Sepsis

Current Awareness Bulletin

October 2024

Our Current Awareness Bulletins provide details of recently published articles in a given subject. They are a quick and easy way to keep up to date.

Please contact the Academy Library to request any articles:

✉ **ruh-tr.library@nhs.net**

📞 **01225 82 4897/4898**

Carry out basic searches using the Knowledge and Library Hub.

Sign up to NHS OpenAthens to access our subscriptions.

Contact us to receive our bulletins via email each month.

Get personalised alerts via our KnowledgeShare service.

ruh.nhs.uk/library

1. **Tools for Screening, Predicting, and Evaluating Sepsis and Septic Shock: A Comprehensive Review**

Authors: Aggrawal, Kanishk;Verma, Sakshi;Stoltzfus, Mason T.;Singh, Bhupinder;Anamika, Fnu and Jain, Rohit

Abstract: Sepsis is characterized by life-threatening organ dysfunction due to dysregulated host response to infection. It can progress to cause circulatory and cellular/metabolic abnormalities, resulting in septic shock that may significantly increase mortality. The pathophysiology of sepsis involves a complex interplay of invading pathogens and the body's immune defense, causing alteration in normal homeostasis, eventually leading to derangements in the cellular, humoral, circulatory, and metabolic functions. Several scoring systems have been developed to rapidly predict or suspect sepsis, such as Sequential Organ Failure Assessment (SOFA), modified SOFA (mSOFA), quick SOFA (qSOFA), shock index (SI), and modified SI (mSI). Each of these scores has been utilized for triaging patients with sepsis, and as per medical advancements these scoring systems have been modified to include or exclude certain criteria to improve their clinical utility. This review aims to compare the individual scores and their usage for sepsis that may be used for laying the foundation for early recognition and prediction of sepsis and for formulating more precise definitions in the future. Copyright © 2024, Aggrawal et al.

2. **Predictors of Sepsis and Sepsis-related Mortality in Critically Ill Burn Patients: A Single Tertiary Care Center Experience.**

Authors: Alqirnas, Muhannad Q.;Jarman, Yazeed A.;Almosa, Abdulaziz S.;Alharbi, Shaden S.;Alhamadh, Moustafa S.;Qasim, Salman S. and Alhusainan, Hanan

Abstract: Background: Clinical diagnosis of sepsis is challenging, emphasizing the importance of regular bacterial surveillance, and tailored antimicrobial therapy. This study aims to elucidate the predictors of sepsis in critically ill burn patients. Methods: A retrospective analysis was conducted on patients admitted to the burn intensive care unit between 2016 and 2022. Demographics, type of burn, total body surface area (TBSA), presence of inhalation injury, mortality, sepsis, deep vein thrombosis, pulmonary embolism, pneumonia, cultures, and laboratory findings were collected. Descriptive statistics and survival analysis were used to analyze trends during the 7-year period. Results: The study encompassed 196 participants. Among patient factors, men constituted 73.4% (n = 102) of those without sepsis and 86.0% (n = 49) with sepsis, with an association between sepsis and lower age (34 versus 41 years) as well as larger TBSA (41.1% versus 17.3%). Inhalation injury was a significant predictor of sepsis [35.1% (n = 20) versus 11.6% (n = 16)]. Mortality was higher in sepsis cases [17.5% (n = 10) versus 2.9% (n = 4)], as well as positive blood cultures [47.4% (n = 27) versus 2.2% (n = 3)], positive wound cultures [71.9% (n = 41) versus 12.2% (n = 17)], and positive fungal cultures [12.3% (n = 7) versus 0% (n = 0)]. Multivariable analysis identified age and TBSA as significant predictors of sepsis (P = 0.025, P Conclusions: Age, TBSA affected emerge as a strong risk factor for sepsis among critically ill burn patients. It underscores the need for vigilant monitoring to improve outcomes and reduce sepsis-related mortality. Copyright © 2024 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons.

3. **Recovery from Sepsis: Management beyond Acute Care.**

Authors: Andersen, S. K.;Herridge, M. S. and Fiest, K. M.

Abstract: Recovery from sepsis is a key global health issue, impacting 38 million sepsis survivors worldwide per year. Sepsis survivors face a wide range of physical, cognitive, and psychosocial sequelae. Readmissions to hospital following sepsis are an important driver of global healthcare utilization and cost. Family members of sepsis survivors also experience significant stressors related to their role as informal caregivers. Increasing recognition of the burdens of sepsis survivorship has led to the development of postsepsis recovery programs to better support survivors and their families, although optimal models of care remain uncertain. The goal of this article is to perform a narrative review of recovery from sepsis from the perspective of patients, families, and health systems. Copyright © 2024. Thieme. All rights reserved.

---

4. **Cancer and sepsis: Future challenges for long-term outcome.**

Authors: Bianchi, A.;Mokart, D. and Leone, M.

Abstract: Purpose of reviewThe purpose of this review is to investigate the long-term outcomes of cancer patients who experience sepsis or septic shock.Recent findingsSepsis is a frequent cause of ICU admission in cancer patients, accounting for approximately 15% of such cases. Short-term mortality rates among these patients vary widely across studies, but they are consistently found to be slightly higher than those of noncancer patients. However, there is a lack of evidence regarding the long-term outcomes of cancer patients who have experienced sepsis or septic shock. The few available studies have reported relatively high mortality rates, reaching around 80% in a few cohort studies. Although several observational studies have noted a decrease in 1-year mortality rates over time, observational data also suggest that sepsis may increase the risk of cancer in the long run.SummaryAs cancer is becoming a chronic disease, there is an urgent need for studies on the quality of life of cancer patients who have experienced sepsis. The relationship between sepsis and cancer extends beyond its impact on the progression of cancer, as sepsis might also contribute to the development of cancer. Copyright © 2024 Wolters Kluwer Health, Inc. All rights reserved.

---

5. **Current perspectives in the management of sepsis and septic shock.**

Authors: ChiscanoCamon, L.;RuizSanmartin, A.;Bajana, I.;Bastidas, J.;LopezMartinez, R.;FrancoJarava, C.;Gonzalez, J. J.;Larrosa, N.;Riera, J.;NuvialsCasals, X.;RuizRodriguez, J. C. and Ferrer, R.

Abstract: Within patients with sepsis, there exists significant heterogeneity, and while all patients should receive conventional therapy, there are subgroups of patients who may benefit from specific therapies, often referred to as rescue therapies. Therefore, the identification of these specific patient subgroups is crucial and lays the groundwork for the application of precision medicine based on the development of targeted interventions. Over the years, efforts have been made to categorize sepsis into different subtypes based on clinical characteristics, biomarkers, or underlying mechanisms. For example, sepsis can be stratified into different phenotypes based on the predominant dysregulated host response. These phenotypes can range from hyperinflammatory states to immunosuppressive states and even mixed phenotypes. Each phenotype may require different therapeutic approaches to improve patient outcomes. Rescue strategies for septic shock may encompass various interventions, such as immunomodulatory therapies, extracorporeal support (e.g., ECMO), or therapies targeted at

specific molecular or cellular pathways involved in the pathophysiology of sepsis. In recent years, there has been growing interest in precision medicine approaches to sepsis and phenotype identification. Precision medicine aims to tailor treatments to each individual patient based on their unique characteristics and disease mechanisms.

---

6. Functional dependence following intensive care unit-treated sepsis: three-year follow-up results from the prospective Mid-German Sepsis Cohort (MSC).

Authors: Fleischmann-Struzek, Carolin;Born, Sebastian;Kesselmeier, Miriam;Ely, E. Wesley;Topfer, Kristin;Romeike, Heike;Bauer, Michael;Bercker, Sven;Bodechtel, Ulf;Fiedler, Sandra;Groesdonk, Heinrich V.;Petros, Sirak;Platzer, Stefanie;Ruddel, Hendrik;Schreiber, Torsten;Reinhart, Konrad and Scherag, Andre

Abstract: Background: Surviving sepsis can lead to chronic physical, psychological and cognitive impairments, which affect millions of patients worldwide, including survivors after COVID-19 viral sepsis. We aimed to characterize the magnitude and trajectory of functional dependence and new impairments post-sepsis. Methods: We conducted a prospective cohort study including sepsis survivors who had been discharged from five German intensive care units (ICUs), until 36 months post-discharge. Primary outcome was functional dependence, defined as >=1 impaired activity of daily living (ADL; 10-item ADL score : We conducted a prospective cohort study including sepsis survivors who had been discharged from five German intensive care units (ICUs), until 36 months post-discharge. Primary outcome was functional dependence, defined as >=1 impaired activity of daily living (ADL; 10-item ADL score Findings: Of 3210 sepsis patients screened, 1968 survived the ICU treatment (61.3%). A total of 753 were included in the follow-up assessments of the Mid-German Sepsis cohort. Patients had a median age of 65 (Q1-Q3 56-74) years, 64.8% (488/753) were male and 76.1% (573/753) had a septic shock. Considering competing risk modelling, the probability of still being functional dependent was about 25%, while about 30% regained functional independence and 45% died within the three years post-sepsis. Patients reported a high burden of new and often overlapping impairments until three years post-sepsis. In the subgroup of three-year survivors (n = 330), new physical impairments affected 91.2% (n = 301) while new cognitive and psychological impairments were reported by 57.9% (n = 191) and 40.9% (n = 135), respectively. Patients with pre-existing functional limitations and higher age were at risk for low ADL scores three years after sepsis. Interpretation: Sepsis survivorship was associated with a broad range of new impairments and led to functional dependence in around one quarter of patients. Targeted measures are needed to mitigate the burden of this Post-Sepsis-Syndrome and increase the proportion of patients that achieve functional improvements. Funding: This work was supported by the Integrated Research and Treatment Center, Center for Sepsis Control and Care (CSCC) at the Jena University Hospital funded by the German Ministry of Education and Research and by the Rudolf Presl GmbH & Co, Kreischa, Germany. Copyright © 2024 The Author(s).

---

7. Understanding, assessing and treating immune, endothelial and haemostasis dysfunctions in bacterial sepsis

Authors: Girardis, Massimo;David, Sascha;Ferrer, Ricard;Helms, Julie;Juffermans, Nicole P.;Martin-Loeches, Ignacio;Povoa, Pedro;Russell, Lene;Shankar-Hari, Manu;Iba, Toshiaki;Coloretti, Irene;Parchim, Nicholas and Nielsen, Nathan D.

Abstract: The interplay between the immune system, coagulation, and endothelium is critical in

regulating the host response to infection. However, in sepsis and other critical illnesses, a dysregulated immune response can lead to excessive alterations in these mechanisms, resulting in coagulopathy, endothelial dysfunction, and multi-organ dysfunction. This review aims to provide a comprehensive analysis of the pathophysiological mechanisms that govern the complex interplay between immune dysfunction, endothelial dysfunction, and coagulation in sepsis. It emphasises clinical significance, evaluation methods, and potential therapeutic interventions. Understanding these mechanisms is essential for developing effective treatments that can modulate the immune response, mitigate thrombosis, restore endothelial function, and ultimately improve patient survival. Copyright © 2024. Springer-Verlag GmbH Germany, part of Springer Nature.

8. A nomogram to predict 28-day mortality in patients with sepsis combined coronary artery disease: retrospective study based on the MIMIC-III database.

Authors: Gu, Quankuan;Huang, Ping;Yang, Qiuyue;Meng, Xianglin and Zhao, Mingyan

Publication Date: 2024

Journal: Frontiers in Medicine 11, pp. 1433809

Abstract: Object: Establish a clinical prognosis model of coronary heart disease (CHD) to predict 28-day mortality in patients with sepsis. Method: The data were collected retrospectively from septic patients with a previous history of coronary heart disease (CHD) from the Medical Information Mart for Intensive Care (MIMIC)-III database. The included patients were randomly divided into the training cohorts and validation cohorts. The variables were selected using the backward stepwise selection method of Cox regression, and a nomogram was subsequently constructed. The nomogram was compared to the Sequential Organ Failure Assessment (SOFA) model using the C-index, area under the receiver operating characteristic curve (AUC) over time, Net reclassification index (NRI), Integrated discrimination improvement index (IDI), calibration map, and decision curve analysis (DCA). Result: A total of 800 patients were included in the study. We developed a nomogram based on age, diastolic blood pressure (DBP), pH, lactate, red blood cell distribution width (RDW), anion gap, valvular heart disease, peripheral vascular disease, and acute kidney injury (AKI) stage. The nomogram was evaluated using C-index, AUC, NRI, IDI, calibration plot, and DCA. Our findings revealed that this nomogram outperformed the SOFA score in predicting 28-day mortality in sepsis patients. Copyright © 2024 Gu, Huang, Yang, Meng and Zhao.

9. Readmissions in Sepsis Survivors: Discharge Setting Risks.

Authors: Hartley, P.;Pelkmans, J.;Lott, C.;Higgins, M. K.;Chen, X.;Reinhardt, A.;Zhang, Y. and Wood, K. A.

Publication Date: 2024

Journal: American Journal of Critical Care : An Official Publication, American Association of Critical-Care Nurses 33(5), pp. 353–363

Abstract: BACKGROUND: Sepsis is a complex condition with high morbidity and mortality. Prompt treatment can improve survival, but for survivors the risk of deterioration and readmission remains high. Little is known about the association between discharge setting and readmission among sepsis survivors. OBJECTIVE(S): To examine 30-day hospital readmission rates in adult sepsis survivors by the type of setting to which patients were discharged. METHOD(S): The Medical Information Mart for Intensive Care database was used to identify adult sepsis survivors and evaluate 30-day readmission by discharge setting. A chi2 contingency analysis was used with each factor and presence/absence of readmission. The Kruskal-Wallis test was used to compare readmissions across discharge settings. RESULT(S): From our sample (N = 7107; mean age 66.5 years; 46.2% women), 23.6% (n = 1674) were readmitted within 30 days and of those readmitted, 30% were readmitted between 1 and 3 times. Discharge setting (P RESULT(S): From our sample (N = 7107; mean age 66.5 years; 46.2% women), 23.6% (n = 1674) were readmitted within 30 days and of those readmitted, 30% were readmitted

---

10. **Impact of the timing of invasive mechanical ventilation in patients with sepsis: a multicenter cohort study.**

Authors: Kim, Gyungah;Oh, Dong Kyu;Lee, Su Yeon;Park, Mi Hyeon and Lim, Chae-Man

Publication Date: Sep 09 ,2024

Journal: Critical Care (London, England) 28(1), pp. 297

Abstract: BACKGROUND: The potential adverse effects associated with invasive mechanical ventilation (MV) can lead to delayed decisions on starting MV. We aimed to explore the association between the timing of MV and the clinical outcomes in patients with sepsis ventilated in intensive care unit (ICU). METHODS: We analyzed data of adult patients with sepsis between September 2019 and December 2021. Data was collected through the Korean Sepsis Alliance from 20 hospitals in Korea. Patients who were admitted to ICU and received MV were included in the study. Patients were divided into 'early MV' and 'delayed MV' groups based on whether they were on MV on the first day of ICU admission or later. Propensity score matching was applied, and patients in the two groups were compared on a 1:1 ratio to overcome bias between the groups. Outcomes including ICU mortality, hospital mortality, length of hospital and ICU stay, and organ failure at ICU discharge were compared. RESULTS: Out of 2440 patients on MV during ICU stay, 2119 'early MV' and 321 'delayed MV' cases were analyzed. The propensity score matching identified 295 patients in each group with similar baseline characteristics. ICU mortality was lower in 'early MV' group than 'delayed MV' group (36.3% vs. 46.4%; odds ratio, 0.66; 95% confidence interval, 0.47-0.93; p = 0.015). 'Early MV' group had lower in-hospital mortality, shorter ICU stay, and required tracheostomy less frequently than 'delayed MV' group. Multivariable logistic regression model identified 'early MV' as associated with lower ICU mortality (odds ratio, 0.38; 95% confidence interval, 0.29-0.50; p : Out of 2440 patients on MV during ICU stay, 2119 'early MV' and 321 'delayed MV' cases were analyzed. The propensity score matching identified 295 patients in each group with similar baseline characteristics. ICU mortality was lower in 'early MV' group than 'delayed MV' group (36.3% vs. 46.4%; odds ratio, 0.66; 95% confidence interval, 0.47-0.93; p = 0.015). 'Early MV' group had lower in-hospital mortality, shorter ICU stay, and required tracheostomy less frequently than 'delayed MV' group. Multivariable logistic regression model identified 'early MV' as associated with lower ICU mortality (odds ratio, 0.38; 95% confidence interval, 0.29-0.50; p CONCLUSION: In patients with sepsis ventilated in ICU, earlier start (first day of ICU admission) of MV may be associated with lower mortality. Copyright © 2024. The Author(s).

---

11. **Predicting Neutropenic Sepsis in Patients with Hematologic Malignancy: A Retrospective Case-Control Study.**

Authors: Lee, J. and Kim, H. J.

Publication Date: 2024

Journal: Clinical Nursing Research , pp. 10547738241273862

Abstract: Neutropenic sepsis (NS) is one of the leading causes of death among patients with hematologic malignancies. Identifying its predictive factors is fundamental for early detection. Few studies have evaluated the predictive factors in relation to microbial infection confirmation, which is clinically important for initiating sepsis treatment. This study aimed to determine whether selected biomarkers (i.e., body temperature, C-reactive protein, albumin, procalcitonin), treatment-related characteristics (i.e., diagnosis, duration of neutropenia, treatment modality), and infection-related

characteristics (i.e., infection source, causative organisms) can predict NS in patients with hematologic malignancies. We also aimed to identify the optimal predictive cutoff points for these parameters. This retrospective case-control study used the data from a total of 163 patients (58 in the sepsis group and 105 in the non-sepsis group). We collected data with reference to the day of specimen collection, with which microbial infection was confirmed. Multiple logistic regression was used to determine predictive risk factors and the area under the curve (AUC) of the receiver operating characteristic for the optimal predictive cutoff points. The independent predictors of NS were average body temperature during a fever episode and procalcitonin level. The odds for NS rose by 9.97 times with every 1degreeC rise in average body temperature (95% confidence interval, CI [1.33, 75.05]) and by 2.09 times with every 1ng/mL rise in the procalcitonin level (95% CI [1.08, 4.04]). Average body temperature (AUC=0.77, 95% CI [0.68, 0.87]) and procalcitonin levels (AUC=0.71, 95% CI [0.59, 0.84]) have fair accuracy for predicting NS, with the optimal cutoff points of 37.9degreeC and 0.55ng/mL, respectively. This study found that average body temperature during a fever episode and procalcitonin are useful in predicting NS. Thus, nurses should carefully monitor body temperature and procalcitonin levels in patients with hematologic malignancies to detect the onset of NS.

---

12. **Getting Up to Speed: Rapid Pathogen and Antimicrobial Resistance Diagnostics in Sepsis**

Authors: Liborio, Mariana P.;Harris, Patrick N. A.;Ravi, Chitra and Irwin, Adam D.

Abstract: Sepsis is a life-threatening organ dysfunction caused by a dysregulated host response to infection. Time to receive effective therapy is a primary determinant of mortality in patients with sepsis. Blood culture is the reference standard for the microbiological diagnosis of bloodstream infections, despite its low sensitivity and prolonged time to receive a pathogen detection. In recent years, rapid tests for pathogen identification, antimicrobial susceptibility, and sepsis identification have emerged, both culture-based and culture-independent methods. This rapid narrative review presents currently commercially available approved diagnostic molecular technologies in bloodstream infections, including their clinical performance and impact on patient outcome, when available. Peer-reviewed publications relevant to the topic were searched through PubMed, and manufacturer websites of commercially available assays identified were also consulted as further sources of information. We have reviewed data about the following technologies for pathogen identification: fluorescence in situ hybridization with peptide nucleic acid probes (Accelerate PhenoTM), microarray-based assay (Verigene R), multiplex polymerase chain reaction (cobas R eplex, BioFire R FilmArray R, Molecular Mouse, Unyvero BCU SystemTM), matrix-assisted laser desorption-ionization time-of-flight mass spectrometry (Rapid MBT Sepsityper R), T2 magnetic resonance (T2Bacteria Panel), and metagenomics-based assays (Karius©, DISQVER R, Day Zero Diagnostics). Technologies for antimicrobial susceptibility testing included the following: Alfed 60 ASTTM, VITEK R REVEALTM, dRASTTM, ASTar R, Fastinov R, QuickMIC R, ResistellTM, and LifeScale. Characteristics, microbiological performance, and issues of each method are described, as well as their clinical performance, when available.

---

13. **Comparison of Modified Early Warning Score (MEWS), Simplified Acute Physiology Score II (SAPS II), Sequential Organ Failure Assessment (SOFA), and Acute Physiology and Chronic Health Evaluation II (APACHE II) for early prediction of septic shock in diabetic patients in Emergency Departments.**

Authors: Liengswangwong, Wijittra;Siriwannabhorn, Ranchana;Leela-Amornsin, Sittichok;Yuksen, Chaiyaporn;Sanguanwit, Pitsucha;Duangsri, Chonthicha;Kusonkhum, Nusara and Saelim, Parnthap

Abstract: INTRODUCTION: Sepsis is a severe medical condition that can be life-threatening. If sepsis

progresses to septic shock, the mortality rate increases to around 40%, much higher than the 10% mortality observed in sepsis. Diabetes increases infection and sepsis risk, making management complex. Various scores of screening tools, such as Modified Early Warning Score (MEWS), Simplified Acute Physiology Score (SAPS II), Sequential Organ Failure Assessment Score (SOFA), and Acute Physiology and Chronic Health Evaluation (APACHE II), are used to predict the severity or mortality rate of disease. Our study aimed to compare the effectiveness and optimal cutoff points of these scores. We focused on the early prediction of septic shock in patients with diabetes in the Emergency Department (ED). METHODS: We conducted a retrospective cohort study to collect data on patients with diabetes. We collected prediction factors and MEWS, SOFA, SAPS II and APACHE II scores to predict septic shock in these patients. We determined the optimal cutoff points for each score. Subsequently, we compared the identified scores with the gold standard for diagnosing septic shock by applying the Sepsis-3 criteria. RESULTS: Systolic blood pressure (SBP), peripheral oxygen saturation (SpO2), Glasgow Coma Scale (GCS), pH, and lactate concentrations were significant predictors of septic shock (p = 6. CONCLUSION: SBP, SpO2, GCS, pH, and lactate concentrations are crucial for the early prediction of septic shock in patients with diabetes. The SOFA score is a superior predictor for the onset of septic shock in patients with diabetes compared with MEWS, SAPS II, and APACHE II scores. Specifically, a cutoff of >= 6 in the SOFA score demonstrates high accuracy in predicting shock within 48 h post-ED visit and as early as 2 h after ED admission. Copyright © 2024. The Author(s).

---

14. Comparing the Predictive Value of SOFA and SIRS for Mortality in the Early Hours of Hospitalization of Sepsis Patients: A Systematic Review and Meta-analysis.

Authors: Majidazar, Mahdi;Hamidi, Farzaneh;Masoudi, Nazanin;Vand-Rajabpour, Zahra and Paknezhad, Seyed Pouya

Publication Date: Aug 01 ,2024

Journal: Archives of Iranian Medicine 27(8), pp. 439–446

Abstract: BACKGROUND: Sepsis, a deadly infection causing organ failure and Systemic Inflammatory Response Syndrome (SIRS), is detected early in hospitalization using the SIRS criteria, while sequential organ failure (SOFA) assesses organ failure severity. A systematic review and meta-analysis was evaluated to investigate the predictive value of the SIRS criteria and the SOFA system for mortality in early hospitalization of sepsis patients. METHODS: Inclusion criteria were full reports in peer-reviewed journals with data on sepsis assessment using SOFA and SIRS, and their relationship with outcomes. For quality assessment, we considered study population, sepsis diagnosis criteria, and outcomes. The area under the curve (AUC) of these criteria was extracted for separate meta-analysis and forest plots. RESULTS: Twelve studies met the inclusion criteria. The studies included an average of 56.1% males and a mean age of 61.9 (+/-6.1) among 32,979 patients. The pooled AUC was 0.67 (95% CI: 0.60-0.73) for SIRS and 0.79 (95% CI: 0.73-0.84) for SOFA. Significant heterogeneity between studies was indicated by an I2 above 50%, leading to a meta-regression analysis. This analysis, with age and patient number as moderators, revealed age as the major cause of heterogeneity in comparing the predictive value of the SOFA score with SIRS regarding the in-hospital mortality of sepsis patients (PCONCLUSION: The SOFA score outperformed the SIRS criteria in predicting mortality, emphasizing the need for a holistic approach that combines clinical judgment and other diagnostic tools for better patient management and outcomes. Copyright © 2024 The Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

---

15. Impact of beta-blocker usage on delirium in patients with sepsis in ICU: a cross-sectional study.

Authors: Ouyang, Honglian;Wang, Xiaoqi;Deng, Dingwei;Wang, Qianqian and Yu, Yi

Publication Date: 2024

Abstract: Introduction: Delirium in patients with sepsis can be life-threatening. This study aims to investigate the impact of the use of beta-blockers on the occurrence of delirium in patients with sepsis in the ICU by utilizing a comprehensive dataset. Methods: This is a cross-sectional study conducted using the data obtained from a single ICU in the USA. Patients diagnosed with sepsis and receiving beta-blockers were compared with those not receiving beta-blockers. Propensity score matching (PSM) and multiple regression analysis were employed to adjust for potential confounders. Results: Among the 19,660 patients hospitalized for sepsis, the beta-blocker and non-user groups comprised 13,119 (66.73%) and 6,541 (33.27%) patients, respectively. Multivariable logistic regression models revealed a significant reduction of 60% in 7-day delirium for beta-blocker users (OR = 0.40, 95% CI: 0.37-0.43, p p p Discussion: Our findings suggest a potential protective effect of beta-blockers against delirium in patients with sepsis. Nevertheless, the observational design limits causal inference, necessitating future randomized controlled trials to validate these findings. Copyright © 2024 Ouyang, Wang, Deng, Wang and Yu.

16. Efficacy of beta-Blockers in Decreasing Mortality in Sepsis and Septic Shock Patients: A Systematic Review

Authors: Perala, Alekya;Wishart, Annetta V.;Hamouda, Ranim K.;Elsaady, Entesar;Aslam, Muhammad Rizwan and Khan, Safeera

Abstract: Sepsis is a life-threatening condition leading to various organ dysfunction due to an underlying infection. Despite providing appropriate treatment, it is still one of the most common causes of death among patients who are admitted to the intensive care unit (ICU). So, multiple studies have been conducted to identify the potential benefits of various drugs in decreasing mortality in sepsis apart from its traditional treatment options. This study aims to identify whether beta-blockers play a role in decreasing mortality in sepsis and septic shock patients because of their potential benefits on several organ systems. Medical databases such as Google Scholar, Summon, PubMed Medical Subject Headings (MeSH), PubMed, Science Direct, Cochrane Library, and Multidisciplinary Digital Publishing Institute (MDPI) were systematically searched for relevant publications. The identified articles were assessed based on the inclusion and exclusion criteria, and 11 research articles were finalized, for which quality appraisal was done using appropriate appraisal tools. beta-blockers significantly lowered the in-hospital mortality in sepsis and septic shock patients, and they were also associated with better patient outcomes. As there are limited studies, further research needs to be done to explore the role of beta-blockers in decreasing mortality in critically ill populations such as sepsis and septic shock patients. Copyright © 2024, Perala et al.

17. Acute Management of Sepsis beyond 24 Hours.

Authors: Premachandra, A. and Heming, N.

Abstract: Sepsis manifests as a dysregulated immune response to an infection, leading to tissue damage, organ failure, and potentially death or long-term health issues. Sepsis remains a major health challenge globally, causing approximately 50 million cases and 11 million deaths annually. Early management of sepsis focuses on source control, antimicrobial treatment, and supporting vital organ function. Subsequent care includes metabolic, nutritional, and immune therapies to address the complex needs of septic patients. Metabolic management is based on obtaining moderate glucose targets. Nutritional support aims to mitigate hypercatabolism and muscle wasting, but aggressive early

nutrition does not improve outcomes and could even be harmful. Immune modulation is crucial due to the dual nature of sepsis-induced immune responses. Corticosteroids have shown benefits in shock and organ dysfunction reversal and in mortality reduction with current guidelines recommending them in vasopressor therapy-dependent patients. In conclusion, sepsis management beyond the initial hours requires a multifaceted approach, focusing on metabolic, nutritional, and immune system support tailored to individual patient needs to enhance survival and recovery.

---

18. **Organizational readiness for change towards implementing a sepsis survivor hospital to home transition-in-care protocol.**

Authors: Sang, Elaine;Quinn, Ryan;Stawnychy, Michael A.;Song, Jiyoun;Hirschman, Karen B.;You, Sang Bin;Pitcher, Katherine S.;Hodgson, Nancy A.;Garren, Patrik;O'Connor, Melissa;Oh, Sungho and Bowles, Kathryn H.

Abstract: Background: Organizational readiness for change, defined as the collective preparedness of organization members to enact changes, remains understudied in implementing sepsis survivor transition-in-care protocols. Effective implementation relies on collaboration between hospital and post-acute care informants, including those who are leaders and staff. Therefore, our cross-sectional study compared organizational readiness for change among hospital and post-acute care informants. Methods: We invited informants from 16 hospitals and five affiliated HHC agencies involved in implementing a sepsis survivor transition-in-care protocol to complete a pre-implementation survey, where organizational readiness for change was measured via the Organizational Readiness to Implement Change (ORIC) scale (range 12-60). We also collected their demographic and job area information. Mann-Whitney U-tests and linear regressions, adjusting for leadership status, were used to compare organizational readiness of change between hospital and post-acute care informants. Results: Eighty-four informants, 51 from hospitals and 33 from post-acute care, completed the survey. Hospital and post-acute care informants had a median ORIC score of 52 and 57 respectively. Post-acute care informants had a mean 4.39-unit higher ORIC score compared to hospital informants ($p = 0.03$). Conclusions: Post-acute care informants had higher organizational readiness of change than hospital informants, potentially attributed to differences in health policies, expertise, organizational structure, and priorities. These findings and potential inferences may inform sepsis survivor transition-in-care protocol implementation. Future research should confirm, expand, and examine underlying factors related to these findings with a larger and more diverse sample. Additional studies may assess the predictive validity of ORIC towards implementation success. Copyright © 2024 Sang, Quinn, Stawnychy, Song, Hirschman, You, Pitcher, Hodgson, Garren, O'Connor, Oh and Bowles.

---

19. **Number of ICD-10 diagnosis fields required to capture sepsis in administrative data and truncation bias: A nationwide prospective registry study.**

Authors: Skei, N. V.;Damas, J. K. and Gustad, L. T.

Abstract: Background: In observational studies that uses administrative data, it is essential to report technical details such as the number of International Classification of Disease (ICD) coding fields extracted. This information is crucial for ensuring comparability between studies and for avoiding truncation bias in estimates, particularly for complex conditions like sepsis. Specific sepsis codes (explicit sepsis) is suggested identified by extracting 15 diagnosis fields, while for implicit sepsis, comprising an infection code combined with an acute organ failure, the number of diagnosis field remains unknown. Objective(s): The objective was to explore the necessary number of diagnosis fields

to capture explicit and implicit sepsis. Material(s) and Method(s): We conducted a study utilizing The Norwegian Patient Register (NPR), which encompasses all medical ICD-10 codes from specialized health services in Norway. Data was extracted for all adult patients with hospital admissions registered under explicit and implicit sepsis codes from all Norwegian hospitals between 2008 through 2021. Result(s): In 317,705 sepsis admissions, we observed that 105,499 ICD-10 codes were identified for explicit sepsis, while implicit sepsis was identified through 270,346 codes for infection in combination with 240,586 codes for acute organ failure. Through our analysis, we found that 55.3%, 37.0%, and 10.0% of the explicit, infection, and acute organ failure codes, respectively, were documented as the main diagnosis. The proportion of explicit and infection codes peaked in main diagnosis field, while for acute organ failure codes this was true in the third diagnosis field. Notably, the cumulative proportion reached 99% in diagnosis field 11 for explicit codes and in diagnosis field 14 for implicit codes. Conclusion(s): Expanding the utilization of multiple diagnosis fields can enhance the comparability of data in epidemiological studies, both internationally and within countries. To make truncation bias visible, reporting guidelines should specify the number of diagnosis fields when extracting ICD-10 codes.

---

20. Fighting A New Front On An Old Battlefield: Examining the Development of Topical Antimicrobial Care to Control Burn Wound Sepsis.

Authors: Tejiram, S. and Shupp, J. W.

Publication Date: 2024

Journal: Journal of Burn Care & Research : Official Publication of the American Burn Association (pagination), pp. Date of Publication: 17 Se 2024

Abstract: Recognition of invasive burn wound sepsis as a major cause of morbidity and mortality in burn injured patients has profoundly changed the management of burn wounds and its associated complications. The development of effective topical antimicrobial therapy is one of the last major developments of modern burn care and has been driven by major world events and scientific breakthroughs. Topical antimicrobial burn care has evolved from the use of anecdotal remedies to scientific breakthroughs such as Moyer's successful dilution of silver nitrate solution, Fox's described benefit of silver sulfadiazine use in animal models, and Pruitt's dramatic improvement in post-burn mortality using topical mafenide acetate in burn wounds. The objective of this manuscript is to review the definition of burn wound sepsis and highlight the major developments and breakthroughs in topical burn wound care throughout history. This includes historical events like major wars or domestic fires that have influenced or impacted the understanding and treatment of burn wounds. Newer advances in topical antimicrobial care such as nanosilvers and dressing technologies that improve the morbidity and mortality associated with burn wound sepsis and novel approaches to management will also be discussed. To improve burn care, it is prudent to look to the past and learn from the experiences of those who contributed to the control of burn wound sepsis.

---

21. Heparin therapy in sepsis and sepsis-associated disseminated intravascular coagulation: a systematic review and meta-analysis.

Authors: Totoki, Takaaki;Koami, Hiroyuki;Makino, Yuto;Wada, Takeshi;Ito, Takashi;Yamakawa, Kazuma and Iba, Toshiaki

Publication Date: Sep 30 ,2024

Journal: Thrombosis Journal [Electronic Resource] 22(1), pp. 84

Abstract: BACKGROUND: Sepsis is a life-threatening condition that affects 49 million people annually. Managing sepsis-associated coagulopathy poses a significant challenge due to its high mortality rates in intensive care. Recent reports suggest that administering heparin may offer potential survival benefits in sepsis and coronavirus disease cases. However, there is currently no established evidence supporting the use of heparin for sepsis. Thus, in this study, we aimed to assess the efficacy of heparin administration in patients with sepsis. METHODS: A systematic review was conducted following the PRISMA guidelines. The searches included MEDLINE, Cochrane, and Japanese databases up to January 2023. The inclusion criteria consisted of randomized control trials (RCTs) involving adult sepsis patients receiving heparin. The risk of bias was assessed using RoB2, and the data extraction included 28-day mortality and bleeding complications. RESULTS: Out of 1733 initial articles, only three studies met the inclusion criteria. The analysis, which included 426 patients, showed no significant difference in 28-day and in-hospital mortality between the heparin and control groups (risk ratio [RR] = 0.86, 95% confidence interval [CI]: 0.60-1.24). Subgroup analysis of sepsis-associated disseminated intravascular coagulation (DIC) patients (n = 109) also did not show a significant reduction in mortality (RR = 0.84, 95% CI: 0.51-1.38). Heterogeneity was zero, and no publication bias was observed. Additionally, there was significant difference in bleeding complications (RR = 0.49, 95% CI: 0.24-0.99, p = 0.047). CONCLUSIONS: This meta-analysis did not demonstrate a survival benefit of heparin administration in patients with sepsis and sepsis-associated DIC. Further investigation into the potential benefits of heparin is warranted. Moreover, the analysis revealed no increase in bleeding risks with heparin administration; instead, a significant reduction in the risk of bleeding was noted. TRIAL REGISTRATION: This review was preregistered with PROSPERO (registration: CRD42023385091). Copyright © 2024. The Author(s).

22. **Impact of Abnormal Ankle Brachial Index on Sepsis Survival: One-Year Prospective Study Results.**

Authors: Tseng, Hsinyu;Liao, Min-Tsun;Keng, Li-Ta;Chang, Chia-Hao;Zeng, Ya-Zih and Hsieh, Mu-Yang

Abstract: Background: Lower extremity peripheral artery disease (LE-PAD) has been linked to unfavorable cardiovascular outcomes. The impact of potentially undiagnosed LE-PAD, suspected by abnormal ankle-brachial index (ABI), on the survival of sepsis patients admitted to the intensive care unit (ICU) remains uncertain. Methods: We conducted a prospective cohort study and recruited adult patients admitted to the ICU with a primary diagnosis of sepsis (defined by a quick Sepsis-Related Organ Failure Assessment score of >= 2) between November 23, 2017 and July 22, 2018. ABI measurements were obtained within 24 hours of admission. The study compared the 30-day and 1-year all-cause mortality rates as well as the incidence of major adverse cardiovascular events (MACEs) between the groups with normal and abnormal ABI values. Results: Of the 102 sepsis patients admitted to the ICU, 38 (37%) were diagnosed with LE-PAD based on their ABI measurements. The overall 30-day mortality rate was 30.0% in patients with LE-PAD and 25.8% in those with normal ABI (p = 0.56). At 1 year, the overall mortality rate was 52.6% in the patients with abnormal ABI and 40.6% in those with normal ABI (p = 0.24). Additionally, the incidence of MACEs was significantly higher in the patients with abnormal ABI compared to those with normal ABI at 1-year follow-up (21.1% vs. 3.1%, respectively; p = 0.003). Conclusions: The patients with abnormal ABI had a higher incidence of MACEs within one year following hospital discharge. Future studies are needed to improve cardiovascular outcomes among sepsis survivors (ClinicalTrials.gov number, NCT03372330).

23. **A Study on the Incidence and Impact of Dysglycemia in Non-diabetic Sepsis Patients.**

Authors: Varghese, Jerin;Mohan, Naveen;Kumar, Indresh;Kumar, Gireesh;Trikkur, Sreekrishnan;Nair, Sabarish;Prasad, Bharath;Theresa, Manna M. and Viswanath, Midhun

Abstract: Context Dysglycemia is common in severe sepsis and is associated with a poor prognosis. There is a limited amount of research on stress-induced dysglycemia in non-diabetic sepsis patients. Aim This study aims to estimate the incidence of dysglycemia among non-diabetic patients presenting with sepsis at the Emergency Department and to determine its correlation with gender, age, APACHE II (Acute Physiology and Chronic Health Evaluation) scores, diagnosis, and duration of hospital stay. Materials and methods The study was conducted at a medical college hospital in Kochi from January 1, 2023, to December 31, 2023. A minimum sample size of 77 was derived after a pilot study, with a 95% confidence interval and 10% allowable error. A total of 100 non-diabetic sepsis patients meeting the inclusion and exclusion criteria were analyzed with regard to gender, age, diagnosis, glycemic status (hypo/hyper/normoglycemic), APACHE II scores, and hospital stay duration. Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 20 (Released 2011; IBM Corp., Armonk, New York) software. Categorical variables were expressed as frequency and percentage. Continuous variables were presented as mean +/- SD (standard deviation) and median (Q1-Q3). To test the statistical significance of the association between the presence of various factors (gender, age, diagnosis) and dysglycemia, the chi-square test was used. To test the statistical significance of the difference in the mean age and APACHE II score values with dysglycemia, an independent sample t-test was used. To test the statistical significance of the difference in the median hospital stay with dysglycemia, the Whitney U test was used. Data were represented as mean +/- SD, and a p-value of 40 years. Dysglycemia was 54.8% in pneumonia and 66.7% in gastrointestinal sepsis (p=0.138). Dysglycemia increased with an increase in APACHE II scores (p=0.017). The median hospital stay was almost the same in both normoglycemics and dysglycemics. Conclusion Dysglycemia is a frequent complication in non-diabetic patients with sepsis. It increased with age and APACHE II score, but it does not prolong the duration of hospital stay, nor is it associated with the diagnosis. Copyright © 2024, Varghese et al.

---

24. Clinical Characteristics and Risk Factors of Sepsis in Patients with Liver Abscess.

Authors: Wang, Kai;Guo, Wei;Zhu, Jihong;Guo, Yang and Gao, Weibo

Abstract: Aims/Background Liver abscess (LA) is a serious medical condition that predisposes patients to sepsis. However, predicting sepsis in LA patients has rarely been explored. This study employed univariate and multivariate logistic regression analyses to identify independent risk factors for sepsis, which would provide guidance for clinical diagnosis and treatment. Methods A total of 122 patients with LA treated in Peking University People's Hospital from 1 January 2016 to 31 October 2022 were recruited. Among the cases, 35 patients had sepsis (sepsis group) while the remaining 87 did not have sepsis (non-sepsis group). Clinical data were collected for all enrolled cases. Univariate analysis was performed to identify potential predictors, which were tested in multivariable logistic analysis to pinpoint the independent risk factors for sepsis in LA patients; these findings were utilized to develop a prediction model. Receiver operating characteristic (ROC) curve was used to evaluate the diagnostic efficacy of the prediction model. Informed consent to participate was obtained from the patients or their relatives. Results The incidence of shivering in the sepsis group was significantly higher than that in the non-sepsis group (p p p Conclusion Elevated levels of HbAlc and PCT were independent risk factors for sepsis associated with LA. Patients with LA exhibiting elevated PCT levels demonstrated a 21% increased susceptibility to sepsis, and those with elevated HbAlc levels showed a 38% heightened risk for sepsis.

---

25. Lymphopenia in sepsis: a narrative review

Authors: Wang, Zhibin;Zhang, Wenzhao;Chen, Linlin;Lu, Xin and Tu, Ye

Abstract: This narrative review provides an overview of the evolving significance of lymphopenia in sepsis, emphasizing its critical function in this complex and heterogeneous disease. We describe the causal relationship of lymphopenia with clinical outcomes, sustained immunosuppression, and its correlation with sepsis prediction markers and therapeutic targets. The primary mechanisms of septic lymphopenia are highlighted. In addition, the paper summarizes various attempts to treat lymphopenia and highlights the practical significance of promoting lymphocyte proliferation as the next research direction. Copyright © 2024. The Author(s).

---

26. Risk factors for acute respiratory distress syndrome in sepsis patients: A meta-analysis.

Authors: Yin, Rui;Yang, Xiaoshan and Yao, Yanfen

Abstract: Background: Acute Respiratory Distress Syndrome (ARDS) is a critical complication of sepsis, associated with high morbidity and mortality. Identifying risk factors for ARDS among sepsis patients is essential for early intervention and improving outcomes. Methods: We conducted a comprehensive meta-analysis, reviewing studies that examined the association between various risk factors and ARDS development in sepsis patients. Databases such as PubMed, EMBASE, Cochrane Library, Medline, CINAHL, and Web of Science were searched up to January 2024, without language restrictions. Eligible studies included observational cohorts and case-control studies. Pooled odds ratios (ORs) and standardized mean differences (SMDs) were calculated using a random-effects model. Heterogeneity was assessed through I2 statistics, and publication bias was evaluated via the Luis Furuya-Kanamori (LFK) index. Results: 15 studies with more than 40,000 participants were analyzed. Significant risk factors for ARDS included pulmonary infection (OR: 2.696, 95 % CI: 1.655 to 4.390), septic shock (OR: 2.627, 95 % CI: 1.850 to 3.731), and pancreatitis (OR: 3.734, 95 % CI: 2.958 to 4.712). No significant associations were found between the development of ARDS in septic patients and the following risk factors: sex (OR: 1.106, 95%CI: 0.957-1.279), smoking status (OR: 1.214, 95%CI: 0.835-1.765), or steroid use (OR: 0.901, 95%CI: 0.617-1.314). APACHE-II and SOFA scores were predictive of ARDS development, emphasizing their utility in clinical assessments. Conclusion: Pulmonary infection, septic shock, and pancreatitis significantly increase ARDS risk in sepsis patients. Our findings advocate for targeted management of these risk factors to mitigate ARDS development, emphasizing the importance of personalized care in sepsis management. Copyright © 2024 The Authors. Published by Elsevier Ltd.

---

27. Early identification and diagnosis, pathophysiology, and treatment of sepsis-related acute lung injury: a narrative review

Authors: Zhang, Jie;Yan, Wenxiao;Dong, Yansong;Luo, Xinye;Miao, Hua;Maimaijuma, Talaibaike;Xu, Xianggui;Jiang, Haiyan;Huang, Zhongwei;Qi, Lei and Liang, Guiwen

Abstract: Background and Objective: Sepsis is a life-threatening organ dysfunction, and the most common and vulnerable organ is the lungs, with sepsis-related acute respiratory distress syndrome (ARDS) increasing mortality. In recent years, an increasing number of studies have improved our understanding of sepsis-related ARDS in terms of epidemiology, risk factors, pathophysiology, prognosis, and other aspects, as well as our ability to prevent, detect, and treat sepsis-related ARDS.

However, sepsis-related lung injury remains an important issue and clinical burden. Therefore, a literature review was conducted on sepsis-related lung injury in order to further guide clinical practice in reducing the acute and chronic consequences of this condition. Methods: This study conducted a search of the MEDLINE and PubMed databases, among others for literature published from 1991 to 2023 using the following keywords: definition of sepsis, acute lung injury, sepsis-related acute lung injury, epidemiology, risk factors, early diagnosis of sepsis-related acute lung injury, sepsis, ARDS, pathology and physiology, inflammatory imbalance caused by sepsis, congenital immune response, and treatment. Key Content and Findings: This review explored the risk factors of sepsis, sepsis-related ARDS, early screening and diagnosis, pathophysiology, and treatment and found that in view of the high mortality rate of ARDS associated with sepsis. In response to the high mortality rate of sepsis-related ARDS, some progress has been made, such as rapid identification of sepsis and effective antibiotic treatment, early fluid resuscitation, lung-protective ventilation, etc. Conclusions: Sepsis remains a common and challenging critical illness to cure. In response to the high mortality rate of sepsis-related ARDS, progress has been made in rapid sepsis identification, effective antibiotic treatment, early fluid resuscitation, and lung-protective ventilation. However, further research is needed regarding long-term effects such as lung recruitment, prone ventilation, and the application of neuromuscular blocking agents and extracorporeal membrane oxygenation. Copyright 2024 Journal of Thoracic Disease. All rights reserved.

---

28. **Effect of mean heart rate on 30-day mortality in older patients with sepsis: Data from the MIMIC-IV database.**

Authors: Zhou, Q.;Li, J.;Miao, Y. and Li, N.

Publication Date: 2024

Journal: American Journal of the Medical Sciences (pagination), pp. Date of Publication: 2024

Abstract: Background: Sepsis is a critical condition with a significant risk of mortality. Advanced age is one factor in increasing mortality in intensive care. Objective(s): The aim of this study is to investigate the association between mean heart rate (MHR) and 30-day mortality among older patients with sepsis in the intensive care unit (ICU). Method(s): All older patients (age 65 or older) with sepsis for first time in ICU admission in Medical Information Mart for Intensive Care-IV (MIMIC-IV) were included in this retrospective study. The effect of MHR within 24 h of ICU admission on 30-day mortality was assessed according to multivariable Cox regression models, restricted cubic splines and two-piecewise Cox regression models. Result(s): The total number of participants was 6598 (mean heart rate, 83.8 +/- 14.3 bpm). A total of 1295 (19.6%) patients died within 30 days after ICU admission. MHR within 24 h of admission was associated with 30-day mortality (J-shaped association) in older patients with sepsis in the ICU, with an inflection point at about 74 bpm and a minimal risk observed at 73 to 82 bpm of MHR. Conclusion(s): In this retrospective cohort study, there was a J-shaped association between MHR and 30-day mortality in older patients with sepsis admitted to the ICU and a minimal risk observed at 73 to 82 bpm of MHR. If further confirmed, this association may provide a theoretical basis for formulating the target strategy of heart rate therapy for these patients.Copyright © 2024 Southern Society for Clinical Investigation.

Sources Used: The following databases are used in the creation of this bulletin: EMBASE and Medline.