



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

International Journal of Current Research
Vol. 14, Issue, 12, pp.22967-22968, December, 2022
DOI: <https://doi.org/10.24941/ijcr.44422.12.2022>

INTERNATIONAL JOURNAL
OF CURRENT RESEARCH

RESEARCH ARTICLE

A CASE REPORT ON PERIOPERATIVE MANAGEMENT OF BILATERAL PULMONARY METASTASECTOMY IN AN OPERATED CASE OF RECTAL CARCINOMA

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ARTICLE INFO

Article History:

Received 08th September, 2022
Received in revised form
14th October, 2022
Accepted 19th November, 2022
Published online 27th December, 2022

Key words:

Bilateral Pulmonary Metastasectomy, One Lung Ventilation, Bronchial Blocker, EZ Blocker.

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Citation: Dr. Avinash K Saknure, Dr. Bineetha K., Dr. Sooraj Manaam, Dr. Misha Mehta, and Dr. Hemant H. Mehta. 2022. "A case report on perioperative management of bilateral pulmonary metastasectomy in an operated case of rectal carcinoma". *International Journal of Current Research*, 14, (12), 22967-22968.

ABSTRACT

Lung isolation techniques and maintenance of one lung ventilation (OLV) with stable hemodynamics has always been a challenge to the anaesthesiologists. A detailed preoperative evaluation of the patient along with knowledge about the surgical plans and requirements is essential for proper planning of lung isolation strategies as different modalities are available for OLV currently. We are reporting the case of a young female, already operated for primary mid rectal carcinoma, now posted for bilateral pulmonary metastasectomy. OLV was achieved using an EZ bronchial blocker considering the surgical requirements of bilateral lung isolation. With a team of expert anaesthesiologist's proper planning and good intraoperative management, patient was extubated on table post procedure with stable hemodynamics inspite of a prolonged surgery with bilateral lung isolation.

INTRODUCTION

Pulmonary metastasectomy is one of the most frequent major surgeries undertaken in thoracic surgical departments after lung cancer resection (1). The commonest epithelial lesion which indicates pulmonary metastasectomy is colorectal neoplasm. In 10–15% of cases, lung metastases are documented at advanced disease and are diagnosed mostly as multiple or bilateral metastases. Currently the practice of pulmonary metastasectomy is widespread, having a 5-year survival rates approximately 30–50 % (2). With the rise in number of pulmonary metastasectomy surgeries done, maintenance of one lung ventilation along with stable hemodynamics and adequate postoperative analgesia are the major concerns for an anaesthesiologist. One-lung ventilation (OLV) can be

accomplished in different ways: using a double-lumen endotracheal tube (DLT), blockade of a main stem bronchus with bronchial blockers (BB) or an endobronchial intubation (3).

CASE REPORT

A 32-year-old female, weighing 58 kg, height 167 cm, case of locally advanced mid rectal carcinoma, status post laparoscopic anterior resection with loop ileostomy and stoma closure, post neo adjuvant chemotherapy with capecitabine + FOLFOX and radiotherapy. She was detected with bilateral lung nodules on routine follow up scan, hence posted for bilateral lung metastasectomy. General examination and airway examination were within normal limits. All routine blood

tests and radiological investigations were normal. Pulmonary function test was of good quality except for mildly reduced diffusion capacity. After explaining the plan of anaesthesia in detail including the postoperative ICU stay, a written informed consent was obtained from the patient and relatives. On the day of the surgery, nil by mouth status was confirmed, a wide bore IV cannula was secured in the preoperative area and patient properly counselled regarding the anaesthesia plan prior to wheeling into the operation room. After a detailed discussion with surgeons regarding the plan of surgery, the final plan of anaesthesia with a thoracic epidural for postoperative analgesia, general anaesthesia with endotracheal intubation and bronchial blocker for lung isolation, along with invasive lines including an arterial line and a central line was made. Patient was taken in the operation room and all routine ASA monitors were attached. Baseline heart rate was 94/min, blood pressure 124/68 mm hg & room air saturation 98%. Under all aseptic precautions, a thoracic epidural catheter was inserted using an 18G Tuohy's needle at T8-T9 level after instilling local anaesthesia. General anaesthesia was induced after pre-oxygenation for 3-5 minutes using face mask, with 2 mcg/kg fentanyl and 2 mg/kg propofol intravenously. After checking ventilation, 0.5 mg/kg atracurium was given intravenously and patient was intubated with a 7.5mm ID endotracheal tube. A 14 Fr Ryle's tube was inserted via the right nostril. Under ultrasound guidance a triple lumen central line was inserted in right internal jugular vein and an arterial line was secured in left radial artery. For the purpose of lung isolation, an EZ blocker was inserted through the endotracheal tube under paediatric fiber optic bronchoscope guidance. Position of the blocker and adequacy of lung isolation was confirmed with the paediatric bronchoscope in supine as well as lateral positions. Since the patient had bilateral lung metastasis, both left and right lungs were isolated one after the other and after every repositioning i.e., right and left lateral decubitus, position of the EZ blocker was confirmed with the bronchoscope. The procedure was uneventful with stable hemodynamics maintained throughout. Since her vital parameters were stable and blood gas analysis reports were normal, decision to extubate on table was taken once she was fully conscious and had good spontaneous breathing efforts after administering reversal agents. Patient was shifted to ICU post extubation for close monitoring. Postoperative period was uneventful.

DISCUSSION

The two lungs on each side of the thoracic cavity are two separate organs, but act as one functional unit, to maintain the normal levels of oxygen and CO₂ in the blood. However, there can be situations when separation of these two from each other becomes essential for retrieving, retaining or maintaining healthy normal functioning of the body. This separation of two lungs achieved by preparation of the airway through proper manipulation and instrumentation, termed as 'lung isolation', makes each of them function as an independent unit. This provides improved exposure of the surgical field and protection of healthy lung from infected or bleeding lung (4). Lung separation and OLV are essential in several clinical situations. The choice of airway device for OLV depends on the experience of the anaesthesiologist and the requirements of the surgical procedure. Even though DLT is still the most commonly used device to enable single lung ventilation, in some situations conventional DLTs for one-lung ventilation are not feasible. In such cases, a bronchial blocker (BB) serves as a valuable alternative for the same (5). The BBs are used to occlude the main-stem bronchus, thereby preventing ventilation distal to the occlusion. In addition, BBs can be used to provide selective lobar collapse as well even though collapse of the right upper lobe can be difficult due to the proximal take-off of the right upper lobe bronchus, which is easily occluded by the bronchial cuff. BBs are placed either intraluminal within a single lumen tube (SLT) i.e., coaxially or placed separately adjacent and outside the SLT (6). The different types of BBs available for lung isolation currently include Univent Torque Control Blocker, wire guided Arndt endobronchial blocker, Cohen tip endobronchial blocker, coopdech bronchial blocker, Fuji Uniblocker and Rusch Bifid EZ-blocker. The main advantage of an EZB compared to other BBs is its Y-design,

which has similarities with the anatomic structure of the tracheobronchial tree. The Y-shaped distal part allows the blocker to anchor on the carina and helps in positional stability. Thus, the two distal extensions, which are positioned in the left and the right mainstem bronchi, mutually stabilize each other by applying counter pressure on the bronchial mucosa in case of surgical manipulation. Compared to other BBs, there is lower incidence of malpositioning, better lung isolation and less injury to the tracheal and bronchial mucosa with EZ blockers. EZ blockers are used in patients with a difficult airway or tracheostomy, increased risk of gastric regurgitation or who have unplanned OLV requirements during an ongoing surgery. An advantage of the EZB is the possibility to alternate OLV to either lung during bilateral procedures like bilateral VATS, bilateral metastasectomy, etc. Our case being a bilateral metastasectomy, isolation of both lungs one after the other in different patient positioning intraoperatively was the major concern. Out of the available choices for lung isolation, a bronchial blocker was the best option for OLV in our patient. Considering the various advantages and surgical requirements, we used an EZ bronchial blocker along with a paediatric fiber optic bronchoscope for guidance of correct placement and adequate lung deflation in right and left lateral decubitus positions. As our patient was a young female without any other comorbidities, she tolerated OLV and the surgery well with stable hemodynamics throughout the surgery. At the end of the procedure, in spite of one lung ventilation of both sides and long duration of surgery, patient was breathing spontaneously with good respiratory efforts maintaining 100% oxygen saturation along with good arterial blood gas report because of the good intraoperative anaesthetic management and pain control. Hence patient was extubated on table and shifted to ICU for close monitoring. Postoperative period was uneventful.

CONCLUSION

With the advancement in thoracic surgeries, the number of minimally invasive thoracic surgeries requiring one lung ventilation including bilateral metastasectomy and bilateral VATS are also rising. A detailed discussion about the surgical plan and formulating the plan of anaesthesia for OLV in accordance by an expert team of anaesthesiologists is a must for the successful management of such cases. Bronchial blockers like EZ blocker are a good option for OLV in cases requiring bilateral lung isolation. Good intraoperative management with adequate pain control helps in early extubation and good postoperative outcomes.

Financial support and sponsorship: Nil.

Conflicts of interest: There are no conflicts of interest

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