Children with anterior mediastinal mass: procedural sedation with dexmedetomidine
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Introduction
Anaesthetic considerations for children with anterior mediastinal mass are problematic and challenging. This group of children, who may present with little or no symptoms from cardiovascular and respiratory compromise, is at high risk for sudden airway obstruction, cardiovascular collapse and death on the operating table.

We report two children with anterior mediastinal mass who underwent biopsy and venous port insertion under superficial cervical plexus block (SCPB) and dexmedetomidine sedation. Patients’ permission was obtained to publish this case report.

Case report
Case 1
A 10-year-old boy weighing 19 kg presented with a 3-month history of intermittent fever, chills and rigor with a marked reduction in effort tolerance.

On examination, there were multiple cervical and inguinal lymph nodes with gross hepatosplenomegaly. Severe anaemia was present.

His chest radiograph (Fig. 1) showed a large mediastinal mass. The computed tomography (CT) scan revealed a large soft tissue mass within the anterior and middle mediastinum completely encasing the trachea without tracheal compression and also encasing the arch of aorta, left and right pulmonary artery and the superior vena cava. However, these vessels were not compressed.

In view of inconclusive peripheral blood film and fine needle aspiration cytology results, a lymph node biopsy was needed. Under dexmedetomidine sedation, an ultrasound-guided right SCPB was performed. Standard monitors were applied and his respiratory rate and depth of respiration were closely observed. A loading dose of dexmedetomidine 1 μg·kg⁻¹ was given intravenously over 10 min followed by a maintenance infusion of 0.5–1 μg·kg⁻¹ per h. He was positioned supine for the procedure. With ultrasound guidance and out-of-plane approach, 5 ml of 0.5% levobupivacaine was deposited in the fascial plane just below the midpoint of the posterior border of the sternocleidomastoid muscle using a 24G, 25 mm short-bevel needle (Plexufix, B Braun, Melsungen, Germany). After 15 min, the surgeon was able to excise three cervical lymph nodes situated posterior to the sternocleidomastoid muscle.

Biopsy result revealed Hodgkin’s disease. For administration of chemotherapy, a subcutaneous venous port was implanted 10 days later under dexmedetomidine sedation, using a similar regime as described above. This enabled the successful performance of a SCPB and port implantation.

In both procedures, performed at separate times, the patient breathed spontaneously with oxygen supplementation via nasal prongs. There was no untoward event in the perioperative period. His respiratory rate was 15–20 min⁻¹. Reduction in blood pressure (BP) and heart rate (HR) was less than 15% from baseline.

Case 2
A 12-year-old boy weighing 24 kg presented with 3 days history of cough, chest discomfort, facial swelling and distended veins over the chest. There was no history of exertional dyspnoea, difficulty in breathing or stridor.

Chest radiograph showed a huge mediastinal mass. CT scan showed a large heterogeneous mass at the anterior mediastinum encasing the left brachiocephalic vein with superior vena cava compression. The great vessels and the trachea were displaced posteroinferiorly (Fig. 2). Small pleural effusion was also noted bilaterally. Previous biopsy of the mediastinal mass performed under general anaesthesia revealed B-type non-Hodgkin’s lymphoma.

He required a subcutaneous venous port for which sedation with a similar dosage of dexmedetomidine was administered, as in case 1. Prior to the ultrasound-guided SCPB, 0.5 mg·kg⁻¹ of ketamine was administered intravenously. Supplemental local infiltration was given at the incision site for the port reservoir. Oxygen supplementation was via nasal prongs. The procedure finished uneventfully with minimal reduction in BP and HR.

Discussion
The clinical application of dexmedetomidine as a sedative agent in children continues to be explored.

Dexmedetomidine has been used as part of a general anaesthetic with placement of laryngeal mask airway in a child with an anterior mediastinal mass. The use of dexmedetomidine for sedation has been reported in an adult for anterior mediastinotomy.

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Mediastinal masses can be classified according to anatomic location. Generally, anterior mediastinal mass results in the most severe and critical complications arising from compression of vascular and respiratory structures. Although some children are stable at admission, sudden complications can occur. Their high risk is exacerbated by the smaller airways and reduced cardiorespiratory reserves. Anghelescu et al.\(^4\) recommended minimal anaesthetic intervention in patients who present with orthopnoea, upper body oedema, great vessel compression and main stem bronchus compression.

Guidelines for the anaesthetic management of children with anterior mediastinal mass are available.\(^5,6\) Diagnostic procedures have been performed under local anaesthesia in adults to avoid the deleterious effects of a general anaesthetic, but this technique may be difficult in children, often making it necessary to choose general anaesthesia. With dexmedetomidine, the maintenance of spontaneous respiration for procedural sedation is clearly a major and desirable advantage in this category of children because this technique would avoid the need for co-operation under local anaesthesia or multiple risks of general anaesthesia (whether with airway control by supraglottic airway device or intubation). The two cases demonstrate that dexmedetomidine can achieve a safe and successful outcome.

Dexmedetomidine has a wide safety margin that includes the production of stable respiratory parameters even though the sedation state of dexmedetomidine is dose dependent and, therefore, at large doses, deep sedation or even general anaesthesia is possible.\(^7\) However, dexmedetomidine as a sole agent for more painful procedures such as biopsy, performance of a regional block or insertion of a subcutaneous venous port may not be uniformly effective because of the limited analgesic property. Combining dexmedetomidine and ketamine is suitable for painful procedures, with the latter at a lower dose. As demonstrated in case 2, this enabled the completion of painful procedures without episodes of apnoea, oxygen desaturation and coughing. The sympatholytic and haemodynamic effects of dexmedetomidine (bradycardia, hypotension) are balanced by the sympathomimetic effects of ketamine (tachycardia, hypertension).

Such children are at high risk for morbidity and mortality and deserve meticulous attention, although the procedures are minor in comparison. It cannot be overcautious to state that whatever benefits drugs such as dexmedetomidine may offer as sedation for children with anterior mediastinal mass, a collapsed airway can still occur. Vigilance is necessary. If bleeding occurs, it may be essential to convert to general anaesthetic. In our institution, the cardiothoracic surgeon is on standby for rigid bronchoscopy should airway obstruction occur. Some authors have recommended the immediate availability of cardiopulmonary bypass before induction of anaesthesia.

We suggest that procedural sedation with dexmedetomidine is a promising technique in children with anterior mediastinal mass which meets the goals of minimum anaesthetic intervention with maximum safety.

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**References**


General anaesthesia for caesarean sections: are anaesthetists dealing with exaggerated fear?
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Introduction
General anaesthesia for caesarean sections (c-sections) is feared to be associated with high incidence of airway problems and so the majority of c-sections are performed under regional anaesthesia which decreases the experience of anaesthetists in general anaesthesia for such procedures.1-4 Therefore, young anaesthetists invariably face a lot of pressure when administering general anaesthesia to obstetric patients, especially in emergency conditions.5 Based on an 8-year experience of general anaesthesia for c-sections at Aziz Fatima Hospital, Faisalabad, Pakistan, our point of view on general anaesthesia for c-sections is slightly different from the current popular point of view on this subject. We believe that in the absence of additional risk, for example obesity, pregnancy alone does not significantly increase the risk of airway complications in obstetric patients. We report here our experience/observations about the incidence of regurgitation and failed intubation involving patients primarily scheduled for c-sections under general anaesthesia.

Methods
After the approval of an ethical committee of the Aziz Fatima Hospital, Faisalabad, Pakistan, of the protocol ‘GA for c-sections 1991–1999’ (Chairperson Dr Tariq Javid), a retrospective observational study was performed to determine the incidence of regurgitation and failed intubation during an 8-year period from 1991 to 1999 in parturients who received general anaesthesia for their c-sections. The patients who had general anaesthesia following a failed spinal block were excluded. Data were retrieved from a paper-based anaesthesia and postoperative record.

During the 8 years, there was a consistent technique for induction of general anaesthesia for c-sections. Anaesthesia was managed by a team of four experienced anaesthetists consisting of a consultant and three staff grade professionals. Patients were given no antacid premedication. Anaesthesia was induced after draping the patient, and a surgeon was standing by ready to proceed immediately after tracheal intubation was achieved. The patient’s head was stabilised on a sand bag in sniffing position and the body was placed in a slight reverse-Trendelenburg position. Each patient was given metoclopramide 10 mg intravenously followed by preoxygenation for 3 min, a sleeping dose of thiopentone (4-6 mg kg⁻¹ body weight) and suxamethonium (1.5 mg kg⁻¹ body weight) to intubate the trachea. No cricoid pressure was applied and lungs were gently mask ventilated until full relaxation was achieved. No other device except a laryngoscope and a gum-elastic stylet was available for airway management. Occurrence of clinical and subclinical regurgitation was based on anaesthetist’s direct observation and on perioperative clinical and radiological indicators in suspected patients. Patients who developed postoperative problems such as a cough, fever, and so on were investigated. Endotracheal intubation was assumed to have failed if general anaesthesia was maintained for a c-section without an intubation or general anaesthesia was terminated to consider an alternate form of anaesthesia for the c-section.

Results
A total of 2114 parturients received general anaesthesia of which 1018 were assessed as American Society of Anesthesiologists-I (ASA-I), 1004 ASA-IE, 66 ASA-II and 26 as ASA-III. Of the 2114 c-sections, 1030 (49%) were emergency procedures. Thirty (1.4%) patients were assessed having Mallampati-III grade. No study patient had any other major risk factor for regurgitation, for example morbid obesity, gastro-esophageal reflux or opioid labour analgesia. Other parturient-related characteristics are summarised in Table 1.

No incidence of clinical/subclinical regurgitation or a failed intubation in the study population was observed (0/2114). Eight (0.4%) patients complained of mild hoarseness immediately after recovery from anaesthesia and this was determined to be due to inadvertent laryngeal trauma during endotracheal intubation. Five (0.23%) patients presented with fever and rigors on the 2nd postoperative day. Three (0.14%) of those patients were diagnosed as having a urinary tract infection and two (0.09%) having bilateral basal atelectasis of lungs. Chest radiographs of those patients did not show any feature suggestive of pulmonary aspiration.
Discussion

Results of this study indicated that the incidence of airway complications related to general anaesthesia for c-sections in the study population was extremely low (0%). Djabatey and Barclay\(^5\) have reported a similar success with traditional rapid sequence induction technique of general anaesthesia in a series of 3430 low-risk c-sections involving experienced anaesthetists. In a recent study of 1095 c-sections involving anaesthetists of variable experience, McDonnell et al\(^4\) reported the occurrence of regurgitation and a failed intubation in eight and four patients, respectively, and their reported incidence is similar to the one previously reported by many other investigators.

In spite of limitations resulting from the retrospective and weak nature of the data, the results of this study are overall reassuring for anaesthetists. Our observations clearly indicate that in the absence of additional risk factors, parturients are not at any significant extra risk of regurgitation or failed intubation. Traditionally reported higher incidence of such complications may be due to compromised experience of anaesthetists and the application of cricoid pressure\(^6,7\).

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References


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Table 1 Parturient characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
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<tbody>
<tr>
<td>Age: mean (range) years</td>
<td>27 (19–37)</td>
</tr>
<tr>
<td>BMI: mean (range) kg m(^{-2})</td>
<td>23 (21–27)</td>
</tr>
<tr>
<td>Cause for c-section(^a): mother/foetus</td>
<td>1275 (60%)/839 (40%)</td>
</tr>
<tr>
<td>Count of c-section(^a): first/repeat</td>
<td>1428 (67.5%)/686 (32.5%)</td>
</tr>
<tr>
<td>Nature of pregnancy: singleton/twin</td>
<td>2076 (98%)/38 (2%)</td>
</tr>
<tr>
<td>Pregnancy-induced hypertension:</td>
<td>2048 (97%)/66 (3%)</td>
</tr>
<tr>
<td>Gestational diabetes: absent/present</td>
<td>2089 (99%)/25 (1%)</td>
</tr>
</tbody>
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*Caesarean section. Figures are in absolute number as well as in percentage of the total study population.*