Journal Update

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Introduction

The *Emergency Medicine Journal* has been publishing regular summaries of key publications regarding COVID-19 relevant to Emergency Medicine. While the disease remains with us and still dominates the news, we have broadened this journal update to include original research relevant to topics other than the COVID-19 pandemic that has appeared in both emergency and specialty journals. We will continue to use a multimodal search strategy, drawing on both free open access medical education (FOAMEd) resources and formal literature searches that we have used previously.[1]

For this update, we identified 1969 papers published between 1 May and 31 May 2021. These were narrowed down to the five most interesting and relevant papers (decided by consensus within our group), providing a snapshot of those that we felt most deserved the attention of the EMJ readership. We have highlighted the main findings, key limitations and clinical bottom line for each paper.

The papers are ranked in one of the three categories, allowing you to focus on the papers that are most vital to your practice:
► Worth a peek—interesting, but not yet ready for prime time
► Head turner—new concepts.
► Game changer—this paper could/ should change practice

This month's update was undertaken by the core editorial team based out of the EMERGING research group from Manchester.

The Ambulance Cardiac Chest Pain Evaluation in Scotland Study (ACCESS): a prospective cohort study by Cooper *et al*

Rating: Worth a peek
Topic: Chest pain

With the growing number of patients presenting to the ED, there has been increasing interest in validating new pathways that incorporate point of care tests (POCTs) that may enable acute myocardial infarction (AMI) to be ruled out in some patients in the prehospital environment. Some early research has suggested that this may be possible, even with a less sensitive POCT for cardiac troponin, when used alongside an established decision aid.[2 3] A validated pathway like this could potentially reduce unnecessary transport to hospital with faster reassurance for many patients, helping to unburden crowded EDs.

The Ambulance Cardiac Chest Pain Evaluation in Scotland Study (ACCESS) was a prospective diagnostic accuracy study that included patients with chest pain who had called for an emergency ambulance.[4] Paramedics collected data and took venous blood samples, which were analysed using the Samsung LABGEO POCT for conventional cardiac troponin. The authors evaluated the accuracy of the HEART and HEAR scores (HEART without troponin testing). The primary outcome was major adverse cardiac events (MACE) within 30 days.

1054 patients were included in the analysis of the HEAR score, while 357 patients had POCT cardiac troponin results available for evaluation of the HEART score. Neither HEART nor HEAR had very high sensitivity for MACE: a HEART score ≤3 had a sensitivity of 87.0% (95% CI: 80.7% to 93.4%), while a HEAR score ≤3 had a sensitivity of 81.5% (95% CI: 74.2% to 88.8%). The negative predictive values for each score were also below 90%. At a threshold of ≥7 points, the HEART score had reasonably high specificity (94.8%) and could 'rule in' AMI for 14% of patients, with 73.5% positive predictive value. However, using the troponin assay alone (at a cut-off of 100 ng/L) 'ruled in' the same proportion with very similar specificity and positive predictive value. Notably, this result is similar to that found by Nilsson *et al* in an ED in Sweden.[5 6]

Bottom line

On this evidence, the HEAR/HEART pathways could not be used to 'rule out' ACS in the prehospital setting. High sensitivity POC troponin assays may soon be available, they have the potential to perform better in these study settings than the contemporary POC assays.

Assessment of an AI aid in detection of adult appendicular skeletal fractures by emergency physicians and radiologists: a multicentre cross-sectional diagnostic study by Duron *et al*

Rating: Head turner
Topic: Radiology

Duron *et al* aimed to assess how well a previously derived artificial intelligence (AI) system performed in aiding both radiologists and emergency physicians to correctly diagnose fractures from limb or pelvic X-rays[7].

Stratified randomised sampling was used to collate 600 patient examinations (50 with and without fractures per examination location). True fractures were determined by two experienced radiologists, disagreements resolved by a third. Six radiologists and six emergency physicians identified fractures in subsets with and without AI assistance.

Primary analysis used patient-wise sensitivity and specificity (correct identification of all fractures on an image). Across physicians, AI assistance improved sensitivity by 8.7% (70.8% to 79.4%, p=0.003 for superiority) but when stratified, improvement was only statistically significant for hand and foot radiographs. Specificity improved with AI assistance by 4.1% (89.5% to 93.6%, p<0.001 for non-inferiority). False positives per patient were reduced 41.9% and the time to read the radiograph reduced from 67 to 57 s but this was not significant. Among emergency physicians only, the AI aid improved sensitivity from 61.3% to 74.3% (p=0.3). The AI model had an area under the curve of 0.91 (95% CI: 0.89 to 0.94), improving to 0.94 (95% CI: 0.92 0.96) with recent model updates.

However, interpretation was made without clinical information and obvious fractures were excluded, likely reducing emergency physician performance. The description of the model derivation is limited, denying the authors the space to describe it in detail, which may add to the AI 'black box' conundrum.

Bottom line

This AI tool may offer a promising solution to help improve fracture diagnosis in ED, reducing errors.

Defining major trauma: a Delphi study by Thompson *et al*
Rating: Worth a peek
Topic: Trauma

Major trauma is traditionally defined using the injury severity score (ISS), and other scores applied retrospectively.[8] These scores are arguably of little use to treating clinicians at the time of caring for patients. This Delphi study involved an expert panel (n=55) of paramedics (n=20), doctors (n=20), nurses and others to create a predetermined level of consensus of 70% for elements to be included in the definition of major trauma.[9] The result is the following:

> Significant injury or injuries that have potential to be life-threatening or life-changing sustained from either high or low energy mechanisms especially in those rendered vulnerable by extremes of age.[9]

The statement has face validity, but it is worth noting consensus study was conducted in the setting of UK emergency medicine and may not translate to other geographies. It is open to the criticisms that many Delphi studies receive, including reliance on convenience sampling, the definition of an 'expert' and the significant dropout rate between rounds.

However, compared with ISS, this is a more holistic definition that is clearly patient-outcome focused. It will also be able to better reflect the impact of single injuries with long term sequelae.

Bottom Line

The authors propose a patient focused and holistic definition of major trauma that could be used in real time.

Restrictive fluid management versus usual care in acute kidney injury (REVERSE-AKI): a pilot randomised controlled feasibility trial by Vaara *et al*
Rating: Worth a peek
Topic: Fluid resuscitation

Acute kidney injury (AKI) usually results in clinicians reflexively reaching for bags of intravenous fluid. However, AKI patients are especially high risk for fluid overload. While we now know that fluid restrictive approaches can be safe for patients with sepsis and acute respiratory distress, the preferred strategy in critically ill patients with AKI is unclear.

A multicentre feasibility study in seven European/Australian ICUs randomised 100 general 'adequately resuscitated' ICU patients with AKI in a 1:1 ratio to receive either restrictive fluid management or usual care. Groups were a little uneven, with more comorbidity (although younger age) in the usual-care arm.[10]

The primary feasibility outcome measure was cumulative balance of fluid input and output at 72 hours (a measure of fidelity of intervention) which was 1148 mL lower (2200 to 96 mL) p=0.033 in the restrictive group. For secondary and exploratory outcomes, there was less renal replacement therapy in the restrictive group, but no difference found between groups in: furosemide use; days alive free of: mechanical ventilation/vasopressors/ICU treatment/renal replacement therapy at 90 days/dialysis dependence at 90 days, or 90-day mortality .

This pilot study with limited numbers suffers from obvious lack of blinding, multiple potential confounding factors on study outcomes and exclusion of patient with treatment limitations.

While an ICU-based study, what this pilot does suggest for emergency department care, is to think more carefully about fluid provision for those in AKI who are normovolaemic. What it cannot do, however is provide evidence for definitive practice-change.[10]

Bottom line

AKI in critically unwell patients may benefit from a fluid-restrictive approach if already adequately resuscitated, but more data are needed

P2Y12 inhibitors plus aspirin versus aspirin alone in patients with minor stroke or high-risk transient ischaemic attack by Li *et al*
Rating: Game changer
Topic: Stroke

Current acute management for secondary prevention of high-risk transient ischaemic attacks (TIAs) or ischaemic strokes is single-agent therapy, such as clopidogrel.[11] Recent trials have examined the addition of aspirin, but they did not demonstrate a benefit.[12] However, there has been speculation that these trials failed to capture the early benefit of dual antiplatelet therapy (DAPT).

In this systematic review and meta-analysis, Li *et al* sought to determine the benefit of DAPT in patients with mild ischaemic stroke or high-risk TIA when initiated within 3 days of presentation.[13]

Although the study was not preregistered with PROSPERO, it did follow appropriate reporting guidelines.[14 15] The search strategy appears robust, but it was not checked by a methodologist. DAPT was defined as aspirin plus ticagrelor or clopidogrel. Placebo-controlled trials that reported outcomes of cerebrovascular events, morality haemorrhage or myocardial infarction were included

Of 1334 papers identified, four randomised control trials (totalling 21 067 patients) were included. Three of these studies had a low risk of bias and one had some concerns around the intervention. There was an absolute risk reduction of 24% in the pooled analysis of stroke recurrence within 90 days for DAPT initiated in 24 hours (RR of 0.76%–95% CI: 0.68 to 0.83 (I^2=0%)). There was no difference identified in the pooled analysis for all-cause mortality and cardiovascular death. However, DAPT was associated with severe or moderate bleeding in a pooled analysis (RR: 2.17 95% CI: 1.15 to 4.08). The association was strongest with ticagrelor and treatment duration beyond 21 days (RR 3.25 and 2.86).

Bottom line

Initiation of DAPT within 24 hours of high-risk TIA or mild ischaemic stroke reduces the recurrence of stroke but was associated with increased risk of bleeding.

Check for updates

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