

## **Supplemental Appendix 1: Definitions of Postoperative Pulmonary Complications (PPCs)**

Postoperatively a physician not aware of the patient study group and not involved in the patient's ongoing care, collected data on the occurrence of a symptomatic and clinically significant postoperative pulmonary complications within the first 7 postoperative days through review of clinical records, laboratory, and radiology data.

1. Postoperative hypoxemia:  $SpO_2 \leq 92\%$  in room air for  $\geq 30s$  responding to supplemental oxygen.<sup>1</sup>

Patients admitted to the post anesthesia room were awake, responsive and extubated. Complete decurarization was verified in the operating room.  $SpO_2$  monitoring began within 30 s from admission using pulse oximeter with a disposable probe attached to the distal phalanx of a finger until the transfer to the surgical ward. In case of a  $SpO_2 \leq 92\%$  in room air for  $\geq 30s$ , patients received oxygen therapy through nasal cannula or face mask with wall oxygen flow set from 4 to 12 L/min depending on the device used to treat hypoxemia.  $SpO_2$  monitoring was continued in the ward for 24 hours after surgery.

2. Acute respiratory failure:  $PaO_2 < 60$  mmHg and/or  $SpO_2 < 90\%$  despite oxygen therapy or need for non-invasive or invasive mechanical ventilation and/or a ratio of  $PaO_2$  to inspired oxygen fraction  $< 300$ .<sup>2,3,4,5</sup>

3. Bronchospasm: newly detected expiratory wheezing treated with bronchodilators, excluding cardiopulmonary edema (clinical signs of congestion, including dyspnea, edema, rales and jugular venous distention, with the chest X-ray demonstrating increase in vascular markings and diffuse alveolar interstitial infiltrates).<sup>2,3</sup>

4. Respiratory infection: when a patients received antibiotics for a suspected respiratory infection and met at least one of the following criteria: new or changed sputum, new or changed lung opacities, fever, leukocyte count  $> 12,000/dl$ .<sup>5,6,7,8</sup>

5. Pneumonia:<sup>9</sup>

Two or more serial chest radiographs with at least one of the following (one radiograph is sufficient for patient with no underlying pulmonary or cardiac disease):

- (1) new or progressive and persistent infiltrates
- (2) consolidation
- (3) cavitation

at least one of the following:

- (1) fever ( $>38^{\circ}\text{C}$ ) with no other recognized cause
- (2) leukopenia (white cell count  $< 4 \times 10^9\text{L}^{-1}$ ) or leukocytosis (white cell count  $> 12 \times 10^9\text{L}^{-1}$ )
- (3) for adults  $>70$  years old, altered mental status with no other recognized cause;

and at least two of the following:

- (1) new onset of purulent sputum or change in character of sputum, or increased respiratory secretions, or increased suctioning requirements
- (2) new onset or worsening cough, or dyspnea, or tachypnea
- (3) rales or bronchial breath sounds
- (4) worsening gas exchange (hypoxemia, increased oxygen requirement, increased ventilator demand).

## References

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