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Role of ICD in Pleural Diseases

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Abstract
Study Objective: *To evaluate the outcome of Intercostal drainage (ICD) in pleural diseases performed in the department of Respiratory Medicine in Rajarajeswari Medical College and Hospital over a period of one year.*
Design: *Retrospective.*
Patients: *All adult patients requiring consultation by a respiratory physician for a ICD.*
Results: *Data collected over 1year period, 56 patients had undergone intercostal chest drain insertions. Descriptive data are displayed in Table 1.Out of these 31 patients were pneumothorax (55.36%) and 25 ICD insertions were for pleural effusions (44.64%). Average extubation time for ICD in pneumothorax patients is 13.6 days and for pleural effusion patients is 9 days. 10.7% of total pneumothorax cases were primary spontaneous and 89.3% were secondary spontaneous pneumothorax. Majority of pleural effusion cases were tubercular and other causes of effusion were malignancy and empyema.*
Conclusions: *ICD can be safely performed by pulmonologists with relatively few associated problems. Average extubation time for ICD in pneumothorax cases can be extended to 10-15 days.*
Keywords: *Intercostal Chest Drain; Pneumothorax; Pleural Effusion.*

Introduction

ICD insertion or tube thoracostomy (TT) is a common treatment procedure performed earlier by surgeons, however in the last one decade ICD is performed in Respiratory medicine wards by respiratory physicians[1]. American Council on Graduate Medical Education suggests in its directory, pulmonary training programmes should provide training in ICD insertion[2] It is generally used to drain air and fluid from pleural cavity either as elective or emergency. Procedure is either done by a blunt dissection technique or trochar technique. As an invasive procedure complications related to insertion of ICD have been reported especially when performed by surgeons and in case of acute trauma. Complications can be either technical or infective. Malposition, blocked drain, chest drain dislodgement, re-expansion pulmonary edema, subcutaneous emphysema, nerve injuries, cardiac and vascular injuries, residual/post extubation pneumothorax, are some of the technical issues. Infective complications include empyema and surgical site infection.

Materials and Methods

All the patients who had undergone ICD at Respiratory medicine unit in Rajarajeswari

medical college were retrospectively followed up over a period of one year from July 2014 to July2015. Each patient's history, clinical examination and radiological, hematological and bacteriological examinations were done to arrive at diagnosis. According to The General Medical Council (GMC) guideline consent for procedure was taken and the procedure, risks associated with the procedure was explained in a language which is understandable to the patient.[3] This observational study looked at indications, duration of ICDs in each case, site of insertions, gender predominance, minimum and maximum days required for ICDs.

Results

Demographics and Indications

From the data collected over one year 56 patients had ICDs placed.54 ICDs were placed using trocar technique and two of the ICDs were placed with blunt dissection technique. The mean age of the patients was 52 years with a median age of 48 years (range, 17 to 80 years). The duration of placement was a mean of 11.5 days with a median of 18.5 days (range, 3 to 34 days).

Majority of ICDs were placed for pneumothorax (31/56, 55.36%). Next common indication for ICD was moderate to massive pleural effusion (25/56, 44.64%).The size of the chest tube placed were 24F of 55 patients except in one case 32F was placed.

Table: 1

Number of patients	56
Average age, yr	52 (17-80)
Average duration of ICD	11.5 (3-34 days)
Male patients	50 /56 (89.28%)
Female patients	6 /56 (10.71%)
Placed on right side	34 (60.71%)
Placed on left side	22 (39.28%)

Figure:1 Indication for placement of ICD.

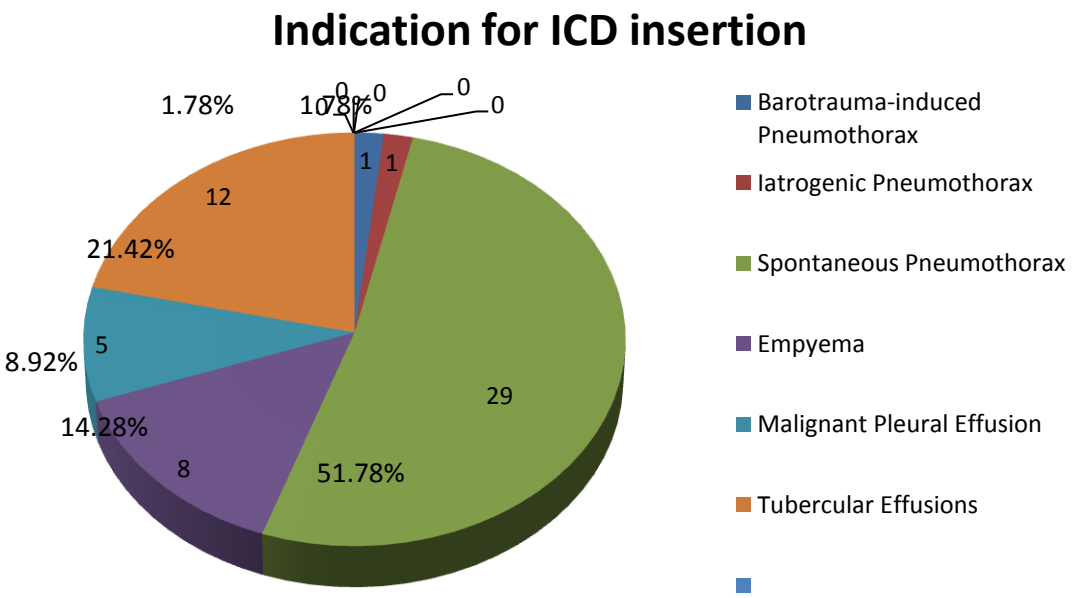
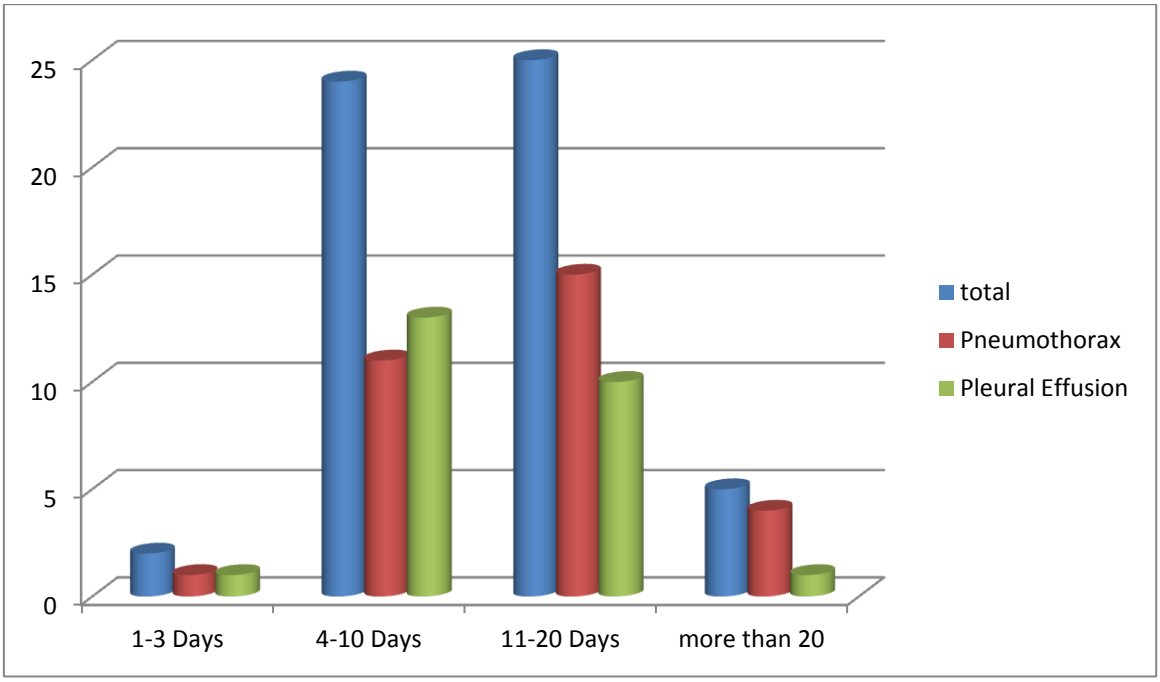


Figure 2



Discussion

Indication for ICD include: pneumothorax (spontaneous, related to barotrauma, or iatrogenic); hemothorax or hemopneumothorax; pleural effusions (malignant, tubercular, complicated parapneumonic, symptomatic, chylothorax); and following trauma orthoracic surgery[4].

In our study the most common indication for ICD's inserted was pneumothorax (55.36%) followed by pleural effusion (44.64%).We had one case of pneumothorax due to mechanical ventilation-related barotrauma (1.78%) and one Iatrogenic pneumothorax (1.78%) case following bronchoscopy. Out of all the cases of pneumothorax, 29(51.78%) cases were due to spontaneous pneumothorax.

Tubercular massive pleural effusion cases (12, 21.42%) was the most common indication for ICD in effusion cases followed by empyema cases (8, 14.28%) and malignant pleural effusion cases(5, 8.92%).

In this study patients were analyzed according to the days of ICD in situ. We observed that in 2 cases (1.12%), ICD was removed following full expansion in 3 days of which 1 case was pneumothorax and 1 case was pleural effusion. In 24 patients (13.44%) ICD insertion was from 4-10 days of which 11cases were of pneumothorax and 13 cases of pleural effusion. In 25 cases (14%) required 11 to 20 days of ICD insertion of which 15 are pneumothorax and 10 are pleural effusion cases. 5 cases (2.8%) required more than 21 days of ICD insertion of which 4 cases were of pneumothorax and 1 case of pleural effusion.

According to ACCP consensus group, in cases of pneumothorax ICD should not be kept more than 4 days in primary spontaneous pneumothorax and 5 days in secondary spontaneous pneumothorax and recommends surgical intervention for air leak cessation[5]. The BTS guidelines suggests surgical evaluation for air leaks between 3-5 days.[6.]

Chee et al[7]showed that 100% of primary pneumothoraxes with a persistent air leak for >7 days which were treated by tube drainage had resolved by 14 days. Also, 79% of those with secondary pneumothorax and a persistent air leak had resolved by 14 days, with no mortality in either group. However, surgical intervention carries a low morbidity[7,8] and post surgical recurrence rates are low[7,8].

In our study there is complete resolution of 25 (86.2%) cases within 20 days, out of the total 29

spontaneous pneumothorax cases and 4 cases required surgical intervention.

Out of total 25 pleural effusion cases, 20 cases were exudative and 5 cases were transudative. The mean duration of ICD in exudative pleural effusion cases was 9.3 days (range, 3 to 21 days) and that of transudative pleural effusion was 11.8 days (range, 7 to 17 days).

Conclusion

In case of pneumothorax, as compared to previous studies our study also suggests that keeping ICD for upto 14 days has shown complete resolution of pneumothorax though ACCP guidelines and BTS guidelines recommend surgical intervention. Our study and other studies have shown that, ICD'S up to 14 days can achieve full expansion up to 86%, thereby minimizing surgical interventions, cost and post procedure complications in places where there is limitation of sources.

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