Use of NEXUS II Clinical Decision Tool for Blunt Head Injuries in Elderly Patients

Take Home Point: Older patients with blunt head-injury are at high risk of sustaining serious intracranial injuries even with low-risk mechanisms of injury, such as ground-level falls.

Citation: Mower W, Akie T, Morizadeh N, et. al. Blunt Head Injury in the Elderly: Analysis of the NEXUS II Injury Cohort. *Ann Emerg Med.* 2024 May;83(5):457-466. doi: 10.1016/j.annemergmed.2024.01.003

Relevance: Older adults are known to be at higher risk of serious injuries after trauma and specifically age has been used as an exclusion criterion in many clinical decision rules (CDR), including the NEXUS Head CT Rule.

Study Summary: This was a planned secondary analysis of all patients aged ≥65 years who were enrolled in the NEXUS head CT (computed tomography) decision instrument validation study. The primary goal of the NEXUS study was to validate the NEXUS head CT decision instrument compared to the performance of the Canadian CT head rule. This was a retrospective study conducted in 4 emergency departments (ED) in California and included patients from urban, suburban, and rural communities as well as community and academic hospitals. Participants recruited were patients with blunt head trauma that had a head CT performed.

The authors enrolled 11,770 patients and identified 1,352 with any intracranial injury. Of these, 767 had significant intracranial injuries (ICH), and 420 patients required neurosurgical intervention. Of all participants, 3,659 (31.1%) were ≥65 years old, and 500 (13.7%) elderly patients had evidence of injury on their head CT, including 325 patients who had significant intracranial injuries (8.9% of all elderly patients). Senescent changes to the brain likely explain many of these findings, and clinical judgment was found to be unreliable in identifying elderly patients who harbor serious injuries. Importantly, 15% of the older adults with ICH had no other high risk features other than age, based on the NEXUS Head CT criteria. 81 patients died and 45% of the deaths occurred in patients whose mechanism of injury was a simple fall from standing.

Editor's Comments: Although capturing a wider range of patients, this study's enrollment was limited to patients presenting to an ED setting and did not account for those who either didn't seek medical attention or presented to their primary care provider or urgent care (UC) setting. This likely represents spectrum bias as patients presenting to EDs tend to have more significant symptoms and mechanisms of injury. All patients enrolled had CT imaging of the head as well, which further contributes to spectrum bias. Despite the spectrum bias, it's important that UC clinicians consider and discuss the increased risk of significant intracranial injury with older patients and their families when determining if immediate ED referral is appropriate. ■

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Limitations of Pulse Oximetry in Patients with Darker Skin

Take Home Point: Pulse oximeter accuracy for diagnosing hypoxemia is impaired in patients with darker skin tones, especially if accompanied by poor perfusion.

Citation: Gudelunas M, Lipnick M, Hendrickson C, et. al. Low Perfusion and Missed Diagnosis of Hypoxemia by Pulse Oximetry in Darkly Pigmented Skin: A Prospective Study. *Anesth Analg.* 2024 Mar 1;138(3):552-561. doi: 10.1213/ANE.0000000000006755. PMID: 38109495.

Relevance: Pulse oximeters are universally used in UC centers in acquiring vital signs. The data is used to ascertain severity of illness, particularly in patients with respiratory symptoms. Inaccuracies in pulse oximetry could have a significant impact on patient safety and further impact racial disparities in outcomes.

Study Summary: This was a prospective study investigating the hypothesis that pulse oximeter measured functional saturation (SpO2) overestimates SaO2 more frequently in the presence of increased skin melanin and low perfusion than in the presence of either condition alone. Two pulse oximeters (Masimo and Nellcor) were used. Data from 146 consecutive, healthy, non-smoking volunteer participants

in pulse oximeter performance studies at the University of California at San Francisco Hypoxia Research Laboratory was used. Forty-three subjects were classified as Fitzpatrick skin type V or VI (dark), 78 as Fitzpatrick III or IV (medium), and 25 as Fitzpatrick I or II (light).

The authors found that low perfusion appeared to interact with both medium and dark skin pigment to substantially increase pulse oximeter bias. Subjects with darkly pigmented skin and low perfusion had hypoxemia in the SpO2 range of 92% to 96% missed in 30.2% of the readings from the Masimo™ pulse oximeter and 7.9% of the readings from the Nellcor. The area under the receiver operating characteristic curve for a diagnosis of hypoxemia was lowest for subjects with darkly pigmented skin and low perfusion and the rate of missed hypoxemia was almost twenty-fold higher for the darkest skinned patients with poor perfusion compared to the lightest skinned patients.

Editor's Comments: The use of healthy participants in this study cannot equate to real-world conditions when acutely ill patients are being assessed. The study also used only 2 models of oximeters, which limits generalizability when comparing their performance to newer models and other manufacturers. This study does identify the need for vigilance for UC clinicians particularly relying on pulse oximetry data without considering the clinical appearance of the patient. This adds to growing evidence that patients with darker skin tones may be at higher risk of inaccurate pulse oximeter readings. ■

Patient's Spoken Language and Decisions for Investigating Atraumatic Headache

Take Home Point: Patients who were Spanish speaking are more likely to undergo investigations than those proficient in English.

Citation: Preston-Suni K, Fleischman R, Garrett A, et. al. The Effect of Language on the Decision to Image in the Evaluation of Atraumatic Headache. *Journal of Emergency Medicine,* Vol. 66, No. 3, pp. e323–e330, 2024

Relevance: There are over 30 million people in the US, who have limited English proficiency (LEP), and these patients have worse outcomes, lower satisfaction, and less understanding of clinician discharge instructions.

Study Summary: This was a retrospective observational study of patients presenting to a public level-1 trauma ED, in Los Angeles County, California, with atraumatic headache. The authors performed a review of electronic health records of the study participants. The county had considerable linguistic diversity, with >50% of the population speaking a non-English language at home. Patients speaking a language other than English or Spanish were excluded due to low overall numbers (2.2% of the sample) and lack of any language-concordant patient–provider pairs among the 20 languages spoken in this group.

The authors reviewed 3,030 visits. These visits were seen by 286 residents, nurse practitioners, and attending physicians, of whom 54 (18.8%) had passed the Spanish proficiency test. They found Spanish-speaking patients had longer lengths of stay (49.4% vs 37.9% ≥600 minutes) and were significantly more likely to undergo head CT (adjusted odds ratio [aOR] 1.28; 95% CI [confidence interval] 1.08–1.52). In the stratified analysis examining only the subset of Spanish-speaking patients, evaluation by clinician who had passed the language test had no significant effect on the odds of undergoing head CT (aOR 0.95; 95% CI 0.75–1.20).

Editor's Comments: The study did not include assessment of historical features or physical examination findings for which CT was recommended. It was also unable to unable to assess whether certified health care interpretation was used during ED visits. This study does highlight the need for native language clinicians to be recruited to centers where patient populations have a large proportion of LEP to enable better provision of care. ■

Metoclopramide vs Other-Antimigraine Therapies: Which Is Best?

Take Home Point: 10 mg IV metoclopramide was effective in relieving migraine attacks with minimal side effects and could be one of the first-line treatments to decrease acute migraine attacks in ED/UC.

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 Neurol*. 2023 Jun 8;23(1):221. doi: 10.1186/s12883-023-03259-7

Relevance: Over 1 million patients annually present to ED suffering from acute migraine, the world's 7th leading cause of disability. Identifying effective treatment will help UC clinicians provide care for patients presenting with this condition.

Study Summary: This was as systematic review assessing metoclopramide, its efficacy, side effects, and recurrence compared to other described migraine drugs in literature. All randomized controlled trials that investigated the effect of metoclopramide alone without any combination with an active drug in relieving acute migraine attacks were reviewed. Efficacy of metoclopramide was compared with placebo or any other active antimigraine drugs like prochlorperazine, chlorpromazine, ketorolac, valproate, sumatriptan, bupivacaine, granisetron, dexketoprofen, dexamethasone, magnesium sulfate, pethidine, sumatriptan, and ibuprofen. Primary outcomes were headache change and complete headache relief while the secondary outcomes were the recurrence of attacks, use of rescue drugs, nausea relief, and side effects. Studies that combined metoclopramide with any other active drug, reviews, observational studies, case reports, case series, conference abstracts, and published articles in any language rather than English were excluded.

The authors identified 16 studies for review and found metoclopramide's efficacy was significantly higher than placebo and sumatriptan in decreasing headache scores and was significantly lower than only granisetron. Its ability to completely relieve headache and decrease the need for rescue medication was significantly higher than only placebo and valproate in only the need for rescue medication. The recurrence rates were similar between all antimigraine drugs and metoclopramide significantly decreased the incidence of nausea in patients.

Editor's Comments: There were limited number of studies available comparing metoclopramide to other drugs to perform direct meta-analysis. The study does support clinicians in choosing to consider metoclopramide as a first line option in treating acute migraine.

Should We Be Prescribing Antihypertensives at Discharge?

Take Home Point: Prescription antihypertensive therapy for discharged patients was associated with a 30-day decrease in severe adverse events and revisit rates to ED.

Citation: Todd B, Xing Y, Zhao L, et. al. Antihypertensive prescription is associated with improved 30-day outcomes for discharged hypertensive emergency department patients. *J Am Coll Emerg Physicians Open*. 2024 Mar 30;5(2): e13138. doi: 10.1002/emp2.13138.

Relevance: Up to 33% of patients presenting to ED with notable elevated blood pressure (BP) have no previous documented history of hypertension. Management of these patients with appropriate outpatient follow-up limits future morbidity and mortality.

Study Summary: This was a multicentered observational cohort study of discharged ED patients with elevated BP without concurrent treatment of hypertension, based in Detroit, Michigan. The study aimed to investigate whether emergency physician prescription of oral antihypertensive therapy on ED discharge for untreated hypertensive patients was associated with a decreased 30-day risk of the severe adverse events (AE), death, and revisits to ED.

The authors identified 93,512 patients for the study cohort. They found 9,442 (10.1%) of patients received antihypertensive treatment, while in the ED, a further 4,435 (4.7%) of patients received antihypertensive prescription upon ED discharge, and 4,458 (4.8%) patients were prescribed antihypertensive therapy from another medical professional within 30 days after ED. Patients receiving antihypertensive prescriptions at ED discharge were significantly more likely to be younger, male, Black, have higher systolic and diastolic BPs, have a lower burden of comorbidity (lower Elixhauser comorbidity indices), and have received antihypertensive treatment in the ED before discharge. 660 (0.7%) patients experienced one or more AEs within 30 days of ED discharge, which comprised of 13 (<0.1%) aortic catastrophes, 422 (0.5%), acute heart failure cases, 19 (<0.1% hypertensive encephalopathy cases, 42 hemorrhagic strokes (<0.1%), 111 ischemic strokes (0.1%), and 107 (0.1%) myocardial infarctions. Just 9 AEs were observed in the cohort prescribed antihypertensive therapy compared with 651 AEs in the nontreatment group. Antihypertensive therapy was associated with a decreased odds of acute heart failure (adjusted OR, 0.183, [95% CI, 0.056–0.441], $p < 0.001$).

Editor's Comments: The retrospective nature of the study, with its reliance on EMR, could introduce selection bias and limit the ability to assess causality. There was no data on the filing of the discharge prescriptions or patient compliance with the discharge prescription, which could affect the results. The study does suggest potential opportunistic initiation of treatment, with appropriate further

follow-up and safety netting could be considered by clinicians for these cohort of patients. ■

Facial Expression, Gender, and Virtual Background Affect Patients' Perceptions

Take Home Point: Hypothetical clinicians over telehealth with neutral facial features and novelty backgrounds were considered the least trustworthy and competent in this study.

Citation: Cook A, Thompson M, Ross P. Virtual first impressions: Zoom backgrounds affect judgements of trust and competence. PLoS ONE18(9): e0291444. https://doi.org/10.1371/journal.pone.0291444

Relevance: First impressions are powerful and subconscious. In the era of ubiquitous virtual meetings and telehealth consultations, it is important to understand what features of our virtual presentation affect rapport and trust.

Study Summary: This study recruited volunteers from sampling of various sites to view faces on virtual backgrounds. Some participants were paid to complete a 10-minute survey, while others were given academic credit. There were 3 independent variables; virtual meeting background with 6 levels: "Home," "Blurred Home," "Bookcase," "Plants," "Blank" and "Novelty." Facial expressions with 2 levels were included: "Happy" and "Neutral." Finally, hypothetical clinician gender: male or female. First impressions were measured by 2 dependent variables: evaluations of trustworthiness and competence. After viewing each photo, participants responded to 2 items "How trustworthy is this individual?" and "How competent is this individual?" which were both rated on a 7-point Likert scale.
The authors enrolled 167 participants (115 females, 50 males, 2 non-binary). They found faces presented on the "Bookcase" and "Plants" background were consistently rated as the most trustworthy and most competent, contrasting the "Home," "Blurred Home," and "Novelty" backgrounds, which received lower trustworthiness and competence rating. Happy faces are judged as more trustworthy and more competent than neutral faces. Females were rated as more trustworthy and competent regardless of background selection.

Editor's Comments: This study was limited to 6 backgrounds and did not consider other background variables, particularly those with corporate insignia or more typical clinical settings. There was also a lack of racial variability to the actors in the photos (all were Caucasian). The level of aesthetic pleasantness/attractiveness of the faces was not quantified nor controlled for, but studies demonstrating the "halo effect" have shown that attractiveness plays an important role in perceptions of intelligence and competence. Despite its limitations, the study does highlight that, unsurprisingly, how we present ourselves in virtual professional interactions has a measurable influence on how those we interact with perceive us. ■