

CHEST X RAY FOR DETECTING PNEUMOTHORAX AFTER BRACHIAL PLEXUS BLOCK: IS IT ENOUGH?

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Abstract:

Background: Pneumothorax is a common complication with classic approach of supraclavicular brachial plexus block technique. Which may be appear immediately or delayed.

Case report: We report a 75 years, cachexic, ASA grade IV female (with respiratory and cardiac problem), had cellulitis of left arm and need amputation. She received brachial plexus block with supraclavicular technique, had developed pneumothorax after 40 hrs.

Conclusion: This observation demonstrates that we should monitor the patient over 48 hours with suspicion of pneumothorax, so immediate care can be provided.

Key words: Supraclavicular block, Pneumothorax, Cachexic Patient, Pleura.

INTRODUCTION

Brachial plexus block is method of choice of anesthesia for upper limb surgeries. The commonest complication of brachial plexus block using supraclavicular approach is pneumothorax and less frequent complications are hematoma, injury to nerves, phrenic nerve block, Horner syndrome etc.¹ We represent a case of elderly, cachexic patient with cardiac and respiratory disease, developed tension pneumothorax on 2nd post-operative day. This case report highlights the importance of remaining vigilant post operatively for 48 hours after classical approach of brachial plexus block.

Case Report:

A 75 years old female, cachexic weighing 40 kg (figure 1), height 140 cm, ASA grade IV, with shortness of breath had cellulitis of left arm ,scheduled for amputation of left arm in O.T. of department of plastic & reconstructive surgery. During pre-anaesthetic evaluation, patient vitals were normal and gave history of shortness of breath on exertion since 10 years. On examination of respiratory system, patient had barrel shaped chest. On auscultation, air entry was bilaterally equal, wheeze was present on both side. Chest X-ray of the patient indicated cardiomegaly and emphysematous changes (figure 2). Cardiovascular system: S1 and S2 normal, no murmur and ECG indicated ST depression and T inversion in V₁₋₆ leads

(LBBB).The report of 2D-echo indicated dilated left atrium, pulmonary artery, right atrium and right ventricle; Grade 4/4 tricuspid regurgitation, moderate pulmonary artery hypertension and pulmonary artery systolic pressure was 60 mmHg. LVEF was 60% and patient also had grade ¼ mitral regurgitation with aortic sclerosis with grade ¼ aortic regurgitation and other investigations were within normal limit. Considering these cardiac and respiratory abnormalities, patient was not fit for general anaesthesia, so supraclavicular block was planned and overnight fasting instructed. Peripheral line was secured. Patient vitals were monitored: BP-130/84 mmHg, HR - 90 mmHg, SpO₂-93% on air.ECG shows ST depression and T inversion in V₁₋₆ leads. Left supraclavicular block was performed using nerve stimulator, as we do not have USG in our department. Local anaesthetic agent 2% lignocaine with adrenaline, 12 mL, diluted with normal saline up to 20 mL was given. After drug injection there was no chest pain, no cough and bilateral air entry was equal. Surgery was uneventful. Post operatively on shifting patient was conscious, oriented, alert, vitals were BP-140/87 mmHg, HR- 98/min, SpO₂ -95% on air with no respiratory distress. On auscultation bilateral air entry was equal and patient shifted in postoperative ward. After 24 hours of block in the ward patient developed difficulty in breathing, SpO₂ was 93% on air, BP-134/87 mmHg, PR-100/min. 100% oxygen was supplemented by polymask. Chest X ray was done, which shows bilateral clear lungs with no signs of pneumothorax. Post –operative day 2nd(approx. 40 hours after surgery), she had severe difficulty in breathing with tachypnea ,PR -110/min, BP-130/76 mmHg,SpO₂ 85-90%. On auscultation air entry was decreased on left side. Immediately chest x ray was done, which shows left side pneumothorax (figure 3) and immediately chest tube (ICDT) was inserted. After 1 hour patient’s respiratory rate was decreased and on auscultation bilateral air entry was equal. Intensity of respiratory distress decreased and patient was comfortable. In 3rdPost –operative day: chest x-ray was done, which shows bilateral clear lung with ICT in situ (figure 4), ICTD was removed on 4th day and patient was discharged.



Figure 1: 75 yrs old, Cachexic female

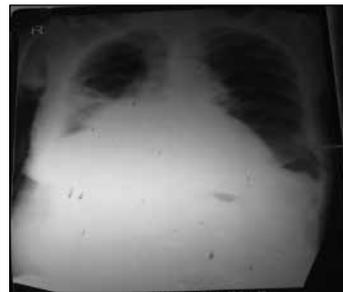


Figure 2: Pre-operative chest X-ray (Emphysematous changes with cardiomegaly)



Figure 3: chest X-ray shows Pneumothorax (Lt side)



Figure 4: chest X-ray shows ICT in situ

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 Regional anaesthesia for upper limb surgery has many advantages over traditional general anaesthesia including more effective post-operative analgesia, decreased requirement of systemic opioids and avoidance of airway instrumentation.² Risk factors, such as old age, cachexia, history of smoking and preexisting lung and cardiac disease, may predispose patients to the development of pneumothorax. As in our case patient already had pre-existing lung disease i.e. Chest

X ray shows emphysematous changes with cardiomegaly and other associated risk factors. Pneumothorax can occur because apex of 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 dyspnea, cough & rarely hemoptysis. 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. Chest X ray in upright position helps in detecting pneumothorax, but in supine position air tracks to the anterior costo-phrenic sulcus. Thus radiographic signs of pneumothorax in supine position tend to be more subtle with approximately 30% of pneumothorax going undetected.^{3,4} 40 % Pneumothorax or 80 % pneumomediastinum not visible on plain chest radiographs and can be seen with CT scan.⁵ In our case, on complain of difficulty in breathing at 24 hours the chest X-ray was not showing pneumothorax as it was done in supine position. There were no other clinical or investigational features of pneumothorax; so she was kept on conservative management. Nonspecific ECG changes such as decrease in amplitude of ECG complex may occur before clinical symptoms developed.⁶ Right axis deviation, precordial T wave inversion & electrical alternans are other ECG changes seen with tension pneumothorax.⁷ However, in our case ECG changes were already present so pneumothorax was misdiagnosed intraoperative. The pneumothorax was attributed to spontaneous rupture of a preexisting lung bulla, suggesting that blocks are not always the cause of this complication. Dietzeland Ciullo⁸ reported 4 cases of spontaneous pneumothorax within 24 hours of uncomplicated arthroscopic shoulder procedures under general anesthesia in the lateral decubitus position. The pneumothorax can be caused by rupture of blebs or bullae from underlying lung disease; these ruptured blebs or bullae are difficult to detect and usually located in the upper lung. The delayed pneumothorax in our patient could either be due to rupture of bullae or due to rent opening up on later days (2nd postoperative day) when patient exerted or not revealed on 1st X ray as that was done in supine position. The patient had received more than one pleural punctures by less experienced anesthesiologist.

CONCLUSION

We conclude that the use of USG guided technique in place of the classical approach to the brachial plexus block by experienced senior anesthesiologist is highly recommended as it is associated with greatly reduced complication rate. Serial chest X ray for 3 days may be done, keeping in view the possibility of latent pneumothorax after brachial plexus block. Timely recognition and placement of a chest tube result in satisfactory clinical outcomes.

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