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Pneumonia in Patients Undergoing Major Heart Surgery: Why Intensify Treatment and Preventative Measures?

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Patients who undergo heart surgery show a high risk of post-operatory complications derived not only from the pathology itself but also from co-morbidity, prolonged in-hospital stays prior to being operated on and age [1].

Of such complications, nosocomial infections are the most predominant and, more specifically, pneumonia, due to its frequency and severity. The Centers for Disease Control and Prevention (CDC) defines ventilator associated pneumonia (VAP) as the presence of new and/or progressive pulmonary infiltrates on a chest radiograph plus 2 or more of the following criteria: fever (≥38.5°C) or hypothermia (<36°C), leukocytosis (≥12 × 10^9/L), purulent tracheobronchial secretions, or a reduction in PaO_2/FIO_2 of at least 15 % in the previous 48 hours [2]. The prevalence of VAP is estimated to be 7.8 % to 21.6 % [3-5] and is associated with prolonged hospitalization [6,7], increased health care costs [8], and a 15% to 45% attributable mortality [9]. Its development is directly related to the amount of time spent on mechanical ventilation [10]. It is known that early diagnosis and treatment are fundamentally important in improving its prognosis. Among the recommended measures for reducing the incidence of VAP, the following are found [11-14]:

1. Handwashing between all patient contacts on entering and exiting the intensive care unit.
2. Protective gown and glove use for specific groups of patients as recommended by the CDC guidelines.
3. Avoid gastric over-distension; monitor gastric residual volumes before administering scheduled enteral feedings (maximum gastric residual 150–200 mL).
4. Place mechanically ventilated patients in a semirecumbent position.
5. Provide adequate sedation to avoid accidental extubation; sedation score scale maintained between 3-5.
6. Use non-invasive positive pressure ventilation to avoid endotracheal intubation.
7. Use non-invasive positive pressure ventilation to facilitate early extubation, to minimize the duration of endotracheal intubation.
8. Use orogastric tubes whenever possible; as nasogastric tubes may increase the incidence of nosocomial sinusitis.
9. Prevent accidental extubation by securing the endotracheal tube at the bedside and using soft restraints according to hospital policy; whenever necessary to avoid self-extubation.
10. Provide oral hygiene with a chlorhexidine-based oral rinse at least daily.
11. Dispense with inline humidifiers from the ventilator circuits and use heat and moisture exchange filters.

What is becoming increasingly better known is 1) the profile of the patients with a higher risk of developing pneumonia, thus allowing for their more intensive handling in order to prevent it or for a better treatment of it, 2) the etiology 3) the resistance to different anti-microbials and their effectiveness 4) the importance of the appearance of pneumonia in the in-hospital evolution of this group of patients. However, the long-term evolution of patients who develop post-operatory pneumonia remains under-evaluated and is important in the taking of decisions during their therapeutic handling.

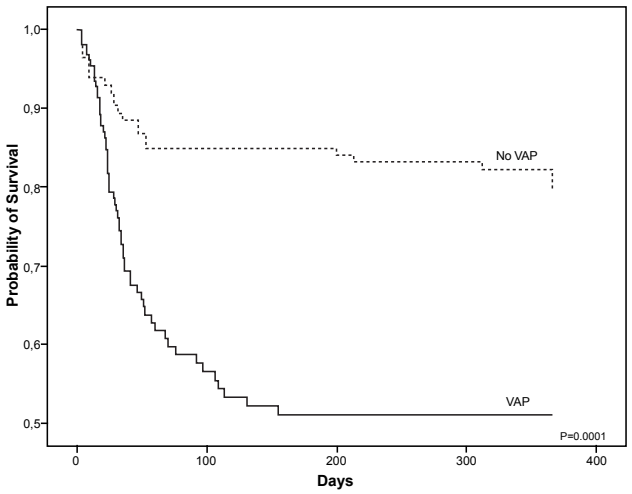

Figure 1: Adjusted Kaplan-Meier curves (according to the COX method) showing survival of patients with ventilator-associated pneumonia (VAP) after cardiac surgery compared with patients without VAP, adjusted for chronic renal failure, diabetes mellitus, and acute postoperative renal failure.

Our group analyzed the impact of pneumonia on the mortality of heart-surgery patients independently from co-morbidity or the development of other complications and it was observed that the development of VAP is an important factor in determining in-hospital mortality, increasing the risk of death by 8.53 times [15]. Its development was also accompanied by an increased incidence of other complications, and vice-versa.

One issue that has been widely debated in critical care units is that of the patient profile analysis for those for whom it is supposed that evolution will be unfavorable and that the intensification of treatment is illogical due to it being ineffective from a clinical point of view [16] and with it also giving a negative result from the point of view of being cost effective. In this sense, knowledge of the long-term psychological

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and clinical evolution of patients with prolonged critical care unit stays provides valuable information for the management and optimization of resources.

Basing ourselves on the results of other studies which observed that, in the group of patients that underwent cardiac surgery, long-term survival tended to equal itself out between the group with complications and those who did not develop them, as is the case with renal failure, we analyzed the evolution of a sample of 232 patients who had needed prolonged mechanical ventilation during the post-operatory stage between June 2004 and February 2008, of which, 104 developed VAP, with the aim of evaluating the impact of pneumonia on their evolution. In-hospital mortality was 55.8%. We observed with the long-term evolution that the survival curves, once past the acute phase, equaled themselves out with respect to the group of patients who did not contract pneumonia (p 0.0001) Figure 1. This shows that treatment intensification in this group of patients was accompanied by some good long-term results.This finding is of great importance and should be taken into account in the handling of post-operatory patients. Also, medium-term mortality could be a better measurement which would allow us to better evaluate the evolution of critical patients after heart surgery, program follow-up and be useful in the allocation of resources and the cost analysis of the intervention [17].

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