LETTER TO THE EDITOR

Postobstructive pulmonary edema (POPE) after surgery for obstructive sleep apnea

To the Editor,

The mechanism of developing postobstructive pulmonary edema (POPE) involves fluid shifting to the pulmonary interstitium owing to changes in intrathoracic pressure. Negative intrathoracic pressure is generated in the pulmonary cavity when the patient attempts to inspire against an obstructed airway. The drop in intrathoracic pressure causes increased venous return and pulmonary venous pressure, which creates a hydrostatic transpulmonary gradient with the fluid shifting from the pulmonary venous system to the pulmonary interstitium [1]. In general, it is thought to occur in 0.05–0.1% of all procedures involving intubation and general anesthesia [2].

A 39-year-old man came to our clinic for snoring and excessive daytime sleepiness for several years. A physical examination showed bilateral tonsil enlargement (Grade 3), narrowing of the retropalatal space, and nasal septum deviation with chronic hypertrophic rhinitis. Preoperative polysomnography revealed an apnea–hypopnea index of 38.9 events/h, which indicated severe obstructive sleep apnea. He underwent a modified uvulopalatopharyngoplasty and bilateral nasal septomeatal plasty under general anesthesia via endotracheal intubation. Bilateral nasal cavities were packed with Merocel, and the whole procedure was uneventful. However, the patient developed desaturation immediately after extubation. Reintubation was done immediately because of a sharp drop in SaO2 to under 60%. Mechanical ventilation with 100% oxygen with 8 cmH2O positive end-expiratory pressure (PEEP) was performed. No cardiac abnormalities were noted on electrocardiography during the whole process. Chest radiography demonstrated bilateral interstitial infiltration (Fig. 1A), and POPE was therefore diagnosed. PEEP therapy was continued, and a chest radiography showed dramatic improvements 3 hours later (Fig. 1B). He was then extubated smoothly. The mild shortness of breath gradually improved after the use of bilevel positive airway pressure mask therapy for 2 days.

POPE is most commonly caused by laryngospasm [3]. Two subtypes of POPE have been described. Type I is associated with forceful inspiratory efforts in the context of an acute...
airway obstruction, including laryngospasm, epiglottitis, croup, foreign body, laryngeal tumor, and vocal cord paralysis. Type II occurs after relief of a chronic airway obstruction. It occurs after adenoidectomy, tonsillectomy, laryngeal mass resection, and reduction of a hypertrophic redundant uvula [4]. If tachypnea, rales, and rhonchi occur after extubation, then POPE should be considered. The diagnosis can be confirmed by chest radiography.

In the current case, obstruction of oropharyngeal and nasal levels were relieved after surgery without obvious signs of laryngospasm. Therefore, it is reasonable to assume that the POPE in this case was Type II.

Treatment of POPE depends on disease severity. Most cases resolve spontaneously within 24 hours, and require only supportive therapy such as oxygen via a facemask. The treatment may involve intensive care monitoring, continuous oxygen therapy, continuous positive airway pressure, and possible mechanical respiratory support with a high PEEP level in severe cases. Some studies have supported the careful use of diuretics once POPE is diagnosed [5].

To avoid POPE after obstructive sleep apnea surgery, extubation when the patient is fully awake is essential. In addition, removing blood clots and secretions after the operation can also reduce stimulation of the larynx and avoid laryngospasm.

References


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