

Role of Simple Needle Aspiration in the Management of Spontaneous Pneumothorax

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Abstract

Objective : To determine the efficacy of simple needle aspiration in the management of primary spontaneous pneumothorax. Not all patients with pneumothorax require intercostal tube drainage (ICTD). Some patients can be managed conservatively by simple needle aspiration of air from pleural space. It is a cheap and easy alternative to ICTD which can be done on out patient basis.

Materials and Methods : All patients of spontaneous pneumothorax presenting for the first time were included in this study, after obtaining baseline investigations like chest X-ray, ECG, serum creatinine, blood sugar etc. They were managed by ICTD or simple needle aspiration. Chest X-ray was done 6 hours after the procedure (ICTD), 24 hours after aspiration and prior to ICTD removal or before hospital discharge. Patients who had undergone simple needle aspiration were allowed to go home following a few hours of observation after explaining the warning symptoms and the need for reevaluation after 24 hrs, if prompt follow-up could be ensured otherwise they were admitted along with patients undergoing ICTD.

Results : Eighty two patients of spontaneous pneumothorax were included in this study during a period of 12 months (May – 04 to April – 05). Out of these 40 (49%) patients were managed by ICTD, 42 (51%) patients were subjected to simple needle aspiration. Thirty two (76%) patients responded to simple needle aspiration while the remaining 10 patients required ICTD finally. There were no complications in the patients managed by simple needle aspiration; they had less chest pain and lesser duration of hospital stay.

Conclusion : Spontaneous pneumothorax may be managed by simple needle air aspiration primarily, unless contraindicated (tension pneumothorax), or in patients requiring mechanical ventilation. For symptomatic patient it is the recommended procedure. ©

INTRODUCTION

Spontaneous pneumothoraces, which occur in the absence of thoracic trauma, are classified as primary or secondary.¹ Primary pneumothorax is one which occurs in patients having apparently no lung disorder, while secondary spontaneous pneumothorax occurs in the presence of underlying pulmonary diseases most commonly COPD.² Removal of air from pleural cavity either by simple needle aspiration or by the intercostal tube drainage is the treatment. Intercostal tube drainage (ICTD) requires hospital admission, surgical expertise and significant cost of therapy while needle aspiration is a simple procedure, and can be done on outdoor basis.^{3,4} BTS (British Thoracic Society) also recommends this procedure for managing symptomatic spontaneous

pneumothorax.⁵

We conducted this study to assess the efficacy of simple needle aspiration in the management of spontaneous pneumothorax.

MATERIALS AND METHODS

All patients of spontaneous pneumothorax presenting for the first time were included in the study. Very sick patients and those with tension pneumothorax were excluded. Hemogram, blood sugar, blood urea, serum creatinine, ECG, chest X-ray; coagulation parameters were done in each patient. Patients were managed by simple aspiration as the initial treatment modality. Repeat chest X-ray was done after 24 hours. The procedure was considered successful if there was complete re-expansion of lung along with symptomatic improvement. Those patients in whom simple needle aspiration failed were managed by intercostal tube drainage (ICTD). All patients had given informed consent for inclusion in the study. Aspiration was carried out under aseptic condition from second intercostal

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space in the mid clavicular line.

The procedure was carried out after giving local anesthesia by 2% lignocaine. An 18 G IV cannula was used for aspiration of air. After withdrawing the needle, 3 way stop clock was connected to IV cannula, an IV tubing set was connected to it at 3'O clock position, a 50 cc syringe at 6' O clock position and lower end of IV set was put under water seal. Air was aspirated and removed through IV set into the water seal. Aspiration was stopped when feeling of resistance was felt or patient became uncomfortable or coughed excessively.

For ICTD insertion, site selected was fourth intercostal space in the midaxillary line. Local anaesthesia with lignocaine was used, skin was incised, superficial fascia were split and underlying muscles exposed pleura was incised and a 24G intercostal tube was inserted. Its lower end was connected to underwater seal.

Chest X-ray was done after 6 hour (ICTD group) and 24 hours (Needle Aspiration group). Successful outcome was full expansion of lung after aspiration or less than 15% of pneumothorax remaining. Aspiration was considered failed if only partial expansion occurred i.e. pneumothorax still persisting >50% and patient still symptomatic even after second aspiration.

RESULTS

Eighty two patients of spontaneous pneumothorax were included in this study during a period of 2 years. Out of these 40 patients were managed by ICTD on an emergency basis, remaining 42 patients were subjected to simple needle aspiration, 32 (76%) patients responded to this treatment, while 10(24%) patients required ICTD finally. Allocation between ICTD and needle aspiration was done randomly. Out of 32 patients complete expansion occurred in 26 (81%) patients while in 6 patients <15% pneumothorax was left behind. But these patients became asymptomatic and complete expansion was found when repeat X-ray was performed after one week. Only 2 (6%) patients in the needle aspiration group turned back because of recurrence on ninth and tenth day. In both these patients repeat needle aspiration was done and it was successful with no further recurrence. There was no complication in the patients managed by simple needle aspiration. Post procedure pain was also less. Cost of the procedure was four times less as compared to ICTD. Duration of hospital stay in needle aspiration group was 8 ± 1.2 hours while in ICTD group it was 144 ± 36.2 hours. Thus needle aspiration saved about 5 days of hospital stays. Five out of 42 patients managed by simple needle aspiration developed minimal subcutaneous emphysema but did not require any specific intervention. All the patients tolerated the procedure well.

DISCUSSION

Simple needle aspiration in the management of pneumothorax is in use from a long time. Various methods have been tried like catheters, Heimlich flutter valves. Simple IV cannula has also been used in many trials³ Use of IV cannula in the management of iatrogenic pneumothorax has shown a success rate of 67%. Another study showed success rate of 71%⁹ while success rates in secondary spontaneous pneumothorax have noted been much good. The overall success rate of simple aspiration in this study has been good. The duration of hospital stay and the cost of entire treatment was less in patients managed by simple needle aspiration. Pain due to procedure and complications were also less in patients of needle aspiration than tube drainage. But the monitoring required was more in patients of simple needle aspiration.

Our study concludes that simple needle aspiration is a safe, simple, effective procedure, requires lesser hospital stay and is economical compared to intercostal tube drainage. Simple needle aspiration for primary aspiration should be the preferred initial treatment for primary spontaneous pneumothorax and also for iatrogenic pneumothorax. However if it fails intercostal tube drainage (ICTD) can be inserted in 24 hours. For secondary spontaneous pneumothorax and recurrent primary spontaneous pneumothorax intercostal tube drainage (ICTD) is the treatment of choice.

REFERENCES

1. Bense L, Lewander R, Elkund G, *et al.* Non-smoking, nonalpha 1 antitrypsin deficiency induced emphysema in non smoking with healed spontaneous pneumothorax, identified by computed tomography of the lungs. *Chest* 1993;103:433-8.
2. Smith WG, Rothwell PG. Treatment of spontaneous pneumothorax. *Thorax* 1962;17:342-9.
3. Bevelqua FA, Aranda C. Management of spontaneous pneumothorax with small lumen catheter manual aspiration. *Chest* 1982;81:693-4.
4. Light RW, Braddus VC. Pneumothorax. In Murray JF, Nadel JA, eds Text book of Respiratory Medicine, 3rd edn. Philadelphia: WB Samdex: 1994:2043-66.
5. Miller AC, Harvery JE. Pneumothorax what's wrong with simple aspiration? *Chest* 2001;120:1041-2.
6. Noppen M, Alexander P, Dsiesen P, *et al.* Manual aspiration versus chest tube drainage in first episodes of primary spontaneous pneumothorax: A multicentric prospective randomized pilot study. *Am J Resp Crit Med* 2002;165: 1240-4.
7. Hamilton AA, Archer GL. Treatment of pneumothorax by simple aspiration, *Thorax* 1983;38:934-6.
8. Andrivet P, Dedajini K, Tebonl JL, *et al.* Spontaneous pneumothorax: Comparison of thoracic drainage vs. Immediate or delayed needle aspiration. *Chest* 1995;108: 335-40.
9. Yanke Leviitz DF, Davis SD, Henschke CL. Aspiration of large pneumothorax resulting from trans thoracic needle biopsy. *Radiology* 1996;200:695-7.