

## Selective Use of Chest Tubes in Congenital Extracardiac Surgeries

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### Abstract

Eighty two patients operated for congenital cardiovascular disease are presented. All were selected to be managed without chest tube drainage after thoracotomy. However, in 14(17.07%) patients chest tube drainage was necessitated at operation and of the 68(82.93%) patients, 4(5.88%) underwent an uneventful post operative chest tube insertion. Except on two occasions all the patients had uneventful post operative period. To reduce complications post operative hospital stay and unnecessary foreign body in chest we have employed a selective use of chest tubes for some common congenital cardiovascular disorders.

### Key Words

Chest tube, Thoracotomy, Extracardiac

### Introduction

Chest tubes are traditionally used to drain air, fluid or to prevent their accumulation. In congenital cardiovascular thoracotomy procedures the use of chest tube is a therapeutic surgical tool and not as preventive measure only.

### Material and methods

The study was conducted in the department of cardiovascular and thoracic surgery SK Institute of Medical Sciences Srinagar, Kashmir. All the patients were for elective surgery. The patients were studied to know the over all postoperative period without chest tube after thoracotomy for congenital cardiovascular disease. All measures were taken to prevent visceral pleura tear, air leak and bleeding. At the completion of procedure (the intrathoracic part) all the blood/fluid was sucked/mopped

completely. Air was evacuated from the chest cavity with positive and expiratory pressure during tying the pericostal stitches and suturing the muscle layers. Blood gas analysis were done within two hours of surgery. A thorough and detailed general physical examination, systemic examination, respiratory and cardiovascular system examination were done in every patient at regular intervals.

Chest skiagram were done immediately in patients where clinical evidence of hemopneumothorax was present or in patient with severe hypoxia and decreased O<sub>2</sub> saturation. However, all the patients were subjected to skiagram chest 16-20 hours after surgery. Post-operative complications of hemopneumothorax were noted. surgical intervention if done was recorded, chest tube

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removal was done taking all the precautions. After removing dressing from around chest tube, controlling purse string suture patient was directed to take deep breath and hold the breath, it is at this time chest tube was removed quickly purse string tightened and an air tight dressing was applied. Skiagram chest was done in all patient after removing chest tubes. Hospital stay of all the patients as recorded.

**Results**

Of the total 82 patients, males were 45(54.80%) and females 37(45.20%). The age of the patient ranged from 2 months to 6 years with a mean age of 3.5 years. Majority of the patients were for PDA ligation (Table 1). After surgery chest tube was not used in 68(82.92%) patients, of these 9(13.23%) patients developed pneumothorax and 6(8.82%) patients developed fluid collection/pneumothorax but chest tube was needed in only 4(5.88%) patients and in other 10(16.17%) patients who otherwise were asymptomatic, pneumothorax collection resolved within 4 days.

**Table 1. Type of disease with surgical procedures performed**

Diagnosis	Number of patients	Operation performed
PDA	66	Ligation of PDA
PDA + COAO	01	Ligation/aortoplasty
PDA + PA Band	01	Ligation/Release

*Chest tube was not used in any of the patients at initial surgery*

Though initial plan was to keep all patients without chest tubes but 14(20.58%) needed chest tubes on table (Table 2). Of the 14(20.58%) patients, 2(14.28%) patients had a large fluid collection associated with pneumothorax in one.

In 10(71.42%) patients chest tube was removed within 48 hours without any significant pneumothorax or fluid collection. It was presumed that this group of 10(71.42%) patients too could have been noted without chest tubes drainage.

Of the 4(28.57%) patients 2(14.28%) patients remained on chest tube for 10 days. One (7.28%) patient needed re-exploration for pyothorax and persistent air leak not amenable to changed sites of tubes, he ultimately developed septicaemia, multi organ failure and died. One (7.28%) patient started with high grade fever purulent chest tube drainage, did not respond to specific drugs and ultimately died suddenly (autopsy revealed disruption of patch aortoplasty). Two (2.43%) deaths were noted in only chest tube group. No death in the chest tube group was related to the use of chest tube, nor could that have been prevented by not using a chest tube.

**Table 2. Type of procedures where chest tube was necessitated on table.**

Diagnosis	Number of patients	Procedure
TOF	2	BTS
PDA	5	Ligation
PDA + COAO	3	Ligation/Repair
COAO	4	Patch aortoplasty

*Chest tube was used in all, though they were planned to be done without chest tube.*

**Discussion**

Chest tubes are traditionally inserted during thoracic surgery to drain fluid or air. However, keeping the complication rates of chest tube in mind their use is made on selective basis only. Chest tube may cause empyema, unresolved pneumothorax and persistent effusion (1) drainage tubes placed during surgery may become insufficient due to adhesion of parietal and visceral pleura (2) . Chest tube after lung inflation may move to a horizontal position into the fissure and be ineffective (3). Also chest tubes may promote an excessive pleural reaction with fibrin accumulation which may persist for days together (2). Entrapment of lung (4), lung perforation (5,6), esophageal perforation (7,8), nerve damage (9,10), vascular lesion (11-13), cardiac tamponade (14,15) and contralateral pleural perforation (16) have also been re-



ported. Infact one of the complications after removal of chest tube is pneumothorax which has been reported as high as in 20.7 percent of patients after removal of chest tube(17). But in the present study in patients with chest tubes this has been rarely observed and if at all it resolved within three to seven days.

Keeping in view the above complication and need-less use of chest tubes in some patients a policy was adopted and chest tubes uses in select group only. Therefore, in the absence of a visceral pleural tear, or any substantial oozing no chest tube is needed, since an air or fluid collection forming after surgery may or may not be drained by the compartmentalized chest tubes, unless in immediate vicinity. The observations of the present study are in consistence with those of other reported studies(18). Though the complications rate was higher in their study probably because of the extensive dissection since they had studied selective use of chest tubes almost in majority of congenital/complex cardiovascular disease(19). In the present study, majority of the patients were for ligation of PDA only. It is not possible to determine the cost savings from the small number but not putting a chest tube definitely decreases the economic burden. Average duration of hospital stay in patients without chest tube was 3-7 days.

We conclude that PDA surgery which is commonly done in this part of country can be done without chest tube drainage in majority to prevent morbidity, decrease expenses and limit hospital stay.

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