

# Patients with cancer on the ICU: Time for optimism

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Severely ill patients with solid cancers or haematological malignancies are often considered poor candidates for intensive care treatments. Not so long ago, in guidelines for ICU admission, a taskforce of the American College of Critical Care Medicine concluded that patients with haematological or metastasised solid malignancies were poor candidates for ICU admission.<sup>1</sup> In a Dutch study from Nijmegen, published in 1992, it was reported that of 13 patients admitted to the ICU after bone marrow transplant, only one patient survived. The authors argued that physicians should be reluctant to admit these patients to an ICU.<sup>2</sup>

In this issue of the Netherlands Journal of Medicine, Van Vliet and coworkers, again from the Nijmegen University Medical Center, report a marked improvement of 100-day post-transplant survival in patients admitted to the ICU after haematopoietic stem cell transplantation (HSCT) from 22% in 2004/2005 to 65% in 2008/2009.<sup>3</sup>

Although these results are from a single-centre study, it is likely that outcomes after ICU admission in haematology patients have also been improving in many hospitals worldwide over the last years. Indeed, in a review of the literature, it was shown that survival of patients after HSCT who received mechanical ventilation improved from lower than 10% in the period before 1990 to 25-50% in the period 1994-2000.<sup>4</sup>

It is possible that the improved survival of critically ill haematology patients is a reflection of an improvement in the quality of intensive care in general. In accordance, the standardised mortality ratio for all non-surgical ICU patients in the Netherlands, adjusted for reason for ICU admission and severity of illness using the APACHE IV model, decreased from 0.94 in 2007 to 0.77 in 2012 [NICE-online, Stichting Nationale Intensive Care Evaluatie; unpublished data]. However, the magnitude of the improvement of survival in patients after HSCT makes it unlikely that improved quality of ICU care can fully explain these findings. Alternatively, the characteristics of patients

may have changed with lower severity of illness in patients admitted to the ICU in recent years. Although APACHE II scores were comparable over the years, the mean European Society for Blood and Marrow Transplantation (EBMT) risk scores of patients decreased from 4.0 to 2.8 in most recent years. Moreover, the proportion of patients treated with myeloablative conditioning, which is an established risk factor for mortality, decreased from 78% to 36%.

In patients with solid cancers in need of intensive care, a similar improvement in outcome has been reported in recent years. In a large study in 198 European ICUs, 15% of patients had a malignancy. In ICU patients with solid cancers, hospital mortality was 27%.<sup>5</sup> It should be noted that the prognosis of ICU patients with cancer strongly differs between patients admitted after surgery or for medical reasons. In the Netherlands, hospital mortality was shown to be 45% if patients were admitted to the ICU for non-surgical reasons, compared with 18% for unplanned ICU admission after surgery<sup>6</sup> and 4.7% in patients admitted to the ICU after elective surgery.<sup>7</sup>

Van Vliet and coworkers clearly demonstrate that prognosis of critically ill patients after HSCT may be good enough to allow admission to an ICU. The most recent survival rate, 65%, is similar to the survival of patients admitted to the ICU for pneumonia.<sup>8</sup> This, however, strongly depends on the selection of patients who are actually offered ICU treatment. In a recent study in patients with different haematological malignancies, only a minority of which were treated with HSCT, performed in two university hospitals and two general hospitals in the Netherlands, 6.2% of 4275 patients were admitted to an ICU within two years after making the diagnosis. Of these ICU patients, almost 50% died within 30 days and 67% died within 365 days after ICU admission [M.M. Bos, *Intensive Care Admission of Cancer Patients: A Comparative Analysis; manuscript submitted*].

Selectively offering ICU treatment only to patients with a relatively good prognosis is a two-edged sword. It is

clearly beneficial in terms of cost-effectiveness and may also avoid prolonged treatment in the ICU, with its many discomforts to both patients and relatives, in patients who will not survive this treatment. On the other hand, also in patients with a high risk of mortality, some of them could survive if offered ICU. Selection of patients will inevitably lead to undertreatment and unnecessary deaths in a minority of patients. Optimal selection of patients is hampered by the fact that we do not know how to objectively assess prognosis. We do know that some factors, such as APACHE IV score, mechanical ventilation, and myeloablative conditioning, are associated with a poor prognosis, but we cannot translate this into a quantitative and individual chance of survival.<sup>9</sup> Furthermore, we do not know at what risk of death a treatment should be considered futile. Is that 85%, 95%, 99%? Future research should focus on understanding individual preferences towards life-sustaining treatments related to the likelihood of a favourable outcome as well as on making reliable individual prognosis. For now, we can only conclude that with the present implicit selection criteria that we use, prognosis for patients after HSCT who need ICU has greatly improved over the last years.

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