

SPONTANEOUS PNEUMOTHORAX FOLLOWING LAPAROSCOPIC CHOLECYSTECTOMY: CASE REPORT

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[Pneumotorace spontaneo dopo intervento chirurgico di colecistectomia in laparoscopia: caso clinico]

ABSTRACT

The authors describe the clinical case of a patient who underwent laparoscopic cholecystectomy and suffered an episode of spontaneous pneumothorax on post-operative day 3. The aim is to highlight the importance of a thorough pre-operative assessment and, more generally, of adequate and continuous peri-operative monitoring in order to detect the possible occurrence of respiratory complications, and particularly late pneumothorax, which can be determined by surgical procedures of this type.

Key words: Pneumothorax, cholecystectomy, general anesthesia, chest drainage, video-assisted thoracoscopy, COPD.

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Introduction

Pneumothorax (PNX) is a benign pathology with sudden onset that consists in the accumulation of air in the pleural cavity. It is characterized by a high relapse rate, typically around 30%, ranging from 16% to 52% in patients treated through simple observation or by placement of a drain⁽¹⁾. It can be idiopathic spontaneous, post-traumatic or secondary.

Idiopathic spontaneous PNX develops in subjects who do not report lung diseases in their clinical history and is due to the rupture of one or more congenital emphysematous blebs, usually located at the apex of the lung. The cause of post-traumatic PNX is the onset of an abnormal increase in endopleural pressure with subsequent rupture of blebs due to direct traumatic lesions of the lung parenchyma (especially fractures of ribs or blows with blunt objects). Secondary PNX is correlated with lung diseases such as emphysema, bronchial asthma or tuberculosis⁽¹⁾.

Materials and methods

The case we observed relates to a male patient, 34 years of age, body weight of 78 kg, 182 cm tall, who underwent laparoscopic cholecystectomy. The patient reported a family history of chronic obstructive pulmonary disease (COPD) and denied exposure to dust and occupational agents, cigarette smoking and other noteworthy diseases.

Comparative auscultation of the lungs showed physiological breath sounds with acts of breathing. Blood tests showed no alteration and cardiological examination with ECG was negative for heart diseases. Surgery was performed under general anesthesia by continuous intravenous infusion (TIVA) of propofol and remifentanyl both during the induction phase and in the maintenance phase, while ensuring continuous and adequate adaptation of the anesthetic and analgesic plan to the more or less intense stages of surgical stimulation in the course of the surgical procedure. Respiratory support was provided by endotracheal intubation and mechani-

cal ventilation set at a tidal volume of 600 mL at a rate of 12 cycles per minute (adjusted to the end-tidal CO₂ values determined by the pneumoperitoneum induced during the surgical procedure), a PEEP of 5 cm H₂O (so as to ensure recruitment of poorly ventilated alveoli with a consequent improvement of the patient's respiratory parameters) and a FiO₂ of 40%.

Monitoring of the blood pressure, arterial oxygen saturation and peak and plateau pressures in the airways was ensured to prevent traumatic injury in the airways, and in particular⁽²⁾. Post-operative analgesia was based on the intravenous administration of 200 mg of paracetamol associated with 60 mg of ketoralac 20 minutes before awakening so as to ensure adequate analgesic coverage at the time of awakening and in the immediately following hours.

Results

Upon awakening, the patient did not present any immediate complication, which is why he was kept under observation for about two hours during spontaneous breathing with Venturi mask in order to monitor vital signs, do serial blood gas tests and finally perform a chest X-ray to assess the lung parenchyma. Given the stable hemodynamic and respiratory parameters, the patient was transferred to the unit of origin, since no post-operative care was needed in the intensive care unit.

On post-operative day 3, the patient reported a stinging pain in the left hemithorax associated with dyspnea and tachycardia⁽³⁾. A chest X-ray, performed urgently, revealed the presence of a medium-sized pneumothorax. For this reason, a chest tube was immediately placed⁽⁴⁾.

Discussion

The patient's clinical history and results showed that he suffered from idiopathic spontaneous pneumothorax, also called "healthy lung" PNx. This form of PNx has an annual incidence of 7-18 cases out of every 100,000 men and 1.2 to 6 cases out of every 100,000 women. It affects mainly young adults in the second to third decade of life. It occurs in tall, thin individuals with a family history of respiratory disease and in whom smoking can be a predisposing factor⁽⁴⁾.

In terms of pathological anatomy, spontaneous PNx consists of a structural alteration of lung tissues (bullous dystrophy) that lose their natural elasticity, thereby becoming thinner in certain points (bubbles). Following major increases in endopleural pressure (for example, during coughing) they rupture, thereby resulting in the release of alveolar air⁽¹⁾. At the first episode of pneumothorax, the indication is to place only a chest drain; in the event of a second episode or if, despite the placement of the drain, air continues to escape from the pulmonary hole, bullectomy and pleurectomy by video-assisted thoracoscopic surgery via a mini-invasive approach is now the treatment of choice⁽⁴⁾.

In our case, the onset of PNx on post-operative day 3 did not seem to be ascribable to positive pressure mechanical ventilation, or to respiratory effects (increased airway pressure) related to pneumoperitoneum or errors in surgical procedures, because of the lapse of time between surgery and the event, but rather to surgical stress that can lead, among the countless negative consequences, to sudden pressure surges, and to muscular stress, such as a cough or defecation, which may lead to increased intrathoracic pressure causing a major rupture of a bubble and the appearance of PNx.

Conclusions

A proper anesthetic approach should always include the identification of patients at risk of pneumothorax and the implementation of measures to reduce this occurrence, such as maintaining a reduced intrathoracic pressure during surgery. It is also of paramount importance to perform careful post-operative monitoring of the patient, which, in our opinion, must be extended even to the days following surgery, in order to control the onset of late PNx.

Patients should be "protected", with appropriate anesthetic techniques, against surgical stress and post-operative pain in order to avoid that any reflexes triggered by these events may impact on the post-operative complications, such as pneumothorax, especially in subjects at risk.

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