

MANAGEMENT OF PROLONGED AIR-LEAK



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Air leakage increases the duration of hospital stay more than normal is termed ‘prolonged air leak’ (PAL) [1]. Air leaks in most cases resolve within many days after thoracostomy tube drainage. How many days must persist an air leak to be considered PAL? It has extended to over 14 days in the past decades [2]. In subsequent studies, the limit was accepted for 7 days [3,4]. According to a recent study based on the “The Society of Thoracic Surgeons General Thoracic Surgery Database (STS GTSD)”, an air leak is defined as PAL if it persists longer than 5 days [5].

Prolonged air leak which is not rare complication, continue to bothers thoracic surgeons in daily practice [6]. Almost 30-50% of patients who undergo pulmonary lobectomy have air leakage from chest drainage either immediately after surgery or during the first two postoperative days [7]. Although air leakage is significantly reduced after a few days, there are approximately 7% to 18% of patients who undergo pulmonary resection still have PAL that persists beyond the normal hospitalization [5]. Nearly 90% of patients who undergone lung volume reduction surgery (LVRS) have air leakage at the early postoperative period and whose air leaks are often prolonged [8]. A PAL depend on spontaneous pneumothorax is commonly caused by underlying lung disease such as secondary spontaneous pneumothorax, pulmo-

nary infections, and complications of mechanical ventilation[9]. PAL creates surgical indications. However, prolonged or persistent air leakage is observed even in 2-10% of primary spontaneous pneumothorax (PSP) patients who undergo surgery [10].

ETIOLOGY AND RISK FACTORS

If the air leak from major airway such as bronchus after surgery, it is called a bronchopleural fistula [11]. Whereas, PAL is the prolongation of an alveolapleural air leakage. An alveolar-pleural fistula is a communication between the alveoli and the pleural space [9]. PAL result from impaired healing of disrupted alveoli, often associated with poor apposition of lung with parietal pleura.

PAL is commonly caused by spontaneous pneumothorax, pulmonary infections, complications of mechanical ventilation, following chest trauma or after pulmonary lung resection (6–18%).

PAL can be divided into two main groups as postoperative PAL and PAL in patients with spontaneous pneumothorax. The successful of a pulmonary resection depends on closure of the airway completely [11]. Depending upon the type of resection, this may include closure of the bronchus, and also bronchioles and/or alveolar

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of IBVs for the treatment of PAL even patients in the ICU requiring high levels of oxygen or mechanical ventilation. Although success rates of up to 90% have been reported in patients with the treatment by endobronchial valves in some studies that control groups are lacking and the number of cases are limited [9].

Surgery

PAL is a not rare problem in the patient with spontaneous pneumothoraces. Surgical treatment is recommended if they do not have the severity of respiratory disease [31]. If there is no serious contraindication, surgical treatment for PAL is generally undertaken by videoassisted thoracoscopic surgery (VATS), which has replaced open thoracotomy at the nowadays. The aims of surgery are both to identify and seal any areas of air leakage, and to resect any visible blebs or bullae on the visceral pleura [31]. During surgery, some additional measures such as surgical sealants, pleural tenting, stapler line buttressing and pneumoperitoneum can be applied, especially in patients with secondary spontaneous pneumothorax.

Excluding surgery for disrupted bronchial stump closure and bronchopleural fistula, reoperation for persistent air leak is uncommon. In patients who have undergone pulmonary resection, 0.05% -2% required reoperation for persistent air leak [1,11,13]. VATS is useful to identify and seal or staple any areas of air leakage, and also may be used to assure pleural abrasion or pleurectomy. A rarely required more invasive procedure is filling the space with viable tissue, such as muscle flaps or omentum with thoracotomy [11,13].

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