Encouraging Shorter Course Antibiotic Prescribing

Take Home Point: In this quality improvement project, education with performance feedback in combination with clinical decision support (CDS) was effective in modifying clinician behavior surrounding antibiotic prescribing.

Citation: Vernacchio L, Hatoun J, Patane L, et al. Improving Short Course Treatment of Pediatric Infections: A Randomized Quality Improvement Trial. *Pediatrics*.2024;153(2): e2023063691

Relevance: There is increasing evidence that shorter courses of antibiotics for the treatment of pediatric pneumonias (CAP) and skin and soft tissue infections (SSTI) are equally effective to longer courses with fewer side effects. However, clinician prescribing practices often lag behind updates in guidelines.

Study Summary: This was a site-randomized, quality improvement trial within a large pediatric primary care network in Massachusetts. Seventy-five practices were randomly assigned to 1 of 4 intervention groups: quality improvement education and feedback; CDS; both education and feedback plus CDS (combined group); and control (no intervention). There was a 3-month intervention period at the start of the initiative. Pediatric primary care practices in the education and feedback group received an e-mail reminding them of the recommendations and updating them on their performance by e-mail during the 1- and 2-month period of the intervention. Those assigned to the CDS group did not receive any performance feedback or education relative to the project.

The authors found for all cases of CAP and SSTI combined and for each condition individually, the proportion of cases in the control group treated with the recommended short course did not change from the baseline period. In contrast, within all 3 of the intervention groups, there were statistically significant improvements after the intervention period. Education with performance feedback via e-mail and CDS delivered at the point of care were equally effective in changing clinician behavior. The combination of the 2 techniques, however, was more effective than either approach alone. There was an approximately 25% improvement in the groups assigned to education with performance feedback alone or to CDS alone, and there was 42% improvement in the group assigned to the combination of the 2 intervention strategies.

Editor's Comments: There may be limited generalizability of the study to community urgent cares as this was a pediatric primary care group of sites affiliated with an academic children's hospital. The findings do suggest that to change clinicians' behavior a combination of feedback and education methods work better than either alone, and therefore, initiatives developed to influence clinician prescribing are more likely to achieve results if multi-pronged in their approaches. ■

Prepared by Ivan Koay MBChB, MRCS, FRNZCUC, MD; Urgent Care Physician and Medical Lead, Kings College Hospital Urgent Treatment Centre, London; Convenor Ireland and UK Faculty of the Royal New Zealand College of Urgent Care; Independent Assessor European Reference Network, Andalusian Agency for Healthcare Quality

Can I Trust That Computer ECG Read?

Take Home Point: In this study, a normal or "otherwise normal" ECG machine read excluded a ST elevation myocardial infarction (STEMI).

Citation: Deutsch A, Poroksy K, Westafer L, et. al. Validity of Computer-interpreted "Normal" and "Otherwise Normal" ECG in Emergency Department Triage Patients. *West J Emerg Med*. 2024;25(1)3–8.

Relevance: Chest pain is a common presentation to UC centers. STEMI is the most critical form of acute coronary syndrome (ACS) to identify because immediate revascularization – typically via percutaneous coronary intervention (PCI) – has been shown to improve outcomes.

Study Summary: This was a prospective cohort study of triage ECGs performed in triage according to a standard protocol in an academic emergency department (ED) in the Northeastern United States. Adult patients presenting to the ED with chest pain, chest pressure, chest tightness, weakness, unusual fatigue, palpitations, syncope, dyspnea, or other less typical symptoms for ACS such as nausea and vomiting or pain in the jaw, upper back, or upper abdomen were triaged and had an ECG performed. The ECGs were obtained with a GE MAC 5500 (GE Healthcare, Waukesha, WI) and interpreted using Marquette 12SL (GE Health-

care). Board-certified cardiologists blinded to all aspects of the study reviewed the ECGs and entered the final interpretation into the medical health records. The primary outcome was the number of ECGs with a computerized interpretation of "normal" or "otherwise normal" ECG that were interpreted by cardiologist as STEMI.

Data from 2,275 patients were included in the study. The authors found the most common indication for ECG was chest pain (58% of patients), followed by cardiac arrhythmia (19%). Of patients with ECG machine-interpretations of "normal" or "otherwise normal," 98.6% were discharged from the ED. None of the patients with computer readings of "normal" or "otherwise normal" included in the analysis were found to have a STEMI or a final diagnosis of ACS. Cardiologists agreed with the machine-interpretation of "normal" or "otherwise normal" ECG in 96.7% (n = 2,201) of cases. Of the 3.3% (n = 74) of ECGs where cardiologists did not agree with the machine interpretation, none were interpreted by the cardiologist as STEMI.

Editor's Comments: This study has limited generalizability due to its single site and use of only 1 medical device. The narrow scope of the study to exclude STEMI only should be taken into consideration as there are many other causes for chest pain that were not considered by the authors. Although it is reassuring that the patients had a "normal" or "otherwise normal result," care needs to be taken during any consultation to avoid cognitive bias or premature closure on a benign diagnosis. Nevertheless, this study offers reassurance that, with increasingly sophisticated artificial intelligence and computer algorithm based ECG interpretation, clinicians can feel more confident that "normal" readings make immediately life threatening ACS as a cause for patients' symptoms highly unlikely. ■

Visual Learning Advances Clinical Knowledge

Take Home Point: The combination of procedural and conceptual knowledge improved learning in medical students.

Citation: Beeler N, Ziegler S, Volz A, et. al. The effects of procedural and conceptual knowledge on visual learning. *Adv Health Sci Educ Theory Pract*. 2023 Dec 7. doi: 10.1007/s10459-023-10304-0

Relevance: Learning to interpret visual information is crucial in the provision of care in urgent care (UC) settings, including dermatology and radiology studies. Medical students are often instructed to use algorithms and subsequently provided opportunities to use visual images.

Study Summary: This was a study based in Switzerland where 4th year medical students were recruited to investigate the effects on visual learning of combined procedural and conceptual knowledge (P+C) versus pure procedural knowledge (P) during a dermatology block. The authors used online surveys which allowed them to capture the participants' decisions and their response times. Images from an archive collection were used to design skin-lesion-classification tasks for the learning activities and tests. The study included 2 learning activities: initial knowledge acquisition, in which the learning materials differed between the 2 study groups; and subsequent visual learning, which was similar for both groups.

The authors found that the visual learning resource was necessary to reach significant performance improvements in track tasks. This implies that additional conceptual knowledge about algorithms for medical image interpretation might support error correction mechanisms in visual classification tasks.

Editor's Comments: This study focused on novice learners (eg, medical students) and may not be generally applicable to practicing clinicians. Regardless, it does highlight the importance of visual aspects of learning, especially for inherently visual aspects of clinical practice. ■

Non-Operative Cross Bracing Protocol for Anterior Cruciate Ligament Ruptures

Take Home Point: Anterior cruciate ligament (ACL) ruptures were found to heal with a novel bracing protocol after 3 months without surgical repair.

Citation: Filbay S, Dowsett M, Jomaa M, et. al. Healing of acute anterior cruciate ligament rupture on MRI and outcomes following non-surgical management with the Cross Bracing Protoco. *Br J Sports Med*. 2023 Dec;57(23):1490-1497. doi: 10.1136/bjsports-2023-106931

Relevance: The present management strategy for ACL ruptures centers around surgical repair, however, surgery may not be an option for many patients and non-surgical treatments which could yield similar outcomes would be highly valuable.

Study Summary: This was a case series where the authors recruited and treated 80 consecutive participants, aged between 10-58 years old, who presented to a private sport

and exercise medicine practice in Sydney, Australia. All patients had magnetic resonance imaging (MRI) confirmed acute ACL ruptures and subsequently were treated non-operatively with the cross-brace protocol (CBP). The CBP aims to reduce the gap distance between the ligament remnants by immobilizing the knee at 90° of flexion for 4 weeks after acute ACL rupture in attempt to facilitate bridging of tissue and healing between the ruptured ACL remnants. Following this initial period, participants then underwent a range of motion knee movements at weekly increments and physical therapy-led rehabilitation targeting lower limb neuromuscular control, muscle strengthening and power, and functional training.

The authors noted that at the 3-month follow-up, 90% (n=72) of the participants had healing of the ACL such that it was continuous again. 40 participants had an MRI grade that suggested better 12-month knee function and quality of life, reduced passive knee laxity and a higher rate of return-to-sport. Among participants, 11 subsequently suffered a re-rupture of the ACL.

Editor's Comments: This was a case series and not a research study so there was no comparison between the CBP, surgical repair, or no treatment. The CBP is a long protocol and may not be feasible in all regions. Furthermore, after the 50th recruited patient, patients were discouraged from undertaking the CBP if they had a femoral avulsion and/or ACL tissue displaced outside the boundaries of the intercondylar notch, implying a change in protocol during the course of the case series. Further research with a comparator group to the CBP would be helpful in determining if this may be a viable or even preferable alternative to surgical repair and, if so, in which patient groups. ■

Opioid Exposure and Risk of Spontaneous Preterm Delivery

Take Home Point: In this case-controlled study, an association was found between total opioids prescribed and the odds of spontaneous preterm birth.

Citation: Bosworth O, Padilla-Azain M, Adgent M, et. al. Prescription Opioid Exposure During Pregnancy and Risk of Spontaneous Preterm Delivery. *JAMA Network Open*. 2024;7(2): e2355990. doi:10.1001/jamanetworkopen.2023.55990

Relevance: Pregnant patients with severe pain not controlled with acetaminophen are left with little pharmaceutical options beyond opioids. The impact of short prescription opioid exposure for acute episodes of pain on perinatal outcomes is not well characterized.

Study Summary: This was a nested case-control study of a retrospective cohort of pregnant patients enrolled in Tennessee Medicaid (TennCare), which provides insurance coverage to 50% of the state's pregnant patients. Records of TennCare enrollment files were linked to health care encounters, hospital discharge data, and opioid prescription fills. Tennessee birth certificate data that provide information on clinical estimates of gestational age, maternal demographics, clinical characteristics, and obstetric procedures were also reviewed and linked with opioid prescription fills using national drug codes. Births between 24 weeks 0 days and 36 weeks 6 days were considered spontaneous if there were premature rupture of membranes, prolonged or precipitous labor, a use or attempted use of forceps or a vacuum, and no induction for delivery.

The authors identified 25,391 cases of spontaneous preterm birth. They found opioid morphine milligram equivalents (MME) prescribed in the 60 days prior to the index date were significantly associated with higher odds of spontaneous preterm birth. Doubling of opioid MME was associated with a 4% increase in the odds for spontaneous preterm birth compared with no opioid exposure (adjusted odds ratio [OR], 1.04; 95% confidence interval [CI], 1.01-1.08). In the study, 1,573 pregnancies had filled prescriptions for 900 MMEs or greater prescriptions, which were associated with 21% increased odds for spontaneous preterm birth compared with no opioid exposure.

Editor's Comments: The dispensing data of the study assumed a proxy use, which may lead to potential bias as the amount of opioids actually consumed is unclear from this data. Opioid prescribing suggests patients are dealing with severe pain, which may have contributed to the preterm delivery as could the underlying condition causing pain. Since causality cannot be proven from these data, caution in over-interpretation is advisable. However, the results of this study do support recommendations for restricting opioid use in pregnancy to the minimal reasonable amount as most opioids are known to cross the placenta and cause additional perinatal issues for infants beyond prematurity. ■

Online Sessions Improve Long COVID Recovery

Take Home Point: In this study, online, home-based, supervised, group physical and mental therapy was clinically

effective in improving health-related quality of life compared with usual care at 3 and 12 months.

Citation: McGregor G, Sandhu H, Bruce J, et. al. Clinical effectiveness of an online supervised group physical and mental health rehabilitation programme for adults with post-COVID-19 condition (REGAIN study): multicentre, randomised controlled trial. *BMJ* 2024;384: e076506. doi: 10.1136/bmj-2023-076506

Relevance: Long COVID continues to affect a multitude of patients and identifying appropriate therapies that will improve their quality of life remains an important target for relieving disability and allowing those afflicted to resume normal daily activities.

Study Summary: This was a pragmatic, multicenter, parallel group, superiority randomized controlled trial conducted on patients throughout England and Wales. Participants were adults who had been discharged from the hospital ≥3 months previous to a hospital admission with COVID-19 and who had ongoing substantial COVID-19 related physical and/or mental health sequelae. They were randomly allocated to an intervention or usual care (control) group. Participants in the control group received best practice usual care, consisting of a 30-minute, online, one-to-one consultation with a trained practitioner. The intervention participants received an 8 week, online, home based, supervised, group rehabilitation program, supported by a workbook. The intervention group received weekly practitioner-led live online group exercise sessions and 6 live online group psychological support sessions delivered through Zoom.

The authors randomized 585 participants for the study. They found at 3-months, health-related quality of life improved more for participants in the intervention group (mean PROPr score 0.27 [SD 0.18]; n=237) than the control group (0.23 [SD 0.18]; n=248). By 12 months, all scores and scales were further improved in the intervention group. However, the investigators observed improvements in overall quality-of-life and in other indices of wellbeing with both the intervention and control groups.

Editor's Comments: Importantly, patients in both groups improved over the course of 12 months, adding additional evidence to support that the natural history of long-COVID is recovery, albeit at a frustratingly slow pace for some. It was not possible to blind participants to which arm of the study they were randomized. It is likely that the intervention group experienced a placebo effect to some extent given the higher degree of support they received than controls. ■