Anesthetic concerns for rigid bronchoscopic debulking of tracheal growth in postpneumonectomy patient

Madam,

Post-pneumonectomy patients for lung cancers may require incidental surgeries as lung cancers have good 10-year survival. Patients with tracheobronchial neoplasms can manifest with significant airway compromise and therapeutic rigid bronchoscopy remains an option. The airway management for rigid bronchoscopy in a post-pneumonectomy patient with tracheal neoplasm is challenging.

A 72-year-old man diagnosed as lung carcinoma, post radiotherapy, chemotherapy and left pneumonectomy, presented to the hospital with chief complains of persistent dry cough, shortness of breath and tachypnea (respiratory rate -35 breaths/min). He was a chronic smoker (30 pack years). Presently he was diagnosed with tracheal tumor extending intratracheally. On auscultation, there was absent breath sounds on the left side whereas normal vesicular breath sound with no adventitious sounds were heard in the right side. Chest radiograph showed homogenous opacity on left side with deviation of trachea towards left. Pulmonary function test revealed forced expiratory volume 1st second (FEV1) as 42% of predicted. The ratio of the forced expiratory volume in 1st second to forced vital capacity (FEV1/FVC) was 107% of predicted. His diffusion for carbon monoxide (DLCO) was 48% of predicted. Flexible bronchoscopy revealed polypoidal growth arising from 3 cm below vocal cords at multiple levels causing 90% luminal occlusion extending up to 1.5 cm above the carina. Total length of the lesion was 9 cm. A difficult airway cart and extracorporeal membrane oxygenator were kept ready. Oxygen saturation was 91% on room air. He was preoxygenated with 100% oxygen. The patient was premedicated with intravenous (iv) glycopyrrolate 0.2 mg and hydrocortisone 100 mg. Anaesthesia was induced with iv fentanyl 100 μg; propofol 100 mg and succinylcholine 100 mg. IV propofol infusion at a rate of 150 μg/kg/min was started. Rigid bronchoscope was introduced and the side port was used for mechanical ventilation. The bronchoscope was cored through the tumor and after it negotiated beyond the tumor, the cored tissue was removed with the help of forceps. The mechanical ventilation (intermittent positive pressure ventilation) improved and intravenous vecuronium 6 mg was administered. Lung was ventilated with a fresh gas flow of 12 L/min with 100% oxygen with intermittent positive pressure ventilation. Further resection of tumor was accomplished in piece meal and most part of the tumor was removed and hemostasis achieved. The whole procedure took about 60 min. The residual neuromuscular blockade was reversed with iv neostigmine 2.5 mg and glycopyrrolate 0.5 mg. Trachea was extubated once adequate tidal volume was generated and patient regained consciousness. Post extubation, the patient complained of dypnoea and was unable to generate adequate tidal volume. So, he was intubated with endotracheal tube size 7.5 mm ID and flexible fiberoptic bronchoscopy done which revealed mucosal edema of trachea. Patient was kept intubated and electively ventilated for one day and extubated next morning.

Pneumonectomy leads to significant anatomic and physiological changes.[1,2] Pulmonary function diminishes in a predictable fashion following pneumonectomy but less than the expected.[3] Post pneumonectomy FEV_1, FVC, DLCO all decrease by 50%.[2,3] Certain surgical procedures have been reported in post pneumonectomy patients.[4-6] Rigid bronchoscopic tracheal tumor debulking has not been reported earlier. In apneic ventilation, the anesthesiologist withholds lung ventilation for some periods during which the pulmonologists work. In post pneumonectomy patient, this method of apneic ventilation could be more precarious as they have diminished oxygen reserve and rise of $PaCO_2$ is higher. Preoxygenation with 100% oxygen and hyperventilation with low tidal volume should be done in such patients. The procedure lasts over 60 minutes and because of frequent instrumentation and thus patient develops mucosal edema. The experience of pulmonologist is very crucial in management of such cases. So, these patients' warrant accurate bronchoscopic assessment and elective ventilation till the tracheal edema subside. To conclude, post pneumonectomy patients undergoing a tracheal debulking require cautious assessment for airway compromise, warrants proper planning and great vigilance during airway interventions.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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