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URGENT CARE ASSOCIATION

COLLEGE OF URGENT CARE MEDICINE

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The Official Publication of the UCA and CUCM

Rapid Strep PCR Testing and Throat Cultures:

Does Real-World Practice Match Best Practice?

ALSO IN THIS ISSUE

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†Full results appear in 30 minutes. Negative test results for COVID-19, flu A, and flu B are presumptive and should be confirmed using an alternative molecular diagnostic test, if clinically indicated.[1]

PCR, polymerase chain reaction; RT-LAMP, reverse transcription loop-mediated isothermal amplification.

Please see all authorized labeling for LUCIRA® by Pfizer COVID-19 & Flu Test at: LUCIRAbyPfizer.com/hcp/labeling

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References: 1. LUCIRA® by Pfizer COVID-19 & Flu Test. Instructions for Use. Pfizer Inc; 2023. **2.** US Food and Drug Administration, Center for Devices and Radiological Health. LUCIRA® by Pfizer COVID-19 & Flu authorization letter. June 15, 2023. Retrieved September 14, 2023, from https://www.fda.gov/media/163455/download

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Broader Issues Surround 'Work Note Seeking'

Who among us has worked a single urgent care (UC) shift without at least one patient making a humble request for a sick note to take back to work? "Can I have a work note?" It's a simple ask. In fact, apart from medication refills, work note visits rank among the most welcomed presentations for many overworked clinicians, offering a much-needed mental reprieve and a chance to finally catch up with charting. However, while the path of least resistance (ie, providing the note without asking too many questions) may seem harmless, it's worth exploring the knock-on consequences of our frequent complicity in the utilization of urgent care as a "work-note factory."

As urgent care clinicians, we have many responsibilities. We root out disease when present and offer reassurance when it's not. We alleviate the symptoms of the ill and then move on to the next patient. And we do this many, many times a day—all while also trying to keep up with our charting and various inboxes. There's often not even time enough for a lunch break. So while it may require little effort to produce notes for employers on demand, it's equally understandable for frustration to arise when patients present with a singular focus on walking out with a note to give to their supervisor.

Am I the only one who recognizes the absurdity of this?

This frustration, furthermore, can be exacerbated by the common tendency of patients to be less than forthcoming with their motivations until the conclusion of the visit. Over the 12 years I've practiced in emergency departments (ED) and UC centers, I've seen countless patients present for benign and often vague complaints. Sometimes the patients get a workup, sometimes they don't. But not infrequently it's only at the very end of the encounter when the patient will divulge, usually as a feigned afterthought, that the all-important note was the true reason for their visit. "Can I have a work note?" There are those words again.

Underlying Motivation

Of late, I have begun paying closer attention to this phenomenon and find myself wondering why these patients are so compelled to seek out this documentation. What's the underlying motivation here? And, most notably, why is this even *a thing*?

Let me provide a few examples of the broader categories of work-note-seeking behavior that may sound familiar:

1. **The Retroactive Work Note:** "I missed work several days ago, but I'm all better. I need a note saying I was sick."
2. **The Day Off Request:** "I have a headache and/or nausea and/or diarrhea, and I can't go to work today."
3. **The Sick Duty Work Note:** "I have a sick family member at home, and I need to take care of them."
4. **The Anti-Work Note:** "I was sick or injured, and I need a note saying that I'm allowed to return to work."

Each of these scenarios represents a relatively common occurrence, and yet all are slightly different situations. The unifying theme, however, is that we are being asked to be arbiters of the legitimacy of work absences or fitness to return to work. This is a job few of us are trained for and even fewer of us willingly agreed to.

In certain instances, there are clear guidelines that we can look to when faced with such requests. COVID-19 is a perfect example. The Centers for Disease Control and Prevention (CDC) has offered guidance regarding timing of isolation and masking since early in the pandemic.[1]

However, outside of these cases, we are left to our own judgment. And again, few of us have much specific training to guide our determinations, much less the time to probe sufficiently to determine which requests frankly may be inappropriate. Am I the only one who recognizes the absurdity of this? I understand that employers need to hold their workers accountable and prevent excess absences, but have we looked at the toll this expectation takes on the patients or our healthcare system?

Everyone's Doing It

A colleague recently polled various emergency medicine (EM) and UC social media groups. These polls confirmed my suspicion regarding the universality of this experience. With more than 500 total respondents, 76% of EM clinicians stated that they provide a work note at least once per shift. And 78% of UC clinicians said that they do the same one or more times per day.

Healthcare is obviously a business and a *big* business at that—$4.1 trillion per year to be exact. From a strategic standpoint, these patients are low-hanging fruit that have very simple expectations, and their "care" generates millions of dollars in annual revenue. Imagine the healthcare costs this group of patients might represent annually in urgent care alone.

13,000 urgent cares
365 days/year
x 2 patients/day (conservative estimate)

9.49 million visits

That's nearly 10 million UC visits explicitly for work notes. If the average UC visit charge for such a visit is $100—again a conservative estimate—then this represents about $950 million in healthcare spending for work-note-driven visits in UC alone.

As with the examples above, these visits are not always driven out of medical necessity or even patient concern. The next logical question becomes whether illness- and injury-related absences are a medical problem or an employer problem. I argue it is the latter.

Additional Costs

Some employers want to have a deterrent to prevent unnecessary and excessive work absences. Other employers might have liability concerns and need documentation of employee illness and/or fitness. Fair enough. But busy medical professionals and truly ill patients who need timely access to care are compromised when healthcare providers' bandwidth is consumed by these millions of visits explicitly for work notes.

Turns out the legislation regarding this practice isn't very straightforward. Employers generally seem to have the right to ask for a medical provider's note if a patient misses three or more consecutive days of work. Depending on the state, they might ask for a note for any missed work.[2] But what about a note for missing one or two days? This is situation we are faced with most often. Do patients in these circumstances actually "require" a note, or is this just an employer's way of disincentivizing absences?

Not only does this quest for documentation involve use of the patient's time, it also has potential childcare and transportation implications. And of course, there's always the matter of the bill. For uninsured patients, the cost of obtaining a note to avoid jeopardizing their job only compounds the cost of the lost wages for the time they missed.

For patients with coverage, their insurance carriers aren't likely to be very happy about this situation either. For that matter, taxpayers should take objection as well, knowing that many of the patients subject to such employer requirements have publicly funded health insurance because they have lower-income, blue collar, or service industry jobs. It's pretty rare for a lawyer or accountant to ask me for a work note. This highlights the inherent inequities furthered by these policies.

Let's also examine the effect on other parts of the healthcare system. Already overwhelmed, EDs routinely have wait times measured in hours, pushing these patients increasingly to UC centers. Patients presenting for work notes may expose other patients and clinicians to the flu or other contagious illnesses, occupy healthcare workers' time, undergo unnecessary testing, and add to the already rampant epidemic of excessive paperwork.

The Madness of Work-Note Seeking

There is relatively easy revenue for UC organizations in welcoming—or at least not discouraging—work-note-seeking patients, and employers can easily enact mandates demanding such documentation as they bear little of the burden of their impact. However, the employees that find themselves subject to such policies are in an unenviable position, and we as clinicians are dragged into the scene as unwitting and largely unwilling participants.

The solution to this dilemma may not be obvious or simple, but if we don't speak up about the madness of work-note seeking, the trend is unlikely to abate anytime soon. There has to be a better way. A more rational system must be achievable without excessive losses for employers or healthcare systems, while not penalizing those most affected by the status quo: patients and clinicians. I am open to any suggestions. Send an email with your thoughts to editor@jucm.com. ■

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2. Indeed.com Website. Doctor's Note for Work: What It Is and When You Need One. Accessed September 22, 2023. https://www.indeed.com/career-advice/career-development/doctors-note-for-work

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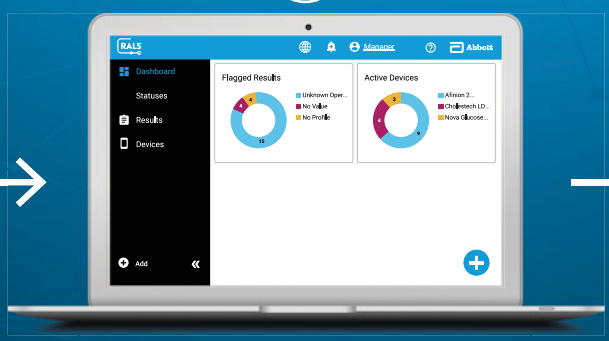

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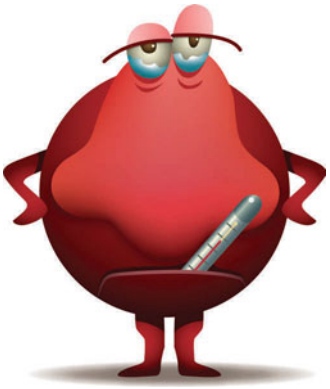

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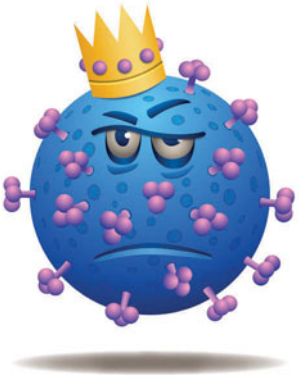

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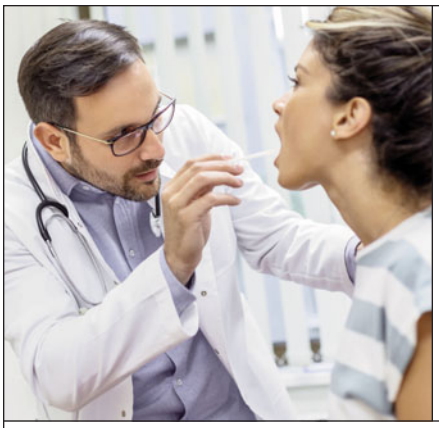

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URGENT INTERACTIONS

LETTERS TO THE EDITOR

In response to the October 2023 Letter From the Editor In Chief Joshua W. Russell, "What Happens If We Do Nothing?

Dr. Russell,

Your letter regarding the risks of iatrogenesis in urgent care should be required reading for every clinician, but in particular every clinician working in every urgent care and every emergency department. All of your points are only further amplified in pediatric UC and pediatric emergency medicine, which are my areas of practice. Kudos to you for bringing this to the fore and highlighting that it's not just a matter of intervention not being helpful but also the very real and significant risk that it can be harmful on multiple levels (individual, community, healthcare system).
Phenomenal work!

Jeff Seiden, MD, MHA
Medical Director, CHOP Urgent Care
Medical Director for Pediatric Services, Virtua Health System
Attending Physician, Emergency Medicine
Children's Hospital of Philadelphia
Professor of Clinical Pediatrics
University of Pennsylvania School of Medicine

"A patient with 5/5 Centor score has only a 51-53% likelihood of testing positive for strep on culture, hence the need for rapid and accurate point-of-care testing. This article establishes that POCT strep PCR testing is not only rapid but also accurate."

— Justin Bowles, MD

Author of Real-World Validation of Rapid PCR Strep Testing in Urgent Care (Page 15)

"Do not practice defensive medicine, but evaluate and document in a way that is defensible."

— Michael Weinstock, MD

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"I joined the Journal of Urgent Care Medicine *to enhance and share pediatric knowledge beyond the tertiary care site so all urgent and emergent care clinicians can have confidence in their pediatric readiness."*

—Brittany Wippel, MD

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A Love Letter

Lou Ellen Horwitz, MA

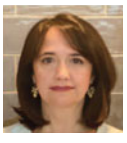
Dear Urgent Care,

I remember the day we first met. It was a long-ago Christmas Eve early in the morning, and I had awakened with a terribly sore throat. I was despondent, knowing no one would be willing to take care of me on the holiday, which meant it wouldn't be a very merry one for me. Then, there you were.

In a brick building on a well-traveled highway, your lights were on and your sign was bright. I turned into the warm welcome of your parking lot, and you took care of me. It was love at first sight. It was many years later before we met again. A friend of a friend reintroduced us, and I fell in love again, this time much more deeply. The more I got to know you, the more I loved everything about you.

Your feisty spirit that wouldn't take no for an answer and rose to meet every challenge that came your way. Your maverick side that said, "the way we've always done it" wasn't in your playbook. Your tender side that wanted to stay focused on each and every individual that came through your doors and to treat them as the remarkable people that they are. Your brainy side that wanted to dive into numbers and science, looking for proof and evidence and returns on investment. Your protective side that reared up when your staff was in danger or being mistreated. Your funny side that could still laugh with friends amidst desperate uncertainty, and your beautiful side that wanted to create a more healing environment for patients and families. How could I not fall in love with you?

As we have grown older together, we've learned together too. We've learned not to be afraid of new market entrants. We've stopped circling the wagons and instead opened the circle to embrace the new—or at least give others the opportunity to be part of what we are doing!



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

"Every time I look at you, I see all the colors that you can show."

We've lost our fear of raising our heads up out of the herd and are learning how to leverage the power of visibility. We've learned that we are resilient and creative and that we are even more so together. We've learned that we still have room to grow and that new expertise is a wonderful thing.

We've learned that scaling is hard, staying small is hard, consistent quality is hard, and that inconsistent quality is harder. We've learned that standards and standardization matter, even though they go against our entrepreneurial grain. We've learned that diversity of thought and diversity among our approaches, our teams, and our patients matters much, and that inclusion is the path to growth. We've learned that partnerships can be critical, having the right team members is crucial, and that there's actually no such thing as the secret sauce in Urgent Care; many different approaches can be successful if the right standards are underneath.

As our relationship has matured and we both have matured, we've made it okay to challenge each other. I call you out on your ways of thinking, and you call me out on mine. I believe it has made me a better person, and I hope it has contributed to the amazing "you" that you have become and continue to become. Every day, I love watching how you reinvent yourself over and over again to adapt to the needs of the world around you and the changes it throws your way. Chameleons may not be thought of as standards of beauty, but every time I look at you, I see all the colors that you can show. And you are beautiful to me.

In the past few months I've shared your story with new people, and it has made me fall in love with you all over again. As you face another challenge or change or opportunity in the coming months, I hope that you will open this up again and remember that you are loved, cherished, appreciated, and one of a kind. ■

Leaders Must Prioritize Goals for the Next Phase in Urgent Care

Ben Barlow, MD

Urgent care medicine is still trying to find its place in the vast medical care landscape. At the same time, the whole "house of medicine" is going through yet another challenging time.

Our journals and the media are reporting that medical providers are feeling demoralized and uncertain of the future. In some clinics, the medical staff shows up focused only on surviving the day. Considering these organizational issues, it can often feel overwhelming when leaders examine where they want to go with their organization and what they want to accomplish. The answers to these issues are challenging, and executing the solution will take intentional leadership and discipline.

During the COVID-19 pandemic, we began to see our greatness emerge. Now is the time to fully realize what we can do as a community of on-demand care providers. Throughout my career in medicine, I have had the privilege of working alongside some truly exceptional mentors and co-leaders. Their guidance and expertise have been invaluable, and I'll share some of their lessons in this article. In addition to my extensive 14-year background in military emergency medicine, I will also draw from the insights and experiences of the successful leaders in the urgent care industry.

My leadership career is also influenced by the four years I spent at the White House Medical Unit, not only caring for but also observing our nation's presidents, leaders, and staff. I observed and learned as our leaders dealt with some of the most pivotal global issues.

As of now, patient volumes per clinic are below 2019 levels, and urgent care operators are asking why.[1] The answers are complex, but it's clear that excellent leadership is needed to address the challenges at hand. What we should not do is blame the staff and providers. We must look at ourselves and ask how we can lead a behavior change in our clinic personnel to execute a strategy of improvement leading to excellence. We need to lead in a way that inspires commitment rather than just compliance.

Ben Barlow, MD, is Chief Medical Officer of Experity

In *The 4 Disciplines of Execution*, the authors describe the whirlwind of the day-to-day job.[2] This description holds true in urgent care clinics. Every day we have patients with unique problems seeking care on-demand. This whirlwind makes it extremely difficult for urgent care providers and staff to spend meaningful time implementing the new goals their leaders are pushing down on them.

In order to pursue our goals as an organizational team, leaders need to clearly communicate a vision for a goal and seek input during the goal-setting process. By involving clinic personnel in the decision-making process, you can inspire their commitment to the cause.

There are a number of ways that urgent care operators will make the future of urgent care bright. Tactics might be new marketing strategies, improved technology, or new services. Regardless of the new goals that are pursued, the execution in how you will meet those goals will make all the difference. I've seen urgent care centers flourish doing primary care and those that limp along. I've seen those that dispense in clinic medications to 40% of their patients and those that failed miserably. The goals where the same, however, the execution was different. Whether a practice succeeds or fails depends purely on how well the leader executes the vision.

Set Your Priorities

The most important detail determining successful execution vs failure is the willpower to focus on just one thing. We all have 3 to 5 great ideas we want to explore, and it's tough not to go after all of them at once. But we need to focus our attention on one big goal—the most crucial goal that makes the most significant impact.

When I transitioned from the White House to being the

chief medical officer of a large urgent care organization, I faced a drastically understaffed provider workforce in my new organization. There were easily 3 or 4 process-improvement goals that we could have focused on. But we knew that filling our many open shifts was the most important. We gathered the data as a team and looked at the problem together. We found even when we used locum tenens, the organization still had 120 open shifts each month out of 3,000. It was important for me as the leader to make sure the team understood filling 2,880 shifts was impressive. However, all 3,000 had to be filled to fulfill the organization's mission.

We came up with several goals as a team, but then we picked one priority goal. Over 6 months, our priority goal was to hire and train enough full-time providers to have zero gaps in our schedule. We identified the current number of providers and what we needed to fill all shifts. I am positive that if I had given my team 3 or 4 goals to accomplish, we would have never achieved the most important one: our full-time provider staffing goal.

After this goal was accomplished, maintaining the full-time provider roster at this level became part of our standard and part of the daily whirlwind. As a team, we then decided our next big goal would be to eliminate locum usage by hiring a large PRN pool. The team accomplished that goal also.

Apply the Technique

Think about all the goals that you want to accomplish, then solicit additional ideas from your staff and teammates. Evaluate each one and decide how much impact it will have. Also start to map out how your organization would embark on a strategy to accomplish the goals. Then go back to the team, share your findings, and select one goal.

If this is new to your organization, it is often best to pick a goal that will give your team a quick win. This will start the momentum going forward for future, longer-term goals. Setting one main goal is going to take lots of evaluation, teamwork, and effort. But by starting with intentional goal setting, you will be ready for execution through selecting and tracking daily behavior drivers. ■

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Release Date: November 1, 2023
Expiration Date: October 31, 2024

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

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What Urgent Care Operators Need to Know About Pay Transparency (Page 27)

1. **Estimates indicate what percentage of the US labor force is covered by pay-transparency regulations?**
   a. 14%
   b. 21%
   c. 25%
   d. 33%

2. **Estimates indicate that women working full time are paid about what percentage compared to men working full time?**
   a. 84%
   b. 89%
   c. 91%
   d. 93%

3. **Which factors do pay-transparency laws attempt to reduce?**
   a. Payment inequities
   b. Discrimination by age
   c. Discrimination by religion
   d. All of the above

Detection and Management of Urinary Calculi in the Urgent Care Setting (Page 31)

1. **How common are urinary calculi?**
   a. Affect 2% of the world's population
   b. Affect 3% of the world's population
   c. Affect 5-10% of the world's population
   d. Affect 50% of the world's population

2. **Which of the following may be present in patients with urinary calculi?**
   a. Flank pain
   b. Hematuria
   c. Vomiting
   d. All of the above

3. **Which locations of urinary calculi may cause pain that radiates to the groin?**
   a. Kidney
   b. Ureteropelvic junction (UPJ)
   c. Ureterovesical junction (UVJ)
   d. Bladder

Diabetic Ketoacidosis Due to Intra-articular Steroids: A Case Report (Page 39)

1. **All of these are considered benefits of intra-articular steroid injections except:**
   a. Reduced pain
   b. Increased mobility
   c. Greater glycemic control
   d. Safer than systemic steroids

2. **Which patients may have up to a 70% increase in blood glucose 2 hours after intra-articular steroid injection?**
   a. Those with diabetes
   b. Those without diabetes
   c. Those with previous steroid injections
   d. Those with urinary tract infections

3. **How long should patients with diabetes be advised to monitor blood glucose after intra-articular steroid injection?**
   a. For at least 3 days
   b. For at least 1 week
   c. For at least 10 days
   d. For at least 2 weeks

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Real-World Validation of Rapid PCR Strep Testing in Urgent Care

Urgent Message: The diagnosis of bacterial pharyngitis is often difficult. Rapid polymerase chain reaction testing has potential to improve diagnostic certainty. Despite high accuracy rates, many urgent care providers continue to seek confirmation by throat culture.

Justin Bowles, MD, Supreet Ghumman, MS4

Citation: Bowles J, Ghumman S. Real world validation of rapid PCR strep testing in urgent care. *J Urgent Care Med.* 2023;18(2):15-21

Key Words: bacterial pharyngitis; PCR testing

Abstract

Introduction: Point-of-care polymerase chain reaction (PCR) testing for strep pharyngitis has recently been adopted as the preferred method of rapid testing for pharyngeal group A strep (GAS) infection in many urgent care (UC) centers. Despite the high published accuracy of PCR for GAS (sensitivity 94.2% and specificity 98%), many medical providers continue ordering confirmatory throat cultures.

Methods: This was a multisite retrospective chart review of patients seen throughout a regional network of UC centers in Washington state who were tested for GAS. Patients were included if they had a resulted strep PCR and throat culture to validate the accuracy of the point-of-care testing (POCT) strep PCR in a real-world setting.

Results: A false negative PCR result (PCR -, culture +) was identified in only 6 cases (2.3%). True negative PCR findings (PCR -, culture -) resulted in 247 cases (95.7%). Specificity was calculated to be 99.3% (NPV= 97.6%), which closely approximates the manufacturer's reported value. Five patients were identified as having a true positive test (PCR +, culture +), and two had a false positive (PCR +, culture -). Non-GAS, not testable with this PCR strep test machine, was revealed on 7% (26/383) of all throat cultures. An antibiotic was prescribed presumptively in 42% (159/383) of cases. Oral steroids were given for symptomatic treatment in 129 of the 383 (33.6%) cases. Centor scores were calculated for all patients. No difference in the average scores was identified when calculated for the several subcategories of patients identified to have GAS, non-GAS, true positive,

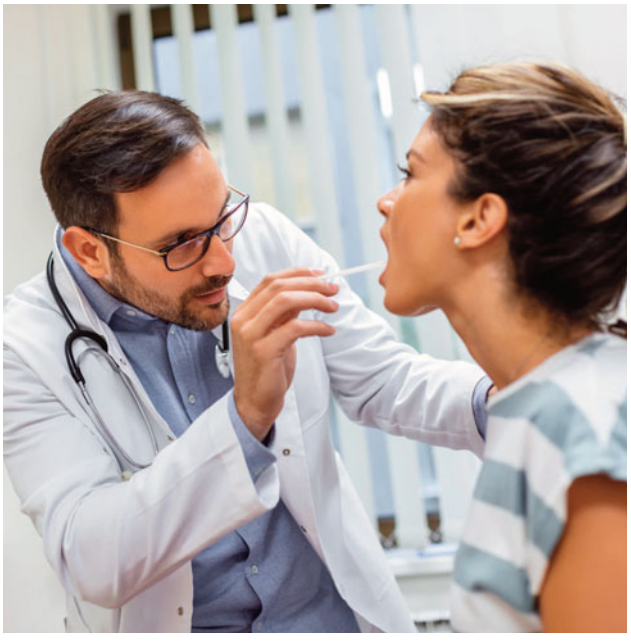

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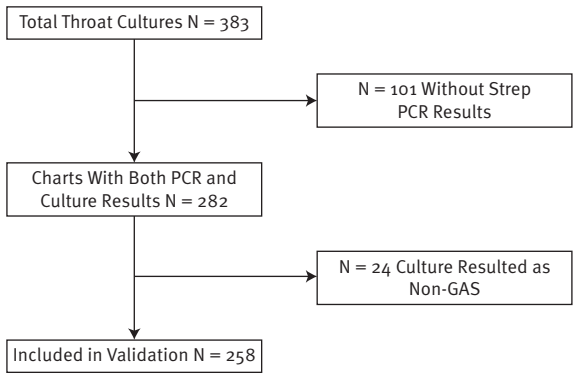
Figure 1. Chart Selection



Charts were excluded for lacking finalized culture results. Additionally, cultures resulting in Non-GAS cannot be used to validate PCR tests as it is not testing for Non-GAS.

true negative, false positive, or a false negative. Each category scored approximately 2 out of 5 (range: 1.8–2.2), suggesting that throat cultures were being used for confirmation on the least obvious cases.

Conclusion: Despite excellent specificity, ordering of confirmatory throat cultures was common in this urgent care network. This practice as well as presumptive antibiotic treatment while culture is pending suggests a lack of clinician confidence in the validity of a negative PCR strep test result. The test characteristics in this chart review study correspond with the industry published specificity of POCT strep PCR testing and should reassure acute care providers as they incorporate this new technology into their practice.

Introduction

Acute pharyngitis is among the most common conditions encountered in outpatient clinical practice in the United States.[1,2] Although most cases of acute pharyngitis are caused by respiratory viruses, group A streptococcus (GAS), also known as *Streptococcus Pyogenes*, is responsible for 5–15% of cases in adults and 20–30% of cases in children. It is the most common bacterial pathogen involved in cases of pharyngitis in children and adolescents.[3,4]

Clinical diagnosis of GAS pharyngitis is challenging due to its overlapping symptomatology with other infectious and non-infectious etiologies.[5,6] The Centor Score has been an essential part of acute pharyngitis assessment for over 30 years in adults.[7] The original Centor criteria were later modified by McIsaac et al. in 1998 to include age. This addition allowed its use for children.[8]

"PCR strep testing has been shown to be more accurate than antigen testing and significantly decreases inappropriate antibiotic use."

A score of 4 or greater correlates with a 56% probability of a GAS-positive culture. This clinical assessment tool helps differentiate GAS from other etiologies of pharyngitis, however, it is not sensitive or specific enough to definitively rule in or rule out GAS infection.[7,8] Rapid antigen detection tests (RADT) for GAS are common in the acute care setting, however their sensitivities are generally <90%,[9] and therefore the Infectious Disease Society of America (IDSA) recommends that negative RADT be confirmed via throat culture for all children.[5]

Point-of-care laboratory testing (POCT) involving polymerase chain reaction (PCR) technology is a recent addition to many urgent care clinics. PCR strep testing has been shown to be more accurate than antigen testing and significantly decreases inappropriate antibiotic use.[10] Nascent bedside PCR tests, like those for COVID-19 and influenza, lack an immediately available gold standard for comparison, requiring clinicians to rely on industry-published accuracy data.

Study Design

The Cobas Liat® strep A nucleic acid test became available in the urgent care clinics involved in this study in Washington state in 2022. Despite the industry-published sensitivity and specificity of 94.2% and 98% respectively,[11] many clinicians continued to seek confirmation rapid PCR tests by throat culture. This practice style created an opportunity to validate the accuracy of the POCT strep PCR machine under real-world conditions.

All visits with either a rapid strep test or throat culture ordered during the 3-month period of August 2022 to October 2022 by 71 medical providers at 32 different Indigo Urgent Care centers in Washington state were screened for eligibility. From there, 418 charts were identified. Thirty-five of these cases lacked a finalized throat culture (**Figure 1**). A recent PCR strep test (within the previous 7 days) was not available in 101 cases, yielding 282 patient encounters with both a resulted

Figure 2. Number of True Positives, False Positives, True Negatives, and False Negatives Per Age Group and Gender

Age	Number of charts	True positive	False positive	True negative	False negative
<3 yo	1	0	0	1	0
3 - 14 yo	44	0	1	43	0
15 -44 yo	210	3	1	200	6
>45 yo	27	0	0	27	0

Gender	Number of charts	True positive	False positive	True negative	False negative
Female	175	1	1	170	3
Male	105	1	1	101	2
Not disclosed	1	0	0	0	1
Other	1	0	0	1	0

Centor Score By Age							
Age	**-1**	**0**	**1**	**2**	**3**	**4**	**5**
<3 yo	0	0	0	0	1	0	0
3 - 14 yo	0	16	4	10	4	6	4
15 -44 yo	0	55	43	64	36	11	0
>45 yo	3	15	4	4	2	0	0

Figure 3. Study Results

	Culture Positive	Culture Negative	
PCR Positive	True Positive = 3	False Positive = 2	PPV = 60%
PCR Negative	False Negative = 6	True Negative = 247	**NVP = 97.6%**
	Sensitivity = 30%	**Specificity = 99.2%**	

PCR test and a corresponding throat culture. Twenty-four patients had group C strep or group G strep (non-GAS) growth on the throat culture.

The Cobas Liat® strep A nucleic acid test was used for PCR testing; it does not detect non-GAS strains. Therefore, these charts were also excluded from the PCR test validation, although they are included in calculations not involving PCR results. The PCR test findings were compared with the culture result as a gold standard to categorize each as a true or false, positive or negative PCR result in the remaining 258 charts. The project was reviewed by the MultiCare Institutional Review Board and given a waiver given its retrospective design as a chart review study.

Results

Demographic information was collected on the 282 charts with both rapid PCR and strep culture results. Despite the higher incidence of strep throat among pediatric patients, only 44 of the 282 (16%) charts reviewed were younger than 14 years old. All 6 of the cases with a negative PCR and a positive throat culture (the false negatives) were in the category of 15 to 44 years old. Sixty-two percent of the study participants were female (175/282). The incidence of a false negative PCR result was very similar between males and females at 2:3 (**Figure 2**).

Centor scores were categorized according to age. The patients who scored the highest Centor value of 5 were all in the age group of 3 to 14 years old, and the lowest possible score of -1 was only found in those >45 years old. This is not surprising because in the age-modified Centor scoring, a point is added for patients 3 to 14 years old, and a point is subtracted for patients >45 years old.

The throat culture was positive in 9 of the cases included for validation. Three of these culture positive cases had a previous positive PCR, representing a true positive PCR result (1.2%, 3/258). The 6 remaining pos-

Figure 4. Antibiotic Use

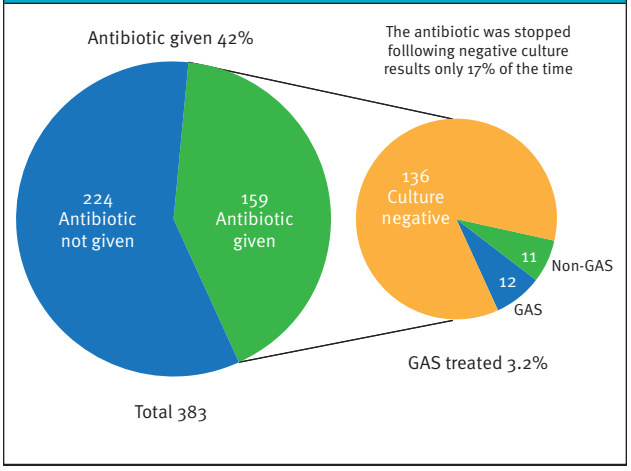
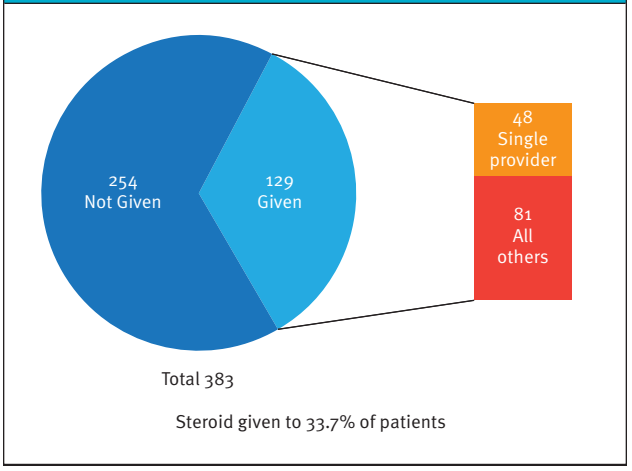


Figure 5. Corticosteroid Use



itive throat cultures had a corresponding negative PCR. This signifies a false negative PCR rate of 2.3% (6/258). Some 247 charts revealed both a negative PCR and negative throat culture, resulting in a true negative rate of 95.7%. Two cases were identified as having a positive PCR test that later yielded a negative culture, denoting a false positive result (0.8%, 2/258), given that the throat culture is the gold standard of comparison. Subsequently, the specificity was calculated to be 99.2% (NPV= 97.6%). From the available data included in this study, the sensitivity was 30% (PPV 60%). Non-GAS was identified on 7% (26/383) of the throat cultures (**Figure 3**).

A total of 383 charts included a throat culture result allowing a strep infection to be confidently identified. An antibiotic was empirically prescribed in 42% (159/383) of cases (**Figure 4**). The culture was negative in 136 charts. Thus, a bacterial infection was present in 6.0% (23/383) of individuals. Only 11 of these infections were confirmed to be due to GAS. Of the 383 patient charts reviewed, steroids were prescribed in 129 cases (33.7%).

The rate of empiric antibiotic therapy and symptomatic steroid treatment is highly variable between medical providers. It was observed that a single provider, who participated in 14% of the patient encounters (59/418), ordered 37% (48/129) of the total number of corticosteroids and 26% (41/159) of the total antibiotic prescriptions. When this provider's data is excluded as an outlier, the rate of antibiotics and corticosteroids prescribed decreases by 6% (118/324, 36%) and 8% (81/324, 25%), respectively.

Discussion

This study provides real world validation for the Cobas Liat® strep A nucleic acid test by revealing a specificity (99.2%) very near the published value of 98%. Due to a relatively low number of PCR positive results having an associated throat culture (N=5), the calculated sensitivity of 30% is almost certainly spurious and related to the appropriate practice of not sending cultures when initial POCT PCR testing is positive.

The throat culture revealed non-GAS as a possible cause of the patient's pharyngitis in 26 cases. Rapid PCR testing for *S. pyogenes* does not evaluate for non-GAS strains, thus corresponding PCR tests are expected to be negative. The primary goal for antimicrobial therapy of bacterial pharyngitis, according to the IDSA, is for the prevention of acute rheumatic fever and suppurative complications including peritonsillar abscess, cervical lymphadenitis, and mastoiditis.[6] Non-GAS pharyngitis is not known to trigger acute rheumatic fever. Also, patients with group C and G strep frequently experience less severe symptoms of fever, throat erythema, and lymphadenopathy and higher rates of cough and rhinorrhea when compared with those with group A strep; therefore, treatment of non-GAS is thought to be of little benefit. When treatment is indicated, the same regimens recommended for GAS pharyngitis are suitable for non-GAS, yet a course of 5 days (rather than 10 days) is reasonable.[12] For these reasons, these 26 charts were not included in the overall analysis.

Patients with pharyngitis are frequently treated empirically with antibiotics pending throat culture results. In this study population, an antibiotic was prescribed in 42% of cases (**Figure 4**). A bacterial infection, however, was present in only 6.0% of individuals. As treatment of non-GAS is often not appropriate, antibiotics were likely only indicated in 2.9% of the cases. This high rate of pre-

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sumptive treatment suggests a lack of confidence in the accuracy of a negative PCR test and a general trend to overprescribe antibiotics for pharyngitis in UC.

This is significant because, according to the IDSA clinical practice guidelines, "with the exception of very rare infections by certain other bacterial pharyngeal pathogens (eg, *Corynebacterium diphtheriae* and *Neisseria gonorrhoeae*), antimicrobial therapy is of no proven benefit as treatment for acute pharyngitis due to organisms other than GAS."[5] Best practice for appropriate antibiotic stewardship, in the case that a patient is treated presumptively for GAS, would be to discontinue treatment as soon as the culture resulted negative. This occurred only 17% of the time (23/136).

Despite only mild benefit, the availability of other analgesics with significantly fewer risks, and the IDSA guidelines recommending against the use of glucocorticoids, oral steroids were prescribed in over one-third (33.7%) of cases by the providers in this study for symptomatic treatment of sore throat (**Figure 5**).[5, 13] While corticosteroids have been shown to decrease the duration and severity of symptoms in GAS pharyngitis, the actual reduction in pain duration is less than 6 hours on average.[13]

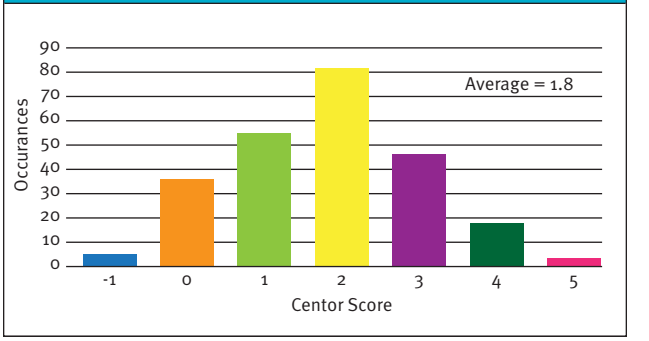
Centor scores were calculated for all patients with a strep PCR and throat culture result to objectify severity and hint which patient presentations prompt the ordering of a throat culture to confirm a PCR test. The Centor Criteria is a scale from -1 to 5, assigning points for age, fever, lack of cough, tender or swollen anterior cervical lymph nodes, and tonsillar swelling or exudate. No substantial difference was identified in the average Centor score for any of the studied subgroups; culture identified GAS (2.1) and non-GAS (1.8), or true positive (2.0), false positive (2.0), false negative (2.2), and true negative (1.8) PCR results (**Figure 6**).

Finally, several charts were excluded from the study because the throat culture was part of a sexually transmitted disease work up. This hints that some medical providers do not understand which organisms grow on this throat culture medium or what specific tests are appropriate when a patient being evaluated for a sexually transmitted disease also has complaints of a sore throat.

Limitations

This chart review study includes important and noteworthy limitations. Most importantly, the study was retrospective in design and involves only chart review. It is unclear why certain providers may or may not have ordered confirmatory cultures in cases of negative rapid PCR testing. Moreover, it is unlikely that the 71 medical providers included in the study were operating under a single rationale when deciding to order a throat culture or treat with an antibiotic or steroid. It cannot even be assumed that a single provider used similar logic with each patient they evaluated. There are many reasons that one may opt for these tests and treatments. This may include patient request or concern, provider practice habits, previous poor outcome, practicing defensive medicine, conservative practice style, or even electronic medical record order sets.

Figure 6. Charts With True Negative By Centor Score



The study was conducted over only a 3-month period in the late summer and fall. It is unclear whether test ordering and prescribing patterns may have had seasonal variability based on this limited period of data collection.

Another limitation to this study is that strep PCR tests and throat cultures in the UC clinics require different swab material and collection medium, thus some of the variability between PCR and throat culture practices may result from swab collection quality. In real-world conditions, the quality of the sample collected cannot be standardized and will vary between providers.

Conclusion

As new point-of-care testing becomes available for use, providers are confronted with the dilemma of whether and how to change their practice. In the summer of 2022, our network of UC clinics was confronted with this situation when PCR GAS testing became available for use, touting a highly accurate result in 20 minutes. In many cases, medical providers in our centers continued to order confirmatory throat cultures despite usually negative results.

False negative PCR tests were rarely identified by throat culture with a specificity of 99.3% (NPV= 97.6%). These results correspond with the industry reported values and offer reassurance to acute care practitioners that this technology is safe to include in their practice.

Non-GAS was discovered on 7% of all throat cultures included in the study. Non-GAS pharyngitis symptomatology is frequently less severe, suppurative complications are fewer, and do not lead to rheumatic fever when comparted to GAS.[14,15] Thus, the significance of identification and treatment are controversial. As non-GAS species are not tested on with the PCR test, culturing the throat to identify group C strep or group G strep is not a valid clinical rationale for obtaining a culture.

In the charts reviewed, antibiotics were prescribed 13 times more often than indicated. This surprisingly high rate of antibiotic treatment suggests that UC providers may overestimate the incidence of GAS, or patient satisfaction may be trumping antibiotic stewardship.[16] Additionally, oral steroids, which are rarely indicated, were used for symptomatic treatment in over one-third of the patient encounters.

"The accurate diagnosis of GAS pharyngitis has been a perpetual and central issue for acute care clinics."

Our data also suggest that the rate of empiric antibiotic therapy and symptomatic steroid treatment is highly dependent on practice styles. For example, a single provider who participated in 60 of the 415 patient encounters (14%) ordered 38% (49/129) of the total number of corticosteroids and 25% (41/161) of the antibiotics.

This study was designed to validate the rapid strep PCR test to determine the necessity of confirmatory throat cultures following a negative result. A future quality improvement study could include presenting our internal data to medical providers and conducting a post-intervention chart review to evaluate if any change in practice was achieved. Additionally, a more accurate sensitivity could be assessed by requesting that medical providers order throat cultures after a positive PCR for a short, specified period of time. However, the ethics of this study would be problematic unless there were funding to ensure the cost of these mostly unnecessary cultures is not passed on to the patients.

The accurate diagnosis of GAS pharyngitis has been a perpetual and central issue for acute care clinics. Clinical criteria in combination with POCT can aid this evaluation. The advent of rapid PCR testing has the potential to improve diagnostic accuracy and decrease the inappropriate use of antibiotics. Confirmatory throat cultures and presumptive antibiotic treatment increases cost and risk to the patient. This chart review supports the industry published specificity of POCT GAS PCR testing and should offer reassurance for UC clinicians as new technology is increasingly integrated into UC practice. ■

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What Should We Do with the Nail? Nailbed Repair in Children

Take Home Point: After nail bed repair, discarding the fingernail was associated with similar rates of infection and similar cosmetic outcomes compared to replacement of the fingernail.

Citation: Jain A, Grieg A, Jones A, et al. Effectiveness of nail bed repair in children with or without replacing the fingernail: NINJA multicentre randomized clinical trial. *BJS*, 2023, 110, 432–438 https://doi.org/10.1093/bjs/znad031

Relevance: Procedures for nail bed injuries in children are common, and one of the key surgical decisions is whether to replace the nail plate following repair.

Study Summary: This was a two-arm 1:1 parallel-group, open, multicenter, superiority randomized controlled trial performed across 20 hospitals in the United Kingdom (UK) to assess whether discarding the fingernail during nailbed repair was superior to retaining it. Included were children under 16 years old with acute nailbed injury <48 hours old who were believed to require surgical repair. Interventions involved were to replace fingernail or substitute (ie, foil), compared to discarding the fingernail and applying a low-adherent dressing. Follow-up assessments involved a clinical appointment between 7—10 days after operation and a participant-reported questionnaire at 7–10 days after the procedure and again at 4 months with a reporting window of up to 12 months.

The authors randomized 451 patients (224 nail discard, 227 nail replace). There was no significant difference in cosmetic appearance between the groups. There was no evidence that replacing the nail after the procedure offered reduced pain at dressing change. The early infection rate (day 7) was 2.2% in the nail-replaced group versus 0.9% in the nail-discarded group (trend, but not statistically significant). The health economics analysis revealed, unsurprisingly, that replacing the nail was associated with significantly longer procedure time and cost.

Editor's Comments: Patients in the study were seen and treated in a secondary care setting, therefore caution is suggested regarding its generalizability to urgent care (UC). However, it is likely these were, on average, more complicated nailbed injuries than typically seen in UC as well given the study stetting. The findings do suggest a reasonable argument for a "less-is-more" approach to children presenting with nailbed injuries in UC—especially given the additional clinician time and patient discomfort associated with more elaborate repair techniques. This option certainly merits further investigation in both UC practice settings and adult populations. ■

Uncertainty Within New Specialists and Practitioners

Take Home Point: There is a need for newly graduated clinicians to have psychologically safe, reflective spaces to think through uncertainties with others.

Citation: Collini A, Alstead E, Knight A, et al. "You may think that the consultants are great, and they know everything, but they don't": Exploring how new emergency medicine consultants experience uncertainty. *Emerg Med J*. 2023;40:624–629. doi:10.1136/emermed-2022-213013

Relevance: Uncertainty is inherent in the practice of medicine, particularly at times of transition, but managing uncertainty is often not addressed explicitly in practitioner training.

Study Summary: This was an interpretive phenomenological analysis (IPA) to examine how new emergency medicine (EM) consultants (attendings) in the United Kingdom experience uncertainty. IPA is a method for analyzing data that centers the individual and their lived experience involving a "double hermeneutic" process, where the phenomenon being studied is interpreted and expressed by the participant then further interpreted by the researcher. IPA uses small sample sizes with relatively homogenous characteristics to maintain focus on the individual while identifying patterns across data.

The authors performed analysis on 5 consultants (2 female, 3 male), working in different locations in the UK, with experience as a consultant/attending ranging from

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5-11 months. All had completed their EM residency training in the UK. Three superordinate themes were identified: 1) transition and performance as a source of uncertainty; 2) uncertainty and decision-making in the context of the emergency department (ED); and 3) sharing uncertainty and asking for help. These were compounded by a perceived lack of useful feedback. Sharing uncertainty and asking for help were seen as beneficial but potentially risky due to the perception of the participants that certainty is expected of them in their roles.

Editor's Comments: There was no data collected regarding age, ethnicity, or other relevant experience of the participants, which limits its transferability. The small number in the study also limits its generalizability. The study does highlight the need for more work to be done on the matter in the UC sector with an expanded scope to include other practitioners as well. Psychological safety has been demonstrated in a variety of settings to be an important factor for healthcare team performance to minimize the risks of medical error. ■

Does Cold Air Really Help in Treatment of Croup?

Take Home Point: A 30-minute exposure to outdoor cold air (‹10°C or ‹50°F), as an adjunct to oral dexamethasone, is beneficial for reducing the intensity of clinical symptoms in children with moderate croup symptoms.

Citation: Siebert JN, Salomon C, Taddeo I, et al. Outdoor Cold Air Versus Room Temperature Exposure for Croup Symptoms: A Randomized Controlled Trial. *Pediatrics*. 2023;152(3): e2023061365

Relevance: Nonpharmacological measures such as mist therapy and exposure to cold air have been anecdotally cited as remedies for croup, however, limited data exists to support their efficacy.

Study Summary: This was a prospective, open-label, single-center, randomized controlled trial conducted in a tertiary pediatric emergency department (ED) in Switzerland. Participants were randomized on a 1:1 ratio to wait 30 minutes outside the ED (within sight of the triage desk) exposed to outdoor cold air (intervention group) ‹10°C or ‹50°F or to wait inside the ED where ambient air is pulsed between 24 to 25°C or 75.2°F to 77°F (control group). All participants received of a single 0.6 mg/kg dose of oral dexamethasone at time of arrival and prior to intervention. The primary outcome was the proportion of participants showing clinical improvement defined as a decrease in Westley Croup Score (WCS) ›2 points from baseline at 30 minutes.

The authors randomized 118 children and found the number of patients showing a reduction of at least 2 points in WCS at 30 minutes after triage was significantly higher in patients allocated to the cold air exposure group, which was statistically significant. Patients with moderate croup had the greatest benefit from the intervention. Symptoms were completely resolved in 44.2% of children in the intervention group and 32.1% of children in the control group on the day 7 follow-up call. No adverse events were recorded in the trial with no readmissions for croup/respiratory conditions recorded in the subsequent 7-day period.

Editor's Comments: The single center, small numbers and unblinded nature of the study limits its generalizability and potentially introduces various forms of bias. The results do lend credence to the historic home remedy of cold air exposure as a useful means to assuage children with mild to moderate croup symptoms and is a low risk adjunct that parents can continue safely at home. ■

Treating Nausea With Inhaled Isopropyl Alcohol

Take Home Point: In this systematic review, inhaled isopropyl alcohol had a modest effect in reducing nausea among ED patients.

Citation: Lee SY, Tamale JR. Isopropyl alcohol inhalation for the treatment of nausea in adult emergency department patients: a systematic review and meta-analysis. *Emerg Med J.* 2023; 40:660–665. doi:10.1136/emermed-2022-212871

Relevance: Nausea is a common, debilitating, and frequently refractory symptom for patients presenting to acute care settings. Inhaled isopropyl alcohol (IPA) has shown some promise in relief of nausea and has favorable features in its safety and rapidity of onset.

Study Summary: This was a systematic review of present evidence on the use of inhaled IPA for treatment of nausea among patients presenting to an ED. The authors included studies that compared inhaled IPA to routine care or placebo in the treatment of adult ED patients with nausea. The authors identified 3 studies that were suitable for the meta-analysis, with a total of 275 participants. They found that patients treated with inhaled isopropyl alcohol reported

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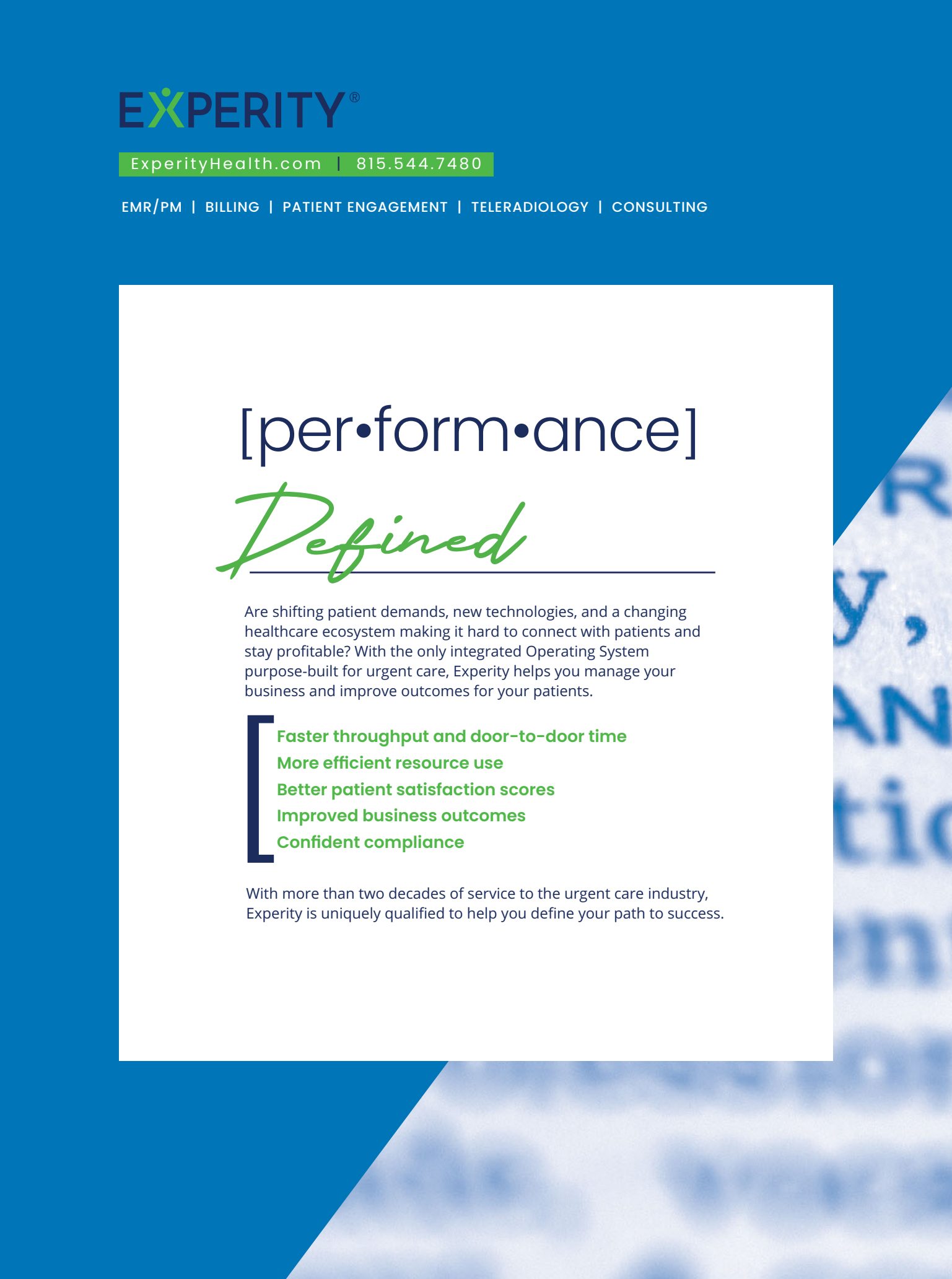

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a 2.18 point reduction on a 0-10 visual analog scale (VAS) for nausea severity, as compared with an inhaled saline as placebo. This was felt to be clinically significant. Only one study assessed the proportion of patients who vomited during their ED stay and did not find any difference between the intervention and control groups.

Editor's Comments: The limited number of studies identified along with the low number of pooled participants limit conclusions regarding inhaled IPA as a nausea intervention. Additionally, nausea is a non-specific symptom and can be caused by conditions ranging from vertigo to bowel obstruction to early pregnancy. It is unclear from existing data for which etiologies of nausea inhaled IPA may be more or less effective. There is certainly opportunity for interested UC clinicians to study the efficacy of inhaled IPA further among various groups of patients, including children. ■

Injectable Metoclopramide For Migraines – Is it our Best Parenteral Option?

Take Home Point: 10mg of intravenous metoclopramide is effective in treating acute migraine attacks and superior to many alternatives.

Citation: Abdelmonem H, Abdelhay H, Abdelwadoud G, et al. The efficacy and safety of metoclopramide in relieving acute migraine attacks compared with other anti migraine drugs: a systematic review and network meta-analysis of randomized controlled trials. *BMC Neurology*. (2023) 23:221. https://doi.org/10.1186/s12883-023-03259-7

Relevance: Acute migraine relief is sought by many UC patients. There are numerous treatments for migraines to choose from. Metoclopramide is a relatively common injectable antiemetic with a reasonable safety profile, and therefore, well suited as a potential abortive for UC use.

Study Summary: This was a systematic review and meta-analysis of studies comparing intravenous (IV) metoclopramide with other treatments for acute migraine. The authors included all randomized clinical trials that investigated the effect of metoclopramide alone (of any dose or route) without any combination with an active drug in relieving acute migraine. They compared it with placebo or any other active anti-migraine drugs such as prochlorperazine, chlorpromazine, ketorolac, valproate, sumatriptan, bupivacaine, granisetron, dexketoprofen trometamol, dexamethasone, magnesium sulfate, pethidine, sumatriptan, and ibuprofen.

The authors included 16 randomized clinical trials with 1,934 pooled patients—826 of whom received metoclopramide for analysis. They found that 10mg of IV metoclopramide had efficacy in decreasing headache scores at every time point from 15 minutes–1 hours and was superior to placebo, sumatriptan 6mg subcutaneou injection, and prochlorperazine 10m IV, most notably. The recurrence rates were similar between all anti-migraine therapies Metoclopramide significantly decreased the incidence of nausea and had relatively few and minor adverse reactions. The IV route was most efficacious although intramuscular administration also was superior to placebo but not IM prochlorperazine.

Editor's Comments: The results do suggest that metoclopramide is safe and efficacious to use in both reducing the headache symptoms of migraine as well as nausea and vomiting. Migraine treatment is rarely achieved with a single agent in clinical practice. Rather patients typically take over-the-counter medications and/or prescription medications for migraine prior to presenting to an UC for an acute headache. This study does not clarify to what extent metoclopramide adds additional relief in combination with other therapies. Additionally, IV administration in UC is infrequently feasible and the effects of IM dosing have not been as robustly studied. Finally, as migraine is a recurrent problem for most patients, it is also appropriate to confer with patient about what therapies have worked and have been well tolerated during prior episodes. ■

Venous Thromboembolic Risk with NSAID and Hormonal Contraception Use

Take Home Point: In this study, the number of extra venous thromboembolic events (VTE) among patients using non-steroidal anti-inflammatory drugs (NSAIDs) was significantly higher when taken concomitantly with high/medium risk hormonal contraception.

Citation: Meaidi A, Mascolo A, Sessa M, et al. Venous thromboembolism with use of hormonal contraception and non-steroidal anti-inflammatory drugs: nationwide cohort study. *BMJ* 2023; 382: e074450. doi:10.1136/bmj-2022-074450

Relevance: Use of estrogen containing contraceptives is an established risk factor for VTE, and observational studies have reported an increased risk of VTE with use of NSAIDs as well.

Study Summary: This was a nationwide cohort study of women 15-49 years old in Denmark over a 21-year period from 1996-2017. Participants were identified using the Civil Registration System, the National Registry of Causes of Death, the National Patient Registry, and the National Registry of Medicinal Product Statistics. Participants were Danish citizens by birth or immigration. The registries identified participants who were exposed to non-aspirin NSAIDs and hormonal contraception. The registries also identified participants with primary VTE events.

The authors included 2,029,065 participants and found 8,710 incident cases of VTE (2,715 cases (31.2%) were coded as pulmonary embolism (PE), and the rest were registered as isolated deep venous thrombosis (DVT) of the lower extremity. Authors found 228 (2.6%) women died within 30 days of the diagnosis of VTE. Hormonal contraception and NSAIDs were used concomitantly by 529,704 participants. Compared with non-use of hormonal contraception, the association between NSAID use and venous thromboembolism was stronger in women using high risk hormonal contraception (combined estrogen and progestin patch, vaginal ring, and tablets containing 50 µg ethinyl estradiol, or the progestins desogestrel, gestodene, drospirenone, or the anti-androgen cyproterone). Importantly, use of NSAIDs alone without hormonal contraception was also associated with an increased incidence of VTE.

Editor's Comments: There are numerous confounders within the study including socioeconomic factors, access to healthcare and the racial mix of the population that limits generalizability. As NSAIDs may have been used without a prescription, it is difficult to ascertain the true exposure to NSAIDs in this population. However, this study does highlight an additional risk to NSAID use that is worth considering, especially in patients with history of VTE, estrogen based contraception use, and/or other risk factors for VTE. ■

COVID-19 Abstract

Can We Safely Co-Administer COVID-19 and Influenza Vaccines?

Take Home Point: In this study, both reactogenicity and immunogenicity were mostly unchanged with coadministration of the COVID-19 and seasonal influenza vaccines.

Citation: Gonen T, Barda N, Asraf K, et al. Immunogenicity and Reactogenicity of Coadministration of COVID-19 and Influenza Vaccines. *JAMA Network Open*. 2023;6(9): e2332813. doi:10.1001/jamanetworkopen.2023.32813

Relevance: The ongoing incidence of COVID-19 infections has resulted in continued morbidity and mortality associated with the virus. Co-administration of vaccines has been shown improve adherence, but it is unclear whether vaccination for seasonal influenza and SARS-CoV-2 is as safe and effective as spacing the vaccines out temporally.

Study Summary: This was a prospective cohort study which enrolled healthcare workers at a large tertiary medical center in Israel. The OmicronBA.4/BA.5–adapted bivalent vaccine (COVID-19 vaccine) and the Influvac Tetra SIV (Abbott) (2022/2023, SIV) were used. Vaccines were offered as 2 shots administered together on a single day (injected into opposite arms); or 1 of the vaccines or both on separate days. Reactogenicity was assessed by an electronic questionnaire sent up to 62 days after vaccination, addressing local and systemic symptoms. Immunogenicity was assessed by post vaccination anti-spike IgG titers.

The authors included 2,106 study participants of which 649 responded to the questionnaire (30.8% response rate). They found of the 3 study groups, those who received SIV alone experienced the least reactogenicity, while COVID-19 vaccination alone elicited similar reactogenicity to that of the co-administration of COVID-19 vaccine with SIV. Immunogenicity in the co-administration group was estimated to be 0.84 (95% CI, 0.69-1.04) times lower than in the COVID-19 alone group, however none of the participants were infected with COVID-19 during the 60-day follow up period.

Editor's Comments: The study population was comprised of relatively healthy subjects, which limits generalizability to the patients at greatest risk from infection with these viral pathogens. Furthermore, there are a number of commercially available COVID-19 and influenza vaccines and conclusions about the combination of other forms of these vaccinations cannot be made. The limited follow-up period and use of a surrogate marker (ie, IgG spikes after inoculation) make determinations about the efficacy of simultaneous vaccination difficult to assess. However, the findings do suggest that administering both COVID-19 and influenza vaccination at the same time point toward safety of the practice of co-administration of the vaccines, which should improve adherence. ■

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What Urgent Care Operators Need to Know About Pay Transparency

Urgent Message: As a rising percentage of jurisdictions require disclosure of salary ranges to current and/or prospective employees, urgent care leaders must achieve compliance with pay transparency laws.

Alan A. Ayers, MBA, MAcc

California, New York, Washington, and Rhode Island are among the latest states to add salary range transparency laws to their books.[1] As of this writing, eight states have enacted such laws, with at least 15 more considering legislation on this topic, including Illinois, Georgia, and South Dakota.[2] Multiple cities and counties ranging from Cincinnati, Ohio, to Westchester County, New York, also have local ordinances requiring pay transparency.

Pay transparency means an employer provides general information about workers' compensation.[2] Employers should be aware of this trend and their obligations to comply with new legislation.

More than 25% of the U.S. labor force is now covered by salary transparency legislation, according to an estimate by the National Women's Law Center.[3] Norms are shifting nationwide, and indeed.com found that nearly half (roughly 45%) of all advertisements for work in the United States now carry a pay range disclosure. This is an increase from less than 20% before the pandemic.[4]

Background

On June 10, 1963, President John F. Kennedy signed the Equal Pay Act of 1963[5] into law, declaring that this was a "first step" toward eradicating wage inequality between the sexes.[6]

This federal law is proscriptive. As such, it bans sex-based wage differentials but does not impose any affirmative obligations on employers.[7] Specifically, the act bans sex-based pay discrimination only where employees can demonstrate they are being paid wages that are lower than wages paid to employees of the opposite sex who are performing "equal work on jobs the performance of which requires equal skill, effort, and responsibility, and which are performed under similar working conditions" in the same establishment.[7]

However, House Rep. Eleanor Holmes Norton (D-DC) has introduced three pay transparency bills to Congress since 2019. If passed, her Pay Equity for All Act[8] could further address gender and race pay gaps by making it illegal for employers to ask job applicants about their salary history and generally prohibits employers from relying on the wage history of prospective employees when considering them for employment or determining their wages.[8]

Interestingly, even though pay transparency is not yet required in most states, the notion is gaining momentum. The Society of Human Resource Management

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data released on Equal Pay Day, March 14, 2023, shows that, among more than 1,300 human resources professionals surveyed, more than 42% of their organizations operate in a location that requires job postings to include pay ranges.[8] The survey data also shows that more than 2 in 3 human resource professionals say that, even when pay transparency is not required by law, their organizations still will list starting pay in job postings.[9]

What Pay Transparency Means for Employers and Employees

Lawmakers have enacted pay transparency laws in an attempt to help reduce gender and racial wage gaps. Women working full time in the United States are paid about 84% as much as men, according to the Department of Labor.[10] Moreover, Black, Hispanic, and Native American workers earn 73 to 77 cents for every dollar earned by White workers. Experts say that requiring employers to set out their salary ranges helps to demystify a job search.[4]

The details of when and where the salary range must be shared vary in each state, county, or city. Typically, this information must be provided upon request, in the job posting, and after an interview. Employees may file complaints for an employer or prospective employer's failure to comply with local or state department of labor offices.

Employers

Pay transparency laws are jurisdictionally specific, but some of the common requirements include the following:

- Employers are required to disclose wage rates and salary ranges upon request by a job candidate or employee
- Employers are required to file annual reports that disclose salary and wage compensation to a state or local agency
- Employers must list pay ranges internally to existing employees and externally in job postings
- Employers who violate pay transparency laws are subject to a fine and must rectify the violation[2,11]

Salary range transparency can benefits employers in a significant way.[1] A study found that including salary information in job postings reduced recruiting costs by lowering postings' cost per click.[12] In addition, upfront information about salary helps employers recruit talent: A recent survey found that 4 out of 5 applicants would likely stop "applying for the given profession" if a job posting did not contain salary information.[13]

Employees

Studies show that if employees know how their salary compares to that of their colleagues, it may motivate them to work harder to prove their worth.[14] If workers learned their managers earned more than they expected, they worked harder because they then saw an avenue toward career advancement.[14]

Examples

As part of the general trend toward recognizing the importance of transparency in strengthening wage equality overall, these laws require employers to disclose salary ranges to job applicants—in job postings, during the hiring process, or upon request. Here are some specific examples.

California

In September 2022, the California legislature passed Senate Bill 1162.[15] The bill amended an existing law and expanded on previous employee pay data reporting obligations. As of January 1, 2023, employers with 15 or more employees must disclose the "salary or hourly wage range that the employer reasonably expects to pay for the position" in any job posting and disclose the pay scale to a current employee who requests to see the pay scale for their current position.[15] In addition, the new law requires businesses with more than 100 employees to report more detailed information to the state on what they pay employees, breaking down the pay by job category, sex, race, and ethnicity.[16]

Illinois

Illinois Governor J.B. Pritzker signed into law a pay transparency bill that will mandate employers in the state with at least 15 employees to include in job postings the "pay scale and benefits" that employers reasonably believe they will pay for the positions.[17] The law will apply to jobs performed at least in part in Illinois as well as jobs where the employee will report to a supervisor, office, or other work site in Illinois. This law will go into effect on January 1, 2025.[18]

Virginia

On April 22, 2020, the state General Assembly passed a new pay transparency law that prohibits employers from discharging or otherwise retaliating against an employee for discussing wages or compensation with another employee.[19] The statute provides, in pertinent part:

> No employer shall discharge from employment or take other retaliatory action against an employee because the employee (i) inquired about or discussed with, or disclosed to, another employee any

> information about either the employee's own wages or other compensation or about any other employee's wages or other compensation or (ii) filed a complaint with the Department alleging a violation of this section.[19]

Specifically excluded from this provision, however, are the following:

> Employees who have access to the compensation information of other employees or applicants for employment as part of their essential job functions who disclose the pay of other employees or applicants to individuals who do not otherwise have access to compensation information, unless the disclosure is (a) in response to a formal complaint or charge, (b) in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or (c) consistent with a legal duty to furnish information.[19]

New York City

The New York City Council amended a law that requires employers to publish good faith salary ranges in any advertisement for a job, promotion, or transfer.[20] The law's effective date was delayed until November 1, 2022.[21] The pay transparency law does not apply to positions that can't or won't be performed, at least in part, in New York City. However, the amendment doesn't address remote work, but additional guidance on the issue is expected from the NYC Commission on Human Rights.[22] In addition, the amendment creates a limited private right of action.[22]

Employers' advertisements for positions must state the minimum and maximum annual salary or hourly wage for the position.[22] The law currently applies to all NYC employers that employ four or more people. However, the guidance makes clear that there is no obligation to advertise opportunities—including internal opportunities—and provides specifically that salary postings are not required for opportunities that are not advertised. It also notes that the law does not prohibit employers from hiring without using an advertisement or require employers to create an advertisement to hire.[23]

Takeaway

In a recent but limited study examining Colorado's pay transparency law, researchers found that after its passage, the state's labor force participation rate increased compared with the labor force participation rate of nearby Utah, which has "similar demographics and economic characteristics."[24]

In addition to understanding the pay transparency laws in their area, employers should consider a regular pay scale audit to help pinpoint areas of pay inequality. However, prior to analyzing the data, employers should determine their pay audit goals and frequency and consult with legal counsel. ■

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Detection and Management of Urinary Calculi in the Urgent Care Setting

Urgent Message: Abdominal pain may result from a variety of benign to life-threatening etiologies, which can pose diagnostic difficulty for the clinician. Ureteral calculi are able to be diagnosed and managed in the urgent care setting.

Andrew Alaya MD MSc

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Introduction/Epidemiology

Formation of calculi in the urinary system (ie, nephrolithiasis) is a very common issue. The propensity for urinary stone formation is a metabolic disease caused by various exogenous and endogenous factors and is often hereditary.

Urinary calculi (ie, stones) may be asymptomatic, however, many patients experience severe pain, hematuria, and vomiting. The prevalence of urinary calculi has been increasing globally and presently affects an estimated 5–15% of the world's population.[1] In the United States, for example, prevalence has more than doubled in the last two decades. The lifetime risk of symptomatic urinary stones is approximately 13% in men and 7% in women.[1] The prevalence is highest in older Caucasian males and lowest among African American females.[2] Symptomatic passage of uroliths occurs most frequently during warmer months.[2]

Urinary calculus formation is frequently chronic with an estimated 50% risk of recurrence.[2] Risk factors for recurrent nephrolithiasis include a positive family history, dietary factors such as low intake of water, increased intake of animal protein, sodium, and underlying medical conditions, such as hyperparathyroidism.[2]

Urinary calculi are among the most economically impactful urologic conditions for direct and indirect costs, such as missed work days and temporary disability due to the pain.[3] More than 70% of urinary calculi are diagnosed by the use of computerized tomography (CT) scan currently, which has added further expense associated with nephrolithiasis.[4]

The experience of severe pain often results in emergency department (ED) presentation. However, in recent years the number of visits to urgent care (UC) centers due to urinary calculi has also increased. While not specifically studied, it's likely that UC presentations for ureterolithiasis have also increased because of growing numbers of UC centers in the US. Therefore, it is increasingly important for UC clinicians to be familiar

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with initial diagnosis and management of urinary calculi as well as appropriate referral practices for follow-up and possible urologic intervention.

This article will outline the basics of different imaging modalities, their sensitivity and specificity for detection of calculi in the urinary system, advantages, disadvantages, and cost considerations. The article will synthesize clinical guideline recommendations from three organizations: the American Urological Association (AUA), European Association of Urology (EAU) and the American College of Radiology (ACR).

Clinical Presentation and Pathophysiology

Clinical presentation of patients suffering with urinary calculi is typically with "renal colic," or severe flank pain, radiating to the groin when stone passage from the kidney to the ureter occurs. Nausea and vomiting may also occur. Dysuria and frequency of micturition are common, particularly when the stone progresses to the lower urinary tract or there is co-existent infection.[3] Microscopic or gross hematuria is usually present and renal angle tenderness may be elicited on examination.[3]

Urinary calculi are most often asymptomatic when they are growing in the renal calyces. However, when stones become dislodged and pass into the ureter, they can obstruct the flow of urine, which leads to hydronephrosis.[5] As the ureteral peristalsis encounters the obstruction, intense waves of intermittent, visceral pain results which is termed "renal colic."[5] Flank pain, nausea, vomiting and hematuria are often associated with these severe bouts of pain.[5]

The diagnosis and location of kidney calculi may often be anticipated without imaging modalities but is based on patients' history and physical examination. When the calculus causes obstruction approximately at the ureteropelvic junction (UPJ), it often causes pain radiating to the flank. If the ureterolith manages to pass through the first part of the ureter it commonly next will lodge at the distal part of the ureter, referred to as ureterovesical junction (UVJ). The UVJ region has two points of narrowing, one at the intersection across the iliac vessels and the other entering the bladder. In the former narrowing, obstruction causes pain radiating down into the groin of lower abdomen. In latter narrowing, obstruction causes pain radiating into the scrotum or labia, inner thigh or urethra and often creates urinary frequency, urgency, and dysuria as the calculus irritates the urinary bladder.[5]

Although patients presenting to the UC center with flank pain and hematuria are likely to have urinary calculi, even if a clinical estimation of the location of the stone can be made, abdominal imaging is still considered appropriate as part of the initial workup with severe/active symptoms.[4] A wide differential diagnosis is still advisable for patients with severe abdominal and/or flank pain, especially if older or without known history of nephrolithiasis.

Role of Imaging

Imaging considerations are central to the evaluation for suspected urinary calculi. Imaging may confirm diagnosis or demonstrate alternate diagnoses. If ureterolithiasis is identified, clinicians may stratify the likelihood of spontaneous calculus passage without intervention based on the calculus size and location.[6] The likelihood of stone passage is multifactorial and the probability of spontaneous passage decreases with larger size and improves when located more distally in the ureter.[6] Pain is not always a reliable marker, as pain may vary and even resolve completely despite continued obstruction from the stone. Persistence of the asymptomatic obstruction can occur and lead to permanent loss of renal function. This is the justification for why imaging is generally recommended when a stone is suspected to have been passed, but the patient has not actually seen the stone.[6]

Urinary Calculi in Pregnancy

The urinary tract undergoes certain anatomical and physiologic changes during pregnancy that may increase the risk of development of urinary calculi. In pregnancy, ureterolithiasis is the most common cause of abdominal pain related to the urinary system.[7] The increased progesterone associated with pregnancy increases smooth muscle relaxation and reduces peristalsis in the ureter. The enlarging gravid uterus compresses the ureter, especially later in pregnancy. Gestational hydronephrosis occurs in 90% of pregnant women beginning from 6 to 11 weeks of pregnancy and resolving by 4 to 6 weeks after delivery. The right side is generally more dilated than the left, possibly as a result of dextro-rotation of the uterus, and the protective effect of the sigmoid colon over the left ureter. However, the incidence of renal calculi in pregnancy is quoted to be 1 in 1,500, which is similar to non-pregnant women.[8]

Urinary calculi may present with similar symptoms as other acute conditions such as appendicitis, diverticulitis and even placental abruption, thereby leading to misdiagnosis and delays in appropriate treatment.[8] Calculi appear to be more common in multiparous women and in the later stages of pregnancy, with 80–90% of calculi occurring in the second and third tri-

Table 1. Stone Composition

Stone Composition	Children (%)	Adults (%)	Comment
Calcium	50-90	64-92	Radio-opaque
Calcium oxalate	60-90	32-46	
Calcium phosphate	10-20	3-5	
Both	--	29-40	
Struvite (magnesium ammonium phosphate)	1-18	2-15	Associated with infection
Uric acid	1-10	3-16	Radiolucent
Cystine	1-5	1	
Ammonium urate	0.5-1	1	
Other: xanthine, protein matrix	Rare		
2,8-dihydroxyadenine drugs (eg, indinavir, triamterene)			

Reference
Table 1 Modified From: Moe OW. Kidney stones: Pathophysiology and medical management. *Lancet*. 2006; 367: 333–344.

mester. Ureteral calculi are encountered equally on the right and left side among pregnant patients despite greater dilatation of the right renal tract.[7] The incidence rates of recurrent urinary calculi is up to 50%.[8]

Calcium stones account for over 80% of calculi in the general population (see **Table 1**). They are also the most common calculi found in pregnancy. However, up to 74% of pregnant patients with nephrolithiasis have calcium phosphate calculi, in contrast to the general population, where calcium oxalate is more common. This is thought to be secondary to the renal excretory changes and the higher pH of urine in pregnancy.[6]

Diagnosis

Laboratory Assessment

Urinalysis (UA) is a critical test in the evaluation of potential urinary calculi. UA can offer clues to the diagnosis of urinary calculi and is critical for excluding concurrent infection (eg, nitrites, large number of leukocytes).[9] It is important to note that, while microscopic hematuria is common in patients with urinary calculi, the absence of blood in the urine does not exclude the presence of stones.[10] Additionally, certain crystals may be seen on urine microscopy further suggesting the diagnosis, and even composition, of the stone.[10]

Testing may be conducted with a one-time urine sample provided in the UC center although this is often non-diagnostic for the stone's likely composition. A 24-hour urine collection test may show the patient excreting too many calculi-forming minerals or too few stone-preventing substances and is often part of outpatient urological work-up.[10]

Dipstick and/or microscopic analysis of a midstream specimen of urine should be performed to assess for underlying infection.[11] An alkaline pH may suggest infection with a urea-splitting organism.[12] Positive nitrites has the highest specificity for concomitant urinary infection (85-98%).[13] Leukocytes or leukocyte esterase on the dipstick are also concerning for infection, but less specific.[13] In cases of obstructive urinary stones with concern for infection (ie, pyoureter), immediate ED referral is prudent as patients may require urgent nephrostomy tube or ureteral stent to prevent progression to bacteremia and sepsis.[14] Such patients will require, at a minimum, close ongoing monitoring and rapid administration of appropriate antibiotics.[15] Women are at higher risk of sepsis related to ureterolithiasis.[15]

Blood tests in urgent care are often not immediately available, however, no routine blood lab testing is necessary in uncomplicated cases of kidney stone passage.[9] In fact, many lab results may be misleading or lead to unnecessary further testing due to their lack of specificity. For example, mild leukocytosis is common in patients presenting with ureterolithiasis due to pain-related stress demargination.[16] Creatinine also has been shown to return to baseline in most cases when elevated and, therefore, can be reasonably deferred if close follow-up is ensured.[17] Patients with urinary calculi have twice the risk of chronic kidney disease (CKD) compared to those without nephrolithiasis, however, and therefore do benefit from urologist guided monitoring of renal function.[18]

Diagnostic Imaging

The appropriate imaging modality for evaluating for suspected urinary calculi depends on many factors including the clinical setting, patient body habitus, cost, and risk of ionizing radiation exposure. While there are multiple modalities to choose from, those used clinically are generally limited to CT, ultrasound (US) and plain film radiography (ie, KUB).[4]

Computerized Tomography

CT of the abdomen and pelvis has become the most widely used modality for diagnosing urinary calculi over recent decades.[4] By the end of the 20th century, there was a rapid rise in the use of CT for many indications and CT use has increased from around 3 million per year in 1980 to over 62 million in 2006.[16] However, increasing evidence has demonstrated the risks associated with cumulative ionizing radiation exposure from CT scans, most notably as it relates to lifetime risk of malignancy. Patients with urinary stone disease are at a particularly high risk of excessive diagnostic radiation exposure given the recurrent nature of calculi formation.[19]

Sensitivity and Specificity

CT is the most sensitive and specific modality for imaging when suspecting urinary system calculi. The ACR estimates the sensitivity of CT to be ~95% and the specificity of CT to be 98% in patients with acute flank pain.[20,21] Almost all calculi are radiopaque on CT except for the rare exception of stones caused by the precipitation of protease-inhibitor medications (eg, ritonavir) in the urine.[20] CT imaging can also provide information regarding the composition of calculi by using the Hounsfield unit measurement of their attenuation.[20] CT, while often not immediately available in UC, does have the additional benefit of identifying alternate diagnoses that may mimic ureterolithiasis with high sensitivity (eg, diverticulitis, appendicitis).[22]

Relevant Guidelines

Standard CT of the abdomen and pelvis without contrast is the imaging modality of choice for obese (ie, BMI >30) patients according to the ACR, AUA, and EUA.[23,20,21] The ACR and AUA both recommend CT scan as the first-line investigation for adult patients presenting with symptoms suggestive of obstructive nephrolithiasis. The EAU recommends that CT be used to confirm a stone diagnosis for cases in which ultrasonography is equivocal.[23]

Low-dose Radiation CT

Low-dose CT is a method of reducing radiation exposure by lowering the tube current to the radiation source. A low-dose CT study provides similar information to that provided by standard CT when evaluating for suspected urinary stones. Data regarding calculus size and location are still easily assessed and the Hounsfield units (HU) can still be measured predict stone composition.[20]

Relevant Guidelines

Currently, the ACR, AUA and EAU do not recommend low-dose CT scans for patients with a BMI >30 as they are believed to have inferior sensitivity and specificity in this patient population.[20,21,23] When considering low-dose protocols, clinicians should be mindful of the patient's age, BMI, and degree of clinical suspicion of calculi in order to choose the optimal imaging option.[23]

Kidney, Ureter, Bladder Radiography

KUB radiography can provide clues about the cause of renal colic if a calcification is detected in the anticipated area of the ureter on the side where the patient is experiencing pain. However, it is important to note that not all stones are visible on radiographs. Moreover, some calcifications that appear on XR may not be located in the ureter (eg, phleboliths or other types of vascular calcifications). Distinguishing between these entities can be challenging when viewing a single two-dimensional image.

Sensitivity and Specificity

The effectiveness of a KUB in detecting urolithiasis can be influenced by various factors, including the composition, location, and size of the stone, as well as the patient's body habitus and the presence of bowel contents overlying the area. One study has demonstrated only 63% of stones >5 mm and only 8% of stones ≤5 mm being visualized by KUB when comparted to CT.[24] Additionally, calculi such as cystine and struvite are often poorly visible on KUB radiography, and uric acid and matrix calculi are usually fully radiolucent.[24]

Relevant Guidelines

The American College of Radiology (ACR) recommends CT scan as "usually appropriate" in patients with a suspicion of stone disease, compared to a KUB which "may be appropriate."[21] These authors recommend that while KUB is more widely available, it holds relatively limited clinical utility in the UC setting.[21]

Ultrasound

US is generally a lower cost imaging modality and does not rely upon ionizing radiation. It has become the primary alternative to CT as clinician training in point-of-care US (POCUS) has increased and US technology has become more widely available.[21] A wide range of sensitivities and specificities for US have been reported, probably owing to variations in technique, body habitus, patient population and reference standards.[25] Imaging calculi in the renal pelvis and in the ureter also present different challenges due to artifact and interference from bowel gas.[25]

Sensitivity and Specificity

A review of the literature suggests that US has a pooled sensitivity and specificity of 45% and 94%, respectively, for detection of ureteral calculi and 45% and 88%, respectively, for renal calculi.[25] Sensitivity is reduced for calculi < 3 mm, and calculi can be missed in a decompressed renal pelvis owing to the difficulty in distinguishing echogenic calculi from echogenic central sinus fat in the kidney.[25] Sensitivity can be improved by combining ultrasonography with KUB radiography. Sensitivity and specificity for these combined studies range from 58% to 100% and 37% to 100%, respectively.[26]

Relevant Guidelines

The ACR and AUA recommend CT evaluation as a first-line investigation of patients with suspected kidney calculi, whereas the EAU recommends starting with US.[21,23,27] To reduce the cumulative effects of ionizing radiation, especially in pediatric and young adult patients and those who are pregnant, the ACR, AUA and EAU recommend US as a first-line imaging modality.[21,23,27] US also has increased accuracy in children owing to their small body size meaning that the distance between the US probe and anatomy of interest is reduced.[28]

Useful Additional Ultrasound Technique

In pregnant women, signs of obstruction such as a lack of ureteral jets can be used as a surrogate marker of an obstructing calculus.[29] Use of the twinkling artefact assists in identifying calculi and can improve the specificity of US by differentiating calculi from other echogenic structures.[30] B-mode and Doppler US can be used to induce a twinkling artifact. The twinkling artifact is the appearance of a mosaic of colors in a Doppler US image.[30]

Patients with Recurrent Stones

Immediate imaging is not typically advised for patients displaying symptoms suggestive of recurrent and uncomplicated ureterolithiasis. This recommendation takes into consideration the patient's prior history of kidney or ureter stones. If a patient has a well-documented history of such stones, and their symptoms align with a typical stone episode, healthcare providers might initially rely on the patient's medical history and clinical presentation to establish a diagnosis.

It is crucial to understand that this recommendation is not an absolute rule and can vary depending on individual patient factors and the clinical judgment of the healthcare provider. If the patient's symptoms do not improve, worsen, or if there is any suspicion of complications, such as infection or complete blockage, then imaging may be promptly conducted to aid in making treatment decisions. In such cases, it is advisable to refer the patient to a urologist urgently (or an ED if severe symptoms) for a determination regarding the necessity of imaging.

Urgent Care Considerations

While CT is the preferred first-line imaging modality for most patients with suspected urinary stones based on the ACR and AUA guidelines, it is not often readily available from UC. Additionally, immediate US is also rarely accessible from UC as well. POCUS provides a useful option, if available, and has been widely adopted in emergency medicine practice. However, it is unclear to what extent UC clinicians have access and proficiency with this technology.[31]

While no specific guidelines exist for UC evaluation and management of patients with suspected ureterolithiasis, it is reasonable to forego any immediate imaging if CT and US are not immediately available in patients with reassuring vitals and urinalysis who are minimally symptomatic and can follow-up quickly with a urologist. Given the natural history of uneventful passage in the majority of patients, ED referral can generally be reserved for patients who develop intractable symptoms or concerns for concomitant infection.[24]

Treatment and Management

Acute Renal Colic Management

For management of acute renal colic, pain relief is the top priority.[32] Nonsteroidal anti-inflammatory drugs (NSAIDs) such as ketorolac 15-30 mg intramuscularly (IM) are effective and have fewer adverse effects than opioids.[33] In patients tolerating oral fluids well, oral ibuprofen (usually at doses between 400-600mg) can provide similar relief to IM ketorolac.[34] Increased oral fluid intake or intravenous fluid administration is generally not therapeutic in the acute management of pain related to renal colic.[35]

Many suspected or confirmed ureteral calculi may be watched conservatively after UC presentation with close urologist follow-up arranged. For stones <5 mm in size, the chance of passage without intervention is ~90%. Medical expulsive therapy with alpha-blockers (eg, tamsulosin) is controversial. A recent Cochrane Review demonstrated a modest effect in improving passage for larger stones (>5mm) but also increased rates of adverse reactions (mostly orthostatic hypotension) in patients treated with alpha-blockers.[36] As it is rare that the size of a calculus will be known in UC, use of medical expulsive therapy is reasonable in patients at low risk of harm from orthostasis (eg, younger patients, pa-

Figure 1. An Algorithm for the Diagnosis and Management of Acute Kidney Calculi

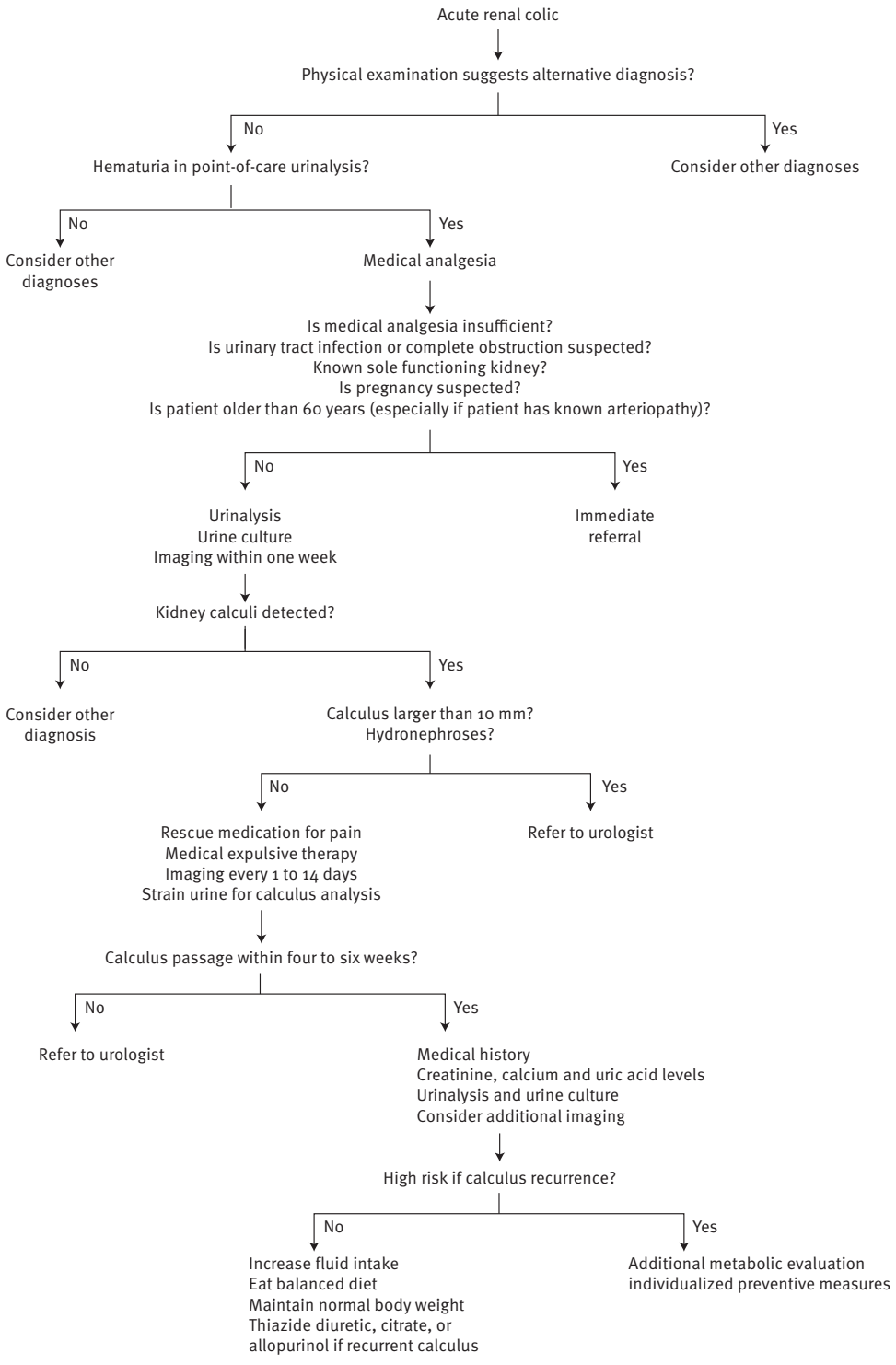

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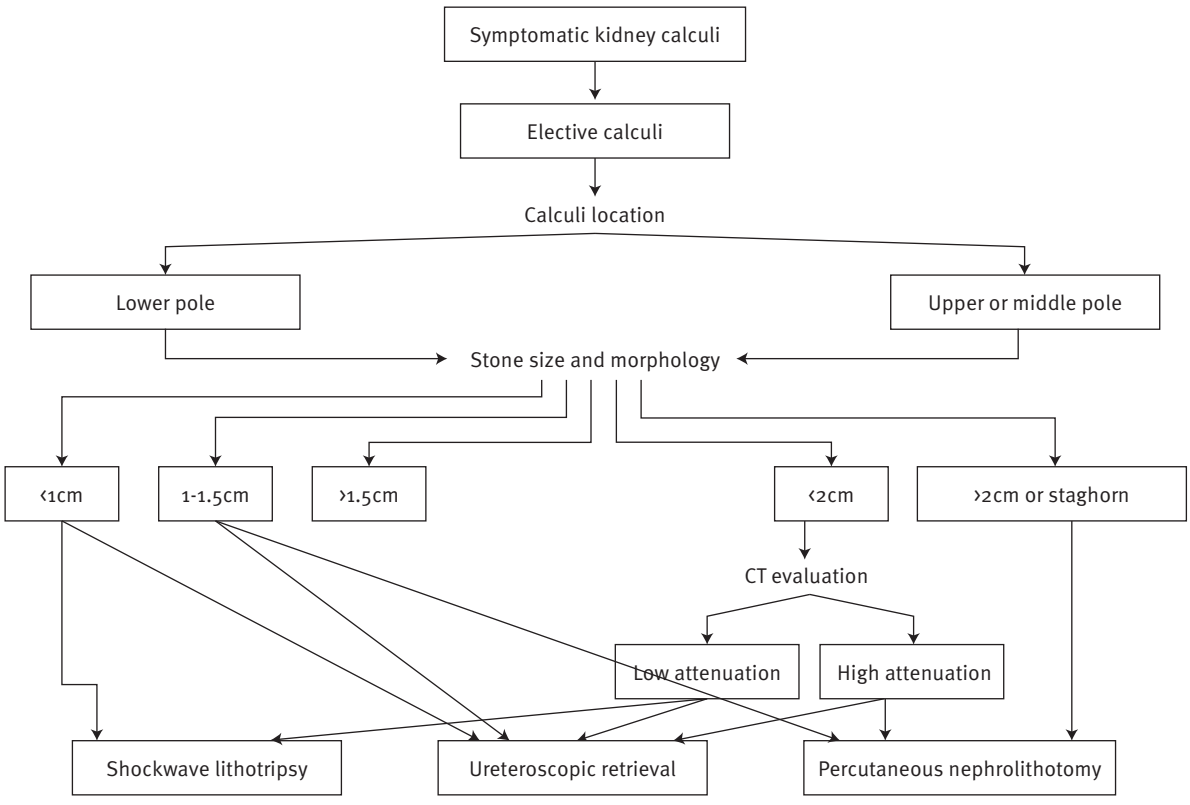
Figure 2. Algorithm of Decision Making For Surgical Treatment of Renal Calculi



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tients not at risk for falls, etc.).

Any suggestion of coexisting urinary infection should be treated with antibiotics. This may be simple cystitis but in patients with fever, severe flank pain, or other systemic symptoms, pyoureter must be considered.[31]

Immediate referral to the ED is appropriate if:

- Adequate analgesia cannot be achieved with oral agents
- Intractable vomiting
- Pyoureter and/or sepsis is suspected
- Bilateral urinary obstruction or unilateral obstruction with solitary kidney is suspected
- Older patients or those with significant comorbidities in which other life-threatening diagnoses such as abdominal aortic aneurysm cannot be excluded[37]

Figure 1 shows an algorithm for the diagnosis and management of acute kidney stones.[37]

Surgical Management

For surgical management, the most common three treatment modalities for renal calculi are extracorporeal shockwave lithptripsy (ESL), ureteroscopic retrieval (with rigid or flexible retrograde ureteroscopy), and percutaneous nephrolithotomy.[38] The advantages and disadvantages of these therapies depends on the experience of the treating urologist, stone factors, such as size, location and composition, and patient characteristics, such as body habitus, medical co-morbidities, and anatomy. With the appropriate patient and procedure selection, there is a high stone clearance rate, low associate morbidity and quick recovery time.[38] A general decision-making algorithm for these procedures depends on stone location, size, and density (see **Figure 2**).

Conclusion

The evaluation of patients with characteristic flank pain suggestive of possible renal colic/ureterolithiasis depends on history, physical exam, and urinalysis. Imaging is recommended, but may be deferred in mild presentations when rapid urologist follow-up can be assured.

Decisions regarding immediate ED referral are case dependent and warrant consideration of severity of symptoms, concerns for infection, and patient co-morbidities, most notably.

Urinary calculi of 5mm or less have 90% chance of passage without intervention. When access to advanced imaging from UC is possible, US is the preferred first-line imaging modality for younger patients and those who are pregnant. For older patients and those with larger body habitus, CT of the abdomen and pelvis without contrast is recommended. In patients with BMI <30, a reduced dose CT scan is preferrable as it offers similar sensitivity and specificity.

Oral ibuprofen has similar efficacy to parenteral ketorolac and is a reasonable agent for ongoing analgesia in patients without contraindications to NSAIDs. Medical expulsive therapy with alpha-blockers may offer a small benefit for passage, especially in stones >5mm, but does carry risk of adverse reactions, which must also be considered.

Patients with confirmed stones should be referred for urology follow-up as this is a chronic condition in many patients which can increase risk of CKD. Appropriate management of current stones and therapies and lifestyle changes that mitigate stone formation can minimize the aggregate lifetime morbidity and symptoms related to urinary calculi. ■

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Case Report

CME: This article is offered for AMA PRA Category 1 Credit.™
See CME post-test questions on page 13.

Diabetic Ketoacidosis Due to Intra-articular Steroids: A Case Report

Urgent Message: Corticosteroid use is common, and patients receiving corticosteroids of any type are at risk for hyperglycemia and ketoacidosis.

Tracey Quail Davidoff, MD, FCUCM

Citation: Quail Davidoff T. Diabetic Ketoacidosis Due to Intra-articular Steroids: A Case Report. *J Urgent Care Med.* 2023;18(2):39-40

Abstract

A 63-year-old male presents to urgent care with a self-diagnosis of urinary tract infection (UTI). The patient had been experiencing urinary frequency leading both he and his wife to believe he may have a UTI. After a simple dipstick urinalysis, it was determined the patient did not have a urinary tract infection but in fact had hyperglycemia and ketosis. Further questioning determined the patient had no history of diabetes but had recent intra-articular steroid injections. Patients receiving corticosteroids of any type are at risk for hyperglycemia.

Introduction

A 63-year-old male presents to urgent care while on vacation with concerns that he may have a urinary tract infection (UTI). The patient states that he has been voiding frequently for the last 2 days. His wife nods her head in agreement. The wife also states he has been acting "off," has been repeating things, and is occasionally confused. She says his personality seems different. He has no complaints of dysuria, urinary urgency, abdominal or flank pain, nausea, vomiting, diarrhea, fever, or chills.

Past medical history includes hypertension, osteoarthritis, and gout. Medications include losartan, hydrochlorothiazide, atorvastatin, and allopurinol.

Physical Exam

His vital signs were normal. He was minimally agitated, but awake, alert, and oriented. He appeared well hydrated. Head, ears, eyes, nose, and throat, as well as cardiopulmonary, abdominal, neurologic, and extremity exams were all normal.

Testing

Urinalysis was performed which showed a very dilute urine, large glucose and large ketones but no blood or leukocyte esterase.

Upon further questioning, the patient admits to excessive thirst over the past few days. He also disclosed that he has severe osteoarthritis of both knees and needs knee replacements. Four days prior to travel, his orthopedist had performed intra-articular steroid injections (IASIs) in both knees to reduce his discomfort while on vacation. It is unknown the specific medication or what dose was administered.

A review of the patient's medical records showed lab work done 1 month prior to admission with a normal complete blood count, comprehensive metabolic profile, a normal fasting glucose, and a HbA1c of 6.4%. The patient had not been informed he was prediabetic. A fingerstick glucose test completed in the urgent care center delivered a result too high for the glucometer to register (>500 mg/dl).

He was sent to the emergency department where lab work showed:

- Blood glucose of 860 mg/dl
- Serum bicarbonate of 14
- pH 7.21
- Anion gap of 13
- Serum ketones were positive consistent with a diag-

Author Affiliations: Tracey Quail Davidoff, MD, FCUCM, BayCare Urgent Care, Florida. The author has no relevant financial relationships with any commercial interests.

nosis of diabetic ketoacidosis (DKA)

He was given intravenous fluids, placed on an insulin drip, and admitted to an intensive care unit (ICU). Patient was lost to follow-up, and therefore some details of the case were changed to protect patient anonymity and confidentiality.

Discussion

A literature search of PubMed and Google Scholar using the key words "intra-articular," "joint injection," "steroid," "corticosteroid," "hyperglycemia," "diabetes," "prediabetic," "ketoacidosis," and "non-diabetic" in various combinations returned multiple articles of elevated blood glucose in patients with diabetes and patients without diabetes who received IASIs. No case reports were found in which diabetic ketoacidosis occurred in any patient following IASIs.

Use of corticosteroids in both the urgent care and orthopedic setting has become commonplace for their anti-inflammatory and pain-relieving effects. It is commonly perceived among clinicians that IASIs are safer than systemic steroids, and that the benefits of IASIs, such as reduced pain and increased mobility, significantly outweigh the risks of complications of these injections.[1]

The most well-known complication of IASIs is infection. Rarer local complications include skin necrosis, post injection flare of arthritis, and tendinopathy, including patellar tendon rupture. Systemic complications include transient hyperglycemia and adrenal suppression.[1]

Although thought to be safer than systemic corticosteroids, IASIs may be as likely as oral steroids to cause hyperglycemia in diabetic patients. Those with poor glycemic control and those prone to DKA are especially susceptible.[2]

A literature review by Waterbrook, et al, found several studies identifying hyperglycemia in diabetic patients after orthopedic corticosteroid injections, however none had significant complications from the hyperglycemia. In most cases, blood sugar returned to baseline in 24 hours.[3]

Uboldi, et al, found that patients without diabetes will have a 43% increase in blood glucose 2 hours after intra-articular steroid injection, while patients with diabetes may have up to a 70% increase in glucose from baseline 2 hours after intra-articular steroid injection. However, blood glucose returned to baseline in all patients without complication within 24 hours, prompting the authors to recommend that IASI are safe in diabetic patients.[4]

Both Barker and Choudhry found that hyperglycemia may occur up to 1 week after IASI in patients with diabetes.[2,5] Clinicians are encouraged to ensure patients who have poor control or those who are prone to DKA have access to follow-up for close monitoring.

More than 9 million Americans have undiagnosed diabetes and more than 79 million Americans may have pre-diabetes.[6] Those without adequate primary care, poor follow-up, or poor insight regarding their health may have an increased risk for hyperglycemia following IASIs. In a study by Nguyen, et al, a screening questionnaire for risk factors for hyperglycemia and diabetes was administered to patients prior to IASIs in the knee. More than 60% had a high risk of having inadequately treated diabetes or previously undiagnosed diabetes.[7]

Recommendations

Following IASI, diabetic patients should be warned of the possibility of hyperglycemia and should be advised to regularly monitor their blood glucose for at least a week following injection.[2,5] Clinicians are encouraged to counsel all patients on the symptoms of hyperglycemia (such as polydipsia, polyuria, polyphagia) following the administration of steroids.[2] Early recognition allows early assessment and intervention if needed.

Conclusion

This patient was treated in the ICU for DKA. After a 3-day hospitalization, he became asymptomatic, his lab results returned to normal, and he was discharged on no diabetic medications. He had no permanent sequela. Providers believed the 2 injections simultaneously doubled the dose of corticosteroids received, and accidental soft-tissue injection—rather than intra-articular injection—may have contributed to the extreme hyperglycemia and subsequent DKA. ■

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INSIGHTS IN IMAGES

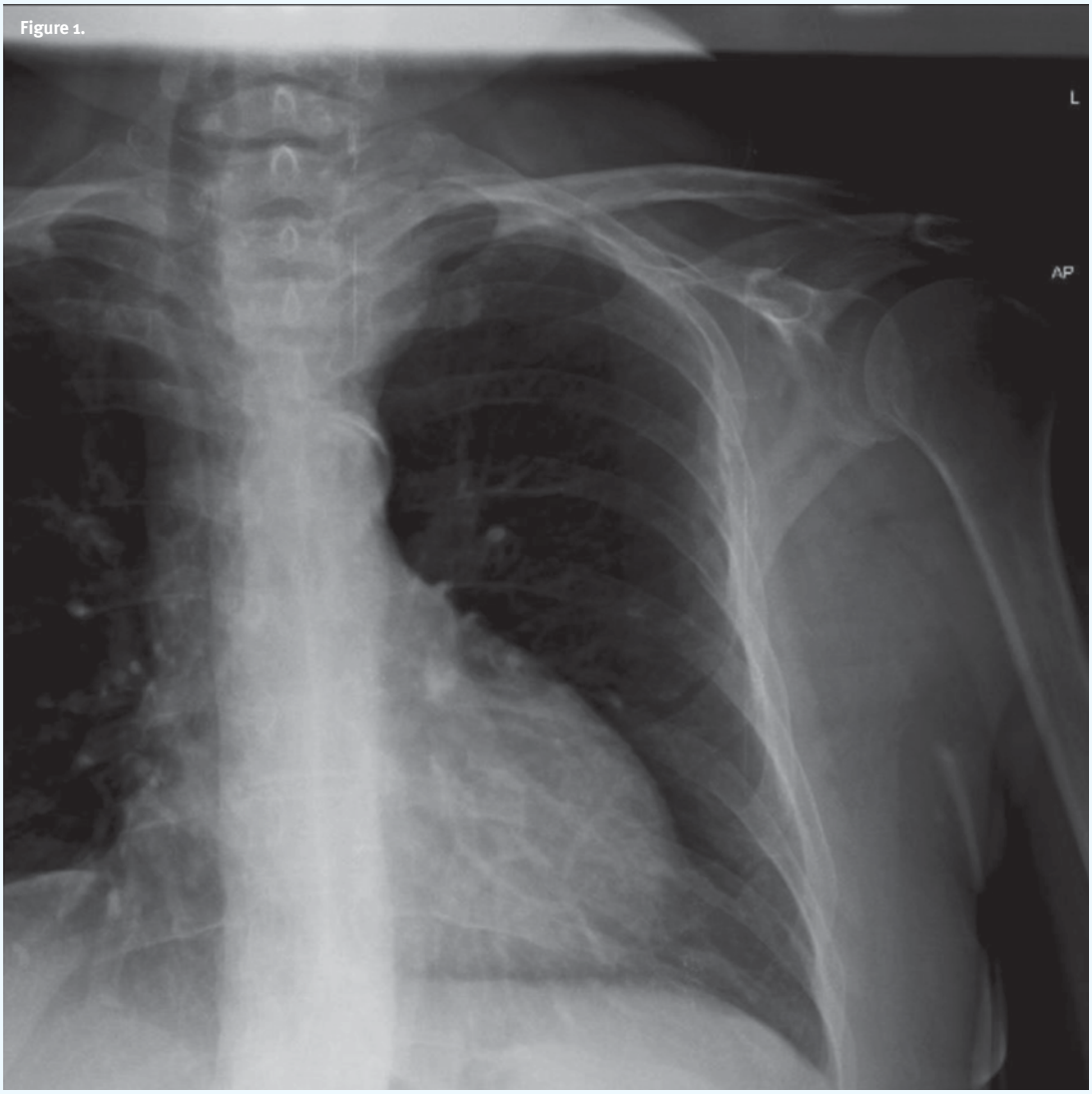
CLINICAL CHALLENGE: CASE 1

In each issue, *JUCM* will challenge your diagnostic acumen with a glimpse of x-rays, electrocardiograms, and photographs of conditions that real urgent care patients have presented with.

If you would like to submit a case for consideration, please e-mail the relevant materials and presenting information to editor@jucm.com.

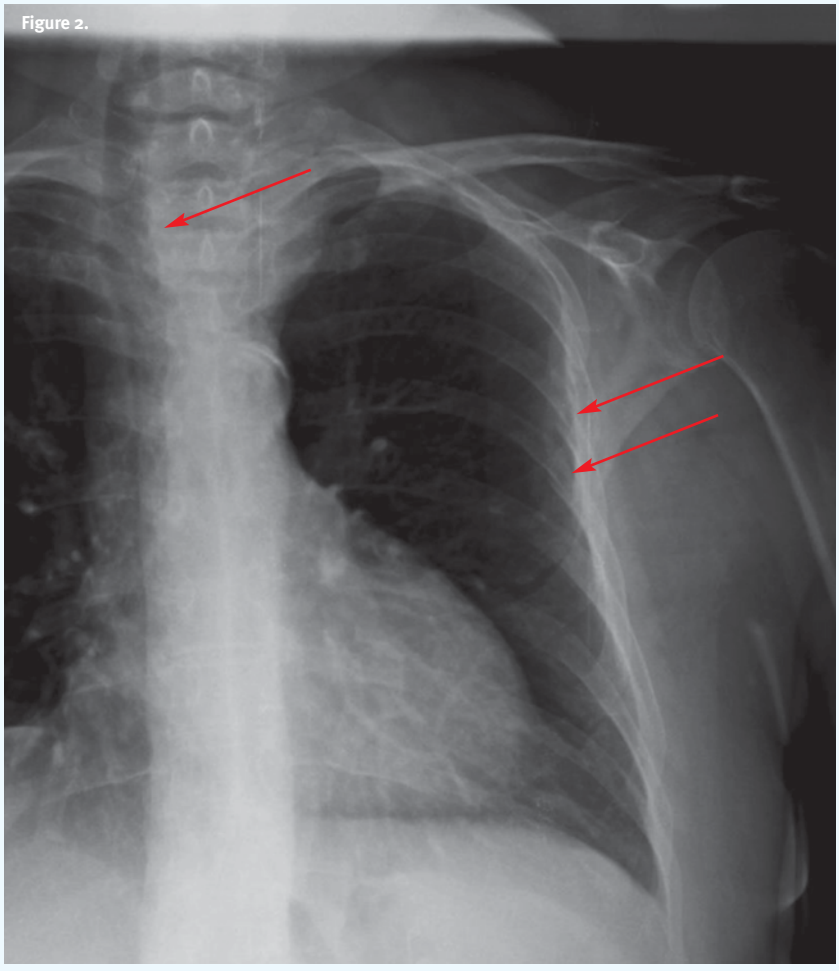
75 Year Old With Rib Pain

Figure 1.



A 75 year-old woman presents to urgent care following a fall in her home that day. An adult daughter explains that her mother has pain on her left side around her ribs.

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



Differential Diagnosis

- Left-sided rib fractures
- Rightward tracheal deviation
- Left-sided pneumothorax
- Left sided hemothorax

Diagnosis

The imaging reveals multiple left-sided rib fractures and rightward tracheal deviation. The tracheal deviation is concerning for underlying mass of the upper mediastinum. Common causes for tracheal deviation include aberrant right subclavian artery, bronchogenic cyst, double aortic arch, duplication cyst, esophageal carcinoma, lymphadenopathy, middle mediastinal lesion, neurenteric cyst, right aortic arch, thyroid mass, and tracheal cyst. Complications from rib fractures include pneumothorax and hemothorax, neither of which are present in this image.

What to Look For

- Normal tracheal alignment should occur directly in front of the cervical spine on the PA view of a chest x-ray
- Rib fractures appears as "jumps" along the smooth edge borders of the rib bone

Pearls for Urgent Care Management

- Tracheal deviation requires further evaluation to understand the underlying etiology, including advanced imaging such as a CT scan
- Rib fractures heal with time and pain management
- Patients with rib fractures should be encouraged to do deep breathing or incentive spirometry to minimize risk of complications

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

52 Year Old With a Lateral Nasal Growth


Figure 1.

A 52-year-old man presents to urgent care for a new growth on his nose. On examination, a smooth, faint pink papule with overlying scant telangiectasias was seen at the lateral nasal sidewall.

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


Figure 2.

Differential Diagnosis
- Epidermoid cyst
- Lobular capillary hemangioma
- Nodular basal cell carcinoma
- Trichoepithelioma

Diagnosis
This patient was diagnosed with trichoepithelioma. As benign neoplasms derived from the hair follicles, trichoepitheliomas usually present as asymptomatic smooth, skin-colored papules or nodules on the central face and scalp. Most cases occur in adults over age 40. Histopathologic examination reveals reticular basaloid islands with peripheral palisading surrounded by fibroblasts and a cellular fibrotic stroma. Various genetic syndromes can be associated with trichoepitheliomas.

What to Look For
- Smooth, skin-colored papules most commonly on the cheeks, eyelids, and nose
- Papules are not painful or itchy and usually do not bleed

Pearls for Urgent Care Management
- Trichoepitheliomas are benign lesions
- Distinguishing these from malignant lesions requires a biopsy
- Treatment is surgical removal

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

66 Year Old With Weakness and Dyspnea

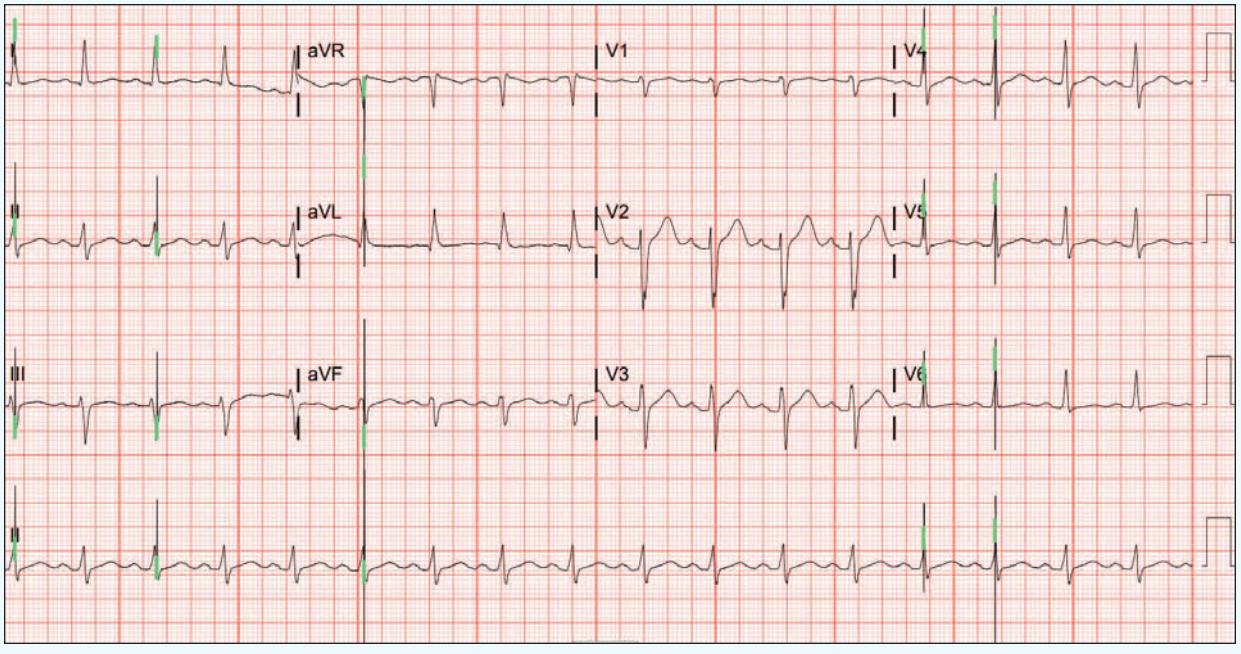


Figure 1: Initial ECG

A 66-year-old male presents in the urgent care, saying "it's hard to breathe." He's had weakness and dyspnea for one day. The patient has a medical history of diabetes, hypertension, and heart failure. The patient has a pacemaker. 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, MEd, FACEP, The University of Texas Health Science Center at Houston, Department of Emergency Medicine

Figure 2: Failure-to-sense.

Differential Diagnosis

- Complete heart block
- Failure-to-sense
- Failure-to-pace
- Failure-to-capture
- Oversensing

Diagnosis

The diagnosis for this patient is failure-to-sense. The ECG reveals sinus tachycardia with a rate of 100 beats per minute. There are several pacemaker spikes occurring within the QRS complexes (vertical green bars), indicating failure-to-sense (**Figure 1**). This case was caused by a mechanically dislodged pacemaker. The patient was transferred to a capable facility, and the pacemaker was revised.

Failure-to-sense occurs when the pacemaker fails to sense native cardiac activity, which leads to asynchronous pacing. Pacing spikes can be seen just after the onset of the QRS complexes (**Figure 2**). It can be caused by a lead insulation break, new intrinsic bundle branch blocks, electrolyte abnormalities, and Class IC antiarrhythmics.[1,2]

Failure-to-pace occurs when the paced stimulus is not generated when expected. Pacemaker spikes are decreased or absent (**Figure 3**). It is usually caused by oversensing but can also be caused by lead fracture or insulation defect. Oversensing occurs when pacemaker activity is inhibited by inappropriately recognized non-cardiac activity (ie, skeletal muscle).[1,2] A pacemaker magnet placed over the pacemaker site on the chest wall will enable asynchronous pacing—a mode that paces without sensing—and can be a stabilizing temporary treatment.

Failure-to-capture occurs when the delivery of a pacing stimulus does not lead to myocardial depolarization (**Figure 4**). This can be caused by mechanical lead displacement or fracture, electrolyte abnormalities, and ischemia or infarction.[1,2]

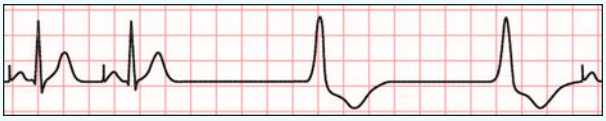


Figure 3: Failure-to-pace.

Figure 4: Failure-to-capture.

Complete heart block occurs when normal conduction between the atria and ventricles is disrupted, leading to atrioventricular dissociation (ie, the atria and ventricles act independently). Since every QRS complex is preceded by a P wave, the rhythm is sinus.

Patients diagnosed with pacemaker malfunctions should be transferred via ambulance to a hospital with an electrophysiologist on call.

What to Look For

Pacemaker malfunctions include failure-to-sense, failure-to-pace, and failure-to-capture. Look for pacemaker spikes in spurious locations. Pacemaker failures can be caused by mechanical lead disruption, electrolyte abnormalities, ischemia, or antiarrhythmics.

Pearls For Initial Management; Considerations For Transfer

- Patients with pacemaker failures should be immediately transferred to a center with an electrophysiologist on call
- A magnet placed on the chest wall over the pacemaker site will enable asynchronous mode and can be a helpful temporizing measure when oversensing occurs

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

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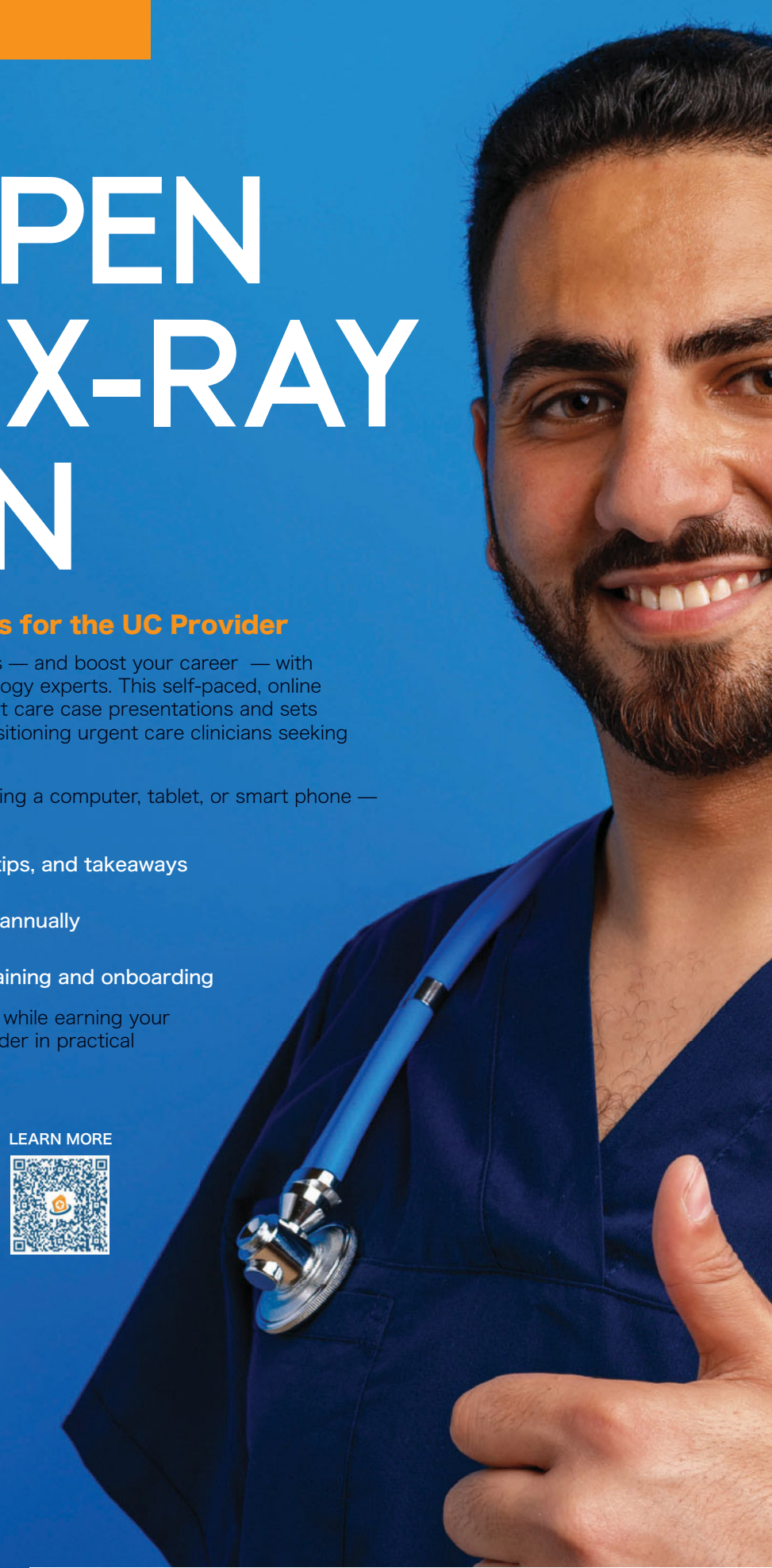

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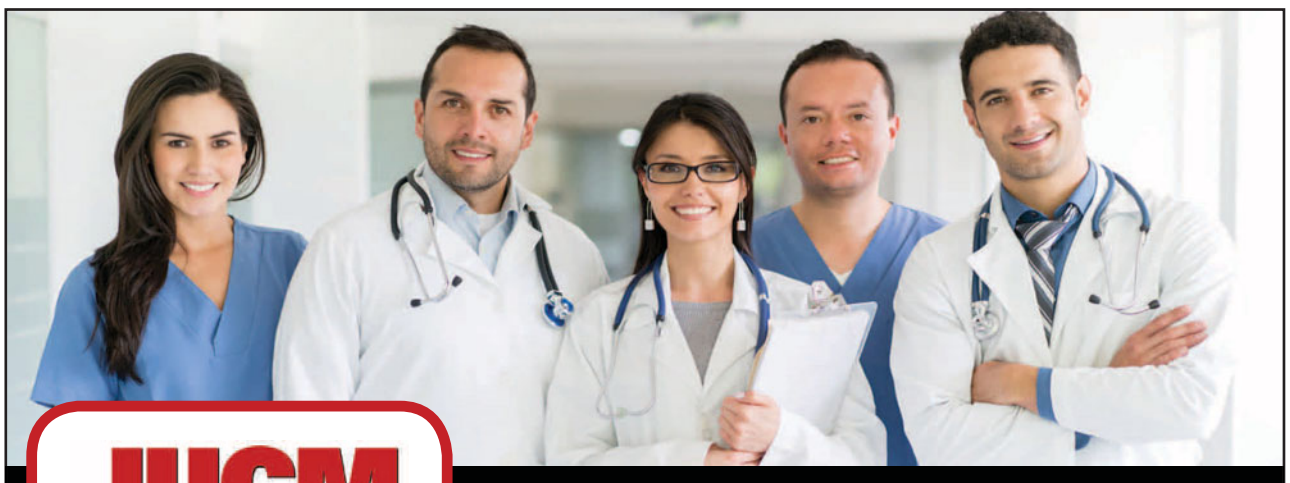

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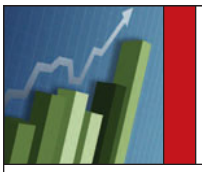


DEVELOPING DATA

Telehealth Adoption Rises Steadily in Urgent Care

■ Julie Miller

Consumers have come to expect a level of convenience from the healthcare system that parallels the digital innovations they enjoy in retail shopping, banking, and nearly every other aspect of daily life. Patients don't want to spend time on paperwork, cross-town travel, or cooling their heels in a provider's waiting room.

Much of the convenience they demand can only be enabled by technology, not the least of which is telehealth. The Department of Health and Human Services found that about 22% of patients used telehealth between April 2021 and August 2022, with the highest use among Medicaid patients.[1]

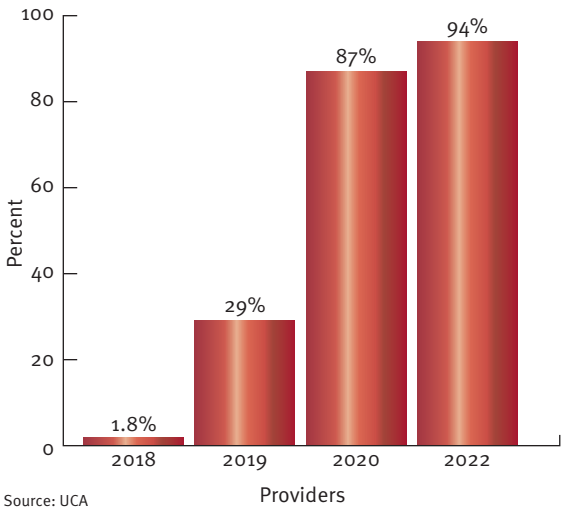
Urgent care (UC) lends itself well to the use of virtual modalities—whether for patient-to-provider interactions or for interactions between providers to consult on specific cases. Because of its time-sensitive nature, urgent care delivery stands to benefit, especially in rural areas that are experiencing access issues.

In terms of payment rates, many commercial insurance plans have opted to reimburse providers for virtual care as a response to consumer demand as well as to maintain access. Policies vary of course, but many UC organizations are finding a telehealth line of business to be profitable.

Additionally, the federal waivers crafted during the pandemic that broadened policies to allow Medicare providers to receive payment for telehealth services delivered to patients in any geographic area are scheduled to end on December 31, 2024. Although telehealth is a back-burner issue, industry leaders continue to advocate for a permanent waiver extension.

These and other factors are driving the steady growth of virtual care. Empowered by technology advancements and favorable reimbursement, telehealth—at least in part—solves for a number of issues, including consumer demand, timeliness of care, and ongoing provider shortages.

Urgent Care Providers Offering Telehealth 2018-2022



Source: UCA

The Urgent Care Association (UCA) reported in its recent white paper that UC organizations are almost universally embracing telehealth. Just prior to the pandemic, 29% of organizations offered telehealth, and by 2022, 94% said they offer the service.[2]

What's noteworthy is that many health specialties demonstrated a rise in telehealth offerings between 2020 and 2021 when the pandemic served as a catalyst for adoption, followed by a backslide in 2022 as in-person care took precedence once again. Urgent care, however, has maintained its growth and competitive advantage, as the UCA reports. ■

Julie Miller is Managing Editor of the *Journal of Urgent Care Medicine.*

Reference

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2. Urgent Care Association. Urgent Care Industry White Paper, The Essential Nature Of Urgent Care In The Healthcare Ecosystem Post-Covid-19. August 2023. https://bit.ly/3RRxwKq. Accessed October 10, 2023.

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