A Complication of PCNL Surgery

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Abstract

A complication of posted for percutaneous nephrolithotomy (PCNL) surgery.

Key words: Hydrothorax, intercostal drainage, positive end-expiratory pressure

A 50-year-old lady diagnosed with right-sided renal calculus was posted for percutaneous nephrolithotomy (PCNL). She was assessed as belonging to American Society of Anesthesiologists (ASA) physical status I and the surgery was performed in a prone position under endotracheal general anesthesia with controlled ventilation using vecuronium + sevoflurane + N_2O + O_2 through a closed-circuit CO_2 absorber. Toward the end of the procedure, her oxygen saturation dropped to 92%. Airway pressure was found to be elevated (at 40 cm). Auscultation of the chest revealed decreased breath sounds on the right base. Fluoroscopy with C-arm showed right hydrothorax and decreased lung expansion. The patient was immediately turned to a supine position and a chest tube was inserted. Around 1,500 mL of irrigation fluid was drained. The patient was then ventilated with a positive end-expiratory pressure (PEEP) of 10 cm H_2O to expand the lung. Repeat C-arm imaging confirmed correct placement of the chest tube and reexpansion of the lung. The patient was observed for 30 min and then extubated. Postoperative recovery was uneventful and the chest tube was removed on the second day.

Discussion

PCNL is done under general anesthesia in a prone position. Close intraoperative monitoring of pulse oximetry, echocardiogram (ECG), noninvasive blood pressure (NIBP), end-tidal CO_2 ($ETCO_2$), and airway pressure is important to prevent complications. Any rise in airway pressure or a dip in oxygen saturation should rule out tube displacement/kinking in the prone position. It may be helpful to place a stethoscope near the ipsilateral base of the chest for frequent auscultation. There should be no hesitation to use C-arm to rule out pleural injury when suspected. It must be remembered, however, that the images on the C-arm are usually inverted, i.e., the air appears white and the fluid black. The anesthetist has to coordinate respiration with the surgeon's movements as he/she makes a track by sequential dilatation. The parietal pleura is reflected at the level of the 10th rib in the mid axillary line; posteriorly, it is usually reflected obliquely at the midpoint of the 12th rib. In full expiration, the visceral pleura never descends to the level of the midpoint of the 12th rib. During forced maximum inspiration, the lung would be in the path of the needle in most patients. Hence, initial needle puncture must be made only during full expiration to avoid inadvertent pleural injury damage to the visceral pleura. It must be ensured that the needle is advanced just above the upper border of the 12th rib. In order to provide full downward displacement of the kidney for easy access to the superior pole and posterior calyx, the entry into the renal parenchyma must be made during deep inspiration. In all cases, equipment for intercostal drainage should always be at hand. There is also a risk for hypothermia and septicemia because of the use of large amounts of irrigation fluid. Before exubation, the absence of pleural injury can be confirmed with C-arm. A routine chest X-ray after operation is mandatory.

All supracostal punctures would traverse the diaphragm; although harmless, this can be a source of intense pain after the procedure. Adequate pain relief also contributes to smooth recovery.

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