

## MANAGEMENT OF POSTOPERATIVE PNEUMONIA AND ATELECTASIS



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### INTRODUCTION

Postoperative pulmonary complications (PPC) are the leading cause of postoperative morbidity, mortality, and prolonged hospital stay [1,2]. There is no standard definition of PPCs. In general, they can be defined as conditions following surgery that affect the respiratory system and can adversely impact the patient's clinical course. An approach to standardize PPCs can be the physiopathological definition of reduced postoperative functional residual capacity and total lung capacity resulting in ventilation-perfusion mismatch and hypoxemia [3]. In clinical trials, postoperative pulmonary complications are defined as the occurrence of at least one postoperative respiratory event among the composite of in-hospital fatal or nonfatal postoperative events (Table 1) [4].

Incidence rates of PPCs dramatically vary between 2-40% [5]. This wide interval is due to different definitions of postoperative pulmonary complications. In a systematic review of studies on non-cardiac surgeries, PPC incidence ranged between 2-19% [6]. PPCs are related to about 4.8 million prolonged days of hospital stay and 46,200 additional deaths related to in-hospital mortality [7]. PPCs are the top cause of postoperative death following both non-cardiothoracic and cardiothoracic surgeries [8]. PPC incidence also varies among surgical procedures. For instance, thorac-

ic surgeries (37.8%) have higher PPC incidence compared to upper abdomen (12.2%) or peripheral (2.2%) surgeries [9]. In addition, PPCs also increase financial burdens of health care [10].

While the etiology of postoperative pulmonary complications is multifactorial, the surgical intervention, method of anesthesia, and the patient's preoperative risk factors all play an important role. Patient-related factors include obesity, smoking, age, existing chronic respiratory diseases, and other comorbidities. Risk factors involving anesthesia include type of anesthesia, duration, use of different agents, and effectiveness of postoperative analgesia. The operation time, surgical technique, and size of incision all represent surgical risk factors. The main postoperative pulmonary complications are atelectasis, pneumonia, respiratory failure, and tracheobronchial infection. The most common postoperative complication is atelectasis. The primary cause of mortality has been reported to be pneumonia [11].

Furthermore, identifying potential risk factors related to pulmonary complications may predict complications of patients and determine protective strategies. At the same time, estimating perioperative risk, including PPCs, is an important matter in terms of reducing postoperative morbidity, mortality, and decreasing hospitalization expenses.

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therapy. This ensures maximum opening of the respiratory tract and effective coughing. In addition, it must be ensured that the patient has sufficient pain control in order to achieve deep breathing.

If significant improvement is not observed after physiotherapy, bronchoscopy may be necessary in order to help eradicate pulmonary secretions, however this is not routinely conducted.

## PREVENTION

It is possible to prevent and reverse atelectasis in the perioperative period. The aim is to increase transpulmonary pressure and ensure re-expansion of collapsed regions of the lung. Intermittent positive pressure breathing, deep breathing exercises, respiratory physiotherapy are recommended for this purpose and none of these methods has not been proven superior to another [49]. Squadrone et al. demonstrated in postoperative high-risk hypoxic patients that reversal of atelectasis with noninvasive CPAP method decreased the risk of reintubation and incidence of pneumonia and sepsis [49].

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