Negative pressure pulmonary edema due to residual neuromuscular blockade.

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Background: Negative pressure pulmonary edema (NPPE) is a well described object but with few reported cases. Its recognition is important to initiate appropriate treatment. Related to the anesthetic act, it may occurs after extubation, due to causes that lead to airflow supraglottic obstruction through inspiratory effort. Reversing the neuromuscular blockade is an important step during the anesthetic procedure, because if it is inadequate, can cause respiratory complications generating intrathoracic negative pressure and resultant alveolar transudation.

Case Report: Female patient, 26 years old, 60 kg, accepted for open appendectomy surgery. No comorbidities, ASA IE, normal physical examination of cardiovascular and respiratory system. Rapid sequence of anesthetic induction was performed (Fentanyl 150mcg, Propofol 150mg and Succinylcholine 60mg IV); maintenance of the anesthesia with Rocuronium 40mg IV and inhalatory Sevoflurane 2%. Observed with TOF WATCH SX to evaluate the amount of neuromuscular blockade. After surgery, the patient had a 15% TOF with spontaneous ventilation, then Neostigmine 2mg and Atropine 1mg IV were added. Extubation was done immediately after the injection of these drugs. At this time, the patient indicated low tidal volume, dyspnea, tachypnea, significant ventilatory effort, and agitation. Her condition got worse, due to increase of dyspnea, pink secretion expelled through oral cavity, and bilaterally diffuse crackling eruptions. Oxygen therapy was introduced at 12L / min and Furosemide 80mg IV (diuresis of 2.5L) but yet no progress on her condition. The patient was transferred to the ICU.

Discussion: The NPPE is defined as alveolar and interstitial transudation after intense inspiratory effort against glottic or supraglottic obstruction. In residual neuromuscular blockade situations, the pathophysiology of NPPE occurs due to the reduction of retropharyngeal diameter and large respiratory obstruction, along with great inspiratory effort and alteration of the transpleural pressure gradient.

Fig 3. Proposed explanation for NPPE.
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Learning points: reversal of neuromuscular blockade is important for the acceleration of patient recovery and prevention of postoperative residual neuromuscular blockade and reduces the incidence of severe morbidity and mortality associated with anesthesia management.