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Journal update monthly top five

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This month's update is by the Emergency Department of the University Hospital of Heraklion, Crete, Greece. We used a multimodal search strategy, drawing on free open-access medical education resources and literature searches. We identified the five most interesting and relevant papers (decided by consensus) and highlighted each paper's main findings, key limitations, and clinical bottom line.

The papers are ranked as follows:

- Worth a peek—interesting, but not yet ready for prime time.
- Head turner—new concepts.
- Game changer—this paper could/should change practice.

We first present two related studies, published in the same issue of the New England Journal of Medicine, with a similar bottom line.

1. **A randomized trial of drug route in out-of-hospital cardiac arrest. Couper K *et al.***

Topic: Cardiac arrest
Outcome rating: Head turner

Securing intravenous (IV) access during out-of-hospital cardiac arrests (OHCA) can be challenging and time-consuming. Intraosseous (IO) access is familiar to many working in pre-hospital or emergency department (ED) settings, but is it actually better?

PARAMEDIC-3 was a pragmatic, parallel-group, open-label randomised trial conducted across 11 United Kingdom emergency medical systems over 33 months.(1) The study aimed to assess the impact of initial vascular access route on 30-day survival after OHCA. Secondary outcomes included return of spontaneous circulation (ROSC) at any time, time to ROSC, sustained ROSC on transfer to hospital, survival at hospital discharge, three and six months, length of hospital stay,

neurological outcome (measured by the modified Rankin Scale) and health-related quality of life (measured by the EQ-5D-5L questionnaire).

The study was terminated early due to funding expiration and a lower-than-anticipated enrolment rate. Power analysis required 14972 patients to detect a 1% difference in 30-day survival; 6096 participants were recruited.

There was no statistically significant difference in survival at 30 days between groups when adjusted for age, sex, witness status, bystander CPR, initial rhythm, time from emergency call to drug administration, and aetiology. Fewer patients in the IO group achieved ROSC compared to the IV group (adjusted odds ratio 0.863, CI 95% 0.765 - 0.974). Although IO access had a higher success rate (94.4% vs 64.6%), there was no difference in time to drug administration or number of doses administered. Lack of masking of vascular access route may have led to assessor bias, especially regarding the neurological outcome.

2. Intraosseous or intravenous vascular access for out-of-hospital cardiac arrest. Vallentin MF *et al.*

Topic: Cardiac arrest

Outcome rating: Head turner

This second IO vs IV RCT compared outcomes of vascular access route for out-of-hospital cardiac arrest (OHCA) in five EMS agencies in Denmark. The primary outcome was sustained (≥ 20 minutes) ROSC. Secondary outcomes included 30-day mortality, 30-day mortality with favorable neurological outcome assessed via modified Rankin scale, and quality of life assessment at 30 days.(2)

Analysis included 1479 patients (731 in the IO and 749 in the IV group). There were no differences in basic demographic characteristics, time to vascular access, and time to administration of medications between groups. There was no statistically significant difference between groups regarding sustained ROSC (30% in IO vs 29 % in IV, RR 1.06, 95% CI 0.9-1.24), in 30-day survival (12% in IO vs 10% in IV group) or neurologically favorable outcome (9% in IO vs 8% in IV group).

The main limitation of both studies is that adrenaline, whether given IV or IO, still lacks convincing evidence for OHCA patient orientated outcomes. Also, this study was underpowered to detect significant differences in most secondary outcomes, including mortality.

The bottom line for 1 & 2: Both RCT's failed to demonstrate a difference in outcomes of patients according to the vascular access routes used during out-of-hospital cardiac arrest.

3. **Effect of cash benefits on health care utilization and health: A randomized study. Agarwal *et al***

Topic: Health policy

Outcome Rating: Head Turner

Poverty represents a significant barrier to healthcare access and may lead to worse health. Previous studies showed moderate to no effect of income support on overall health and raised concerns regarding potential increases in substance abuse.(3)

During the COVID-19 pandemic, a lottery was organized in Chelsea, Massachusetts, a city in the US inhabited mostly by low-income families. From 2,880 participants who applied, 1,746 were randomly selected to receive up to $400 monthly for nine months. Electronic health records in three major health systems in the area, were used to track ED visits, outpatient health care utilization and COVID-19 vaccination among those receiving benefits and a control group of those not receiving benefits.(4)

Compared to the non-benefit group, those receiving cash benefits had significantly fewer ED visits (217.1 vs 317.5 visits per 1000 persons) with an adjusted difference of −87.0 per 1000 persons (95% CI, −160.2 to −13.8) (p = 0.02) and fewer hospital admissions per ED visit (−27.3 visits per 1000 persons [95% CI, −53.6 to −1.1]). The most prominent effect was a decrease in ED visits related to behavioural health and substance abuse. There was no difference in primary care, outpatient behavioural health, and urgent care visits or COVID-19 vaccination rates, but there was a non-significant increase in outpatient subspecialty visits in those receiving the benefit.

Generalisation may be limited due to the unique characteristics of the participating population and the potential effect of the COVID-19 pandemic.

The bottom line: Economic support resulted in fewer ED visits and hospitalisations, suggesting that even small changes in household income could decrease ED use.

4. **Comparison of initial adenosine dose conversion rate for supraventricular tachycardia in the emergency department. Krug N *et al***

Topic: Cardiology

Outcome rating: Worth a peek

Standard teaching regarding termination of supraventricular tachycardia (SVT) is an attempt with vagal manoeuvres and, if unsuccessful, adenosine. Current guidelines for adenosine recommend an initial dose of 6 mg followed by 12 mg if the SVT does not terminate. However, the ideal initial adenosine dose is unclear.

This was a multicentre, retrospective cohort study, performed from January 2020 to June 2022, comparing SVT termination outcome between patients who received an initial dose of 6 mg versus 12 mg of adenosine.(5) The study included 213 patients, 117 initially received 6 mg of adenosine and 96 initially received 12 mg. There were no differences in age, sex, weight or comorbidities between groups. Among patients who initially received 6 mg, 56.4% experienced SVT termination compared to 79.1% of patients who received 12 mg ($p < 0.01$). In a subgroup analysis of a small number of patients with BMI ≥ 40 kg/m^2 ($n = 32$), initial dose of adenosine 6 mg was effective in 42.1%, while 12 mg was effective in 69.2 % ($p = 0.17$). Median time to discharge was 161 mins in the 12 mg group vs. 209 mins in the 6 mg group, but the difference was not statistically significant. No differences were noted regarding safety or patient disposition.

Study limitations include the retrospective design and small numbers for the subgroup analysis. Confounding factors like drug administration technique cannot be adequately considered. Due to COVID-19 measures, admission rates and potential delays in patients' evaluation cannot be precluded.

The bottom line: This study suggests termination SVT is higher with an initial dose of 12 mg of adenosine than 6 mg, paving the way for future multicentre prospective trials.

5. The Impact of point-of-care ultrasound-guided resuscitation on clinical outcomes in patients with shock: A systematic review and meta-analysis. Basmaji *et al*

Topic: Point of care ultrasound in resuscitation

Outcome Rating: Head Turner

POCUS is increasingly used for shock in the ED to provide real-time assessment of physiological parameters and detect potential life-threatening complications such as cardiac tamponade. This meta-analysis of 18 RCTs compared outcomes of POCUS-guided resuscitation to non-POCUS-guided resuscitation in shock. Study included 2,227 patients, 1,120 in the POCUS-guided group and 1,107 in the non-POCUS-guided group.(6)

There was a small but significant reduction in 28-day mortality (RR 0.88; 95% CI, 0.78-0.99) and a statistically significant reduction in the duration of vasoactive medication use by 0.73 days in POCUS group. Both outcomes had moderate certainty of evidence. Using POCUS, doctors escalated inotropes or vasopressor less and performed fewer adjustments to intravenous fluids (IVF), however the effect on total IVF administered was negligible. Other findings, albeit with low or very low certainty, included lower use of echocardiography but not CTs, lower risk for acute kidney injury and renal replacement therapy, and higher lactate clearance. No effect on the duration of mechanical ventilation, ICU or hospital admission, or length of stay was identified.

Generalisability is limited due to lack of a sensitivity analysis based on factors known to influence POCUS interpretation such as operator expertise. Heterogeneity precluded a planned subgroup analysis based on prior medical conditions and a cost analysis could not be performed. Finally, use of low-evidence data and imprecision limit the strength of conclusions regarding POCUS use for some clinical outcomes.

The bottom line: POCUS-guided resuscitation may lead to a small improvement in clinical outcomes in patients with shock.

References

1. Couper K, Ji C, Deakin CD, Fothergill RT, Nolan JP, Long JB, et al. A Randomized Trial of Drug Route in Out-of-Hospital Cardiac Arrest. N Engl J Med. 2024 Oct 31;NEJMoa2407780.

2. Vallentin MF, Granfeldt A, Klitgaard TL, Mikkelsen S, Folke F, Christensen HC, et al. Intraosseous or Intravenous Vascular Access for Out-of-Hospital Cardiac Arrest. N Engl J Med. 2024 Oct 31;NEJMoa2407616.

3. Jaroszewicz A, Jachimowicz J, Hauser O, Jamison J. How Effective Is (More) Money? Randomizing Unconditional Cash Transfer Amounts in the US. SSRN Electron J [Internet]. 2022 [cited 2024 Dec 14]; Available from: https://www.ssrn.com/abstract=4154000

4. Agarwal SD, Cook BL, Liebman JB. Effect of Cash Benefits on Health Care Utilization and Health: A Randomized Study. JAMA. 2024 Nov 5;332(17):1455.

5. Krug N, Baize P, Barre S, Barnes R, Weigartz K. Comparison of initial adenosine dose conversion rate for supraventricular tachycardia in the emergency department. Am J Emerg Med. 2024 Nov;85:117–22.

6. Basmaji J, Arntfield R, Desai K, Lau VI, Lewis K, Rochwerg B, et al. The Impact of Point-of-Care Ultrasound-Guided Resuscitation on Clinical Outcomes in Patients With Shock: A Systematic Review and Meta-Analysis*. Crit Care Med. 2024 Nov;52(11):1661–73.

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