SEMI-FOWLER'S POSITION DURING EXTUBATION AND POST ANAESTHESIA CARE; REVIEW

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Abstract:
Tracheal extubation is often carried out when the patient is lying flat on their back. Nevertheless, in patients after abdominal surgery, the act of removing the breathing tube from the windpipe while the patient is in a partially upright posture (known as the semi-Fowler's position) is linked to reduced coughing, the need for sputum removal, and discomfort, as well as increased comfort. This approach does not have any particular negative consequences when compared to the traditional lying down position. Our objective was to assess the safety and comfort levels associated with various extubation settings in patients following abdominal surgery. The safety and comfort of tracheal extubation in the semi-Fowler's position have not been fully established, however it may potentially lessen some risks.

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Introduction:

The post-anesthesia care unit (PACU) offers vigilant observation for surgical patients who have not regained full consciousness following general anesthesia. Entering the Post-Anesthesia Care Unit (PACU) carries a significant risk of problems due to the lingering effects of anesthetics and muscle relaxants. An analysis of 18,473 patients revealed that the overall occurrence of complications in the post-anesthesia care unit (PACU) was 23%. The most prevalent complications were postoperative nausea and vomiting (10 to 30%), upper airway abnormalities (6.9%), low blood pressure (2.7%), irregular heart rhythm (1.4%), high blood pressure (1.1%), and changes in consciousness (0.6%) [1].

Research has demonstrated a correlation between the position in which extubation occurs during the recovery from anesthesia and the occurrence of problems both during and after the surgical procedure. Extubating patients with obstructive sleep apnea following uvulopalatopharyngoplasty in an upright position might effectively decrease upper airway obstruction, respiratory effort, postoperative respiratory depression, and enhance functional residual capacity. A further research discovered that extubation while in the prone position might considerably decrease postoperative coughing in individuals following spine surgery [2].

Patients who have abdominal surgery are at a significantly elevated risk of experiencing postoperative nausea and vomiting. Following the administration of general anesthesia, the majority of anesthetists opt to arrange patients in the supine posture for extubation. The reason for this is its simplicity, which allows for effortless monitoring and can help reduce regurgitation in the event of vomiting [3]. Nevertheless, there is a belief that doing extubation while the patient is awake restores defensive reflexes, such as coughing and swallowing, following the removal of the breathing tube. In such instances, the benefits of performing extubation when the patient is lying on their back are reduced. In addition, postoperative abdominal discomfort results in breathing limitation and elevated intra-abdominal pressure [3].

Overview:

Since its inception in 1987, laparoscopic surgery (LS) has caused a change in surgical techniques, moving away from conventional methods towards less invasive alternatives [4]. The LS, a method characterized by minimum invasiveness, offers several appealing and prospective benefits for patients. These include less postoperative discomfort, shorter hospitalization duration, and faster recovery as compared to open surgical procedures. The rapid recuperation after LS is primarily achieved by minimizing postoperative discomfort at the incision site. Nevertheless, post-laparoscopic shoulder pain (PLSP), a condition frequently overlooked by medical practitioners, can occur alongside laparoscopy treatments with a prevalence that ranges from 35% to 80% [5]. While the precise cause of shoulder discomfort is not fully understood, the most widely accepted hypotheses involve the buildup of carbon dioxide and irritation of the phrenic nerve due to straining of the diaphragm [3, 5].

Transitioning the patient from a supine to a prone posture results in the movement of the tracheal tube and alters the pressure within the cuff of the endotracheal tube (ETTICP). Manipulating the positions of the head results in the movement of the tracheal tube. Altering the posture of the neck by raising the head has an impact on the ETTICP. Studies have demonstrated that altering the patient's posture relative to the ventilator, either towards or away from the direction of the ventilator, is also beneficial in modifying the endotracheal tube intracuff pressure (ETTICP). Furthermore, the patient's rotation in the opposite direction of the ventilator raises the endotracheal tube intracranial pressure (ETTICP) [6].

Several methods aimed at alleviating shoulder pain by mitigating phrenic nerve irritation have not been used in everyday medical practice due to their impracticality or insufficient effectiveness in achieving the desired therapeutic outcome in ordinary clinical settings. One particular technique that has gained interest is the pulmonary recruitment maneuver (PRM). This technique involves performing five manual inflations of the lungs with a maximum pressure of 40-60 cm H2O. It has shown promising benefits in reducing pulmonary leak syndrome (PLSP) [5]. Postoperative mechanical ventilation, conducted immediately after the surgery, elevates the intraperitoneal pressure and facilitates the elimination of residual carbon dioxide from the body.

The semi-Fowler posture, which involves elevating the head of the bed by 30°, has been proven to be advantageous in raising intra-abdominal pressure [6].

The LS facilitates early mobilization, hence decreasing the likelihood of thromboembolism. Recent results suggest that women receiving LS for gynaecologic benign disorders may not need mechanical or pharmacological

thromboprophylaxis unless they have risk factors. However, thromboprophylaxis is still important for patients undergoing LS for gynaecological malignancies [7].

While the precise cause of shoulder discomfort in relation to laparoscopic operations remains unknown, it is observed in 35-80% of patients and can persist for up to 72 hours after the surgery [7]. Shoulder discomfort that occurs after laparoscopic surgery (LS) is thought to be primarily caused by irritation of the phrenic nerve due to distension-induced neuropraxia, the acidic environment within the abdomen, and the presence of residual carbon dioxide gas in the abdominal cavity [8]. According to Jackson et al., there is a clear relationship between the degree of discomfort and both the volume of gas below the diaphragm and the surface area of the gas that comes into contact with the diaphragm [9]. In a study conducted by Sabzi Sarvestani et al. and Song et al., it was found that there is a strong correlation between the amount of residual pneumoperitoneum and the intensity of shoulder pain experienced by patients undergoing laparoscopic cholecystectomy and gynecologic procedures. The study showed that patients with little to no residual pneumoperitoneum reported lower levels of pain [9]. In a separate study involving patients who were scheduled for laparoscopic cholecystectomy, the researchers found that patients in the group who underwent NO2-induced pneumoperitoneum had lower levels of postoperative pain compared to those in the group who underwent CO2-induced pneumoperitoneum. This suggests that the introduction of CO2 gas during the procedure contributes to the development of postoperative pain [10]. Furthermore, several trials done on patients after laparoscopic surgery (LS) have demonstrated that improved gas efflux leads to a decrease in shoulder discomfort. This suggests that the shoulder pain experienced after LS is mostly caused by the accumulation of carbon dioxide (CO2) within the abdomen [10].

The PRM entails administering a sequence of positive pressure ventilations following the laparoscopic surgery. This facilitates the release of any remaining intra-abdominal gas by raising the intra-abdominal pressure. The PRM has been popular among anaesthesiologists due to its practicality, time efficiency, and cost-effectiveness in lowering PLSP. The utilization of Positive Respiratory Pressure (PRM) leads to an elevation in the pressure within the chest cavity, resulting in a downward movement of the diaphragm. This, in turn, raises the pressure inside the abdomen, facilitating the efficient expulsion of any leftover gas. Research has demonstrated that a low-pressure peritoneal residual monitor (PRM) with a pressure of 40 cm H2O effectively eliminates the remaining gas in the peritoneal cavity [11]. Significant evidence suggests that the PRM (Patient-Reported Outcome Measure) enhances postoperative pain ratings and decreases pain intensity by 61% to 31% in individuals who have undergone laparoscopic surgery for diverse causes. In a prior investigation done by Phelps et al., it was shown that the PRM (peritoneal resorption method) has the potential to efficiently eliminate any remaining CO2 from the abdominal peritoneal cavity. Consequently, this can result in a reduction of intra-abdominal acidosis, as well as alleviate irritation of the phrenic nerve and peritoneum [9]. In a recent study, Güngördük et al. discovered that applying positive pressure of 40 cm H2O with the PRM at the conclusion of surgery effectively decreased the occurrence of shoulder and upper abdominal discomfort. Additionally, it resulted in lower pain scores 12 and 24 hours after the operation [12].

Conclusion:

In surgical patients under general anesthetic, both excessive coughing and bucking can lead to hazardous consequences, including hypertension, tachycardia, and other arrhythmias. These issues can have varying negative effects on carotid endarterectomy, craniotomy, and ophthalmology procedures. In patients undergoing abdominal surgery, intense coughing and sudden movements can cause a rapid and significant increase in abdominal pressure, resulting in noticeable discomfort at the surgical site or the opening of the incision. The documentation about the safety and comfort of using the semi-Fowler's posture during emergence and extubation is still limited. The findings of this analysis indicate that utilizing the semi-Fowler's position during emergence and extubation is a superior option for patients following abdominal surgery compared to the conventional supine position. Transient hypotension may occur due to fluctuations in systemic circulation blood volume when in the semi-Fowler's posture.

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