

Commentary

Recent progress in sepsis epidemiology – have we learned enough?

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Abstract

The encouraging results of recent clinical trials on therapy of severe sepsis and septic shock are paralleled by ongoing studies on the epidemiology of sepsis and infection in intensive care unit patients all over the world. The development of network-based systems for assessing morbidity and mortality in intensive care unit patients has contributed to a significant improvement in quality of care. Data from the SOAP (Sepsis Occurrence in the Acutely Ill Patient) study demonstrate that the treatment of septic patients varies widely, and that even those strategies that have been evaluated are not yet implemented in routine practice. Hence, activities on surveillance and education still merit further attention.

Keywords definition, epidemiology, organ failure, quality improvement, sepsis

It seems to be a good time for optimists. Within less than 24 months, three large randomized controlled trials [1–3] were able to demonstrate that improvement in outcome in patients with severe sepsis and septic shock – a goal that appeared insurmountable for many years – is possible. Is this optimism justified? Actually, the body of data from extensive studies on morbidity and mortality of sepsis and infection in intensive care units (ICUs) is growing, and these data are far from encouraging. Angus and coworkers [4] analyzed more than 6 million hospital discharge records from seven states in the USA and estimated that 751,000 cases of severe sepsis occur annually, with a mortality rate of 28.6% and leading to average costs per case of US\$22,100. Another, international study conducted by Alberti and colleagues [5] examined 14,364 patients in six European countries, Canada and Israel, with more than 4500 documented infectious episodes either on ICU admission or during prolonged hospital stay. The authors found the combination of an infection at the time of ICU admission and subsequent hospital-acquired infections to be associated with a particularly devastating outcome, ranging from a crude hospital mortality rate of 16.9% for noninfected patients to 53.6% for patients who had repeated courses of infection while in the ICU [5]. Indeed, these data provide little reason for optimism.

Nevertheless, the question remains as to whether the end of the road is in sight, for epidemiological purposes at least, or whether further studies will bring important new information. In 2002, the European Society of Intensive Care Medicine launched a survey on the incidence of sepsis and septic shock based on infection, inflammatory response and organ dysfunction in ICU patients (the Sepsis Occurrence in the Acutely Ill Patients [SOAP] study) [6]. Moreover, it addressed various aetiological, diagnostic, therapeutic and prognostic issues in this population. This cohort, multicentre, observational study was performed in May 2002. A total of 3147 patients (62% male, mean age 61 ± 17 years) from 198 ICUs in 24 countries were prospectively enrolled and followed until death, hospital discharge or up to 60 days. Preliminary statistics from the SOAP study reveal that there are large differences in diagnostic and therapeutic standards between the different countries as well as between ICUs in a particular country. Occurrence of sepsis ranged from 17.5% to 72.5% and ICU mortality (for all enrolled patients) from 7.9% to 34.8%. The incidence of early cardiovascular failure and the widely ranging strategies employed for mechanical ventilation make it clear that recently evaluated strategies, namely early goal-directed therapy to stabilize haemodynamics [2] and use of low tidal volumes in

mechanical ventilation [7], are not yet routinely applied by intensivists.

Are these facts surprising? We already have many studies with many documented aspects of the epidemiology of sepsis. We already know that the composite picture they provide remains incomplete and emphasizes the heterogeneity of patients [8]. It is well known that compliance with new, evaluated strategies is a major problem in intensive care medicine, and that further education and quality assurance activities are crucial. It has been demonstrated that merely the participation of intensivists in clinical trials that were designed to measure the compliance of ICU physicians with guidelines before and after a defined time period was able to improve the quality of care [9]. Are multicentre studies such as SOAP able to improve the quality of intensive care treatment, and do we need more of them? We are convinced that this is the case. New developments in network-based registries of septic patients will progressively lead to better assessment of risk factors and individual therapeutic management. Participation in such registries will increase awareness of acute symptoms and predisposing conditions. Finally, the data reveal changes over time, and it is essential that these temporal trends are documented [8].

Even as large a database as that from SOAP or similar studies is only a small fraction of the important research conducted in this area. Recent advances in unravelling the pathophysiology and genetic basis for the host response to sepsis have already improved our understanding of sepsis [10]. Approaches to new concepts are expected [11], which raises the question of whether new epidemiological data lead to new implications for clinical trials in sepsis. Brun-Buisson [12] has pointed out that criteria for systemic inflammatory response syndrome and sepsis are not nearly specific enough, and that selection of patients for inclusion into trials, stratification of data on inclusion, and end-points and efficacy analyses based on further aspects of comorbidities and risk factors will be necessary to reduce the 'background noise'. Finally, a crucial aspect for the near future will be economic evaluation. Novel therapies can no longer be judged simply by their effectiveness in treating illness, but must also be evaluated on an institutional and societal level on the basis of their cost [13]. Hence, future studies on the epidemiology of sepsis and septic shock will have to implement aspects of costs and the use of resources such as time, space and personnel.

In conclusion, recent data from epidemiological studies on sepsis and septic shock revealed highly interesting and important information, but are no reason to relax. Further data acquisition will be necessary if we are to improve research into new therapeutic approaches and the economics of sepsis treatment. Finally, epidemiology is not only a way to gain further data; it is also a very effective educational tool for both investigators and study participants. So, let's go on and learn more!

Competing interests

None declared.

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