Anaesthetic considerations during video-assisted thoracoscopic excision of a mediastinal ectopic parathyroid adenoma

Sir,

In general, 25% of parathyroid adenomas causing the symptoms of hypercalcaemia are mediastinal in location.[1] The treatment of such hyperparathyroid adenomas is surgical resection which varies according to the site of ectopic tissue.[2,3] Here, we present a unique case in which video-assisted thoracoscopic surgery (VATS) was done to excise an ectopic parathyroid adenoma located in the anterior mediastinum in the supine position and its associated anaesthetic concerns.

A 39-year-old man diagnosed with hyperparathyroidism (serum calcium- 11.4 mg/dl and serum parathyroid hormone level- 131.6 pg/ml) due to ectopic parathyroid adenoma located in the anterior mediastinum was scheduled for excision with VATS. After anaesthesia induction, a 39 Fr left-sided double-lumen tube was inserted. Initially, the airway pressure was around 20–22 cm of water with a tidal volume of 7 ml/kg on double lung ventilation. VATS was done in the supine position with the thoracoscopy probes inserted on the left side at the level of the anterior and midaxillary line. Before the creation of pneumomediastinum, the left lung was collapsed by blocking the bronchial lumen. During one-lung ventilation (OLV), the airway pressure increased gradually to 35 cm of water. So, the mode of ventilation was changed to the pressure control mode, generating a tidal volume of approximately 4 ml/kg achieved at a pressure

of 28 cm of water during the OLV period. Fraction of inspired oxygen (FiO_2) was kept within 0.5–0.8 without the use of nitrous oxide. Blood gas analysis one hour after OLV showed: pH-7.25, pCO_2-64 mmHg [end tidal carbon dioxide ($EtCO_2$ 49 mmHg)] and pO_2-107 mmHg. The total duration of OLV was 100 minutes. Arterial blood gas analysis before reversal showed pH-7.30 and pCO_2-47 mmHg. The patient was extubated without any complications. Postoperatively, after shifting the patient to ward, serum electrolyte levels were estimated and found to be normal (serum calcium 8.9 mg/dl and serum parathyroid hormone level 40.2 pg/ml).

Ectopic parathyroid adenomas occurring due to the abnormal migration of embryonic tissues make up for 20–25% of parathyroid adenomas. Mostly, they are located in the anterior mediastinum. With the use of computed tomography (CT) and Sestamibi scintigraphy, the exact location of ectopic mass can be identified which improves the success rate while using minimally invasive techniques.[4] A majority of them are removed by the traditional cervical approach, with up to 1–2% requiring mediastinal exploration. This was done previously by median sternotomy that was associated with morbidity and a longer duration of hospital stay.[4] VATS has become more popular as it lowers postoperative complications. An increase in the parathyroid hormone (PTH) levels and a rise in serum calcium in primary hyperparathyroidism are the key concerns during the perioperative period. The electrocardiogram (ECG) needs to be monitored throughout this period.[5] Those patients having severe hypercalcaemia on preoperative check-up should be treated on the lines of hypercalcaemic crisis and surgery should be deferred. Nowadays, the measurement of intraoperative serum PTH has become the norm whenever possible. In our institute, this has not been yet introduced; so, we could not monitor the intraoperative PTH. Patient positioning has to be done carefully as they have osteoporotic bones. Our patient posed a unique challenge as the VATS approach was used. The anaesthetic challenges include adequate oxygenation during OLV, haemodynamic stability and maintenance of airway pressure. This became more perplexing in our patient as VATS was done in the supine position. The ventilation-perfusion mismatch is lower as the vertical distance (anterior to posterior) in the supine position is less than that in the lateral decubitus position. The initiation of OLV is less tolerated in the supine position as the shunt through the non-ventilated lung is greater than that in the lateral position because of the lack of gravitational redistribution of blood flow.[6] The rise in airway pressure post-pneumomediastinum and the beginning of OLV are more hazardous in patients with a larger mass and pre-existing compression which is seldom seen with mediastinal parathyroid adenomas. Postoperatively, the patient should be monitored for the development of hypocalcaemic tetany.

Thus, prior preoperative assessment, preparation, close monitoring of calcium levels, and intraoperative $EtCO_2$ and airway pressure monitoring are necessary for the successful perioperative anaesthesia management of VATS for ectopic mediastinal parathyroid adenoma.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Riniki Sarma, Raghav Gupta, Vinod Kumar, Anuja Pandit[1]

Department of Onco-Anaesthesia and Palliative Medicine, Dr BRAIRCH, AIIMS, [1]Department of Onco-Anaesthesia and Palliative Medicine, National Cancer Institute-AIIMS, New Delhi, India

Address for correspondence:
Dr. Vinod Kumar,
Department of Onco-Anaesthesia and Palliative Medicine,
Room No- 139, 1st Floor, Dr BRAIRCH, AIIMS,
New Delhi - 110 029, India.
E-mail: vkchanpadia@gmail.com

Submitted: 19-Dec-2020
Revised: 11-Jan-2021
Accepted: 02-Mar-2021
Published: 22-Jun-2021

REFERENCES

1. Boonen S, Bouillon R, Fagard K, Mullens A, Vlayen J, Vanderschueren D. Primary hyperparathyroidism: Pathophysiology, diagnosis and indications for surgery. Acta Otorhinolaryngol Belg 2001;55:119-27.
2. Naik BN, Sujith J, Kajal K. Maffucci syndrome and anaesthesia: Case report. Indian J Anaesth 2019;63:400.
3. Chae AW, Perricone A, Brumund KT, Bouvet M. Outpatient Video-assisted thoracoscopic surgery (VATS) for ectopic mediastinal parathyroid adenoma: A case report and review of the literature. J Laparoendosc Adv Surg Tech A 2008;18:383-90.
4. Russell CF, Edis AJ, Scholz DA, Sheedy PF, van Heerden JA.

Mediastinal parathyroid tumors: Experience with 38 tumors requiring mediastinotomy for removal. Ann Surg 1981;193:805-9.
5. Sasidharan P, Johnston I. Parathyroid physiology and Anaesthesia. Anaesthesia tutorial of the week. 2009; 142. Available from: http://www.frca.co.uk/Documents/142%20Anaesthesia%20&%20the%20parathyroid%20gland.pdf. [Last cited on 2020 Jul 20].
6. Tacconi F, Rogliani P, Cristino B, Gilardi F, Palombi L, Pompeo E. Minimalist video-assisted thoracic surgery biopsy of mediastinal tumors. J Thorac Dis 2016;8:3704-10.

Access this article online

Quick response code

Website: www.ijaweb.org

DOI: 10.4103/ija.IJA_1523_20

How to cite this article: Sarma R, Gupta R, Kumar V, Pandit A. Anaesthetic considerations during video assisted thoracoscopic excision of a mediastinal ectopic parathyroid adenoma. Indian J Anaesth 2021;65:492-4.