

## Abdominal sepsis: What is the best score?

Mirko Barone<sup>1,2\*</sup>, Massimo Ippoliti<sup>1</sup>, Felice Mucilli<sup>1,2</sup>



<sup>1</sup>Department of General and Thoracic Surgery, SS. Annunziata University Hospital, Chieti, Italy

<sup>2</sup>Department of Medical, Oral and Biotechnological Sciences, School of Medicine, G. D'Annunzio University, Chieti, Italy

### Dear Editor,

Intra-abdominal infections still represent a challenge for surgeons. The systemic physiopathological effects of infection rapidly progress, leading to sepsis and multiorgan failure, whose prognosis is often dramatic. Mortality risk stratification using scoring systems would unequivocally aid the early identification of patients at risk of disease progression.

In this regard, in a single-center retrospective study, Dimitrov et al (1) speculated about the diagnostic and comparative power of several available and universally validated prediction tools. They conducted a critical review of the Mannheim Peritonitis Index (MPI), Acute Physiology and Chronic Health Evaluation II (APACHE II), sequential organ failure assessment (SOFA), the World Society of Emergency Surgery Sepsis Severity Score (WSES SSS), and the Sitemic Inflammatory Response Syndrome (SIRS) Scores. They reported 110 adult surgical patients in a two-year enrollment period, selected using a cohort sampling method (85 surviving patients vs. 25 non-surviving patients). Upon confirmation and stratification of SIRS, the patients' outcomes were investigated in order to identify risk factors for in-hospital mortality, such as renal failure, cancer history, spread, and source of peritonitis. In the second part of the study, they identified cut-off thresholds by a receiver operating characteristic (ROC) analysis based on the incremental risk of mortality. They reported that the Mannheim Peritonitis Index exhibited better diagnostic performance (area under ROC=0.844) than the Quick SOFA (qSOFA) or WSES SSS, even though the WSES SSS had high sensitivity and good specificity (Sensitivity=92.0%; Specificity=68.2%), stating that the MPI score was the best tool for prognostic purposes in patients with intra-abdominal infections and concomitant septic status.

While appreciating the concept of the study and the experience of the authors, we believe that the study above has some unavoidable and irrefutable limitations that could have significantly influenced some of the

evidence. First of all, it was a single-center retrospective study with no mention of the consecutiveness of the cases, enrollment criteria, and exclusion parameters, with the exception of age. This aspect may have led to selection bias, which is certainly not negligible; together with the limited methodological significance of a purely retrospective study, this issue could have influenced the results. The second issue is the enrolled patients' sample size. According to the published study design, to ensure a representative sample with an  $\alpha$  power at least of 0.5, it would have been necessary to enroll at least 172 patients. The third issue is the arbitrariness of the reported cut-off values (MPI > 25 and WSES SSS > 4), as they were not supported or confirmed by any test (e.g., Youden's test).

There is also an issue related to population heterogeneity and the systems' applicability or reproducibility. Aside from age, a comparison between the items of the MPI and the WSES SSS tools reveals that the former does not stratify the extent of organ failure, while the latter discriminates between severe sepsis and septic shock. Furthermore, the WSES score does not take into account any qualitative and quantitative features of peritonitis. Moreover, the demographic characteristics of the two groups would not allow a comparative prognostic analysis due to statistically significant differences ( $P < 0.001$ ). This is also true for the extent of peritonitis, considering the ineluctable influence exerted by the non-negligible number of patients with acute appendicitis in the survivor's group.

A careful review of the presented evidence raises debate about the clinical utility of preferring one score over the other, as nowadays, we are still far from providing an exhaustive answer.

As each score is designed based on ideal clinical models, no single test is suitable for the general population. Rather, their applicability depends on the suitable target population (e.g., medical vs. surgical).

The recent World Society of Emergency Surgery Sepsis Severity Score (SSS) from the global prospective observational CIAOW study (2) demonstrates high

Received: August 26, 2023 Accepted: October 8, 2023 ePublished: March 3, 2024

\*Corresponding author: Mirko Barone, Email: mir87mb@libero.it

Citation: Barone M, Ippoliti M, Mucilli F. Abdominal sepsis: what is the best score? Journal of Emergency Practice and Trauma 2023; 9(2): 79-80. doi: 10.34172/jept.2024.03.



applicability and universality due to a worldwide validation. In this study, a threshold value of 8 represents a high mortality risk. Designed for early septic status analysis, the WSES SSS includes patient-specific expanded criteria that do not require monitoring or prolonged observation, further mitigating the limits of qSOFA.

We believe no scoring system has such a high diagnostic power to be recommended for the stratification of the risk of organ dysfunction. Rather than preferring methodologies of disparity and inequality, we should use a combination of different tools in order to offer the greatest probability of early detection of high-risk groups of patients.

#### Authors' Contribution

**Conceptualization:** Mirko Barone.

**Data Curation:** Mirko Barone, Massimo Ippoliti.

**Formal analysis:** Mirko Barone, Massimo Ippoliti.

**Methodology:** Mirko Barone.

**Project administration:** Mirko Barone.

**Resources:** Mirko Barone, Massimo Ippoliti.

**Software:** Mirko Barone.

**Supervision:** Felice Mucilli.

**Validation:** Felice Mucilli.

**Visualization:** Mirko Barone.

**Writing—original draft:** All authors.

**Writing—review & editing:** All authors.

#### Competing Interests

None.

#### Ethical Approval

None.

#### Funding

None.

#### References

1. Dimitrov E, Minkov G, Enchev E, Yovtchev Y. The World Society of Emergency Surgery Sepsis Severity Score shows no prognostic superiority over the Mannheim Peritonitis Index in patients with complicated intra-abdominal infections. *J Emerg Med Trauma Acute Care*. 2022;2022(4):24. doi: [10.5339/jemtac.2022.24](https://doi.org/10.5339/jemtac.2022.24).
2. Sartelli M, Abu-Zidan FM, Catena F, Griffiths EA, Di Saverio S, Coimbra R, et al. Global validation of the WSES Sepsis Severity Score for patients with complicated intra-abdominal infections: a prospective multicentre study (WISS Study). *World J Emerg Surg*. 2015;10:61. doi: [10.1186/s13017-015-0055-0](https://doi.org/10.1186/s13017-015-0055-0).