Journal report – duben 2024

OBSAH

PREHOSPITAL CARE

– clinical trials & RCT

1: Ali S, Moors X, van Schuppen H, Mommers L, Weelink E, Meuwese CL, Kant M, vanden Brule J, Kraemer CE, Vlaar APJ, Akin S, Lansink-Hartgring AO, Scholten E,Otterspoor L, de Metz J, Delnoij T, van Lieshout EMM, Houmes RJ, Hartog DD,Gommers D, Dos Reis Miranda D. **A national multi centre pre-hospital ECPR steppedwedge study; design and rationale of the ON-SCENE study.** Scand J Trauma ResuscEmerg Med. 2024 Apr 17;32(1):31. doi: 10.1186/s13049-024-01198-x. PMID:38632661; PMCID: PMC11022459.

2: Mydske S, Brattebø G, Østerås Ø, Wiggen Ø, Assmus J, Thomassen Ø. **Effect of a vapor barrier in combination with active external rewarming for cold-stressed patients in a prehospital setting: a randomized, crossover field study.** Scand JTrauma Resusc Emerg Med. 2024 Apr 25;32(1):35. doi: 10.1186/s13049-024-01204-2.PMID: 38664809; PMCID: PMC11044347.

PREHOSPITAL CARE

– systematic review & meta-analysis

1: Jones B, Dicker B, Howie G, Todd V. **Review article: Emergency medical services transfer of severe traumatic brain injured patients to a neuroscience centre: A systematic review.** Emerg Med Australas. 2024 Apr;36(2):187-196. doi: 10.1111/1742-6723.14375. Epub 2024 Jan 23. PMID: 38263532.

2: Shafique MA, Haseeb A, Asghar B, Kumar A, Chaudhry ER, Mustafa MS. **Assessing the impact of pre-hospital airway management on severe traumatic Brain injury: A systematic review and Meta-analysis.** Am J Emerg Med. 2024 Apr;78:188-195. doi: 10.1016/j.ajem.2024.01.030. Epub 2024 Jan 24. PMID: 38301369.

3: Li S, Raza MMS, Issa S. **Agricultural Injury Surveillance in the United States and Canada: A Systematic Literature Review.** J Agromedicine. 2024 Apr;29(2):122-135. doi: 10.1080/1059924X.2024.2304699. Epub 2024 Jan 22. PMID:38251421.

4: Michel J, Manns A, Boudersa S, Jaubert C, Dupic L, Vivien B, Burgun A, Campeotto F, Tsopra R. **Clinical decision support system in emergency telephone triage: A scoping review of technical design, implementation and evaluation.** Int J Med Inform. 2024 Apr;184:105347. doi: 10.1016/j.ijmedinf.2024.105347. Epub2024 Jan 24. PMID: 38290244.

5: Alenazi A, Alshibani A. **Confirmatory methods for endotracheal tube placement in out-of-hospital settings: A systematic review of the literature.** Heliyon. 2024 Mar 26;10(7):e28479. doi: 10.1016/j.heliyon.2024.e28479. PMID: 38586363; PMCID: PMC10998048.

6: Keeves J, Gadowski A, McKimmie A, Bagg MK, Antonic-Baker A, Hicks AJ, Clarke N, Brown A, McNamara R, Reeder S, Roman C, Jeffcote T, Romero L, Hill R, Ponsford JL, Lannin NA, O'Brien TJ, Cameron PA, Rushworth N, Fitzgerald M, Gabbe BJ, Cooper DJ. **The Australian Traumatic**

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Brain Injury Initiative: Systematic Review of the Effect of Acute Interventions on Outcome for People With Moderate-Severe Traumatic Brain Injury. J Neurotrauma. 2024 Apr 8. doi: 10.1089/neu.2023.0465. Epub ahead of print. PMID: 38279797.

7: Hagrass AI, Elsayed SM, Doheim MF, Mostafa MA, Elfil M, Al-Kafarna M, Almaghary BK, Fayoud AM, Hamdallah A, Hasan MT, Ragab KM, Nourelden AZ, Zaazouee MS, Medicherla C, Lerario M, Czap AL, Chong J, Nour M, Al-Mufti F. Mobile Stroke Units in Acute Ischemic Stroke: **A Comprehensive Systematic Review and Meta-Analysis of 5 "T Letter" Domains.** Cardiol Rev. 2024 Apr 11. doi:10.1097/CRD.0000000000000699. Epub ahead of print. PMID: 38602410.

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PREHOSPITAL CARE

– clinical trials & RCT –

1. Scand J Trauma Resusc Emerg Med. 2024 Apr 17;32(1):31. doi: 10.1186/s13049-024-01198-x.

A national multi centre pre-hospital ECPR stepped wedge study; design and rationale of the ON-SCENE study.

Ali S(1)(2)(3), Moors X(4)(5), van Schuppen H(6), Mommers L(7)(8), Weelink E(9), Meuwese CL(10), Kant M(11), van den Brule J(12), Kraemer CE(13), Vlaar APJ(14), Akin S(15), Lansink-Hartgring AO(16), Scholten E(17), Otterspoor L(18), de Metz J(19), Delnoij T(20), van Lieshout EMM(21), Houmes RJ(5), Hartog DD(21), Gommers D(10), Dos Reis Miranda D(10)(5).

BACKGROUND: The likelihood of return of spontaneous circulation with conventional advanced life support is known to have an exponential decline and therefore neurological outcome after 20 min in patients with a cardiac arrest is poor. Initiation of venoarterial ExtraCorporeal Membrane Oxygenation (ECMO) during resuscitation might improve outcomes if used in time and in a selected patient category. However, previous studies have failed to significantly reduce the time from cardiac arrest to ECMO flow to less than 60 min. We hypothesize that the initiation of Extracorporeal Cardiopulmonary Resuscitation (ECPR) by a Helicopter Emergency Medical Services System (HEMS) will reduce the low flow time and improve outcomes in refractory Out of Hospital Cardiac Arrest (OHCA) patients.
METHODS: The ON-SCENE study will use a non-randomised stepped wedge design to implement ECPR in patients with witnessed OHCA between the ages of 18-50 years old, with an initial presentation of shockable rhythm or pulseless electrical activity with a high suspicion of pulmonary embolism, lasting more than 20, but less than 45 min. Patients will be treated by the ambulance crew and HEMS with prehospital ECPR capabilities and will be compared with treatment by ambulance crew and HEMS without prehospital ECPR capabilities. The primary outcome measure will be survival at hospital discharge. The secondary outcome measure will be good neurological outcome defined as a cerebral performance categories scale score of 1 or 2 at 6 and 12 months.
DISCUSSION: The ON-SCENE study focuses on initiating ECPR at the scene of OHCA using HEMS. The current in-hospital ECPR for OHCA obstacles encompassing low survival rates in refractory arrests, extended low-flow durations during transportation, and the critical time sensitivity of initiating ECPR, which could potentially be addressed through the implementation of the HEMS system. When successful, implementing on-scene ECPR could significantly enhance survival rates and minimize neurological impairment.
TRIAL REGISTRATION: Clinicaltyrials.gov under NCT04620070, registration date 3 November 2020.

DOI: 10.1186/s13049-024-01198-x
PMCID: PMC11022459
PMID: 38632661 [Indexed for MEDLINE]

2. Scand J Trauma Resusc Emerg Med. 2024 Apr 25;32(1):35. doi: 10.1186/s13049-024-01204-2.

Effect of a vapor barrier in combination with active external rewarming for cold-stressed patients in a prehospital setting: a randomized, crossover field study.

Mydske S(1)(2)(3), Brattebø G(4)(5)(6)(7), Østerås Ø(4)(5), Wiggen Ø(5)(8), Assmus J(4)(5)(6), Thomassen Ø(4)(5)(6).

BACKGROUND: Use of a vapor barrier in the prehospital care of cold-stressed or hypothermic patients aims to reduce evaporative heat loss and accelerate rewarming. The application of a vapor barrier is recommended in various guidelines, along with both insulating and wind/waterproof layers and an active external rewarming device; however, evidence of its effect is limited. This study aimed to investigate the effect of using a vapor barrier as the inner layer in the recommended "burrito" model for wrapping hypothermic patients in the field.
METHODS: In this, randomized, crossover field study, 16 healthy volunteers wearing wet clothing were subjected to a 30-minute cooling period in a snow chamber before being wrapped in a model including an active heating source either with (intervention) or without (control) a vapor barrier. The mean skin temperature, core temperature, and humidity in the model were measured, and the shivering intensity and thermal comfort were assessed using a subjective questionnaire. The mean skin temperature was the primary outcome, whereas humidity and thermal comfort were the secondary outcomes. Primary outcome data were analyzed using analysis of covariance (ANCOVA).
RESULTS: We found a higher mean skin temperature in the intervention group than in the control group after approximately 25 min ($p < 0.05$), and this difference persisted for the rest of the 60-minute study period. The largest difference in mean skin temperature was 0.93 °C after 60 min. Humidity levels outside the vapor barrier were significantly higher in the control group than in the intervention group after 5 min. There were no significant differences in subjective comfort. However, there was a consistent trend toward increased comfort in the intervention group compared with the control group.
CONCLUSIONS: The use of a vapor barrier as the innermost layer in combination with an active external heat source leads to higher mean skin rewarming rates in patients wearing wet clothing who are at risk of accidental hypothermia.
TRIAL REGISTRATION: ClinicalTrials.gov identifier: NCT05779722.

DOI: 10.1186/s13049-024-01204-2
PMCID: PMC11044347
PMID: 38664809 [Indexed for MEDLINE]

Journal report – duben 2024

PREHOSPITAL CARE

– systematic review & meta-analysis –

1. Emerg Med Australas. 2024 Apr;36(2):187-196. doi: 10.1111/1742-6723.14375. Epub 2024 Jan 23.

Review article: Emergency medical services transfer of severe traumatic brain injured patients to a neuroscience centre: A systematic review.

Jones B(1), Dicker B(1)(2), Howie G(1), Todd V(1)(2).

Patients with severe traumatic brain injuries require urgent medical attention at a hospital. We evaluated whether transporting adult patients with a severe traumatic brain injury (TBI) to a Neuroscience Centre is associated with reduced mortality. We reviewed studies published between 2010 and 2023 on severe TBI in adults (>18 years) using Medline, CINAHL, Google Scholar and Cochrane databases. We focused on mortality rates and the impact of transferring patients to a Neuroscience Centre, delays to neurosurgery and EMS triage accuracy. This review analysed seven studies consisting of 53 365 patients. When patients were directly transported to a Neuroscience Centre, no improvement in survivability was demonstrated. Subsequently, transferring patients from a local hospital to a Neuroscience Centre was significantly associated with reduced mortality in one study (adjusted odds ratio: 0.79, 95% confidence interval: 0.64-0.96), and 24-h (relative risk [RR]: 0.31, 0.11-0.83) and 30-day (RR: 0.66, 0.46-0.96) mortality in another. Patients directly transported to a Neuroscience Centre were more unwell than those taken to a local hospital. Subsequent transfers increased time to CT scanning and neurosurgery in several studies, although these were not statistically significant. Additionally, EMS could accurately triage. None of the included studies demonstrated statistically significant findings indicating that direct transportation to a Neuroscience Centre increased survivability for patients with severe traumatic brain injuries. Subsequent transfers from a non-Neuroscience Centre to a Neuroscience Centre reduced mortality rates at 24 h and 30 days. Further research is required to understand the differences between direct transport and subsequent transfers to Neuroscience Centres.

DOI: 10.1111/1742-6723.14375
PMID: 38263532 [Indexed for MEDLINE]

Journal report – duben 2024

2. Am J Emerg Med. 2024 Apr;78:188-195. doi: 10.1016/j.ajem.2024.01.030. Epub 2024 Jan 24.

Assessing the impact of pre-hospital airway management on severe traumatic Brain injury: A systematic review and Meta-analysis.

Shafique MA(1), Haseeb A(1), Asghar B(1), Kumar A(2), Chaudhry ER(1), Mustafa MS(3).

OBJECTIVE: This study aimed to assess the impact of establishing a pre-hospital definitive airway on mortality and morbidity compared with no prehospital airway in cases of severe traumatic brain injury (TBI).
BACKGROUND: Traumatic brain injury (TBI) is a global health concern that is associated with substantial morbidity and mortality. Prehospital intubation (PHI) has been proposed as a potential life-saving intervention for patients with severe TBI to mitigate secondary insults, such as hypoxemia and hypercapnia. However, their impact on patient outcomes remains controversial.
METHODS: A systematic review and meta-analysis were conducted to assess the effects of prehospital intubation versus no prehospital intubation on morbidity and mortality in patients with severe TBI, adhering to the PRISMA guidelines.
RESULTS: 24 studies, comprising 56,543 patients, indicated no significant difference in mortality between pre-hospital and In-hospital Intubation (OR 0.89, 95% CI 0.65-1.23, p = 0.48), although substantial heterogeneity was noted. Morbidity analysis also showed no significant difference (OR 0.83, 95% CI 0.43-1.63, p = 0.59). These findings underscore the need for cautious interpretation due to heterogeneity and the influence of specific studies on the results.
CONCLUSION: In summary, an initial assessment did not reveal any apparent disparity in mortality rates between individuals who received prehospital intubation and those who did not. However, subsequent analyses and randomized controlled trials (RCTs) demonstrated that patients who underwent prehospital intubation had a reduced risk of death and morbidity. The dependence on biased observational studies and the need for further replicated RCTs to validate these findings are evident. Despite the intricacy of the matter, it is crucial to intervene during severe airway impairment.

DOI: 10.1016/j.ajem.2024.01.030
PMID: 38301369 [Indexed for MEDLINE]

3. J Agromedicine. 2024 Apr;29(2):122-135. doi: 10.1080/1059924X.2024.2304699. Epub 2024 Jan 22.

Agricultural Injury Surveillance in the United States and Canada: A Systematic Literature Review.

Li S(1), Raza MMS(1), Issa S(1).

INTRODUCTION: Agricultural injuries remain a major concern in North America, with a fatal injury rate of 19.5 deaths per 100,000 workers in the United States. Numerous research efforts have sought to compile and analyze records of agricultural-related injuries and fatalities at a national level, utilizing resources, ranging from newspaper clippings and hospital records to Emergency Medical System (EMS) data, death certifications, surveys, and other multiple sources. Despite these extensive efforts, a comprehensive understanding of injury trends over extended time periods and across diverse types of data sources remains elusive, primarily due to the duration of data collection and the focus on specific subsets.
METHODS: This systematic review, following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, consolidates and analyzes agricultural injury surveillance data from 48 eligible papers published between 1985 and 2022 to offer a holistic understanding of trends and challenges.
RESULTS: These papers, reporting an average of 25,000 injuries each, were analyzed by database source type, injury severity, nature of injury, body part, source of injury, event/exposure, and age. One key finding is that the top source of injury or event/exposure depends on the chosen surveillance system and injury severity, underscoring the need of diverse data sources for a nuanced understanding of agricultural injuries.
CONCLUSION: This study provides policymakers, researchers, and practitioners with crucial insights to bolster the development and analysis of surveillance systems in agricultural safety. The overarching aim is to address the pressing issue of agricultural injuries, contributing to a safer work environment and ultimately enhancing the overall well-being of individuals engaged in agriculture.

DOI: 10.1080/1059924X.2024.2304699
PMID: 38251421 [Indexed for MEDLINE]

4. Int J Med Inform. 2024 Apr;184:105347. doi: 10.1016/j.ijmedinf.2024.105347. Epub 2024 Jan 24.

Clinical decision support system in emergency telephone triage: A scoping review of technical design, implementation and evaluation.

Michel J(1), Manns A(2), Boudersa S(3), Jaubert C(4), Dupic L(5), Vivien B(6), Burgun A(7), Campeotto F(8), Tsopra R(7).

OBJECTIVES: Emergency department overcrowding could be improved by upstream telephone triage. Emergency telephone triage aims at managing and orientating adequately patients as early as possible and distributing limited supply of staff and materials. This complex task could

be improved with the use of Clinical decision support systems (CDSS). The aim of this scoping review was to identify literature gaps for the future development and evaluation of CDSS for Emergency telephone triage.
MATERIALS AND METHODS: We present here a scoping review of CDSS designed for emergency telephone triage, and compared them in terms of functional characteristics, technical design, health care implementation and methodologies used for evaluation, following the PRISMA-ScR guidelines.RESULTS: Regarding design, 19 CDSS were retrieved: 12 were knowledge based CDSS (decisional algorithms built according to guidelines or clinical expertise) and 7 were data driven (statistical, machine learning, or deep learning models). Most of them aimed at assisting nurses or non-medical staff by providing patient orientation and/or severity/priority assessment. Eleven were implemented in real life, and only three were connected to the Electronic Health Record. Regarding evaluation, CDSS were assessed through various aspects: intrinsic characteristics, impact on clinical practice or user apprehension. Only one pragmatic trial and one randomized controlled trial were conducted.
CONCLUSION: This review highlights the potential of a hybrid system, user tailored, flexible, connected to the electronic health record, which could work with oral, video and digital data; and the need to evaluate CDSS on intrinsic characteristics and impact on clinical practice, iteratively at each distinct stage of the IT lifecycle.

DOI: 10.1016/j.ijmedinf.2024.105347
PMID: 38290244 [Indexed for MEDLINE]

5. Heliyon. 2024 Mar 26;10(7):e28479. doi: 10.1016/j.heliyon.2024.e28479. eCollection 2024 Apr 15.
Confirmatory methods for endotracheal tube placement in out-of-hospital settings: A systematic review of the literature.
Alenazi A(1)(2)(3), Alshibani A(2)(3).

BACKGROUND: Confirming proper placement of an endotracheal tube (ETT) is important, as accidental misplacements may occur and lead to critical injuries, potentially leading to adverse outcomes. Multiple methods are available for determining the correct ETT placement in prehospital care.
OBJECTIVE: To assess the accuracy and reliability of the different methods used to confirm endotracheal intubation in prehospital settings.
METHODS: A comprehensive literature search was performed in the MEDLINE, EMBASE, Scopus, and Web of Science databases for studies that were published between 1-June-1992 and 12-June-2022 using a combination of predetermined search terms. Studies that met the inclusion criteria were included and assessed for risk of bias using "Risk of Bias in Non-randomized Studies of Intervention" tool.
RESULTS: Of the 1016 identified studies, nine met the inclusion criteria. Capnography and point-of-care ultrasound showed high sensitivity and specificity rates when applied to confirm ETT placement in prehospital care. Other methods including capnometry, colorimetric

detectors, ODDs, and auscultation showed varied sensitivity and specificity. Patient comorbidities and device failure contributed to decreased accuracy rates in prehospital care. Capnography was less reliable in distinguishing between endotracheal intubation and right main stem intubation, which is known as a complication in out-of-hospital endotracheal intubation. Point-of-care ultrasound was more accurate and reliable in detecting oesophageal and endobronchial misplacements. ETCO2 monitors, i.e., capnometry and colorimetric detectors, were less reliable in patients with low perfusion states.
CONCLUSION: This systematic review showed that there is no single method with 100% accuracy in confirming the correct ETT placement and detecting the occurrence of accidental oesophageal or endobronchial misplacements in prehospital care. Further studies with a larger sample size are needed to assess the accuracy of multiple confirmatory methods in prehospital settings.

DOI: 10.1016/j.heliyon.2024.e28479
PMCID: PMC10998048
PMID: 38586363

6. J Neurotrauma. 2024 Apr 8. doi: 10.1089/neu.2023.0465. Online ahead of print.
The Australian Traumatic Brain Injury Initiative: Systematic Review of the Effect of Acute Interventions on Outcome for People With Moderate-Severe Traumatic Brain Injury.
Keeves J(1)(2)(3), Gadowski A(3), McKimmie A(3), Bagg MK(1)(2)(4)(5), Antonic-Baker A(6), Hicks AJ(7)(8), Clarke N(3), Brown A(9)(10)(11), McNamara R(12)(13), Reeder S(3)(6), Roman C(14), Jeffcote T(15)(11), Romero L(14), Hill R(16), Ponsford JL(7)(8), Lannin NA(6)(14), O'Brien TJ(6), Cameron PA(3)(17)(18), Rushworth N(19), Fitzgerald M(1)(2), Gabbe BJ(3)(20), Cooper DJ(15)(11).

The Australian Traumatic Brain Injury Initiative (AUS-TBI) is developing a data resource to enable improved outcome prediction for people with moderate-severe TBI (msTBI) across Australia. Fundamental to this resource is the collaboratively designed data dictionary. This systematic review and consultation aimed to identify acute interventions with potential to modify clinical outcomes for people after msTBI, for inclusion in a data dictionary. Standardized searches were implemented across bibliographic databases from inception through April 2022. English-language reports of randomized controlled trials (RCTs) evaluating any association between any acute intervention and clinical outcome in at least 100 patients with msTBI, were included. A predefined algorithm was used to assign a value to each observed association. Consultation with AUS-TBI clinicians and researchers formed the consensus process for interventions to be included in a single data dictionary. Searches retrieved 14,455 records, of which 124 full-length RCTs were screened, with 35 studies included. These studies evaluated 26 unique acute interventions across 21 unique clinical outcomes. Only 4 interventions were considered to have medium modifying value for any outcome from the review, with an additional 8 interventions agreed upon through the consensus process. The interventions with medium value were tranexamic acid and phenytoin, which had a positive effect on an

outcome; and decompressive craniectomy surgery and hypothermia, which negatively affected outcomes. From the systematic review and consensus process, 12 interventions were identified as potential modifiers to be included in the AUS-TBI national data resource.

DOI: 10.1089/neu.2023.0465
PMID: 38279797

7. Cardiol Rev. 2024 Apr 11. doi: 10.1097/CRD.0000000000000699. Online ahead of print.
Mobile Stroke Units in Acute Ischemic Stroke: A Comprehensive Systematic Review and Meta-Analysis of 5 "T Letter" Domains.

Hagrass AI(1), Elsayed SM(2), Doheim MF(3), Mostafa MA(4), Elfil M(5), Al-Kafarna M(6), Almaghary BK(6), Fayoud AM(7), Hamdallah A(8), Hasan MT(1), Ragab KM(9), Nourelden AZ(1), Zaazouee MS(10), Medicherla C(11), Lerario M(12), Czap AL(4), Chong J(11), Nour M(13), Al-Mufti F(14).

Intravenous thrombolysis (IVT) may be administered to stroke patients requiring immediate treatment more quickly than emergency medical services if certain conditions are met. These conditions include the presence of mobile stroke units (MSUs) with on-site treatment teams and a computed tomography scanner. We compared clinical outcomes of MSU conventional therapy by emergency medical services through a systematic review and meta-analysis. We searched key electronic databases from inception till September 2021. The primary outcomes were mortality at 7 and 90 days. The secondary outcomes included the modified Rankin Scale score at 90 days, alarm to IVT or intra-arterial recanalization, and time from symptom onset or last known well to thrombolysis. We included 19 controlled trials and cohort studies to conduct our final analysis. Our comparison revealed that 90-day mortality significantly decreased in the MSU group compared with the conventional care group [risk ratio = 0.82; 95% confidence interval (CI), 0.71-0.95], while there was no significant difference at 7 days (risk ratio = 0.89; 95% CI, 0.69-1.15). MSU achieved greater functional independence (modified Rankin Scale = 0-2) at 90 days (risk ratio = 1.08; 95% CI, 1.01-1.16). MSU was associated with shorter alarm to IVT or intra-arterial recanalization time (mean difference = -29.69; 95% CI, -34.46 to -24.92), treating patients in an earlier time window, as shown through symptom onset or last known well to thrombolysis (mean difference = -36.79; 95% CI, -47.48 to -26.10). MSU-treated patients had a lower rate of 90-day mortality and better 90-day functional outcomes by earlier initiation of IVT compared with conventional care.

DOI: 10.1097/CRD.0000000000000699
PMID: 38602410