Study of Pigtail Catheters for Tube Thoracostomy

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Abstract

Background: To study the efficacy and complications of percutaneous small bore pigtail catheters for tube thoracostomy.

Methods: 50 cases of pleural effusion requiring drainage were enrolled in the study. Pigtail catheters of the size 9 to 12 F were used.

Results : The procedure was successful in 46/50 (92%) cases. Fibrinolytic therapy and pleurodesis was successful through these tubes. Complications included blockade in 4 (8%), small pneumothorax in 10 (20%) and chest pain at tube thoracostomy site requiring analgesics in 30 (60%).

Conclusion: Small bore pigtail catheters are safe, comfortable, cost effective and have few complications especially in loculated pleural effusions.

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Key Words: Pigtail catheter; Tube thoracostomy

Introduction

Tube thoracostomy is used for therapeutic removal of fluid or air from pleural space. Placement of a large bore chest tube is an invasive procedure with potential morbidity and complications and therefore the use of pigtail catheter may be desirable [1].

Materials and Methods

50 patients were enrolled in this study. 30 had loculated exudative pleural effusion, 13 empyema, 2 haemothorax and 4 malignant pleural effusion.

Pigtail catheters of size 9 to 12 F (Fig. 1) were used in all and the catheters were introduced by Seldinger technique. Pleural fluid was aspirated thrice daily with a 20 ml syringe. The catheters were removed as soon as the drainage was less than 50 ml for 3 consecutive days. The therapy was considered successful if the opacity cleared on chest radiograph and confirmed on ultrasonography of the thorax. 4 cases with malignant pleural effusion and one with chylothorax underwent pleurodesis with tetracycline (35 mg/kg diluted in 100 ml of normal saline). Fibrinolytic therapy with urokinase (1,00,000 units for three days) was used in seven cases with multiple loculations as seen on ultrasonography of thorax.

Results

The duration of drainage through pigtail catheters ranged from 3 to 12 days with an average of 7 days. The drainage was successful in 46/50 (92%) cases. Complications included blockade in 4 cases (8%) and pneumothorax in 10 cases (20%). All these small pneumothoraces were possibly due to introduction of air during the procedure. All pneumothoraces

resolved successfully through the same tubes. Chest pain at the site of introduction required analgesia in 30 (60%) cases. Fibrinolytic therapy was successful in all cases.

Pleurodesis was successful in the case with chylothorax and 3 out of 4 cases with malignant pleural effusion as evidenced by reduction in drainage of pleural fluid over 5-7 days and confirmed by chest radiograph and ultrasonography of the thorax. In the fourth case of malignant pleural effusion, pleurodesis was not successful in spite of the catheter being patent.

Discussion

Large-bore thoracostomy tubes commonly used for draining of pleural fluid or air are introduced by blunt dissection or by trocar assistance and have significant morbidity and complications. Furham et al, Lawless et al and Vardhan et al used pigtail catheters in their studies and found them less traumatic and comfortable for the patients with efficacy as good as large-bore tubes [2-4]. We found it successful in 92% of our cases. Westcott JL used small bore pigtail catheters for drainage of empyema in 12 cases and was successful in 11 cases. He found these tubes particularly useful for draining of loculated effusions with difficult access [5].

Minor complications in our study were blockade, small pneumothorax and chest pain. 2 cases with

Fig. 1 : Pigtail catheter size 10F

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haemothorax and 2 with empyema had thick pus with lot of debris and blockade of the catheters could not be cleared by flushing of the tubes. Catheter was replaced with large bore tubes. The complications like haemothorax, rupture of diaphragm, liver or spleen seen with large bore chest tubes are not seen with pigtail catheter insertion [5]. Morrison et al [6] found complications in the form of pneumothorax in 19% of cases while Chang et al [7] found the incidence to be 31%. All pneumothoraces were insignificant and authors attribute it to the use of Seldinger technique. Grodzin and Back used small bore catheter in 53 cases of pleural effusion and found it to be safe, efficacious and cost effective with few complications which was comparable to our study [8].

Pleurodesis was successfully performed through pigtail catheters in the present study. Patz et al studied 19 cases with malignant pleural effusion and found pleurodesis successful with small bore tubes. The response rate was similar to large bore tubes. It was performed as an out patient procedure and patients tolerated the procedure well without any limitation in mobility [9]. Parulekar et al compared small bore and large bore chest tubes in malignant pleural effusion. They found that there was no difference in outcome and small bore tubes were as effective as large bore tubes [10].

Fibrinolytic therapy was successful in all cases in our study. Many studies were done using small-bore catheters (10-12°F) for fibrinolytic therapy and the success rate was comparable to our study [11, 12, 13].

To conclude, small bore pigtail catheters are safe, efficacious, comfortable, cost effective and have minor complications. These are specifically useful in loculated pleural effusions and can be used in empyema. However, these are not useful in haemothorax and empyemas with thick debris, where large bore tubes have to be used.

References

1. Roberts JS, Bratton SL, Brogan TV. Efficacy and complications of percutaneous pigtail catheters of thoracostomy in paediatric patients. *Chest* 1998; 114: 1116-21.
2. Furham BP, Landrum, BG, Ferrara TB et al. Pleural drainage using modified pigtail catheters. *Crit Care Med* 1986; 14:575-6.
3. Lawless S, Orr R, Killian A, et al. New pigtail catheter for pleural drainage in paediatric patients. *Crit Care Med* 1989;17:173-5.
4. Vardhan V, Tewari SC, Prasad BNBM, Nikumb SK. Empyema Thoracis. Study of present day clinical and etiological profile and management techniques. *Ind.J.Tub.*1998;45: 155-60.
5. Westcott JL. Percutaneous catheter drainage of pleural effusion and empyema. *Am J Roentgenol* 1985;144:1189-93.
6. Morrison MC, Mueller PR, Lee MJ et al. Sclerotherapy of malignant pleural effusion through sonographically placed small-bore catheters. *Am J Roentgenol* 1992; 158: 41-3.
7. Chang YV, Patz EF Jr, Goodman PC. Pneumothorax after small-bore catheter placement for malignant pleural effusions. *Am J Roentgenol* 1996; 166: 1049-51.
8. Grodzin CJ, Balk RA. Indwelling small pleural catheter needle thoracentesis in the management of large pleural effusions. *Chest* 1997;111: 133-5.
9. Parz EF Jr, McAdams HP, Goodman PC, Blackwell S, Crawford J. Ambulatory sclerotherapy for malignant pleural effusions. *Radiology* 1996; 199: 133-5.
10. Parulekar W, Primio GD, Matizinger F, Dennie C, Bociek G. Use of small-bore vs large-bore tubes for treatment of malignant pleural effusions. *Chest* 2001; 120: 19-25.
11. Bouros D, Schiza S, Tzanakis N, et al. Intrapleural urokinase in the treatment of complicated parapneumonic pleural effusions and empyema. *Eur Respir J.*1996;9: 1656-9.
12. Taylor RFH, Reubens MB, Pearson MC, et al. Intrapleural streptokinase in the management of empyema. *Thorax* 1994;49: 856-9.
13. Davies RJO, Traill ZC, Gleeson FV. Randomised, controlled trial of intrapleural streptokinase in community acquired pleural effusion. *Throax* 1997;52:416-21.