treated with antibiotics are more likely to continue to have GAS present in the oropharynx. ■

Accuracy of Clinician Interpretation of Pediatric Elbow Radiographs

Take Home Point: In this non-clinical exercise, experienced healthcare professionals overcalled a diagnosis of significant injury nearly 50% of the time when examining pediatric elbow radiographs.

Citation: Dann L, Edwards S, Hall D, et al. Black And White: How Good Are Clinicians At Diagnosing Elbow Injuries From Pediatric Elbow Radiographs Alone? *Emerg Med J*. 2024; 41:662–667

"Among participants, 49.7% reported an injury on the normal radiograph."

Relevance: Because of complex patterns of ossification, pediatric elbow x-rays (XR) are difficult to assess for many

non-radiologists. Missing or overcalling fractures can have negative implications on patient outcomes and resource utilization.

Study Summary: This prospective study was conducted via the Free Open Access Medical Education (FOAMed) platform, Don't Forget the Bubbles (DFTB, ISSN 2754-5407). It consisted of 2 parts: a participant survey and a reporting exercise. The survey consisted of 9 questions including participant demographics, specialty, years of postgraduate clinical experience and experience with pediatric elbow XR interpretation. Clinician participants were asked to rate their proficiency in interpreting trauma XRs. The exercise consisted of participants reviewing 10 trauma XRs obtained from a single tertiary pediatric ED within a 20-minute period.

Among those recruited, 318 clinicians (76%) reported that they routinely interpret pediatric elbow XRs in their current clinical role. These 318 clinicians were included in the analysis. The participants comprised 237 physicians, and the remainder were advanced practice providers, nurses, and unidentified healthcare professionals. The clinicians generally had considerable experience with 72.3% of participants having >6 years of clinical experience.

Completely accurate interpretation of all 10 XRs was rare with only 9/318 (2.8%) of correctly identifying whether a fracture was present or not in all images. The Gartland 3 supracondylar fracture was reported correctly most frequently; the lateral condyle fracture, conversely, was reported incorrectly most frequently. Among participants, 49.7% reported an injury on the normal radiograph. The mean number of radiographs correctly interpreted was 5.44 but higher (6.02) for those with >6 years of experience. Emergency Medicine (EM) and Pediatric Emergency Medicine (PEM) clinicians had similar accuracy and were both more accurate than general practitioners (PEM).

Editor's Comments: This was an artificial study outside of a real-world clinical practice setting. The clinicians were not able to obtain a history or examine the patients. It is difficult to ascertain what these results suggest about the actual abilities of these clinicians in interpreting pediatric elbow XR in practice. The rate of fractures being overcalled was high but fits with the clinical reality that EM and UC clinicians commonly will err on the side of conservatism (ie, immobilizing a possible fracture), especially in the care of injured children. ■

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INSIGHTS IN IMAGES

CLINICAL CHALLENGE: CASE 1

Challenge your diagnostic acumen: Study the following x-rays, electrocardiograms, and photographs and consider what your diagnosis might be in each case. While the images presented here are authentic, the patient cases are hypothetical. Readers are welcome to offer their own patient cases and images for consideration by contacting the editors at editor@jucm.com.

55-Year-Old With Wrist Pain

Figure 1.

A 55-year-old woman presents to urgent care complaining of pain when she moves her right wrist. She reports the pain began suddenly when she woke up that morning without any known trauma. An x-ray is ordered.

Review the image and consider what your diagnosis and next steps would be. Resolution of the case is described on the following page.

Acknowledgment: Images and case provided by Experity Teleradiology (www.experityhealth.com/teleradiology).


Figure 2.

Differential Diagnosis
- Acute calcific periarthritis
- Wrist sprain
- Scapholunate dissociation
- Wrist osteoarthritis

Diagnosis
The correct diagnosis in this case is acute calcific periarthritis as the x-ray shows a linear calcification alongside the distal ulna. It is a painful monoarticular condition identified with juxta-articular deposition of calcium hydroxyapatite crystals and local inflammation. It is a clinical subset of hydroxyapatite deposition disease and occurs when crystals are acutely deposited in the periarticular capsular structures: tendons (calcific tendonitis), bursa (calcific bursitis), or shoulder joint (Milwaukee shoulder). Acute calcific periarthritis occurs more frequently in females than males, most often at middle age. There are a few rare genetic risk factors but no proven acquired risk factors.

What to Look For
- Patient will have severe pain of a single joint with focal tenderness, which may not correlate with the typical location of a joint line
- Erythema, warmth, and swelling may or may not be present
- Imaging will show well circumscribed ovoid or curvilinear calcification adjacent to a joint (usually on one side)

Pearls for Urgent Care Management
- Attacks are self-limited, usually lasting a few weeks to a few months
- First line conservative management with non-steroidal anti-inflammatory drugs usually achieves acute symptom improvement within 48-72 hours
- Intralesional corticosteroid injection may be administered
- Typically, calcification decreases in 3-4 weeks with about 6-8 weeks to clear completely

CLINICAL CHALLENGE: CASE 2

15-Year-Old With Fever

Figure 1.

A 15-year-old girl presents to urgent care with complaints of fever, arthralgia, abdominal pain, and a widespread rash that developed over the last 2 days. The patient says that the pain in her knees is severe and debilitating. On examination, the patient has a temperature of 100.3°F (37.9°C) as well as maroon and violaceous, purpuric papules and plaques on the legs, buttocks, and face. Laboratory examination shows elevated erythrocyte sedimentation rate and C-reactive protein, proteinuria, and hematuria.

View the image above and consider what your diagnosis and next steps would be. Resolution of the case is described on the following page.

Acknowledgment: Image and case presented by VisualDx (www.VisualDx.com/jucm).

Figure 2.

Differential Diagnosis

- Acute meningococcemia
- Erythema elevatum diutinum
- Immunoglobulin A vasculitis
- Systemic lupus erythematosus

Diagnosis

The correct diagnosis in this case is immunoglobulin A vasculitis (IgAV), formerly named Henoch-Schönlein Purpura. With unknown etiology, this necrotizing small-vessel vasculitis is the most common form of vasculitis in children aged younger than 10 years. IgAV is seen more frequently in males, White individuals, and those of Asian descent. It is characterized by IgA-immune complex, C3, and fibrin deposition in small vessels: primarily capillaries, postcapillary venules, and occasionally arterioles in affected organs. Almost all patients develop palpable purpura. Other skin involvement may include petechiae, bullae, edema, and necrosis. Joint abnormalities are the second most common symptom and may accompany skin eruptions with severe pain and sometimes swelling, warmth, and tenderness. Ankles and knees are most often involved; symptoms are often transient and migratory.

Severe abdominal pain, vomiting, hematemesis, diarrhea, and hematochezia occur in about 50% of children, and renal involvement occurs in 20%-50% of children but is usually self-limited.

What to Look For

- Episodes can often be preceded by an upper respiratory infection and thus are more common in the fall and winter seasons
- The classic tetrad of symptoms are palpable purpura, abdominal pain, arthritis, and kidney disease
- Prodromal symptoms of fever, malaise, headache, and arthralgias may be present
- No evidence of thrombocytopenia or coagulopathy

Pearls for Urgent Care Management

- A typical episode may persist for 3-6 weeks with spontaneous recovery, but recurrences may happen
- Treatment includes ensuring good oral intake and pain management with nonsteroidal anti-inflammatory drugs and acetaminophen
- Hospitalization is needed for severe disease: severe pain, decreased oral intake, kidney insufficiency, or other complications

INSIGHTS IN IMAGES

CLINICAL CHALLENGE: CASE 3

35-Year-Old With ESRD

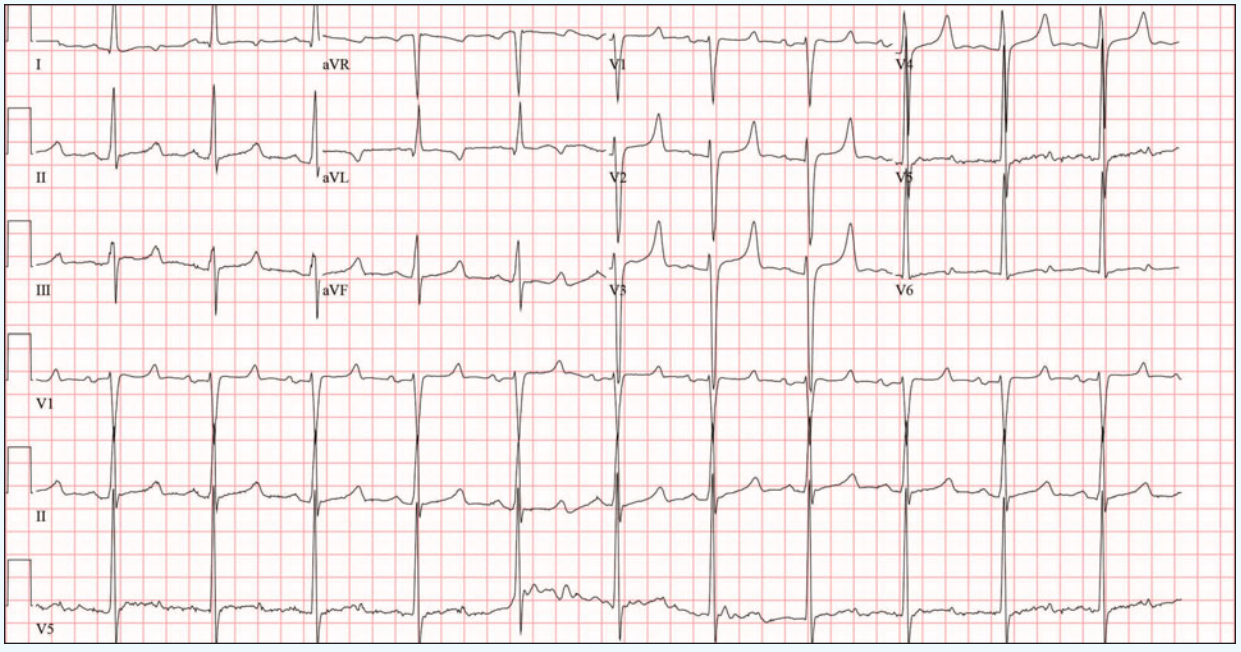


Figure 1: Initial ECG

A 35-year-old male with a history of end-stage-renal-disease (ESRD) presents to urgent care complaining of back pain. The patient missed his dialysis session today because of the pain. An ECG is obtained.

View the ECG captured above and consider what your diagnosis and next steps would be. Resolution of the case is described on the next page.

Case presented by Benjamin Cooper, MD, McGovern Medical School, The University of Texas Health Science Center at Houston, Department of Emergency Medicine.

Case courtesy of ECG Stampede (www.ecgstampede.com).

ECG STAMPEDE

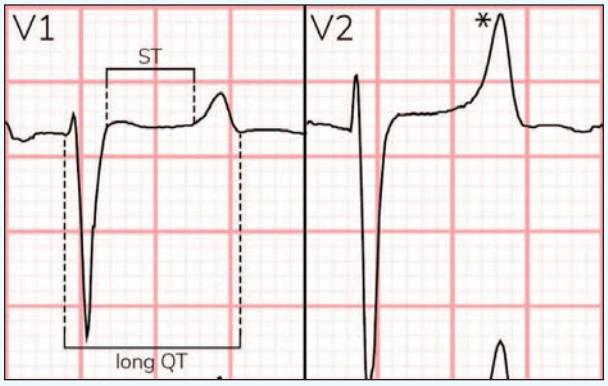


Figure 2: Lengthening of the ST-segment (ST) characteristic of hypocalcemia and peaked T wave of hyperkalemia (asterisk).

Differential Diagnosis

- Hypocalcemia *and* hyperkalemia
- Third degree heart block
- Digoxin toxicity
- Atrial flutter

Diagnosis

The diagnosis in this case is hypocalcemia, hyperkalemia, left ventricular hypertrophy. The rhythm is sinus with a ventricular rate of 70 beats per minute. There are large amplitude QRS complexes across the precordium consistent with left ventricular hypertrophy. There is QT prolongation and a peaked T wave morphology that suggests both hypocalcemia and hyperkalemia.

Discussion

Hypocalcemia characteristically increases the duration of the plateau phase of the cardiac action potential, manifesting as increased length of the ST-segment (**Figure 2**).[1,2] This form of QT prolongation is unique and distinctly different than the delayed repolarization phase experienced during hypokalemia or with QT-prolonging medications. The presence of peaked T waves also suggests hyperkalemia. Electrocardiographic findings of hyperkalemia tend to follow a progression as toxicity progresses. Often, the earliest finding is narrow-based, peaked T waves (ie, pointed on top). At the extreme end of the hyperkalemia spectrum, sine wave morphology is a harbinger of impending ventricular fibrillation.[3–5]

The combination of electrocardiographic findings of hypocalcemia (ie, lengthened ST-segment) and hyperkalemia (ie, peaked T waves) is a classic manifestation of end-stage renal disease. Risk factors for hyperkalemia include renal disease and medications like potassium-sparing diuretics, angiotensin converting enzyme inhibitors, angiotensin receptor blockers, and digoxin.

Patients with characteristic findings of hyperkalemia on electrocardiography should be immediately transferred to the nearest emergency center capable of dialysis by calling emergency medical services. As a temporizing measure, consider nebulizing albuterol (available in most urgent cares) to promote intracellular potassium shifting while awaiting transfer. This patient's total calcium level was 5.2 mg/dL, and the potassium level was 6.5 mEq/L.

What to Look For

- Narrow-based, peaked T waves are often the earliest sign of hyperkalemia
- Prolonged QT by way of ST-lengthening is a unique manifestation of hypocalcemia
- The combination of ECG changes of hyperkalemia and hypocalcemia is classic for end-stage-renal disease

Initial Management, Considerations for Transfer

- Patients with electrocardiographic findings of hyperkalemia should be immediately transferred to the nearest emergency center capable of dialysis
- Consider 10-20 mg of nebulized albuterol as a temporizing measure while awaiting transfer
- If available, intravenous calcium can help stabilize the cardiac membrane when there are electrocardiographic changes of hyperkalemia, particularly QRS widening
- Consider placing automated defibrillator pads while awaiting transport

References

1. Nijjer S, Ghosh AK, Dubrey SW. Hypocalcaemia, long QT interval and atrial arrhythmias. *BMJ Case Rep*. 2010;2010:bcr0820092216. doi:10.1136/bcr.08.2009.2216
2. Bradley TJ, Metzger DL, Sanatani S. Long on QT and low on calcium. *Cardiol Young*. 2004;14(6):667-670. doi:10.1017/S1047951104006134
3. Durfey N, Lehnhof B, Bergeson A, et al. Severe Hyperkalemia: Can the Electrocardiogram Risk Stratify for Short-term Adverse Events? *Western Journal of Emergency Medicine*. 2017;18(5):963-971. doi:10.5811/westjem.2017.6.33033
4. Diercks DB, Shumaik GM, Harrigan RA, Brady WJ, Chan TC. Electrocardiographic manifestations: Electrolyte abnormalities. *Journal of Emergency Medicine*. 2004;27(2):153-160. doi:10.1016/j.jemermed.2004.04.006
5. Mattu A, Brady WJ, Robinson DA. Electrocardiographic manifestations of hyperkalemia. *Am J Emerg Med*. 2000;18(6):721-729. doi:10.1053/AJEM.2000.7344

How 'Data Reviewed' Works When Coding E/M

Phyllis Dobberstein, CPC, CPMA, CPCO, CEMC, CCC

Three elements determine the level for evaluation and management coding (E/M). "Amount and/or Complexity of Data to be Reviewed and Analyzed" is 1 of them and also the most confusing. Data Reviewed remained a point system after guidelines changed in 2021. As an auditor, I see both undercoding and overcoding in E/M caused by not applying the rules correctly.

Let's start with what tests count toward Data Reviewed.

Lab tests—whether performed in-house or sent out to a laboratory—always count toward Data Reviewed. Labs do not require a separate interpretation. They are not a professional service.

Radiology tests rarely count toward Data Reviewed in the urgent care setting where x-rays are performed. If the practice is billing for the interpretation (ie, professional component) of an x-ray, it cannot also count it toward the level of E/M code. This is considered "double dipping," as in, being paid for the same service in 2 different ways.

If you send a patient out for an x-ray, this should be counted towards your E/M level as your practice is not billing for it. If your practice does not bill for the interpretation of an x-ray, you would add a technical component modifier to indicate only the technical component was performed. In this circumstance, you could count the x-rays.

So, how are they counted? Data is divided into 3 categories:

1. Tests, documents, orders, or independent historian(s) (each unique test, order, or document is counted to meet a threshold number)
2. Independent interpretation of tests (not separately reported)
3. Discussion of management or test interpretation with external physician or other qualified healthcare professional or appropriate source (not separately reported)

Phyllis Dobberstein, CPC, CPMA, CPCO, CEMC, CCC, is Revenue Integrity Manager at Experity.

Category 1: Tests and Documents

Review of prior external (notes) from each unique source: If records are obtained and reviewed from an external provider, 1 point can be counted from each source. An external provider is not a member of your group practice. Records could also be from a facility (eg, nursing facility). A review of the records will need to be documented. This item is rare in the urgent care setting.

Review of the result(s) of each unique test: This is also rarely counted in the urgent care setting where practices are ordering and performing the testing they need. In that case, reviewing the test results is part of the encounter and not counted separately.

Ordering of each unique test: As stated above, each lab should be counted as a unique test. A unique test is defined by the CPT code set. A panel is 1 CPT code and is only counted as 1 test. For example, CPT 87428 represents a test for COVID-19, influenza A, and influenza B. It's 1 CPT, so it is only 1 point.

Also counted toward ordering a test are tests "considered but not selected after shared medical decision making." Examples are tests a patient requests that are not necessary or testing the provider recommends but the patient declines. Shared decision making must be documented. It includes "eliciting patient and/or family preferences, patient and/or family education, and explaining risks and benefits of management options."

A common error is to count a lab as both ordered and reviewed. A lab test is counted only once, usually as an order in the urgent care setting. If the patient returns and labs are reviewed that were already counted as ordered, they should not be counted again.

Assessment requiring an independent historian(s): When a history is obtained from an individual (eg, parent, guard-

ian, surrogate, spouse, witness) in addition to the history from the patient, 1 point can be counted for each historian. The historian does not need to be present at the appointment. Common circumstances that require an independent historian are children, elderly parents, individuals with developmental delays, or individuals with psychosis.

Category 2: Independent Interpretation of Tests

Independent interpretation of a test performed by another physician/other qualified healthcare professional (not separately reported): This is rare in the urgent care setting. Urgent care is usually the patient's first stop, so they usually aren't coming in after x-rays were already performed. An example of when an independent interpretation would be counted is when your urgent care provider sends a patient to an orthopedist with a copy of an x-ray for their sprained ankle. Then the orthopedist could count their independent interpretation.

Common errors I see are counting an independent interpretation for tests performed and billed by the practice and counting an independent interpretation when labs are performed. Labs are results only. There is no interpretation to be performed.

Category 3: Discussion of Management or Test Interpretation

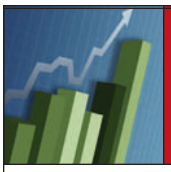
Discussion of management or test interpretation with external physician/other qualified health care professional/appropriate source (not separately reported): This is an exchange between the provider and another party that has impact on the management of the patient's condition, excluding family members. Examples from the American Medical Association (AMA) are a lawyer, parole officer, case manager, or teacher. A common example in the urgent care setting is when one provider calls another provider at the emergency department after sending a patient there. The communication must be direct and not through clinical staff.

Consider this example: The provider treats a patient with respiratory symptoms. A test is ordered for influenza A and B and strep as well as a chest x-ray. The patient declines the x-ray after discussion with the provider.

- **Billed:** 87804 x 2 (flu) and 87880 (strep test)
- **Counted:** 87804 (flu), 87880 (strep test), and 71046 (chest x-ray)

Two labs are counted though 3 are billed; the chest x-ray is counted as it is not being billed.

One of the goals of the AMA was for providers to get credit for all the work that goes into diagnosing a patient. Unfortunately, their guidance in the beginning of 2021 on Data Reviewed was inconsistent, resulting in incorrect information in the urgent care industry. Hopefully, the information above helps to clear up some of that confusion. ■

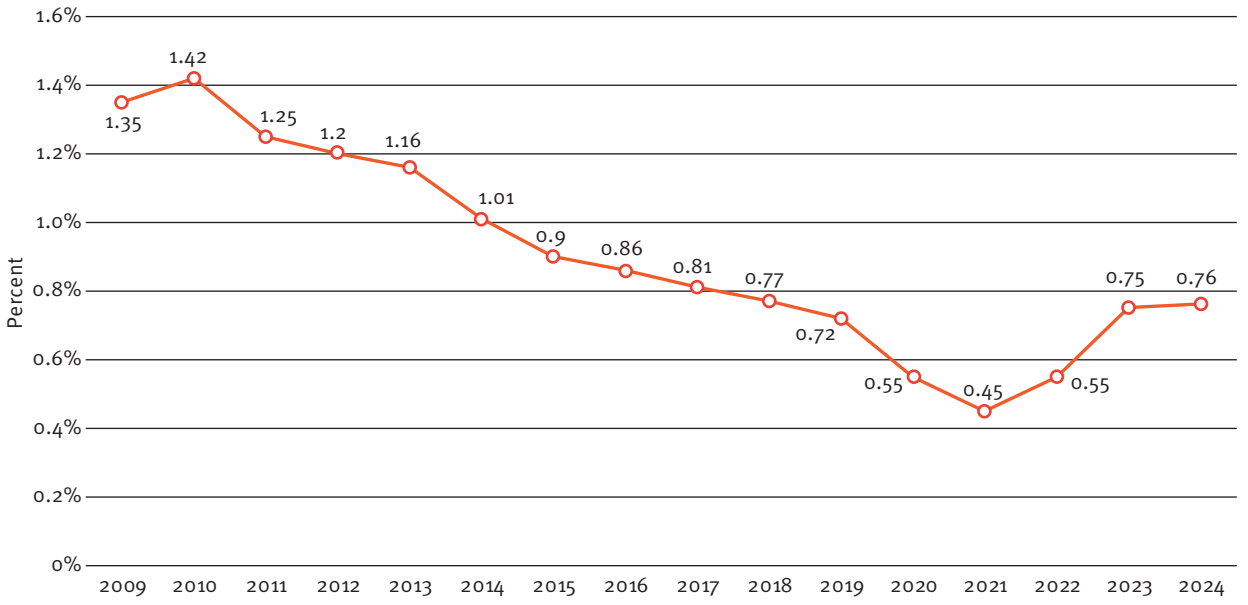


DEVELOPING DATA

Laceration Repairs Rebounding in Urgent Care

Alan A. Ayers, MBA, MAcc

PERCENT OF URGENT CARE VISITS WITH A LACERATION PROCEDURE



The percentage of urgent care visits involving a laceration procedure increased slightly from 0.75% in 2023 to 0.76% year-to-date in 2024, which is on-par with 2018 levels, according to Experity EMR analysis of more than 93.8 million urgent care visits, as of October 6, 2024.

Over the past 15 years, the percentage of patients presenting with a laceration has gradually declined, attributed to a number of factors—chief among them being "case rate" reimbursement. Case rate models pay a contracted, flat rate per visit, regardless of services performed, thus financially disincentivizing procedures that involve extra time and supplies, such as laceration repair.

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Additionally, the urgent care workforce shifted from approximately 30% of urgent care visits attended to by a nurse practitioner or physician assistant in 2009 to more than 85% today, making it less likely that the average urgent care clinic would have the clinical experience necessary to offer laceration repair.

Laceration procedures bottomed out during the pandemic from 2020 to 2022 when many resources were allocated to diagnosis and treatment of upper respiratory conditions, but they have now returned to 2018 levels. In the big picture, the difference between the high point in 2010 and the low point in 2021 reflects a 68.3% decrease.

When an urgent care refers laceration repairs to an emergency department, it not only forgoes additional revenue from visits and charges, but it diminishes its own value proposition of cost savings through emergency department avoidance. ■

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