JARSS 2021;29(1):80-2
doi: 10.5222/jarss.2021.09815

Use of Point of Care Ultrasound for Real-Time Confirmation of Cranial Spread of Local Anesthetic for On-Table Extubation in a Child with Mediastinal Mass Compressing the Great Vessels

Marada Snehitha
Nishant Patel
Abhishek Singh
Rakesh Kumar

Sir,

A 2-month-old child weighing 4 kg presented with recurrent respiratory tract infection. On evaluation, the patient was found to have mediastinal mass arising from the right hilum of the lung extending into middle mediastinum compressing the great vessels and shifting trachea to the left side. On examination there was no history of cyanosis, swelling of the face in supine or lateral position but intercostal and subcostal retraction were present along with audible wheeze. Chest X-ray PA view showed homogeneous opacity in the right upper lobe and tracheal deviation to the left side [Figure 1a]. CT of the chest showed large well-defined mass measuring 40 x 39 x 42 mm in right hilum extending into the right middle mediastinum compressing and shifting great vessels, trachea and its bifurcation to the left side along with the collapse of adjacent right lung upper zone. The patient was scheduled for excision of the mediastinal mass through the right open thoracotomy approach.

We planned to use general endotracheal anesthesia along with caudal epidural catheter for surgery and postoperative analgesia. Operation theatre was warmed to 27°C, airway equipment such as pediatric bougie, 2 stylets, masks, laryngoscopes, video-laryngoscope, fiber optic bronchoscope, armoured and PVC ETTs 3, 3.5 and 4 uncuffed tube was kept ready.

Rigid bronchoscopy was kept at standby as it may be life-saving in the event of tracheal or bronchial collapse under anesthesia. In the operation theatre, standard ASA monitors were attached. The child was positioned in the left semi-lateral position. We have two plans for airway management of this child Plan A: Inhalational induction with sevoflurane and intubation and Plan B: If we can ventilate the child, then short-acting muscle relaxant to be given to facilitate intubation.

Anesthesia was induced with sevoflurane in 100 percent oxygen while maintaining spontaneous respiration in right lateral decubitus position with the patient's head raised with the help of folded towels [Figure 1b] to avoid external compression of an already compromised airway. After achieving an adequate depth of anesthesia, child was intubated with a 4mm uncuffed

Received: 27 July 2020
Accepted: 02 October 2020
Publication date: 29 January 2021

Cite as: Snehitha M, Patel N, Singh A, Kumar R. Use of point of care ultrasound for real-time confirmation of cranial spread of local anesthetic for on-table extubation in a child with mediastinal mass compressing the great vessels. JARSS 2021;29(1):80-2.

Abhishek Singh
Department of Anesthesiology, Pain Medicine and Critical Care Aiims, East New Delhi - India
bikunrs77@gmail.com
ORCİD: 0000-0002-4690-5118

M. Snehitha 0000-0002-8106-4596
N. Patel 0000-0001-9376-4963
R. Kumar 0000-0002-1539-8264
Department of Anesthesiology, Pain Medicine and Critical Care Aiims, East New Delhi - India

Figure 1a. Preoperative chest x-ray showing mediastinal mass with tracheal shifting

Figure 1b. Infant position during intubation

tracheal tube using CMAC video laryngoscope. A caudal catheter was placed with the patient in the left lateral position and the position of the tip was confirmed with the help of ultrasound congruent to surgical incision (Figure 2). Surgery was completed uneventfully. Of various factors delaying extubation in open thoracic surgery, pain is one of the important contributors [1]. At the end of the surgery, the child began to breathe spontaneously but we observed the presence of tachypnea, tachycardia, subcostal retraction, and paradoxical respiration. Considering pain as one of the differential diagnoses for the above clinical manifestations, 3 mL of 0.2% bupivacaine was given and after 5 minutes there was

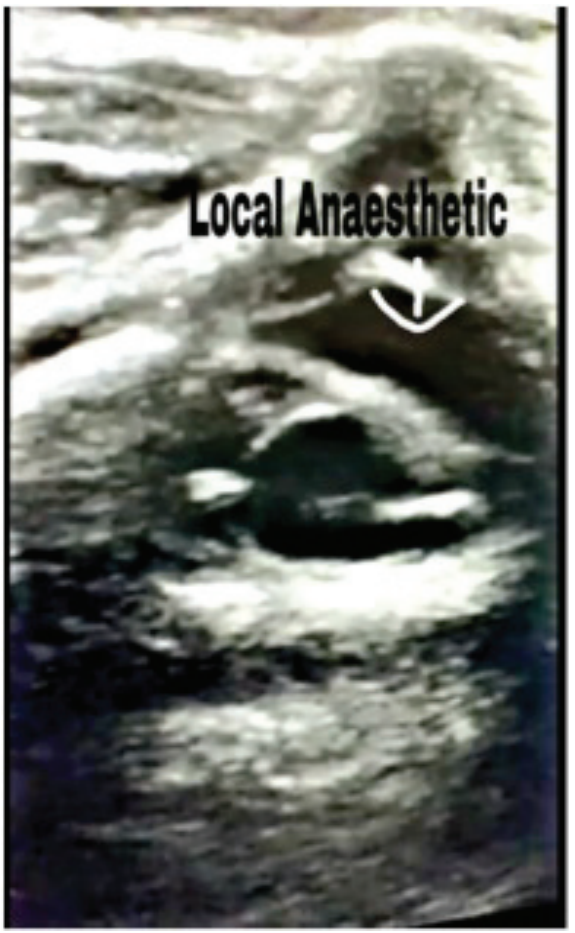

Figure 2. Dura indentation following local anesthetic injection in the short-axis view at the thoracic level congruent to the incision

a dramatic improvement in respiratory rate and pattern.

The child was extubated in the operation theatre and after monitoring for one hour in the post-anesthesia care unit, the child was transferred to ward care. The child received caudal morphine for 3 days and was discharged on the fifth postoperative day.

Mediastinal masses especially those present in the anterior mediastinum pose a significant challenge to the anesthesiologist, causing perioperative morbidity and mortality leading to major airway and vascular compression, which may be exacerbated under general anesthesia [2,3]. In children, with mediastinal mass, there is a history of cough, dyspnea, dysphagia, and recurrent chest infections whereas adults present with chest pain or dysphagia. Respiratory

signs and symptoms are more frequent in children due to relatively soft airways, which are more susceptible to compression, leading to partial collapse, emphysematous chest, and respiratory infections. Relaxation of bronchial smooth muscles under anesthesia increases the risk of compression of the airways since they are already constricted by the external pressure of the mass. Coupled with this, neuromuscular blockade adds to the risk of compression by decreasing the tone of the chest wall [4].

Pain is an important factor delaying extubation in open thoracotomy, hence adequate analgesia is important to reduce morbidity associated with mechanical ventilation [1].

Ultrasound can be used for real-time confirmation of the cranial spread of local anesthetic [5].

Caudal epidural analgesia may assist in the perioperative management of mediastinal mass in pediatric patients if we confirm the location of the tip of the caudal epidural catheter with the help of ultrasound so that high placement or coiling of the catheter in the lumbosacral region can be ruled out as it may cause respiratory complications and inadequate pain relief.

REFERENCES

1. Cywinski JB, Xu M, Sessler DI, Mason D, Koch CG. Predictors of prolonged postoperative endotracheal intubation in patients undergoing thoracotomy for lung resection. Journal of cardiothoracic and vascular anesthesia. 2009;23:766-9. https://doi.org/10.1053/j.jvca.2009.03.022
2. Ku CM. Anesthesia for patients with mediastinal masses. In Principles and Practice of Anesthesia for Thoracic Surgery 2011 (pp. 201-210). Springer, New York, NY. https://doi.org/10.1007/978-1-4419-0184-2_14
3. Slinger P, Karsli C. Management of the patient with a large anterior mediastinal mass: recurring myths. Current Opinion in Anesthesiology. 2007;20:1-3. https://doi.org/10.1097/ACO.0b013e328011390b
4. Hack HA, Wright NB, Wynn RF. The anaesthetic management of children with anterior mediastinal masses. Anaesthesia. 2008;63:837-46. https://doi.org/10.1111/j.1365-2044.2008.05515.x
5. Marhofer P, Bösenberg A, Sitzwohl C, Willschke H, Wanzel O, Kapral S. Pilot study of neuraxial imaging by ultrasound in infants and children 1. Pediatric Anesthesia. 2005;15:671-6. https://doi.org/10.1111/j.1460-9592.2004.01521.x