FOCUS EDITORIAL

Focus on immunocompromised patients

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Introduction

Immunocompromised patients represent a growing proportion of critically ill patients [1]. These patients do not have the ability to respond normally to an infection due to an impaired or weakened immune system. This inability to fight infection can be caused by a number of conditions including underlying disease (malignancy, organ or stem cell transplantation, systemic vasculitis, connective tissues diseases, etc.), associated conditions (diabetes, malnutrition, etc.) or drug-related immune suppression. Immunocompromised patients are admitted for life-threatening complications related to the underlying condition, severe infections, or severe toxic events. Also, because of the ageing population, immunocompromised patients may also be admitted for acute medical conditions unrelated to immune suppression. In the present editorial, we sought to focus on the studies published on immunocompromised patients and comment on how much they have added to the existing literature.

Severe infections

The nature of the immune suppression varies across subgroups of patients with cancer [2]. In a large study (10,365 patients, 112 ICUs), Zinter et al. reported that mortality was higher in children with cancer, and higher in hematologic cancer patients as compared to solid cancer patients [3]. Moreover, cancer type influenced infection rates. For instance, patients with hematologic malignancies were at highest risk of sepsis. This increased risk positively affected the incidence of Gram-positive, Gram-negative, fungal and viral infections. The impact of bone marrow stem cell transplantation was also highlighted. Diagnostic workup for lung infiltrates in patients with cancer was

nicely summarized in the editorial from Rieger [4] along the lines of the recently published guidelines [5]. The corresponding approach for suspected or documented invasive aspergillosis in ICU patients has also been published [6]. All these data allowed the appraisal of the current epidemiology of infections in immunocompromised patients, and the safe performing of antibiotic de-escalation in patients with neutropenia [7, 8]. This strategy, which consists of “de-escalating antimicrobial therapy” by either reducing the number or the spectrum of the molecule used is now part of recently published guidelines [9]. If Mokart and Paskovaty provided convincing retrospective data making a substantial background for the feasibility and the safety of this intervention, dedicated trials are, nevertheless, warranted before drawing any definite conclusion.

Lastly, management of severe endocarditis in immunocompromised patients or *Pneumocystis jirovecii* airborne transmission between critically ill patients and health care workers have also been part of what has recently been published in *Intensive Care Medicine* [10, 11].

Outcomes

Three articles have studied outcomes in critically ill cancer patients. In a systematic review of patients with solid tumors, 35 studies (25,339 patients) reported ICU and hospital mortality rates of 31.2 and 38.2 %, respectively [12]. These studies confirm the impact of performance status and mechanical ventilation on mortality, but also the lack of prognostic value of variables depicting the characteristics of the malignancy [13–15]. Clinical consequences of these findings are of paramount importance. For instance, a decision whether or not to admit a cancer patient to the ICU cannot rely any longer on the presence of neutropenia or on disease status. However, any effective means to avoid intubation would significantly improve survival. These findings are important, as triage decisions to ICU admission remain arbitrary most of the time if not based on criteria that became irrelevant over time. Over the last two decades, studies have shown that ICU patients with neutropenia, recipients of autologous stem cell transplantation or patients with extensive

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malignancies actually have the same short-term survival as other critically ill cancer patients. Performance status, the impact of disease severity and the need for life-sustaining therapies remain the only major determinants of death. Van Vliet and coworkers compared 1741 hematological patients to 60,954 ICU patients without malignancies [16]. That the proportion of hematological patients increased over time, and that their mortality decreased over time confirms recent findings [17]. Interestingly, in this study, in which mortality was 47 % (41–54 %), neutropenia was not a predictor of mortality after adjustment of confounders, a result in line with the paper from Mokart et al. reporting hospital mortality of 45 % in a cohort of 289 patients with neutropenia [18]. Lastly, a large multicenter study of 6373 HIV-infected patients admitted in 34 ICUs over a 12-year study period confirmed the shift for improved outcomes and changing the use of ICU for HIV patients. Patient age at admission significantly increased, with an increasing prevalence of comorbidities, a decline in AIDS-related illnesses and improved benefits from mechanical ventilation, vaso-pressors or renal replacement therapy [19].

Also, the challenge of practising critical care in Hong Kong has been well reported by Joynt and Wai Tat [20]. If readers of *Intensive Care Medicine* have already seen papers on severe acute respiratory syndrome, influenza and tuberculosis, they will have here a unique opportunity to learn about scrub typhus, necrotizing fasciitis caused by Vibrionaceae or traditional Chinese medicine toxicity.

In summary, updated epidemiological and outcomes studies are needed to appraise current beliefs on ICU management of immunocompromised patients. Managing these patients can be challenging, as the search for the etiology of organ dysfunction has to be performed along with the best possible supportive care. As the number of critically ill immunocompromised patients is growing, trials are warranted to establish the best possible standard of care for such patients.

A critical appraisal of the existing literature is needed to improve the management of patients with cancer, organ transplants or other immunosuppressive conditions. Admission policies need to be updated based on recent advances and trends for improved survival. New studies are needed to report outcomes in patients at high risk for tumor lysis syndrome and those with tumor infiltration or compression admitted to the ICU for chemotherapy initiation. Updated data are needed to guide management of patients admitted for the safety of initiation of emergent chemotherapy in patients relapsing after a few lines of standard treatments. As non-ICU studies have reported dramatic increases of mid-term survival (up to 1 year) in that setting, clinicians should consider adapting

their decision-making. In the near future, multiple avenues of research will have to be traveled. *Intensive Care Medicine* would like to see the results of the evaluation of new diagnostic tests, new therapeutic strategies and new admission policies, as well as data on new ICU-related risk factors for invasive fungal infections. This desire to see targeted and personalized treatments widely available is associated with the perspective of new disease- and treatment-related life-threatening complications.

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Compliance with ethical standards

Conflicts of interest

No conflicts of interest.

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