



Retrospective analysis of outcome of women with breast or gynaecological cancer in the intensive care unit

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DECLARATIONS

Conflict of interest

We declare no conflict of interest.

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Ethical approval

Need for individual informed consent was waived as this was a service evaluation.

Contributorship

All authors contributed equally

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Reviewer

Andrew Conway
Morris

Summary

Objectives Advances in oncological care have led to improved short and long-term outcomes of female patients with breast and gynecological cancer but little is known about their prognosis when admitted to the intensive care unit (ICU). Our aim was to describe the epidemiology of patients with women's cancer in ICU.

Design Retrospective analysis of data of patients with breast and gynaecological cancer in ICU between February 2004 and July 2008.

Setting ICU in a tertiary referral centre in London.

Participants Nineteen critically ill women with breast or gynaecological cancer.

Main outcome measures ICU and six-month outcome.

Results Eleven women had breast cancer and eight patients had gynaecological cancer. Twelve patients were known to have metastatic disease. The main reasons for admission to ICU were sepsis (94.7%), respiratory failure (36.8%) and need for vasoactive support (26.3%). ICU mortality was 31.6%. There was no difference in age and Acute Physiology and Chronic Health Evaluation (APACHE) II and Sequential Organ Failure Assessment (SOFA) score on admission to ICU between ICU survivors and non-survivors. During their stay in ICU, non-survivors had significantly more organ failure. Six-month mortality was 68.4%. Four patients had >1 admission to ICU.

Conclusions ICU outcome of critically ill women with breast or gynaecological cancer was similar to that of other non-cancer patient cohorts but six-month mortality was significantly higher. The decision to admit patients with women's cancer to the ICU should depend on the severity of the acute illness rather than factors related to the underlying malignancy. More research is needed to explore the outcome of patients with women's cancer after discharge from ICU.

Introduction

The outcome of patients with cancer has improved significantly in the last decade, mainly as a result of advances in chemotherapy and modern biological treatments. Despite that, the provision of intensive care for critically ill cancer patients still raises controversy, especially when dealing with patients with metastatic disease and limited life expectancy.¹ The arguments range from a call for equity and provision of effective care for everybody to concerns about prolongation of suffering and allocation of limited resources.² Recent publications have confirmed improved outcomes in cancer patients admitted to the Intensive Care Unit (ICU).^{3–12} However, the majority of studies were performed in specific patient groups, in particular patients with haematological malignancies and bone marrow transplant recipients.^{6–9,13,14} Other studies focused on lung cancer patients requiring mechanical ventilation, patients receiving chemotherapy in ICU and cancer patients with a prolonged ICU stay of >20 days.^{15–18} Little is known about the characteristics and prognosis of women with breast or gynaecological cancer in the ICU.¹⁹ We recently reported our data on outcome of patients with haematological malignancies and solid tumours admitted to a large tertiary ICU in the UK and showed that ICU mortality was lower than previously reported.¹²

Objective

The aim of this paper is to describe the epidemiology of critically ill female patients with breast, ovarian, endometrial or cervical cancer in the ICU in more detail.

Materials and methods

Setting

Guy's & St Thomas' NHS Foundation Trust is a two-site tertiary referral oncology centre where the majority of care for critically ill cancer patients is provided on the Guy's site. The 13-bedded multidisciplinary adult ICU is staffed by a full-time intensive care team. Patients are admitted either

directly from the oncology ward or transferred from other hospitals for specialist input.

Design

We searched the electronic database and hand-searched the ICU admission book for patients with active breast or gynaecological cancer who were admitted to the ICU between February 2004 and July 2008 with cancer-related emergencies. In all cases, decisions to admit patients to the ICU were made by both the intensive care team and the referring oncology team. The ICU has a broad admission policy with frequent reappraisal of the benefits of intensive care. Only patients with uncontrolled underlying disease without any treatment options were not admitted to the ICU. In this case, end-of-life care was offered on the oncology ward. In the ICU, decisions to withhold or withdraw life support were made collectively when all participants were convinced that maintenance or increase of life-sustaining therapies was futile. We only analysed patients who were admitted to the ICU as an emergency, and excluded patients who were admitted for postoperative recovery after planned surgery.

Severity of illness on the first day of ICU admission was assessed using the Sequential Organ Failure Assessment (SOFA) and Acute Physiology and Chronic Health Evaluation (APACHE) II scoring systems. Associated organ failure was determined according to the Knaus criteria.²⁰ Respiratory support was defined as the need for non-invasive or invasive mechanical ventilation. Vasoactive support included the use of any inotropic or vasopressor therapy. A total white blood cell count $<1.0 \times 10^9/L$ was used as cut-off for the definition of neutropenia. In patients who were admitted to ICU on more than one occasion, we only analysed the data of their first admission.

Statistical analysis

In a retrospective analysis, continuous variables were reported as median and range, and categorical variables as number and percentage. Continuous variables were compared using the Mann-Whitney *U* test, and categorical variables were compared using the chi-squared test. All reported *P* values were two-tailed and considered significant at <0.05 .

Ethics approval

We had confirmation from the research and ethics committee that need for individual informed consent was waived as this was a retrospective analysis of data collected prospectively for routine care and there was no breach of privacy or anonymity (UK National Research Ethics Service).

Results

During the 4.5-year period from February 2004 to July 2008, 19 critically ill women with breast or gynaecological cancer were admitted to the ICU (breast cancer $n = 11$, ovarian cancer $n = 4$, cervical cancer $n = 3$ and endometrial cancer $n = 1$). At the time of admission to ICU, nine women with breast cancer and three patients with gynaecological cancer were known to have metastatic disease (prevalence 63.2%). The main reasons for admission to ICU were sepsis (94.7%), respiratory failure (36.8%) and hypotension with a need for vasoactive support (26.3%).

ICU mortality among breast cancer and gynaecological cancer patients was 27.3% and 37.5%, respectively. In all cases, the cause of death was multiorgan failure. There was no significant difference in age, APACHE II and SOFA score and proportion of patients with sepsis on admission to ICU between ICU survivors and non-survivors (Table 1). During their ICU stay, women who subsequently died had significantly more failed organ systems. No patient received chemotherapy while in ICU. Four women had at least one further admission to ICU. Hospital mortality was 57.9% and six-month mortality was 68.4%. For comparison, ICU, hospital and six-month mortality of patients with sepsis but without malignancy in our unit was 9.3%, 17.2% and 24%, respectively.

Discussion

This is the first report describing the short- and long-term outcome of critically ill patients with women's cancer. It shows that women with breast or gynaecological cancer admitted to ICU had an ICU mortality of 31.4% similar to that of other patient cohorts routinely admitted to the ICU.^{21,22} However, six-month mortality was high at 68%.

It is important to acknowledge some limitations of our study. Firstly, we do not have any data on patients who were referred but not admitted to the ICU, including patients who had sepsis but were well enough to remain on the oncology ward and patients in whom the prognosis was considered futile and end-of-life care was initiated on the ward. In principle, we have a low threshold to admit cancer patients, especially in the light of the lack of reliable physiological scores. We are also conscious of the study by Thiéry *et al.*⁴ which showed that the 30-day survival of cancer patients who were considered 'too sick' for ICU admission was 26%. More worryingly, 30-day survival of the patients considered 'too well' for ICU admission was only 78.7%. Secondly, our sample size was too small for an in-depth analysis and significant differences between survivors and non-survivors cannot be excluded. Therefore, any non-significant results need to be interpreted with caution. Thirdly, we cannot exclude possible selection biases that may have occurred as a result of our ICU admission/discharge policy. Finally, we did not record performance status or quality of life of patients after discharge from the ICU.

To our best knowledge, there are no data in the literature available for direct comparison. Pène *et al.*²³ recently published an ICU mortality rate of 58.8% among 148 cancer patients with septic shock in the ICU. Patients with urogenital malignancies were included but the authors did not report the mortality rates of individual types of cancers separately.

The decision to admit patients with advanced malignancy to ICU often raises controversy ranging from concern about the inappropriate use of scarce resources to the right to effective care for everybody. However, it is well known that the task of assessing risk and predicting outcome of critically ill cancer patients is difficult, mainly because traditional physiological scores do not perform well in this patient group.²⁴ Analysis of 86 patients with haematological malignancies did not identify any absolute predictors of mortality.²⁵ In fact, the data suggested that sequential changes in the SOFA score during the stay in the ICU (i.e. after admission) were helpful in the decision-making about the continuation or discontinuation of treatment. Reports also suggest that cancer-specific characteristics, including long-term prognosis, have minimal effect on short-term

Table 1
Characteristics and outcome of patients admitted to ICU

Parameter	Patients with gynaecological or breast cancer (n = 19)		
	ICU survivors (68.4%)	ICU non-survivors (31.6%)	P
Mean age (mean; SD)	53.4 (8.19)	49.8 (12.17)	NS
Presence of metastases	8 (61.5%)	4 (66.7%)	NS
On day of admission to ICU			
APACHE II score (median, range)	17 (4–30)	21 (9–24)	NS
SOFA score (median, range)	5 (2–9)	7 (3–11)	NS
Presence of sepsis	12 (92.3%)	6 (100%)	NS
Presence of neutropaenia	3 (23.1%)	4 (66.7%)	NS
Need for vasoactive support	2 (15.4%)	3 (50%)	NS
Need for respiratory support	5 (38.5%)	2 (33.3%)	NS
Need for renal support	2 (15.4%)	1 (16.7%)	NS
During stay in ICU			
Presence of sepsis	13 (100%)	6 (100%)	NS
Presence of neutropaenia	4 (30.8%)	4 (66.7%)	NS
Number of failed organs (median, range)	1 (0–2)	2 (1–5)	0.04
Length of stay in ICU (days) (mean, SD)	4.7 (3.7)	3.7 (1.9)	NS

ICU, intensive care unit; APACHE, Acute Physiology and Chronic Health Evaluation; SOFA, Sequential Organ Failure Assessment; SD, standard deviation; NS, not statistically significant ($P > 0.05$)

prognosis during an acute critical illness. Whether metastases in patients with solid tumours have an impact during a critical illness remains unclear. We found no difference between ICU survivors and non-survivors in the proportion of patients with metastatic disease.

Consistent with our previous analysis and studies in the literature, we confirmed that the number of failed organ systems is an important risk factor for mortality in cancer patients admitted to ICU.^{3,9,12} Although neutropenia is often associated with an increased risk of sepsis and is generally considered to be a poor prognostic indicator, we found that the presence of neutropenia on admission to ICU or during stay in ICU was not associated with an increased mortality.

Presumably, the use of haematopoietic growth factors and timely management of infectious complications have contributed to this improvement.

Six-month mortality was high confirming that ICU care does not modify the cancer-related prognosis.²⁶ Without data to compare with, we are unable to say whether such high six-month mortality is usual for a cohort in whom the majority suffered from metastatic disease, or whether it is related to the way patients are managed in our institution. However, a high six-month mortality of almost 70% raises the question whether admission to ICU was justified and appropriate. In this context, several factors need to be considered, including patient's preferences and availability of alternative management strategies. Previous studies have also attempted to analyse the cost-benefit ratio of ICU utilization for patients with cancer. Although it is possible to calculate the health-care costs consumed by an individual patient, it is difficult to estimate the value and quality of life per period of survival. Clearly, more research is necessary to improve our understanding of the factors which determine the prognosis of critically ill cancer patients as well as patients' quality of life, performance status and medical and psychological needs after discharge from ICU so that patients and clinicians can be advised appropriately.

In conclusion, we report acceptable short-term outcomes in women with breast or gynaecological cancer admitted to the ICU. In our opinion, the decision to admit critically ill patients with women's cancer to the ICU should be based on the probability of surviving the acute illness rather than the underlying malignancy *per se*. Thus, invasive therapy should not be withheld, especially in cases of sepsis/septic shock. Nevertheless, frequent reappraisal of the benefits of intensive care is necessary, in close partnership with the patient, the patient's family and the oncology team. Our high six-month mortality emphasizes the need for more research into management and quality of life of cancer patients after discharge from ICU.

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