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SEPSIS BULLETIN 26 October 2018

Neonatal, paediatric and maternal sepsis

[Evaluation of Effect of Probiotics on Cytokine Levels in Critically Ill Children With Severe Sepsis: A Double-Blind, Placebo-Controlled Trial](#)

Angurana, S.K. et al

Critical Care Medicine: October 2018 - Volume 46 - Issue 10 - p 1656–1664

Evaluates the effect of probiotics on cytokines in children with severe sepsis. Probiotics supplementation for 7 days resulted in significant decrease in proinflammatory and increase in antiinflammatory cytokines in children with severe sepsis.

[Targeted LC-MS/MS for the evaluation of proteomics biomarkers in the blood of neonates with necrotizing enterocolitis and late-onset sepsis](#)

Chatziioannou, A. et al

Analytical and Bioanalytical Chemistry, 2018, Vol.410 (27), pp.7163-7175

Late-onset sepsis (LOS) and necrotizing enterocolitis (NEC) are severe life-threatening conditions for

Adult sepsis (cont.)

[SIRS or qSOFA? Is that the question? Clinical and methodological observations from a meta-analysis and critical review on the prognostication of patients with suspected sepsis outside the ICU](#)

Franchini, S. et al

Internal and Emergency Medicine, Oct 2018, pp.1-10

The purpose of the study was to assess the prognostic performances, in terms of in-hospital mortality, of the quick sequential organ failure assessment (qSOFA) score and the systemic inflammatory response syndrome (SIRS) criteria applied to patients with suspected infection outside the ICU, and to critically reappraise the results and the clinical impact of the SEPSIS-3 study and of the subsequent trials. We performed bivariate meta-analysis, evaluation of the Bayesian post-test probabilities of death, and computation of the unidentified deaths for every 1000 screened cases (UDS1000). The use of qSOFA for screening instead of the SIRS implies a relevant increase in the UDS1000. However, this difference

neonates. Accurate, early diagnosis and timely initiation of treatment are crucial. Non-specific overlapping clinical signs along with the non-sensitive/specific diagnostic tools set obstacles to speedy, trustful diagnosis including differential diagnosis. The objective of this study was to evaluate the potential of targeted LC-MS/MS proteomics in identifying diagnostic biomarkers of NEC or LOS.

[The Association of Nutrition Status Expressed as Body Mass Index z Score With Outcomes in Children With Severe Sepsis: A Secondary Analysis From the Sepsis Prevalence, Outcomes, and Therapies \(SPROUT\) Study](#)
Irving, S.Y. et al

Critical Care Medicine. 46(11):e1029-e1039, November 2018.

The impact of nutrition status on outcomes in pediatric severe sepsis is unclear. We studied the association of nutrition status (expressed as body mass index z score) with outcomes in pediatric severe sepsis. There is considerable variation in nutrition status for children with severe sepsis treated across this selected network of PICUs from different geographic regions. Severe undernutrition was independently associated with higher all-cause ICU mortality in children with severe sepsis. Severe overnutrition was independently associated with greater ICU length of stay in childhood survivors of severe sepsis.

[Shock index-a useful noninvasive marker associated with age-specific early mortality in children with severe sepsis and septic shock: age-specific shock index cut-offs](#)

Gupta, Sarika ; Alam, Areesha

Journal of intensive care medicine, 02 October 2018, pp.885066618802779

Aim of the study was to analyze the association of shock index (SI) from 0 to 6 hours with early mortality in severe sepsis/septic shock and to explore its age-specific cut-off values and to investigate association of change in SI over first 6 hours with early mortality. Age-specific SI cut-off values may identify children at high risk of early mortality in severe sepsis/septic shock and allow for better targeted management.

[Autonomic Nervous System Dysfunction in Pediatric Sepsis](#)

Badke C.M et al

Frontiers in Pediatrics, 01 October 2018, Vol.6

The autonomic nervous system (ANS) plays a major role in maintaining homeostasis through key adaptive responses to stress, including severe infections and sepsis. The ANS-mediated processes most relevant during sepsis include regulation of cardiac output and

appears far smaller in the SEPSIS-3 study, largely due to an underestimation of SIRS sensitivity. The increment in the pre-test probability of death implied by a positive qSOFA is higher than that implied by a positivity of the SIRS. However, the included studies use highly variable definitions of "suspected sepsis" and carry very high levels of heterogeneity. SIRS overperforms qSOFA as a rule-out tool for mortality, while qSOFA shows a higher rule-in power. However, the evident lack of consistency across the published studies undermines the significance of both the meta-analytic approach and the reproducibility of the outcomes, and demands for a standardized definition of the target population.

[Diagnostic value of eosinopenia and neutrophil to lymphocyte ratio on early onset neonatal sepsis](#)

Wilar, Rocky

Korean journal of pediatrics, 08 October 2018

Purpose was to determine the diagnostic value of eosinopenia and neutrophil to lymphocyte ratio (NLR) for diagnosing Early Onset Neonatal Sepsis (EONS). Concluded that eosinopenia has a high specificity value as a diagnostic marker of EONS and an increased in NLR has a high sensitivity and specificity value as a marker to diagnose EONS.

[Risk of Sepsis and Mortality Among Patients With Chronic Obstructive Pulmonary Disease Treated With Angiotensin-Converting Enzyme Inhibitors or Angiotensin Receptor Blockers](#)

Lai, Chih-Cheng et al

Critical care medicine, 09 October 2018

This study aimed to compare the effect of angiotensin-converting enzyme inhibitors and angiotensin receptor blockers on the risk and outcomes of sepsis in patients with chronic obstructive pulmonary disease. It is a retrospective study. Angiotensin receptor blockers were associated with lower rates of sepsis and mortality than angiotensin-converting enzyme inhibitors in the patients with chronic obstructive pulmonary disease. The similar findings were also noted in subgroup analysis.

[No association with cardiac death after sepsis: A nationwide observational cohort study](#)

De Geer, L. et al

Acta anaesthesiologica Scandinavica, 14 October 2018

Cardiac dysfunction is a well-known complication of sepsis, but its long-term consequences and implications for patients remain unclear. The aim of this study was to investigate cardiac outcome in sepsis by assessing causes of death up to 2 years after treatment in an Intensive Care Unit (ICU) in a

vascular tone, control of breathing and airway resistance, inflammation and immune modulation, gastrointestinal motility and digestion, and regulation of body temperature. ANS dysfunction (ANSF) represents an imbalanced or maladaptive response to injury and is prevalent in pediatric sepsis. Most of the evidence on ANSD comes from studies of heart rate variability, which is a marker of ANS function and is inversely correlated with organ dysfunction and mortality. In addition, there is evidence that other measures of ANSD, such as respiratory rate variability, skin thermoregulation, and baroreflex and chemoreflex sensitivity, are associated with outcomes in critical illness. The relevance of understanding ANSD in the context of pediatric sepsis stems from the fact that it might play an important role in the pathophysiology of sepsis, is associated with outcomes, and can be measured continuously and noninvasively. Here we review the physiology and dysfunction of the ANS during critical illness, discuss methods for measuring ANS function in the intensive care unit, and review the diagnostic, prognostic, and therapeutic value of understanding ANSD in pediatric sepsis.

[Culture-Negative Early-Onset Neonatal Sepsis — At the Crossroad Between Efficient Sepsis Care and Antimicrobial Stewardship](#)

Klingenberg, C. et al

Frontiers in Pediatrics, 01 October 2018, Vol.6

Sepsis is a leading cause of mortality and morbidity in neonates. Presenting clinical symptoms are unspecific. Sensitivity and positive predictive value of biomarkers at onset of symptoms are suboptimal. Clinical suspicion therefore frequently leads to empirical antibiotic therapy in uninfected infants. The incidence of culture confirmed early-onset sepsis is rather low, around 0.4-0.8/1000 term infants in high-income countries. Six to 16 times more infants receive therapy for culture-negative sepsis in the absence of a positive blood culture. Thus, culture-negative sepsis contributes to high antibiotic consumption in neonatal units. Antibiotics may be life-saving for the few infants who are truly infected. However, overuse of broad-spectrum antibiotics increases colonization with antibiotic resistant bacteria. Antibiotic therapy also induces perturbations of the non-resilient early life microbiota with potentially long lasting negative impact on the individual's own health. Currently there is no uniform consensus definition for neonatal sepsis. This leads to variations in management. Two factors may reduce the number of culture-negative sepsis cases. First, obtaining adequate blood cultures (0.5-1 mL) at symptom onset is mandatory. Unless there is a strong clinical or biochemical indication to prolong antibiotics

nationwide register-based cohort collected from the Swedish Intensive Care Registry. There was no association with an increased risk of death related to cardiac disease in patients with severe sepsis or septic shock when compared to other ICU patients with similar severity of illness.

[Pneumococcal sepsis requiring mechanical ventilation: Cohort study in 38 patients with rapid progression to septic shock](#)

Ursin Rein, P. et al

Acta Anaesthesiologica Scandinavica, November 2018, Vol.62(10), pp.1428-1435

The aim was to study the course of severe pneumococcal sepsis in patients who rapidly developed septic shock with multiorgan failure. In this patient cohort with pneumococcal sepsis and respiratory failure rapid development of septic shock was seen in all cases, even in young healthy individuals. Initial clinical features were variable; none were treated with antibiotics before admission. Mortality was high (40%), as was morbidity with limb amputations and neurological complications.

[Sooner is better: use of a real-time automated bedside dashboard improves sepsis care](#)

Jung, A.D. et al

Journal Of Surgical Research, 2018 Nov, Vol.231, pp.373-379

Minimizing the interval between diagnosis of sepsis and administration of antibiotics improves patient outcomes. We hypothesized that a commercially available bedside clinical surveillance visualization system (BSV) would hasten antibiotic administration and decrease length of stay (LOS) in surgical intensive care unit (SICU) patients. Implementation of a visual SSS into a BSV led to a decreased time interval between the positive SSS and administration of antibiotics and was associated with shorter SICU and hospital LOS. Integration of a visual decision support system may help providers adhere to Surviving Sepsis Guidelines.

[Computed tomography evidence of psoas muscle atrophy without concomitant tendon wasting in early sepsis](#)

Kubiak, C.A. et al

Journal of Surgical Research, February 2019, Vol.234, pp.210-216

Morphomic studies have demonstrated a correlation between sarcopenia and clinical outcomes in septic patients. However, tendon morphomics has not yet been studied in this context. The purpose of the present study was to evaluate tendon morphology in

physician need to trust the culture results and to stop antibiotics for suspected sepsis within 36-48 h. Secondly, an international robust and pragmatic neonatal sepsis definition is urgently needed. Neonatal sepsis is a dynamic condition. Rigorous evaluation of clinical symptoms ("organ dysfunction") over 36-48 h in combination with appropriately selected biomarkers ("dysregulated host response") may be used to support or refute a sepsis diagnosis.

[Evaluation of factors for poor outcome in preterm newborns with posthemorrhagic hydrocephalus associated with late-onset neonatal sepsis](#)

Stevic M. et al

Therapeutics and Clinical Risk Management, 01 October 2018, pp.1965-1973

Preterm newborns, due to many factors, are at increased risk for poor neural development, intraventricular hemorrhages, infections, and higher rate of mortality. The aim of this study was to evaluate the risk factors associated with poor outcome in preterm neonates with late-onset neonatal sepsis (LONS) who had posthemorrhagic hydrocephalus and underwent neurosurgical procedures for treatment of the hydrocephalus. Neurosurgical procedures are relatively safe in neonates with posthemorrhagic hydrocephalus without LONS after birth. However, if LONS is present, various conditions such as preoperative high grade American Society of Anaesthesiologists score, ductus arteriosus persists, bronchopulmonary dysplasia, and pneumothorax markedly increase the risk for a lethal outcome after the operation.

[Translating Sepsis-3 Criteria in Children: Prognostic Accuracy of Age-Adjusted Quick SOFA Score in Children Visiting the Emergency Department With Suspected Bacterial Infection](#)

van Nassau, SC et al

Frontiers In Pediatrics, 2018 Oct 1, Vol.6

Recent attempts to translate Sepsis-3 criteria to children have been restricted to PICU patients and did not target children in emergency departments (ED). We assessed the prognostic accuracy of the age-adjusted quick Sequential Organ Failure Assessment score (qSOFA) and compared the performance to SIRS and the quick Pediatric Logistic Organ Dysfunction-2 score (qPELOD-2). We studied whether the addition of lactate (qSOFA-L) would increase prognostic accuracy. The currently proposed bedside risk-stratification tool of Sepsis-3 criteria, qSOFA, shows moderate prognostic accuracy for PICU transfer and/or mortality in children visiting the ED with suspected bacterial infection. The addition of lactate did not improve prognostic

septic patients through analytic morphomics. We hypothesized that morphomic analyses would reveal concomitant muscle and tendon wasting in sepsis patients. The results of this study may help to implement different rehabilitation modalities for critically ill patients. Our results demonstrate significantly smaller psoas muscle volume in septic patients than in age-, gender-, and BMI-matched trauma patients but no demonstrable change in tendon morphology between patient groups. These findings begin to define the boundaries of clinical application within the field of morphomics.

[Red blood cell distribution width predicts long-term outcomes in sepsis patients admitted to the intensive care unit](#)

Han, Y.-Q. et al

Clinica Chimica Acta, December 2018, Vol.487, pp.112-116

Although some underpowered studies have proven that increased red blood cell distribution width (RDW) may be associated with short-term prognosis of sepsis, the long-term prognostic value of RDW remains largely unknown. RDW values significantly predicts long-term all-cause mortality in critically ill patients with severe sepsis beyond conventional severity scores.

[Evaluation for occult sepsis incorporating NIRS and emergency sonography](#)

Ho, Weng

The American Journal of Emergency Medicine, Nov 2018, Vol.36(11), pp.1957-1963

We aim to determine whether the combination of regional tissue oxygen saturation (StO₂) measurement using near-infrared spectroscopy (NIRS), inferior vena cava (IVC) collapsibility and ejection fraction (EF) is able to detect occult sepsis. Change in StO₂ and time taken to reach new StO₂ baseline, combined with EF could potentially predict sepsis among patients with infection.

[Ethanol lock is effective on reducing the incidence of tunneled catheter-related bloodstream infections in hemodialysis patients: a systematic review and meta-analysis.](#)

Zhao T, Liu H, Han J.

Int Urol Nephrol. 2018;50(9):1643-52.

The purpose of this meta-analysis is to evaluate the effect of ethanol lock on the incidence of catheter-related bloodstream infection (CRBSI) in patients with central venous catheters. Our meta-analysis suggests that ethanol lock is effective on reducing the incidence of CRBSI in hemodialysis patients with tunneled central

accuracy. Future prospective studies in larger ED populations are needed to further determine the utility of the qSOFA score.

[Neonatal Sepsis of Early Onset, and Hospital-Acquired and Community- Acquired Late Onset: A Prospective Population-Based Cohort Study](#)

Giannoni, E et al

Journal Of Pediatrics, 2018 Oct, Vol.201, pp.106-+
To assess the epidemiology of blood culture-proven early- (EOS) and late-onset neonatal sepsis (LOS). We report a high burden of sepsis in neonates with considerable mortality and morbidity. EOS, hospital-acquired LOS, and community-acquired LOS affect specific patient subgroups and have distinct clinical presentation, pathogens and outcomes.

Adult sepsis

[Participatory design of an improvement intervention for the primary care management of possible sepsis using the Functional Resonance Analysis Method](#)

Mcnab, D. et al

BMC Medicine, 01 October 2018, Vol.16(1), pp.1-20
Ensuring effective identification and management of sepsis is a healthcare priority in many countries. Recommendations for sepsis management in primary care have been produced, but in complex healthcare systems, an in-depth understanding of current system interactions and functioning is often essential before improvement interventions can be successfully designed and implemented. A structured participatory design approach to model a primary care system was employed to hypothesise gaps between work as intended and work delivered to inform improvement and implementation priorities for sepsis management. Traditional improvement approaches often focus on individual performance or a specific care process, rather than seeking to understand and improve overall performance in a complex system. The construction of the FRAM model facilitated an understanding of the complexity of interactions within the current system, how system conditions influence everyday sepsis management and how proposed interventions would work within the context of the current system. This directed the design of a multi-component improvement intervention that organisations could locally adapt and implement with the aim of improving overall system functioning and performance to improve sepsis management.

[Applicability of Sepsis-3 criteria and qSOFA in patients with cirrhosis hospitalized for bacterial infections](#)

De Augustinho, F.C. et al

venous catheters. Discussed in [NIHR Signal: Ethanol locks in catheters for dialysis may prevent sepsis](#)

[Effect of Algorithm-Based Therapy vs Usual Care on Clinical Success and Serious Adverse Events in Patients with Staphylococcal Bacteremia: A Randomized Clinical Trial.](#)

Holland TL.

JAMA 2018;320(12):1249-1258 .

Among patients with staphylococcal bacteremia, the use of an algorithm to guide testing and treatment compared with usual care resulted in a noninferior rate of clinical success. Rates of serious adverse events were not significantly different, but interpretation is limited by wide confidence intervals. Further research is needed to assess the utility of the algorithm.

[Improvement in early detection and prompt treatment of sepsis across Weston Area Health NHS Trust](#)

Merrell, J.

Atlas of Shared Learning Case Study. September 2018
The Lead Nurse for Deteriorating Patient and Sepsis at Weston Area Health Trust identified unwarranted variation in the rates of early detection and prompt treatment of sepsis at Weston Area Health Area Trust and addressed this through awareness raising campaigns, training and introduction of best practice sepsis alert practices. This has significantly improved patient outcomes and safety.

[Challenges in assessing the burden of sepsis and understanding the inequalities of sepsis outcomes between National Health Systems: secular trends in sepsis and infection incidence and mortality in Germany](#)

Fleischmann-Struzek, C et al

Intensive Care Medicine, Oct 2018, pp.1-10

Sepsis contributes considerably to global morbidity and mortality, while reasons for its increasing incidence remain unclear. We assessed risk adjusted secular trends in sepsis and infection epidemiology in Germany. Sepsis and infection remain significant causes of hospital admission and death in Germany. Sepsis-related mortality is higher and has declined to a lesser degree than in other high-income countries. Although infection rates steadily increased, the observed annual increase of sepsis cases seems to result, to a considerable degree, from improved coding of sepsis.

[Early PRediction of sepsis using leukocyte surface biomarkers: the ExPRES-sepsis cohort study](#)

Shankar-Hari, M. et al

Intensive Care Medicine, Oct 2018, pp.1-13

Liver international : official journal of the International Association for the Study of the Liver, 01 October 2018

An algorithm including Sepsis-3 criteria and qSOFA was recently proposed to predict severity of infection in cirrhosis. However, its applicability among patients without a baseline SOFA available for Sepsis-3 definition is unknown. We sought to investigate the applicability and prognostic value of qSOFA and Sepsis-3 criteria in patients with cirrhosis hospitalized for bacterial infections, without pre-hospitalization SOFA. Sepsis-3 criteria evaluated at admission are very limited in infected patients with cirrhosis without baseline SOFA. qSOFA was independently related to survival and appears to be a valuable tool for determining severity of infection and to follow patients initially classified as low risk.

[Sepsis-related deaths in the at-risk population on the wards: attributable fraction of mortality in a large point-prevalence study](#)

Kopczynska, M. et al

BMC Research Notes, 01 October 2018, Vol.11(1), pp.1-6

Sepsis mortality is reported to be high worldwide, however recently the attributable fraction of mortality due to sepsis (AFsepsis) has been questioned. If improvements in treatment options are to be evaluated, it is important to know what proportion of deaths are potentially preventable or modifiable after a sepsis episode. The aim of the study was to establish the fraction of deaths directly related to the sepsis episode on the general wards and emergency departments.

[Differences in Hypotensive vs. Non-Hypotensive Sepsis Management in the Emergency Department: Door-to-Antibiotic Time Impact on Sepsis Survival](#)

Leonor Ballester ; R.M. et al

Medical Sciences, 01 October 2018, Vol.6(4), p.91

Sepsis diagnosis can be incorrectly associated with the presence of hypotension during an infection, so the detection and management of non-hypotensive sepsis can be delayed. We aimed to evaluate how the presence or absence of hypotension, on admission at the emergency department, affects the initial management and outcomes of patients with community-onset severe sepsis. Initial management of patients with community-onset severe sepsis differed according to their clinical presentation. Initial hypotension was associated with early hemodynamic management and less ICU requirement. A non-significant delay was observed in the administration of antibiotics to initially non-hypotensive patients. The

Reliable biomarkers for predicting subsequent sepsis among patients with suspected acute infection are lacking. In patients presenting to emergency departments (EDs) with suspected acute infection, we aimed to evaluate the reliability and discriminant ability of 47 leukocyte biomarkers as predictors of sepsis (Sequential Organ Failure Assessment score ≥ 2 at 24 h and/or 72 h following ED presentation). From a large panel of leukocyte biomarkers, immunosuppression biomarkers were associated with subsequent sepsis in ED patients with suspected acute infection.

[The anticoagulant treatment for sepsis induced disseminated intravascular coagulation; network meta-analysis](#)

Yatabe, T. et al

Thrombosis research, 06 October 2018, Vol.171, pp.136-142

The benefits and harm caused by anticoagulant treatments for sepsis induced disseminated intravascular coagulation (DIC) remain unclear. Therefore, we performed a network meta-analysis to assess the effect of available anticoagulant treatments on patient mortality, DIC resolution and the incidence of bleeding complication in patients with septic DIC. Our study revealed no significant differences in the risks for mortality and bleeding complications when a placebo and all four anticoagulants were compared in septic DIC patients. The results also indicated that antithrombin was associated with a five-fold higher likelihood of DIC resolution, compared to placebo.

[Sepsis is associated with reduced spontaneous neutrophil migration velocity in human adults](#)

Raymond, S. et al

PLoS One, Oct 2018, Vol.13(10), p.e0205327

Sepsis is a common and deadly complication among trauma and surgical patients. Neutrophils must mobilize to the site of infection to initiate an immediate immune response. To quantify the velocity of spontaneous migrating blood neutrophils, we utilized novel microfluidic approaches on whole blood samples from septic and healthy individuals. These findings may demonstrate an impaired ability of neutrophils to respond to sites of infection during the proinflammatory phase of sepsis.

time of door-to-antibiotic administration was related to mortality.

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