Journal report – únor 2024

OBSAH

PREHOSPITAL CARE

– clinical trials & RCT

0: Žádná publikovaná (randomizovaná) klinická studie.

PREHOSPITAL CARE

– systematic review & meta-analysis

1: Scriven JW, Battaloglu E. **The Effectiveness of Prehospital Subcutaneous Continuous Lactate Monitoring in Adult Trauma: A Systematic Review.** Prehosp Disaster Med. 2024 Feb;39(1):78-84. doi: 10.1017/S1049023X23006623. Epub 2023Dec 4. PMID: 38047359; PMCID: PMC10882558.

2: Proctor A, Lyttle M, Billing J, Shaw P, Simpson J, Voss S, Benger JR. **Which elements of hospital-based clinical decision support tools for the assessment and management of children with head injury can be adapted for use by paramedics in prehospital care? A systematic mapping review and narrative synthesis.** BMJ Open. 2024 Feb 13;14(2):e078363. doi: 10.1136/bmjopen-2023-078363. PMID:38355171; PMCID: PMC10868315.

3: Lingawi S, Hutton J, Khalili M, Shadgan B, Christenson J, Grunau B, Kuo C. **Cardiorespiratory Sensors and Their Implications for Out-of-Hospital Cardiac Arrest Detection: A Systematic Review**. Ann Biomed Eng. 2024 Feb 15. doi: 10.1007/s10439-024-03442-y. Epub ahead of print. PMID: 38358559.

4: Heldring S, Jirwe M, Wihlborg J, Berg L, Lindström V. **Using High-Fidelity Virtual Reality for Mass-Casualty Incident Training by First Responders – A Systematic Review of the Literature.** Prehosp Disaster Med. 2024 Feb;39(1):94-105. doi: 10.1017/S1049023X24000049. Epub 2024 Feb 8. PMID:38328887; PMCID: PMC10882557.

5: Appelbaum RD, Puzio TJ, Bauman Z, Asfaw S, Spencer A, Dumas RP, Kaur K, Cunningham KW, Butler D, Sawhney JS, Gadomski S, Horwood CR, Stuever M, Sapp A, Gandhi R, Freeman J. **Handoffs and Transitions of Care: A Systematic Review, Meta-Analysis, and Practice Management Guideline from the Eastern Association for the Surgery of Trauma.** J Trauma Acute Care Surg. 2024 Feb 26. doi: 10.1097/TA.0000000000004285. Epub ahead of print. PMID: 38407300.

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PREHOSPITAL CARE

– systematic review & meta-analysis –

1. Prehosp Disaster Med. 2024 Feb;39(1):78-84. doi: 10.1017/S1049023X23006623. Epub 2023 Dec 4.

The Effectiveness of Prehospital Subcutaneous Continuous Lactate Monitoring in Adult Trauma: A Systematic Review.

Scriven JW(1)(2), Battaloglu E(2)(3).

INTRODUCTION: Existing diagnostics for polytrauma patients continue to rely on non-invasive monitoring techniques with limited sensitivity and specificity for critically unwell patients. Lactate is a known diagnostic and prognostic marker used in infection and trauma and has been associated with mortality, need for surgery, and organ dysfunction. Point-of-care (POC) testing allows for the periodic assessment of lactate levels; however, there is an associated expense and equipment burden associated with repeated sampling, with limited feasibility in prehospital care. Subcutaneous lactate monitoring has the potential to provide a dynamic assessment of physiological lactate levels and utilize these trends to guide management and response to given treatments.

STUDY OBJECTIVE: The aim of this study was to appraise the current literature on dynamic subcutaneous continuous lactate monitoring (SCLM) in adult trauma patients and its use in lactate-guided therapy in the prehospital environment.METHODS: The systematic review was conducted in accordance with the PRISMA guidelines and registered with PROSPERO. Searched databases included PubMed, EMBASE via Ovid SP, Cochrane Library, and Web of Science. Databases were searched from inception to March 29, 2022. Relevant manuscripts were further scrutinized for reference citations to interrogate the fullness of the adjacent literature.

RESULTS: Searches returned 600 studies, including 551 unique manuscripts. Following title and abstract screening, 14 manuscripts met the threshold for full-text sourcing. Subsequent to the scrutiny of all 14 manuscripts, none fully met the specified eligibility criteria. Following careful examination, no article was found to cover the exact area of scientific inquiry due to disparity in technological or environmental characteristics.

CONCLUSION: Little is known about the utility of dynamic subcutaneous lactate monitoring, and this review highlights a clear gap in current literature. Novel subcutaneous lactate monitors are in development, and the literature describing the prototype experimentation has been summarized. These studies demonstrate device accuracy, which shows a close correlation with venous lactate while providing dynamic readings without significant lag times. Their availability and cost remain barriers to implementation at present. This represents a clear target for future feasibility studies to be conducted into the clinical use of dynamic subcutaneous lactate monitoring in trauma and resuscitation.

DOI: 10.1017/S1049023X23006623
PMCID: PMC10882558
PMID: 38047359 [Indexed for MEDLINE]

2. BMJ Open. 2024 Feb 13;14(2):e078363. doi: 10.1136/bmjopen-2023-078363.
Which elements of hospital-based clinical decision support tools for the assessment and management of children with head injury can be adapted for use by paramedics in prehospital care? A systematic mapping review and narrative synthesis.
Proctor A(1), Lyttle M(2), Billing J(3), Shaw P(3), Simpson J(3), Voss S(4), Benger JR(5)(6).

OBJECTIVE: Hospital-based clinical decision tools support clinician decision-making when a child presents to the emergency department with a head injury, particularly regarding CT scanning. However, there is no decision tool to support prehospital clinicians in deciding which head-injured children can safely remain at scene. This study aims to identify clinical decision tools, or constituent elements, which may be adapted for use in prehospital care.
DESIGN: Systematic mapping review and narrative synthesis.
DATA SOURCES: Searches were conducted using MEDLINE, EMBASE, PsycINFO, CINAHL and AMED.
ELIGIBILITY CRITERIA: Quantitative, qualitative, mixed-methods or systematic review research that included a clinical decision support tool for assessing and managing children with head injury.
DATA EXTRACTION AND SYNTHESIS: We systematically identified all in-hospital clinical decision support tools and extracted from these the clinical criteria used in decision-making. We complemented this with a narrative synthesis.
RESULTS: Following de-duplication, 887 articles were identified. After screening titles and abstracts, 710 articles were excluded, leaving 177 full-text articles. Of these, 95 were excluded, yielding 82 studies. A further 14 studies were identified in the literature after cross-checking, totalling 96 analysed studies. 25 relevant in-hospital clinical decision tools were identified, encompassing 67 different clinical criteria, which were grouped into 18 categories.
CONCLUSION: Factors that should be considered for use in a clinical decision tool designed to support paramedics in the assessment and management of children with head injury are: signs of skull fracture; a large, boggy or non-frontal scalp haematoma neurological deficit; Glasgow Coma Score less than 15; prolonged or worsening headache; prolonged loss of consciousness; post-traumatic seizure; amnesia in older children; non-accidental injury; drug or alcohol use; and less than 1 year old. Clinical criteria that require further investigation include mechanism of injury, clotting impairment/anticoagulation, vertigo, length of time of unconsciousness and number of vomits.

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3. Ann Biomed Eng. 2024 Feb 15. doi: 10.1007/s10439-024-03442-y.
Cardiorespiratory Sensors and Their Implications for Out-of-Hospital Cardiac Arrest Detection: A Systematic Review.
Lingawi S(#)(1)(2)(3), Hutton J(#)(4)(5)(6)(7), Khalili M(#)(4)(8)(6)(7), Shadgan B(4)(9)(10)(11), Christenson J(4)(5)(6)(7), Grunau B(4)(5)(6)(7), Kuo C(4)(9)(8).

Out-of-hospital cardiac arrest (OHCA) is a major health problem, with a poor survival rate of 2-11%. For the roughly 75% of OHCAs that are unwitnessed, survival is approximately 2-4.4%, as there are no bystanders present to provide life-saving interventions and alert Emergency Medical Services. Sensor technologies may reduce the number of unwitnessed OHCAs through automated detection of OHCA-associated physiological changes. However, no technologies are widely available for OHCA detection. This review identifies research and commercial technologies developed for cardiopulmonary monitoring that may be best suited for use in the context of OHCA, and provides recommendations for technology development, testing, and implementation. We conducted a systematic review of published studies along with a search of grey literature to identify technologies that were able to provide cardiopulmonary monitoring, and could be used to detect OHCA. We searched MEDLINE, EMBASE, Web of Science, and Engineering Village using MeSH keywords. Following inclusion, we summarized trends and findings from included studies. Our searches retrieved 6945 unique publications between January, 1950 and May, 2023. 90 studies met the inclusion criteria. In addition, our grey literature search identified 26 commercial technologies. Among included technologies, 52% utilized electrocardiography (ECG) and 40% utilized photoplethysmography (PPG) sensors. Most wearable devices were multi-modal (59%), utilizing more than one sensor simultaneously. Most included devices were wearable technologies (84%), with chest patches (22%), wrist-worn devices (18%), and garments (14%) being the most prevalent. ECG and PPG sensors are heavily utilized in devices for cardiopulmonary monitoring that could be adapted to OHCA detection. Developers seeking to rapidly develop methods for OHCA detection should focus on using ECG- and/or PPG-based multimodal systems as these are most prevalent in existing devices. However, novel sensor technology development could overcome limitations in existing sensors and could serve as potential additions to or replacements for ECG- and PPG-based devices.

DOI: 10.1007/s10439-024-03442-y
PMID: 38358559

4. Prehosp Disaster Med. 2024 Feb;39(1):94-105. doi: 10.1017/S1049023X24000049. Epub 2024 Feb 8.

Using High-Fidelity Virtual Reality for Mass-Casualty Incident Training by First Responders - A Systematic Review of the Literature.

Heldring S(1)(2), Jirwe M(3), Wihlborg J(4), Berg L(5), Lindström V(1)(5)(6).

INTRODUCTION: First responders' training and learning regarding how to handle a mass-casualty incident (MCI) is traditionally based on reading and/or training through computer-based scenarios, or sometimes through live simulations with actors. First responders should practice in realistic environments to narrow the theory-practice gap, and the possibility of repeating the training is important for learning. High-fidelity virtual reality (VR) is a promising tool to use for realistic and repeatable simulation training, but it needs to be further evaluated. The aim of this literature review was to provide a comprehensive description of the use of high-fidelity VR for MCI training by first responders.

METHODS: A systematic integrative literature review was used according to Whittemore and Knafl's descriptions. Databases investigated were PubMed, CINAHL Complete, Academic Search Ultimate, Web of Science, and ERIC to find papers addressing the targeted outcome. The electronic search strategy identified 797 potential studies. Seventeen studies were deemed eligible for final inclusion.

RESULTS: Training with VR enables repetition in a way not possible with live simulation, and the realism is similar, yet not as stressful. Virtual reality offers a cost-effective and safe learning environment. The usability of VR depends on the level of immersion, the technology being error-free, and the ease of use.

CONCLUSIONS: This integrative review shows that high-fidelity VR training should not rule out live simulation, but rather serve as a complement. First responders became more confident and prepared for real-life MCIs after training with high-fidelity VR, but efforts should be made to solve the technical issues found in this review to further improve the usability.

DOI: 10.1017/S1049023X24000049
PMCID: PMC10882557
PMID: 38328887 [Indexed for MEDLINE]

5. J Trauma Acute Care Surg. 2024 Feb 26. doi: 10.1097/TA.0000000000004285.
Handoffs and Transitions of Care: A Systematic Review, Meta-Analysis, and Practice Management Guideline from the Eastern Association for the Surgery of Trauma.
Appelbaum RD, Puzio TJ, Bauman Z, Asfaw S, Spencer A, Dumas RP, Kaur K, Cunningham KW, Butler D, Sawhney JS, Gadomski S, Horwood CR, Stuever M, Sapp A, Gandhi R, Freeman J.

BACKGROUND: The Joint Commission reports at least half of communication breakdowns occur during handovers or transitions of care. There is no consensus on how best to approach the transfer of care within Acute Care Surgery (ACS). We conduct a systematic review and meta-analysis of the current data on handoffs and transitions of care in ACS patients and evaluate the impact of standardization and formalized communication processes.
METHODS: Clinically relevant questions regarding handoffs and transitions of care with clearly defined patient Population(s), Intervention(s), Comparison(s), and appropriately selected Outcomes (PICO) were determined. These centered around specific transitions of care within the setting of ACS - specifically perioperative interactions, EMS and trauma team interactions, and intra/inter floor and ICU interactions. A systematic literature review and meta-analysis was conducted utilizing the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology.
RESULTS: A total of 10 studies were identified for analysis. These included 5,113 patients in the standardized handoff group and 5,293 in the current process group. Standardized handoffs reduced handover errors for perioperative interactions and preventable adverse events for intra/inter floor and ICU interactions. There was insufficient data to evaluate outcomes of clinical complications and medical errors.
CONCLUSION: We conditionally recommend a standardized handoff in in the field of ACS, including perioperative interactions, EMS and trauma team interactions, as well as intra-inter floor and ICU interactions.
LEVEL OF EVIDENCE: Guideline; Systematic review/meta-analysis, Level III.

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