Dynamic examination of airway – A pivotal tool in anaesthetic management of mediastinal mass excision

Sir,

A 60-year-old woman with superior mediastinal mass was scheduled for video-assisted thoracoscopic surgery. Her complaints were dry cough, dyspnoea and swallowing difficulty. Cough and dyspnoea worsened in supine position. The mass was 8 cm (craniocaudal) × 5.5 cm (anteroposterior) × 8.7 cm (transverse) in dimensions. It extended from C6 to T5 vertebra, displacing the trachea anteriorly and oesophagus posterolaterally. Tracheal diameter at maximum compression was 5.2 mm, identified 4 cm above carina [Figure 1a and 1b]. There was no compression of great vessels. Her blood gas analysis and echocardiography were normal. After discussion with surgical team, preoperative awake fibreoptic bronchoscopy (FOB) was planned at cardiothoracic unit, keeping instruments for cardiopulmonary bypass ready. Difficult airway cart with adult and paediatric fibreoptic (5.9 and 3.6 mm) and rigid bronchoscope, tracheostomy kit were kept ready. FOB with adult fibreoptic bronchoscope revealed long segment narrowing from mid to lower trachea. To our pleasant surprise, the adult fibreoptic bronchoscope was easily passed till the carina [Figure 2a and 2b]. Procedure was uneventful. On the day of surgery, non-invasive blood pressure, electrocardiogram and pulse oximeter monitors were placed. Difficult airway cart with adult and paediatric fibreoptic and rigid bronchoscope was kept ready. Left radial artery was cannulated for arterial pressure monitoring. With patient in propped up position, airway topicalisation was done with lignocaine gargle and spray. With 7.5 mm flexometallic tube (FMT), FOB was done. FMT was passed beyond the narrowest part of trachea and kept above carina. Fentanyl 100 µg, midazolam 2 mg, glycopyrrolate 0.2 mg, propofol 100 mg, vecuronium 6 mg were given and ventilation confirmed. Surgery was done in left lateral position. Right lung collapsed with carbondioxide pneumothorax. Mass was dissected...
Letters to Editor

Figure 1: (a) Axial computed tomography (CT) image demonstrating tracheal compression by mass lesion. (b) Right parasagittal magnetic resonance (MR) image demonstrating extent of mass lesion with tracheal compression and displacement.

Figure 2: (a) Bronchoscopic image showing narrowed part of trachea. (b) Bronchoscopic image showing carina.

free from trachea, oesophagus and great vessels. Patient was haemodynamically stable throughout surgery. Oxygen, air, sevoflurane were used intraoperatively. Dexamethasone 8 mg, paracetamol 1 gm, fentanyl and vecuronium boluses were used. The patient required 100% oxygen intermittently during episodes of desaturation. Postextubation, the patient was comfortable. There was no breathing difficulty in the postoperative period. On histopathological examination, the mass was reported to be a liposarcoma.

The anaesthetic management of patients with mediastinal mass poses a challenge for the anaesthesiologist. In particular, anterior and superior mediastinal masses cause severe complications relating to compression of airways and vascular structures. A number of signs and symptoms are useful in predicting the increased risk during anaesthesia. Presence of a cough when supine, orthopnoea, stridor, or wheeze predicts respiratory complications. Syncopal symptoms and upper body oedema predict cardiovascular complications. On imaging, a reduction of >70% in tracheal cross-sectional area, carinal or bronchial compression, great vessel compression and pericardial effusion predict severe complications. However, problems may still occur in patients without these symptoms or signs. In our patient, imaging revealed severe tracheal compression. However, she had cough and breathlessness only in supine position and was otherwise comfortable. Also there were no signs or symptoms of vascular compression. Hence we planned to perform awake FOB to diagnose dynamic airway compression. Dynamic examination techniques like awake FOB can assist in the estimation of possible respiratory decompensation under anaesthesia. Our patient had a long segment narrowing of trachea on FOB. As tracheal diameter increased with inspiration, adult bronchoscope was easily passed through the narrowing. The soft and compressible nature of the mass (liposarcoma) probably caused a dynamic obstruction of the trachea. Hence, we were able to intubate with 7.5 mm FMT despite the narrowest part being only 5.2 mm in diameter. FOB even if done awake, can lead to complications, especially in patients with severe airway obstruction. Hence, careful selection of cases for FOB with backup plan is imperative. Vital information from imaging can be useful in this regard. Apart from anatomic extension, information about the contents of mass (fat, fluid or solid), presence of calcifications or fibrosis, tracheal narrowing and invasion can give us clues regarding the nature of tracheal obstruction. This can guide us regarding the need for preoperative FOB in the evaluation of mediastinal mass.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the legal guardian has given his consent for images and other clinical information to be reported in the journal. The guardian understands that names and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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There are no conflicts of interest.

Khaja Mohideen Sherfudeen, Nirmal Kumar Sankaral, Senthil Kumar Kallannan, Sasikumar Palanivel
Department of Anaesthesiology, Kauvery Hospitals, Trichy, Tamil Nadu, India

Address for correspondence:
Dr. Khaja Mohideen Sherfudeen, Kauvery Hospitals, Tenur, Trichy - 620 017, Tamil Nadu, India.
E-mail: khaja.sherfudeen@gmail.com
Need for a central survey-based registry for effective conduct of survey-based medical research

Sir,

A research survey is the process of conducting research using a survey and is considered as the easiest way of collecting considerable information from which the researchers can analyse and draw a meaningful conclusion in a relatively short period. Survey-based research is of extreme priority; for example, in the coronavirus disease (COVID)-19 pandemic itself, there has been a tremendous increase in survey-based studies, and some of them are repetitions of each other. Hence, it is necessary that research-based surveys and those prepared by different researchers on the same topic of interest should be standardised. We feel that there is an urgent need to build a survey-based repository of sources or a survey-based registry, which can act as a key contributor to monitoring survey-based research done every year in India. The registry can provide a fixed template of questions and help researchers define their survey objective, hypothesis, types of questionnaire, validity, and reliability. The survey registry web network can provide a platform to help collaborate amongst researchers from different regions, who can share their ideas. This can provide a new horizon of interaction amongst researchers working on similar survey-based research across the country. We also propose a checklist for review of survey design protocol, which can help future researchers compile their survey. This checklist should be available on the Survey Registry website, and every researcher conducting a survey may be asked to fill this checklist before applying for registration in the Central Survey Registry. Survey hubs/registries can also provide expert-designed survey templates, making it easier for researchers to choose and conduct their study. The survey will have no meaning if the survey methodology and plan are not defined before it is deployed. There should be a standard length of questionnaire dictated by core data metrics that need to be collected, and it is essential to avoid redundant questions in every way possible. It is imperative to use easily understandable language text in the survey. The validity of the survey must be ensured, as an invalid survey may yield faulty results. Survey data analysis should also be clearly defined while submitting a proposal of survey-based studies. There are multiple analysis methods, including the excel method of analysis, cross-tabulation, trend analysis, Max-Diff analysis, conjoint analysis, total unduplicated reach and frequency (TURF) Analysis, etc. The central regulated Survey Registry body can work as a regulatory body to monitor and supervise survey-based registry activities.

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