

Opening the doors of the intensive care unit to cancer patients: A current perspective

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Author contributions: Ñamendys-Silva SA designed research, analyzed and wrote the paper; Plata-Menchaca EP contributed new reagents or analytic tools and wrote the paper; Rivero-Sigarroa E and Herrera-Gómez A analyzed the data; all authors read and approved the final paper.

Conflict-of-interest statement: None of the authors have commercial association or financial involvement that might pose a conflict of interest in connection with this article.

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Received: March 23, 2015
Peer-review started: March 25, 2015
First decision: June 3, 2015
Revised: June 12, 2015
Accepted: July 16, 2015
Article in press: July 17, 2015
Published online: August 4, 2015

Abstract

The introduction of new treatments for cancer and advances in the intensive care of critically ill cancer patients has improved the prognosis and survival. In recent years, the classical intensive care unit (ICU) admission comorbidity criteria used for this group of patients have been discouraged since the risk factors for death that have been studied, mainly the number and severity of organ failures, allow us to understand the determinants of the prognosis inside the ICU. However, the availability of intensive care resources is dissimilar by country, and these differences are known to alter the indications for admission to critical care setting. Three to five days of ICU management is warranted before making a final decision (ICU trial) to consider keep down intensive management of critically ill cancer patients. Nowadays, taking into account only the diagnosis of cancer to consider ICU admission of patients who need full-supporting management is no longer justified.

Key words: Intensive care unit; Critical care setting; Cancer patients; Critically ill cancer patients; Organ failures

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Core tip: The number and severity of organ failures are still the most important determinants for in-hospital mortality of critically ill cancer patients. Thus, an early intensive care unit admission is crucial to impact in the short-term prognosis of this population.

Ñamendys-Silva SA, Plata-Menchaca EP, Rivero-Sigarroa E, Herrera-Gómez A. Opening the doors of the intensive care unit to cancer patients: A current perspective. *World J Crit Care Med* 2015; 4(3): 159-162 Available from: URL: <http://www.wjgnet.com/2220-3141/full/v4/i3/159.htm> DOI: <http://dx.doi.org/10.5492/wjccm.v4.i3.159>

INTRODUCTION

The concept of futility was used to support either refuse of intensive care unit (ICU) admission or early treatment withdrawal decisions for critically ill cancer patients. Nevertheless, emerging of new treatments for cancer and recent advances in intensive care medicine has improved prognosis and survival.

At present, the classical comorbidity criteria used for ICU admission in this group of patients have been discouraged since the risk factors for death that have been studied, mainly the number and severity of organ failures, allow us to understand the determinants of the outcomes inside the ICU. In our center, the overall mortality was 17.5% over a four-year period, provided an appropriate selection of patients, an adequate evaluation of predictors of ICU mortality and treatment outcomes are necessary in each case evaluation^[1-5].

Also, the clinician should be updated in the recent information available about prognostic factors that contribute to in-hospital mortality of critically ill patients with cancer. Furthermore, the availability of intensive care resources is dissimilar by country, and these differences are known to alter the indications for admission to critical care setting^[6]. Unlike the United States and Canada, Mexico seems to have approximately 1984 ICU beds with mechanical ventilators (1.76 ICU beds per population of 100000)^[7].

Also, clinicians should be hard-headed during discussions and respect the patient's will to choice an invasive treatment. We should take into account the number and severity of organ failures when evaluating patients for ICU admission, beyond the diagnosis of cancer. For this purpose Sequential Organ Failure Assessment (SOFA) or, recently, the Mexican sequential organ failure assessment are useful to evaluate number and severity of organ failures as the main prognostic factor in critically ill patients with cancer. Thus, early admission to the ICU with the lowest possible number of organ failures is recommended^[8-10].

In a substudy of the Sepsis Occurrence in Acutely Ill Patients study, a large prospective cohort that included 198 participating ICUs from 24 European countries, the primary endpoint was death or hospital discharge at 60 d. In this study, Taccone *et al*^[11] found that ICU and hospital mortality rates were similar in patients with solid tumors and those without cancer.

Aygenel *et al*^[12] recently described a median of the SOFA score of 9 as a major contributor to mortality of critically ill cancer patients with solid tumors and a median of SOFA score of 10 in patients with hematologic malignancies. Other significant predictors for ICU mortality in patients with solid tumors were lactate dehydrogenase level on admission, sepsis or septic shock during ICU stay, and remission of the underlying cancer. In 2010, Namendys-Silva *et al*^[2] described that Acute Physiology and Chronic Health Evaluation II score and vasopressor requirement during ICU stay, were independent predictors for ICU mortality in patients

with solid malignancies. Aygenel *et al*^[12] also found these risk factors to be significant. In general, classic predictors of mortality are no longer relevant, and we should evaluate other characteristics of the cancer patient to decide the admission to the ICU^[2,12].

In addition, age influences minimally on 6-mo survival of critically ill cancer patients^[13], whereas performance status and comorbidity are much more important^[13-15].

In 2013, we made recommendations and developed a management algorithm to guide ICU admission of cancer patients (Table 1)^[16]. In fact, we highlight that this algorithm should not be different from admission criteria of other patients admitted to the ICU without cancer.

There is a subgroup of patients that should not be considered for admission, including those patients with a poor status performance or those who refuse to ICU admission to receive invasive treatment.

Three to five days of ICU management is warranted before making a final decision (ICU trial) to consider keep down intensive management^[17].

When a doubt exists about the criteria for ICU admission, a trial of ICU management should be proposed to assert that no patients are withhold of an opportunity for recovering from their acute condition. When ICU admission is accepted, patients should be treated with a full-supporting management (ICU trial) for at least 3-5 d. By doing this, patients receive everything they need during the first few ICU days and then have their clinical status reassessed after completing this trial. This "full-code status" includes the provision of cancer chemotherapy, antibiotics, and other life-sustaining therapies. After 3 d of full intensive management, an improvement in the number and severity of organ failures indicates that additional life-supporting treatment should be continued; whereas deterioration of clinical status, evaluated by an increase in the number or severity of organ failures, should prompt a discussion of the patients suitable to be still under aggressive treatment^[17].

In addition, patients with tumor lysis syndrome, neoplasm-related pulmonary or renal infiltration, sepsis related to obstructive pneumonia, or ureteral compression may require full-supporting treatment until the cancer chemotherapy becomes effective^[18].

Full ICU treatment should be provided to cancer patients with particular characteristics (Table 1). However, the postoperative care of surgical oncology patients is not always mandatory in the ICU.

In addition, the mortality rate for mechanically ventilated cancer patients remains higher than that for patients with non-malignant diseases^[19,20].

We studied the prognosis and ICU mortality rates for hematologic malignancies patients who required invasive mechanical ventilation (IMV) and for those with solid tumors, being 73% (65/189) and 34.3% (58/169), respectively. Although IMV in cancer patients is still associated with a very high risk of death, the mortality

Table 1 Recommendations for intensive care unit admission of critically ill cancer patients^[16]

Cancer patients who benefit of ICU admission
SOFA score between 7 and 10 or less than 3 organ failures
Recent diagnosis of hemato-oncological disease
Treatment of medical emergencies related to cancer or its treatment; tumor lysis syndrome, pulmonary infiltrates in patients with leukemia or leukostasis as the initial manifestation of leukemia
The likelihood of a cure or probable disease control
Performance status (Eastern Cooperative Oncology Group scale) between 0 and 2
Postoperative intensive care for patients undergoing complex surgical procedures who require hemodynamic monitoring and/or mechanical ventilation

ICU: Intensive care unit.

rate for patients with IMV in our ICU was lower than previously reported^[21-26]. Soares *et al.*^[25] studied prospectively 463 cancer patients on mechanical ventilation. Age > 70 years, severity of acute organ failures, poor performance status, cancer status, and older age were the main determinants of mortality.

In a large multicenter study of 1004 patients with solid or hematological malignancies and acute respiratory distress syndrome (ARDS) meeting the new operational Berlin definition, about 90% of ARDS cases were due to infections. Opportunistic organisms accounted for over one-third of all ARDS cases, with invasive aspergillosis and *Pneumocystis jiroveci* pneumonia in primary ARDS and candidemia in secondary ARDS. The authors concluded that mortality decreased significantly over time to 52%, despite adjustment for patients' ARDS severity, cause of the respiratory involvement or allogeneic stem cell transplantation. This highlights the relevance of optimal patient triage to ICU admission and ARDS management in ICUs that are highly experienced in managing patients with ARDS and malignancies^[27].

There are some interventions well studied in non-cancer patients that could be beneficial in the critical care setting of patients with malignancies. de Almeida *et al.*^[28] recently found that a restrictive transfusion strategy in surgical oncology patients results in more postoperative complications compared with liberal strategy (hemoglobin trigger of 9 g/dL). The absolute risk reduction for the liberal strategy was 16% (95%CI: 3.8-28.2) and a number needed to treat of 6.2 (95%CI: 3.5-26.5) to avoid postsurgical complications.

Some studies have demonstrated the feasibility of administering chemotherapy in the ICU setting, with admissible short and long-term outcomes, as recently shown by Wohlfarth *et al.*^[29].

CONCLUSION

In conclusion, hesitancy to admit cancer patients to the ICU for advance life supporting therapy is no longer justified if this decision is made based only on the presence of cancer. The clinical oncologist, hematologist and surgical oncologist should be trained with clinical capabilities that will impact in short term outcomes of patients, not only requesting admission to the ICU when they already have vasopressor requirements,

mechanical ventilation, multiple organ failures or palliative care is the only treatment option. Moreover, we should take into account that critically ill cancer patients should be evaluated likewise every other patient before admission to the ICU.

Our aim is to emphasize the clinical relevance of implementing preventive measures to avoid in-hospital death of cancer patients, identifying them at an earlier stage of organ failures, when offering full support to those patients who selectively are candidates to ICU admission will impact on their final outcome.

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P- Reviewer: Chen XL, Llompart-Pou J S- Editor: Tian YL
L- Editor: A E- Editor: Wu HL





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