Dry Spinal Tap And LMA Insertion In A Patient With Byssinosis

S Rao, A Shetty, S Pandya

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Abstract

This case report describes an unusual complication of neuraxial anesthesia in a patient with co existing Byssinosis and occupational noise induced hearing loss. The patient was posted for bipolar hemiarthroplasty following a fracture neck femur. Central neuraxial blockade was chosen for this patient. Spinal anesthesia was attempted by an experienced anesthesiologist. Since there was a genuine dry tap , LMA was later inserted, as the patient had a higher risk for endotracheal intubation and positive pressure ventilation. Inspite of getting the typical “give way” following repeated attempts at lumbar puncture , no flow of cerebrospinal fluid was obtained. Complete dry tap is rarely seen and reported and this case is interesting as the patient had co existing occupational lung disease which precluded general anesthesia and endotracheal intubation. The surgery was successfully carried out under LMA insertion and spontaneous respiration. This technique can be used in such patients in whom regional anesthesia fails and the patient is at a high risk for endotracheal intubation.

INTRODUCTION

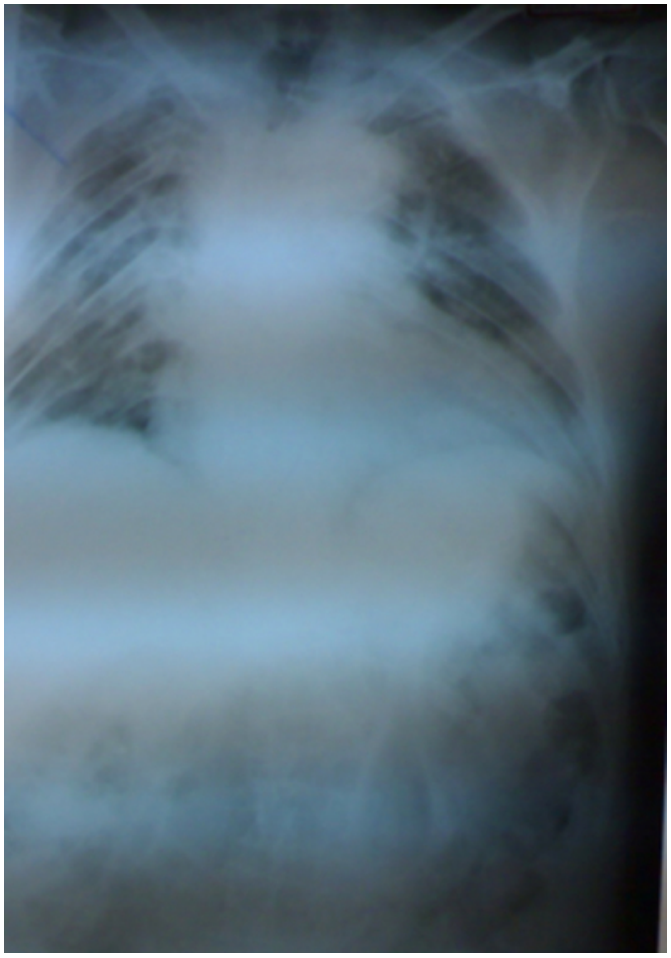
This patient was a 70 year old, 65 kg male, who was posted for bipolar hemiarthroplasty following a fracture neck femur which he sustained after a fall. A complete history and general physical and systemic examination was done as a part of pre anesthetic check up. The patient had history of systemic hypertension and was on tab. Atenolol 50 mg OD , taking regular treatment for the past 20 years. There was no history of Bronchial asthma, tuberculosis, ischemic heart disease or any other medical history. The patient had not undergone any surgery earlier in his life and at present he was taking pain killers apart from his antihypertensive treatment. Occupational history revealed he worked in a cotton mill for the previous 30 years and he had associated noise induced hearing loss due to which he was not fully oriented to person. The patient was also a chronic smoker for 10 years.

A general physical examination revealed normal vitals , with a blood pressure of 140/90 mm Hg, there was no pallor , icterus , cyanosis or clubbing , no signs of left or right heart failure . The patient did not show any signs of respiratory distress at rest. Auscultation of the cardiovascular system proved normal. Auscultation of the respiratory system revealed occasional rhonchi and crepitations scattered over the lung fields. Consultation with chest medicine specialist confirmed the diagnosis of occupational lung disease and regional anesthesia , namely spinal anesthesia was planned for the surgery.

Pre operative investigations revealed Hb of 11 gm/dl , with normal counts and normal liver and renal function tests. ECG showed signs of left ventricular hypertrophy and left axis deviation. A Pre operative Chest X ray showed scattered opacities in both the lung fields, along with emphysematous changes and cardiomegaly (FIG 1) .

Figure 1

Figure 1: Chest x ray showing lung infiltrates and cardiomegaly, with emphysematous changes.



A pre operative ABG was done on room air to know the oxygenation status , it revealed a pH of 7.31 , PaCO2 of 35 mmHg , paO2 of 80 mm Hg , with normal bicarbonate values. Pre operative pulmonary function tests revealed moderate to severe restrictive lung disease , thus placing the patient at a higher risk for general anesthesia.

Premedication included Inj. Glycopyrrolate and oral anxiolytics prior to surgery. The antihypertensives were continued on the day of the surgery. After confirming starvation and checking consent, patient was taken into the operation theatre and routine monitors were attached and intravenous line was secured. Inj. Hydrocortisone 100 mg i.v. and Inj. Deriphylline i.v. were given apart from intravenous antibiotics. Salbutamol nebulisation was started with oxygen via face mask. In sitting position, after appropriate aseptic precautions, skin and subcutaneous tissues were infiltrated locally with Inj. 2 % Lignocaine 2 ml. Lumbar puncture was attempted with a 23 G Quincke needle in the midline approach at the L3-L4 space. The spaces were narrow due to which navigation of the needle was difficult. Lumbar puncture was repeated again with a 25 G Quincke needle in the midline approach in the same space. Though a distinct “give way “ was felt , there was no flow of cerebro spinal fluid. The procedure was repeated at 2 different spaces, namely L4-L5 and L2-L3 for 7 times, with same results. Changing the approach to paramedian did not yield any successful results. Aspiration using a 2 ml syringe did not yield any CSF. We used the fluoroscopy in the orthopedic operation theatre to confirm the position of the spinal needle, which showed the needle placed deep in between the vertebrae, which provisionally implied it was in the subarachnoid space. 3 ml of 0.5 % Heavy Bupivacaine with 25 microgm Inj. Fentanyl was injected into the assumed “subarachnoid space” and the patient was made to lie supine. We observed the patient for the next 20 minutes for any signs of sensory and motor block , which we could not elicit. Since the patient was not very oriented to person and had a hearing loss , sensory level by pinprick could not be elicited. But the patient had pain on manipulation of the fracture site. We concluded that the spinal anesthesia has failed , and we decided to go ahead with general anesthesia with Laryngeal Mask Airway no. 4. The patient was induced with Inj. Propofol 1 mg/kg and Sevoflurane 4 % . LMA no. 4 was introduced and secured appropriately. The patient was maintained on spontaneous respiration with a mixture of oxygen and Sevoflurane throughout the surgery. There was no evidence of any intra operative bronchospasm. Surgery proceeded in the lateral position uneventfully with normal intra operative ABG. At the end of the surgery , the LMA was removed after discontinuing the inhalational agent. The patient was observed postoperatively for 1 hour and a post operative ABG was normal and patient was sent to ward.

DISCUSSION

A major advantage of spinal anesthesia is its definitive endpoint which is the free flow of cerebrospinal fluid ($_{1}$). Occasionally the needle is felt to be in the correct space, but on withdrawing the stylet there is no CSF flow (‘dry tap'). Common sense dictates that the procedure be repeated, but if the outcome remains the same and if the patient is at a higher risk for endotracheal intubation and positive pressure ventilation, then the options are limited. Causes of dry tap include a blocked needle, needle in the wrong space, spinal surgery and low CSF pressures. It can also be congenital or acquired lumbar canal stenosis or adhesive arachnoiditis. It is possible that in patients with ‘absent' CSF or very low CSF pressure, the subarachnoid space is obliterated as the arachnoid “collapses” on the pia. This increases the volume

of the subdural space and may explain the absence of CSF. In this setting an epidural may be considered, but is not without potential drawbacks as a dural tap may go unrecognized. A final block would not have subjected the patient to any undue risk because of the small volume of local anesthetic involved. ([2])

Electrical stimulation is a useful and reliable 'real-time' technique to confirm epidural insulated needle placement. Not only do muscle twitches elicited by low current stimulation detail the position of the insulated needle within the epidural space, but the threshold current for motor responses can also be used to predict intrathecal placement. Insulated needles correctly situated within the epidural space should result in muscle twitches being elicited with a current well above 1 mA. However, whenever a motor response is detected at currents below or around 1 mA, intrathecal, or subdural placement should be suspected ([3,4]). But , experience with the technique is based upon results using an insulated needle or catheter, whereas commonly used spinal needles are uninsulated , so this method was not tried . ([5])

Byssinosis is a form of occupational lung disease, which manifests with breathlessness, tightness or compression in the chest and objective evidence of airway obstruction over progressively longer periods of working week. The disease usually develops after ten or more years of exposure and is more common in smokers. The patient may complain of cough and wheezing occasionally. Unlike atopic asthma, skin tests are not confirmatory in byssinosis. The mechanism by which cotton and other vegetable fibre causes narrowing of airway is not understood. Various hypotheses have been suggested i.e. non-immunological local release of histamine in the lungs, an antigen-antibody reaction, bacterial endotoxins and fungal enzymes ([6]). The two most widely investigated theories of pathogenesis are related to the presence of histamine releasing substance or endotoxin in the cotton with bulk of evidence supporting the latter.([7])

This case report generates interest for the following reasons. Dry tap, involving multiple levels is rarely reported in the literature. Improper technique is one of the major reasons ,but here the lumbar puncture was attempted by an experienced anesthesiologist with experience more than 15 years. This patient had evidence of interstitial lung disease, which precluded endotracheal intubation and positive pressure ventilation. The relatives did not consent for post operative mechanical ventilatory support which would be required in this patient if endotracheal intubation was attempted.

Hence , introducing LMA and maintaining the patient on spontaneous respiration proved useful in successfully conducting the surgery. This technique can be used as an alternative in such patients, in whom regional anesthesia fails and the patient is at a high risk for endotracheal intubation and positive pressure ventilation.

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Author Information

Shilpa Rao, MD
Resident, Department of Anesthesiology, Seth G.S. Medical College and K.E.M. Hospital

Anita Shetty, MD
Associate Profesor, Department of Anesthesiology, Seth G.S. Medical College and K.E.M. Hospital

Sarla Pandya
Professor and Head, Department of Anesthesiology, Seth G.S. Medical College and K.E.M. Hospital