

COMMENTARY

Is prolonged mechanical ventilation of cancer patients futile?

Anne-Claire Toffart^{1,2*} and Jean-François Timsit^{1,3}See related research by Shih *et al.*, <http://ccforum.com/content/17/4/R144>**Abstract**

The issue of limiting life-sustaining treatments for intensive care unit (ICU) patients is complex. The ethical principles applied by ICU staff when making treatment-limitation decisions must comply with the law of their country. Until 2011, the law in Taiwan prohibited the withdrawal of mechanical ventilation. Consequently, patients with severe underlying diseases could receive prolonged mechanical ventilation. In a study conducted by Shih and colleagues in patients with cancer in Taiwan, continuous mechanical ventilation for more than 21 days was associated with poor outcomes, particularly in the subgroups of patients with metastases, lung cancer, or liver cancer. These results highlight the need for appropriate legislation regarding the withdrawal of life-sustaining treatments in patients, especially those for whom no effective cancer treatments are available.

cancer. The prognosis was poor: 1-year survival rate was 14.3% (95% confidence interval 13.3% to 15.3%). Survival rate and life expectancy were worse in the subgroups with metastases, lung cancer, or liver cancer. As previously reported, mortality was dependent mainly on metastatic status and acute organ failure (acute renal failure or shock). Moreover, quality-adjusted life expectancy (QALE) was poor, ranging from 0.18 to 0.48 quality-adjusted life-years (QALYs) in patients in the best cognitive-function category. The same team previously [3] estimated the cost of PMV at USD \$64,708 to USD \$148,829 per QALY for patients with cancer.

This study is original because it estimates the benefits of maximal treatment intensity in patients with cancer. In Taiwan, mechanical ventilation withdrawal, which may affect life expectancy [4], was illegal at the time of the study period. This is the first study on PMV for patients with cancer and the largest to investigate patients with cancer in the ICU. Furthermore, no previous data on outcomes of critically ill patients with different types of solid malignancies are available. Unlike in most other studies in critically ill patients with cancer, solid malignancies predominated (94% of patients).

However, the data were extracted from a national health insurance database designed for cost evaluations and not for research purposes. A number of weaknesses of the study should be acknowledged. No data were available on the reason for ICU admission, severity of the acute disease, or performance status. Noninvasive mechanical ventilation and invasive mechanical ventilation were not distinguished from one another, and neither were intubation and tracheostomy. Furthermore, QALE was estimated by extrapolation from an external sample of 142 unselected ICU patients given PMV [3], and this fact may not be fully relevant to patients with cancer. The low QALE estimated for the first year was probably an underestimation of the overall quality of life during long-term survival, since quality of life has been reported to improve after 1 year in long-term survivors [5].

In the previous issue of *Critical Care*, Shih and colleagues [1] report the results of a claims database study in 5,138 cancer patients who received prolonged mechanical ventilation (PMV) in Taiwan between 1997 and 2007. The authors describe the incidence, outcomes, and prognostic factors of PMV in this cohort. PMV was defined as at least 21 days of continuous mechanical ventilation. Most of the patients survived the acute illness but required a disproportionate amount of health-care resources [2]. The incidences of PMV were 10.4 patients per 100 intensive care unit (ICU) admissions with cancer overall and 14.9 per 100 admissions of patients with lung

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Little is known about the survival of patients with cancer treated with mechanical ventilation, particularly in those with solid malignancies. Differences have been reported according to the type of cancer. In lung cancer patients admitted to the ICU, 1-year survival was estimated to be 18% [6], versus 6.6% in the present study [1]. Mechanical ventilation for more than 96 hours affected quality of life and functional status but had no significant effect on survival in earlier studies [7,8]. In a multicenter hospital-discharge study in the US, mechanical ventilation for more than 96 hours, for any reason, resulted in higher hospital costs (USD \$40,903 versus USD \$14,434) with similar survival compared with shorter mechanical ventilation durations [8]. Similarly, among patients with cancer in a multicenter study from Brazil, including 91% given mechanical ventilation at ICU admission, hospital and 6-month mortality rates in those who spent more than 21 days in the ICU (50% and 60%, respectively) were similar to those in patients with shorter ICU stays (51% and 61%, respectively) [9]. In two other studies, no patients survived after being started on mechanical ventilation at least 3 days after ICU admission [10,11].

The prognostic factors in cancer patients admitted to the ICU are related to the history of the cancer, the condition of the patient, acute disease, and treatment-limitation decisions [4,12]. The current evidence supports ICU admission of patients with cancer for a period of full-code management followed by a reappraisal of the situation after 3 to 5 days [13]. Thus, many studies have established that clinical deterioration during the first days of mechanical ventilation predicts futility of further mechanical ventilation [6,14]. Shih and colleagues [1] showed, in contrast, that stabilization or improvement after the first 3 days is not associated with higher mortality rates after PMV. However, PMV may result in a high risk of quality-of-life impairments. This point underlines the importance of having the patient and family participate in the treatment decisions.

Overall, PMV was beneficial in 14% of the cancer patients studied by Shih and colleagues [1]. However, the main characteristics of these patients are unknown. Further studies are warranted to determine which patients are likely to benefit from PMV according to their performance status, cancer history, and acute disease.

Abbreviations

ICU: Intensive care unit; PMV: Prolonged mechanical ventilation; QALE: Quality-adjusted life expectancy; QALY: Quality-adjusted life-year.

Competing interests

The authors declare that they have no competing interests.

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