Delayed Pneumothorax After Supraclavicular Block

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Brachial Plexus block is a method of choice of anaesthesia for upper limb surgeries. The commonest complication of brachial plexus block using supraclavicular approach is pneumothorax. Other less frequent complications of this technique are hematoma, injury to nerves, phrenic nerve block, horner’s syndrome etc.1 The pneumothorax occurs during or immediately after the procedure and expands much faster especially when GA using nitrous oxide is administered along with. We present a case where pleuritic pain appeared immediately but pneumothorax appeared on 3rd post operative day. This case report highlights the importance of remaining vigilant postoperatively for few days after brachial plexus block.

CASE REPORT
A 55 yr old male weighing 65 kg had fracture of radius & ulna right side and was posted for forearm plating. All preoperative routine investigations and blood biochemistry were within normal limits. There was no history of head injury, chest or abdominal trauma. Supraclavicular brachial plexus block was planned.Peripheral intravenous access was secured. All monitors were attached and patient was monitored for heart rate (HR), non invasive blood pressure (NIBP) and pulse oximetry (SpO₂). After proper positioning of arm, under all aseptic precautions right supraclavicular block was performed with paresthesia technique. Combination of both 0.5% bupivacaine & 2% lignocaine with adrenaline was used. After the drug was injected patient complained of pain in chest and at the back. On inspection chest expansion was equal and on auscultation air entry was bilaterally equal. X-ray chest performed showed no pneumothorax. Sedation was given, patient settled and after achieving adequate anaesthesia under brachial plexus block, surgery was allowed to commence. Surgery was completed in two and a half hours uneventfully and patient was shifted to recovery room. In the recovery room patient again started complaining of chest discomfort on right side. Vitals were BP- 130/70 mmHg, HR-90/min regular, SPO₂-100 %. On inspection, chest expansion was still equal on both sides and as before on auscultation air entry was equal bilaterally. Inj. tramadol 100mg intravenously and diclofenac sodium 75 mg intramuscularly were supplemented. Repeat X-ray chest was done which was again within normal limits. An ECG was also done, which showed normal sinus rhythm but patient continued having mild chest pain inspite of conservative management. He was advised rest, oxygen supplementation, sedation and analgesia for 24 hrs postoperatively. He resumed normal activity on second day onwards. On third postoperative day patient again started complaining of severe chest pain right side along with dyspnoea. Vitals were BP-130/80 mmHg, HR-96/min regular, SPO₂-95%. X-ray chest was repeated which showed pneumothorax of right side with partial collapse of right lung. Surgical intervention was done and an intercostal tube drainage was inserted in right 5th intercostal space in mid clavicular line with water seal. Post procedural X-ray showed fully expanded lung. Chest tube was taken out after 72 hrs. The patient was discharged on seventh post operative day in a stable condition.

DISCUSSION
Pneumothorax is the commonest complication of brachial plexus block especially when supraclavicular approach is used. The prevalence of pneumothorax following supraclavicular block ranges from 0.5 to 6 percent and diminishes with experience. The onset of symptoms is usually delayed and may take upto 24 hours.1 It occurs because apex of the lung is just medial and posterior to the brachial plexus and behind the first rib. When pleura is punctured there is sudden onset of chest pain which may be associated with dyspnoea, cough & rarely haemoptysis. On physical examination, there may be decreased excursion of the affected side, increased resonance on percussion & decreased breath sounds on auscultation. Pneumothorax in the postoperative period needs to be differentiated from bronchospasm, pulmonary edema, pulmonary embolism and pulmonary aspiration.

X ray chest in upright position helps in detecting pneumothorax, but in supine position air tracks to the anterior costophrenic sulcus. Thus radiographic signs of pneumothorax in supine position tends to be more subtle with approximately 30% of pneumothoraces going undetected.2,3 In case of difficulty in diagnosing a
pneumothorax in supine patients, modalities such as thoracic ultrasound and CT scan can be beneficial, but these were not available to us in the operating room. Rowen et al found that USG had an estimated sensitivity and negative predictive value of 100% & specificity of 94%. Rowen et al found that USG had an estimated sensitivity and negative predictive value of 100% & specificity of 94%. Non specific ECG changes such as decrease in amplitude of ECG complex may occur before clinical symptoms developed. Right axis deviation, precordial T wave inversion & electrical alternans are other ECG changes seen with tension pneumothorax. However, it was normal in our case. Since patient gave history of chest pain but no other clinical or investigational features of pneumothorax, he was kept on conservative management for 24 hours. There may be a latent period of variable duration between the needle insertion into the pleura and development of pneumothorax. If the size of puncture on the lung surface is small it may be sealed off before symptomatic pneumothorax develops. However if the size of puncture is large and when patient exerts, the air may leak into the pleural space resulting in clinical presentation of pneumothorax. The delayed pneumothorax in our patient could either be due to rent opening up on third postoperative day when patient exerted or because of x-rays not showing pneumothorax as they were done in supine position. Upright x-ray done on third postoperative day showed pneumothorax requiring intercostal tube drainage.

We therefore suggest that whenever pleural puncture or pleuritic pain occurs, one should not rely only on X-ray chest that too in supine position. On table portable ultrasound may be useful adjunct in diagnosing even a minimal pneumothorax. Serial chest X-ray for 3 days may be done, keeping in view the possibility of latent pneumothorax after brachial plexus block.

REFERENCES
1. Wedel DJ. Nerve blocks. In: Cucchiara R F, Miller ED, Reves JG, Roizen MF, Saverese J J. Editors. Anaesthesia, 5th Edition. California: Churchill livingstone. 2000: 1520-48.
2. Soew A, Kazerooni EA, Perricano PG, et al. Comparison of upright inspiratory & expiratory chest radiographs for detecting pneumothoraces. AJR Am Roentgenol.1996; 166: 313.
3. Kong A. The deep sulcus sign. Radiology. 2003; 228: 415.
4. Rowen KR, Kirkpatrick AW, Liu D, et al. Traumatic pneumothorax detection with thoracic US: correlation with chest radiography and CT- initial experience. Radiology 2002; 225: 210.
5. Tagliabue M, Casella TC, Zincone GE, et al. CT and chest radiography in the evaluation of adult respiratory distress syndrome. Acta Radiol. 1994; 35: 230.
6. Botz G, Brock Utne JG. Are electrocardiogram changes the first sign of impending peri-operative pneumothorax. Anaesthesia.1992; 47: 1057.
7. Walston A, Brewer D, Kitchens C. The electrocardiogram manifestation of spontaneous left pneumothorax. Ann Intern Med. 1974; 80: 375.
8. Denlinger JK: Pneumothorax. In: Orkin FK and Cooperman LH.(Eds) complications in Anaesthesiology. Philadelphia. JB Lippincott.1983: 171-81
9. Gupta R, Singh B, Deva C, Afzal L. Pneumothorax resulting from General Anaesthesia following brachial plexus block. J Anaesth Clin Pharmacol 1997; 13: 81-3.

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