Concussion Recovery in Young Children

Take Home Point: This study suggests that children aged 5-12 years old with concussion have similar trajectories of recovery regardless of mechanism of injury.

Citation: Ledoux A, Sicard V, Bijelic V, et. all. Symptom Recovery in Children Aged 5 to 12 Years With Sport-Related and Non–Sport-Related Concussion. *JAMA Netw Open*. 2024 Dec 2;7(12): e2448797. doi: 10.1001/jamanetworkopen.2024.48797.

Relevance: More knowledge about the natural history of concussion in children can help clinicians to more accurately guide parental expectations about recovery and return to sport and school.

Study Summary: This was a planned secondary analysis of a previous multicentered cohort study, the Predicting Persistent Post-Concussive Problems in Pediatrics (5P), which was based in 9 pediatric emergency departments in Canada. In this study, participants aged 5-12 years old with sports-related (SRC) and non-sports-related (NSRC) concussions were included. All participants underwent comprehensive evaluations which included the Acute Concussion Evaluation (ACE), the Child-Sport Concussion Assessment Tool 3 (Child-SCAT3) and the Post-Concussion Symptom Inventory (PCSI). Using the PCSI, participants completed either a parent-rated (children aged 5-7 years) or self-rated (children aged 8-12 years) assessment at weeks 1, 2, 4, 8, and 12 post-injury.

The authors included 1,747 participants in their analysis: 513 aged 5-7 years and 1,234 children aged 8-12 years. They found that of children aged 5-7 years with SRC, 111 (53.6%) sustained their SRC in non-contact sports, 44 (21.3%) in limited-contact or limited-impact sports, and 52 (25.1%) in contact or collision sports. Similarly, in those aged 8-12 years with SRC, 176 (22.3%) sustained their SRC in non-contact sports, 229 (29.0%) in limited-contact sports, and 385 (48.7%) in collision sports. The most prevalent injury settings were hockey, recreational play, soccer, snowboarding, basketball, and football. There were no significant differences in recovery trajectories found between children with SRC and NSRC. Both SRC and NSRC showed a decrease in symptoms over time in a nonlinear fashion. While there were not significant differences in recovery trajectories between children with SRC and NSRC, it is noteworthy that a lower proportion of children aged 5-7 years were symptomatic at each follow-up time point than the older children. Importantly, over 25% of the older children and roughly 20% of the younger children remained symptomatic 4 weeks post-injury.

Editor's Comments: This was an emergency department (ED) based study, which could affect generalizability to urgent care (UC) settings. Recovery was assessed based on a parental assessment in younger children, which may have affected the ability to compare between age groups. Since this study, there have been further advances in concussion-based assessments with the Child-Sport Concussion Assessment Tool 6 (SCAT-6) being developed and introduced. This was a large study of young children with strong indicators that mechanism of injury plays less of a role in recovery than other factors, including age, with younger children tending to recover more quickly after concussion. ■

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Do Virtual Scribes Improve Clinician Productivity?

Take Home Point: Virtual scribes may reduce time clinicians spend interfacing with the electronic health records (EHR).

Citation: Rotenstein L, Melnick E, Iannaccone C, et. al. Virtual Scribes and Physician Time Spent on Electronic Health Records. *JAMA Netw Open*. 2024 May 1;7(5): e2413140. doi: 10.1001/jamanetworkopen.2024.13140.

Relevance: Many clinicians cite time spent interacting with the EHR as a significant contributor to burnout. With advances in video and high-speed connection capabilities, remote (ie, virtual) scribes have been implemented in various clinical settings in an attempt to offload the burden of documentation from clinicians. The advantages of virtual scribes over in-person scribes largely are associated with lower labor costs and greater flexibility.

Study Summary: This was a retrospective quality improvement study of 144 physicians in the outpatient settings associated with Brigham and Women's Hospital and Massachusetts General Hospital. The authors included physicians who had used a virtual scribe for a 3-month period and reviewed their time spent using the EHR before and after scribe implementation. Outcome measures included the total time per appointment and time on notes per appointment. They also reviewed time that the physicians spent outside of normal working hours on EHR related work.

Sixty percent of physicians included worked in a primary care specialty. Most physicians (88%) used an asynchronous scribe. Virtual scribe use was associated with significant decreases in total EHR time per appointment (mean [SD] of 5.6 [16.4] minutes per visit; P < .001) in 3 months after versus 3 months before scribe use. These associations were seen with the use of virtual scribes among primary care and medical specialists. Physician factors associated with significant reductions in EHR time included practicing a medical subspecialty, high baseline interaction with the EHR, and a greater percentage of the clinic note contributed to by the physician.

Editor's Comments: It is unclear to what extent these results are generalizable to the UC setting. These participants were all physicians working in an academic medical center. The majority of the UC centers in the U.S. are not affiliated with university hospitals and are staffed with advanced practice clinicians (ie, PAs and NPs) rather than physicians. Given the high patient volumes in UC centers, however, a similar study in a UC setting would be valuable to see if similar increases in productivity are achieved. Additionally, studies examining the economic and clinician satisfaction implications of virtual scribe implementation would also provide important information about the feasibility and value of this sort of clinician support. ■

Soft vs Rigid Collars for Pre-Hospital Cervical Spine Immobilization

Take Home Point: The use of soft collars in pre-hospital immobilization of neck injuries improved patient compliance and was better tolerated without any increase in the risk of significant cervical spinal (c-spine) injury.

Citation: Bruton L, Nichols M, Looi S, et. al. Evaluating soft collars in pre-hospital cervical spine immobilisation: A cohort study on neurological outcomes, patient comfort and paramedic perspectives. *Emergency Medicine Australasia* (2024) 36, 862–867 doi: 10.1111/1742-6723.14464

Relevance: C-spine immobilization has long been emphasized as a critical aspect of the care of patients after trauma where there is risk for spinal cord injury (SCI). Rigid c-collars offer the theoretical advantage of less potential for movement in unstable c-spine injuries; however, these injuries are infrequently seen in UC settings and rigid c-collars are poorly tolerated by patients.

Study Summary: This was a pre-hospital observational cohort study conducted across a catchment area for 11 emergency departments (ED) (including 3 major trauma centers) in Australia. The ambulances servicing this region were stocked with soft collars to replace the rigid c-collars previously. Paramedics performed the SPEED (SPinal Emergency Evaluation of Deficits) neurological assessment on patients with suspected neck injuries to ascertain the requirements for immobilization. For patients whose screening SPEED exam was suggestive of possible neck injury, the paramedics placed the patient into a soft collar. Patients were excluded if they were agitated or had a body habitus precluding proper fit of the soft collar. The primary outcome was development of a new or worsened neurological deficit following pre-hospital soft collar application. A total of 2,098 soft collars were applied during the study period and 76 patients (3.6%) were subsequently identified to have had a c-spine injury. Just 8 patients (0.4%) were identified to have a SCI, while 26 patients (1.2%) had a c-spine fracture, and 40 patients (1.9%) had ligamentous disruption. Two patients with SCI experienced a worsening neurological deficit, representing 0.095% of the total soft-collar applications. Both patients had pre-existing conditions which complicated initial neurological (SPEED) assessment.

Editor's Comments: This study lacked a control group (ie, rigid c-collar use), which prevents comparison of outcomes compared to current standards of care. The results of this study reiterate the relative rarity of c-spine injury, and even more so SCI, and in a much higher acuity cohort than would be expected to present to UC. This study highlights the need for UC-based studies that can inform best practices for patients with neck pain after minor trauma. Patients with unstable c-spine injuries presenting to UC is likely quite rare, and the issue has not been specifically investigated. Until such studies or guidelines exist, it remains prudent to treat patients according to existing standards of care when there is concern for c-spine injury.

Using Electronic Triggers to Identify Diagnostic Errors

Take Home Point: In this study, rules-based electronic triggers (e-triggers) proved effective for detecting diagnostic errors in an ED setting.

Citation: Vaghani V, Gupta A, Mir U, et. al. Implementation of Electronic Triggers to Identify Diagnostic Errors in Emergency Departments. *JAMA Intern Med.* 2024 Dec 2: e246214. doi: 10.1001/jamainternmed.2024.6214.

Relevance: Diagnostic errors remain a leading cause of iatrogenesis. This study aimed to determine if EHR-based alerts could mitigate diagnostic errors by alerting clinicians.

Study Summary: This was a retrospective medical record review study conducted in more than 1,300 EDs of the Veterans Affairs (VA) healthcare facilities throughout the US. The authors analyzed the records of all patients presenting to the EDs included. The authors developed and refined a rules-based e-trigger algorithm to identify patterns of presentation suggestive of missed diagnosis opportunities retrospectively. They developed high-risk triggers for potential stroke, high-risk abdominal pain, and unexpected returns visits—ED and hospital—after being seen in the ED within the 10 days prior. Additionally, an e-trigger was created for concerning symptoms-disease dyads (eg, those representing possible myocardial infarction/pulmonary edema in patients with chest pain, acute appendicitis/perforated diverticulitis in patients with abdominal pain etc.) and for those returning with a diagnosis of subarachnoid hemorrhage/meningitis after presenting with headache/dizziness symptoms. Finally, an e-trigger was created for patients with abnormal test results that were not acted upon during an initial ED visit.

The e-triggers were used to analyze all discharged ED patient records during the study period. The authors found that the application of the e-triggers identified over 130,000 cases of possible missed diagnoses. The positive predictive values (PPV) of a positive e-trigger ranged from 11.0% (ED return) to 52.4% (missed test result). The PPV for stroke was 47%. Patients with missed diagnoses were slightly older on average, and 40% of patients with a missed diagnosis experienced moderate or severe harm.

Editor's Comments: This was a VA health system-based study, and nearly 90% of the included patients were men, which would affect generalizability. Additionally, this was a retrospective study, so while the e-triggers may have helped to identify cases of adverse outcomes, it is unclear if the triggers implemented prospectively would prevent diagnostic errors or patient harm. Such prospective studies would be helpful to determine feasibility and clinician acceptance of such triggers and to determine if their use actually has an impact on patient-oriented outcomes in real-world practice. ■

Should Our Antibiotic Strategy for Otitis Media Change When There is Discharge?

Take Home Point: In this small pediatric study, oral antibiotics were more effective for reducing the duration of ear discharge and hastening the resolution symptoms in children with discharging acute otitis media (AOMd).

Citation: Hullegie S, Damoiseaux R, Hay A, et. al. Topical or oral antibiotics in childhood acute otitis media and ear discharge: a randomized controlled non-inferiority trial. *Fam Pract.* 2024 Oct 8;41(5):857-861. doi: 10.1093/fampra/cmae034.

Relevance: Children with AOM can experience tympanic membrane (TM) rupture which presents as discharge (ie, otorrhea) from the ear canal. Previous work has shown efficacy of otic/topical antibiotics for patients with tympanostomy tubes (TT) and otorrhea, but there have not been studies evaluating whether otic antibiotic drops are efficacious in children with TM rupture as a cause for continuity between the middle ear and canal.

Study Summary: This was an open label, randomized controlled, non-inferiority trial conducted in 52 primary care practices in the Netherlands. Consecutive children aged 6 months to 12 years presenting with AOMd in 1 or both ears were enrolled and randomized to receiving either oral antibiotics (amoxicillin) or antibiotic-corticosteroid combination ear drops for 7 days. The primary outcome was the resolution of symptoms (ear pain and fever) at day 3. The authors enrolled only 58 of a planned 350 children due to COVID-19 related disruptions in recruitment. Of those, 27 children were treated with ear drops, and 31 were treated with oral antibiotics. The median age of participants was 28 months; 40% of all participants were <2 years old. Data showed 42% of children receiving ear drops

were free from ear pain and fever at day 3 vs 65% of children receiving oral antibiotics (adjusted absolute risk difference 20.3%, 95% CI −5.3-41.9%). This did not reach statistical significance for non-inferiority of drops versus oral antibiotics. For other outcomes, the authors found that 58% of children assigned to eardrops had parent-reported ear discharge at day 3 vs 19% of those assigned to oral antibiotics (P < .05). The mean time to resolution of symptoms was 5 days (SD 2.8) in the eardrops group vs 4 days (SD 2.2) in the oral antibiotics group (P = .04). The mean ear pain score over the first 3 days of treatment was 2.1 in the otic antibiotic group and 1.4 in the oral antibiotic group (P = 0.02). Also, 26% of parents reported discomfort with administration of the otic antibiotic versus 19% with administration of oral amoxicillin.

Editor's Comments: While the study was underpowered to determine non-inferiority of otic drops due to early termination of enrollment during the COVID-19 pandemic, secondary outcomes favored treatment with oral antibiotics for several clinically relevant outcomes, time to resolution of pain and discharge namely. These results differ from previous studies which have shown that topical ear drops are more effective for patients with TT. The plausibility of this difference is questionable, and therefore, despite the undertaking of this well-designed study, further study with a similar design is warranted before the question can be adequately answered. In the meantime, UC clinicians and patients are likely best served by continuing to adhere to present guidelines in patients with AOMd without TT. This also may be a situation where shared decision making with parents is appropriate. For example, in patients with very poor tolerance for either otic or oral antibiotics, it may be most reasonable to choose the route of administration best tolerated for children with AOMd until there is more conclusive data. ■

Do Patients Understand Our Discharge Instructions?

Take Home Point: Standardized discharge instructions improve patient's understanding, especially regarding guidance about reasons to return and expected duration of illness.

Citation: Russell S, Jacobson N, Pavlic A. Improving Patient Understanding of Emergency Department Discharge Instructions. *Western Journal of Emergency Medicine* .2024 Vol 25;6:917-20 doi 10.5811/westjem.18579

Relevance: Discharge instructions are a vital communication tool which can ensure patients best understand and manage their conditions after leaving UC. Therefore, it is important to understand how these instructions are perceived by patients and clarify areas needing improvement.

Study Summary: This was a pilot interview-based study among patients discharged from an urban VA health system ED in Wisconsin. Patients received either free-text discharge instructions at the discretion of the treating clinician or standardized discharge instructions developed by the research team specific to their condition. The ED clinicians were a convenience sample composed of 10 physicians and 2 advanced practice practioners in the pre-intervention group and 3 physicians and 2 APCs in the standardized discharge instruction group. The patients were approached for a short interview by study staff, and clinicians and nurses working in the ED. During the interview, patients were asked to state their diagnosis, understanding of any new medications prescribed at the visit, recommendations for home care, expected duration of illness, reasons to return to the ED, and follow up plan. The patients were permitted to reference the discharge instructions to answer the interviewer questions. Both group's responses were collected and marked as incorrect (0), partially correct (0.5), or correct (1).

The authors interviewed 45 patients: 25 control (ie, free text instructions) and 20 intervention (ie, standardized instructions). They found that patients who received the standardized instructions had a statistically significant better understanding of the instructions given regarding the duration of expected illness and return precautions (P<0.05). There were no statistically significant differences in understanding with regards to accurately knowing the discharge diagnosis, new medications prescribed, home care instructions, or follow-up.

Editor's Comments: The small sample of this pilot study resulted in limited ability to detect small differences between groups. The use of a convenience sample also limits ability to determine if these results would hold true across a randomized group of clinicians. Additionally, the inter-rater reliability of interview scoring was not assessed, which is typically standard practice with subjectively measured data. Given the importance of patient understanding of their diagnosis, home care, and follow-up instructions, this study does provide some evidence that standardized instructions, if read by patients, can offer certain advantages. A more practical question that the study did not address is proactive patient engagement with discharge instructions. ■