

## POST OPERATIVE CHYLOTHORAX AFTER PEDIATRIC CARDIAC SURGERY

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### Abstract:

We reviewed the management of 6 cases of chylothorax (5 male, 1 female; 1-12 years old) following 500 cardiothoracic procedures during January 2004- December 2006 at National Institute of Cardiovascular Diseases, Dhaka.

**Results:** The surgical procedures preceding the occurrence of lymph leak included ligation of PDA in 3 patients (50%), modified Blalock-Taussig Shunt in 2 cases (33.33%), bidirectional Glenn shunt in 1 case (16.67%).

A protocol for management of postoperative chylothorax was applied for all patients. In this protocol, non-surgical management was always the first line of treatment for patients with postoperative chylothorax in the form of intercostal tube drainage and diet modification using either medium-chain triglycerides (MCT). All of our patients responded to conservative therapy.

**Conclusions:** Conservative management of postoperative chylothorax should be the first line of treatment in postoperative chylothorax either by MCT diet alone or (in case of failure) to be followed by TPN and complete bowel rest.

### Introduction:

Chylothorax refers to the presence of lymphatic fluid in the pleural space secondary to leakage from the thoracic duct or one of its main tributaries. In 1875, H. Quinke described the first traumatic chylothorax. In 1948, R.S. Lanpson performed the first thoracic duct ligation<sup>6</sup>.

The prevalence of chylothorax in various cardiothoracic surgeries is 0.2-1%<sup>7</sup>. From the best series, 72% are non traumatic (mainly lymphoma -45%) and of the rest 28% that are traumatic, 25% are post surgical<sup>7</sup>. Surgical reports are almost entirely from thoracic surgery and less commonly from extrathoracic surgeries are things like neck dissection.

The only way to injury to subdiaphragmatic system can lead to chylothorax is if chylous ascites is formed and seeps into the chest<sup>6</sup>.

Chylothorax and chylous ascites are usually produced by obstruction and disruption of thoracic duct, most frequently

as a result of trauma, neoplasm or tuberculosis. Occasionally, other diseases have been reported as being the cause of chylothorax or chyloperitoneum, such as liver cirrhosis, superior vena cava thrombosis or nephrotic syndrome. On rare occasions, heart failure secondary to various causes produces chylothorax or chylous ascites<sup>8</sup>.

The chylous leak may lead to high morbidity and may even compromise survival because of large amount of losses, that is deficit in lymphocytes, protein and immunoglobulin. Incidence of postoperative chylothorax following cardiothoracic procedure for congenital cardiac anomalies ranges from 0.5% to 2%<sup>1</sup>.

Postoperative chylothorax is caused by traumatic laceration of the thoracic ducts, as it seems to occur more frequently after procedures performed in the vicinity of thoracic duct<sup>2</sup>. Chylothorax has occurred less frequently by median sternotomy than thoracotomy<sup>3</sup>. Chylothorax used to carry high mortality, even though management of chylothorax has significantly evolved in the last two decades<sup>4</sup>.

Different therapeutic approaches: purely conservative, with elemental diet and total parenteral nutrition (TPN) or surgical (early and late) with ligation of thoracic duct, pleurodesis and/or placement of pleuroperitoneal shunt<sup>4</sup>.

Here we reviewed the management of postoperative chylothorax at our institute in last two years. Our aim is to assess the efficacy of our therapeutic management approach.

### Patient and Methods:

The children having postoperative chylothorax following surgical procedures for cardiothoracic lesion between 2004 and 2006 were reviewed.

The diagnosis of chylothorax or chylopericardium was made on the basis of the milky appearance of the fluid, cell count (more than 4000 mononuclear cells/mm<sup>3</sup> and more than 80% lymphocytes), triglyceride content more than 500 mg% of the pleural aspirates.

The following clinical data were collected: age, sex, weight at the onset and during the treatment for chylothorax or chylopericardium, the preoperative diagnosis of congenital lesion, the surgical procedure preceding the onset of lymph leak, central venous pressure, the duration between the diagnosis of chylothorax and chylopericardium and the cessation of drainage, the daily volume of chylous drainage, associated metabolic and hematologic abnormalities (hyponatraemia, hypoalbuminaemia and lymphopenia) and the surgical procedure(s) performed to treat the chylothorax.

All cases of chylothorax were initially treated conservatively in the form of tube thoracostomy for drainage and immediate

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institution of medium chain triglycerides (MCT) diet for one week. The amount of chyle drained through the intercostal tube was then evaluated. If the amount was <10 ml/kg/day, this was a parameter for successful conservative treatment and the MCT diet was continued for another 3 weeks before return to normal diet.

**Results:**

There were 6 (six) cases of postoperative lymph fistulla at cardiac surgery in NICVD. There age ranged from 1-10 years (mean 3.85 years) and their body weight ranged from 6.5 to 35 kg (mean 13.48 kg).

The preoperative diagnosis of our chylothorax group of patients were patent ductus arteriosus in three cases, tetralogy of Fallot in two cases, and single ventricle in one case. The average duration between surgical procedure and the onset of chylothorax was 6 days (range from 5 hours to 15 days). The diagnosis of chylothorax was made during their hospital stay with respiratory distress and complete opacity of hemithorax in their chest x-Ray (massive chylothorax).

Conservative management of started for all the 6 patients as per protocol. In our medically treated patients, no patient died. The average duration of chyle leak was 16.1 days (range from 5 days to 28 days). The maximum daily drainage of chyle drained per day was 36.4 (range from 8.5 to 130) ml/kg/day.

**Table I:** Patients' demographics, preoperative diagnosis and operative procedures

Sl. No.	Age year	Body Wt.kg	Gender	Preoperative diagnosis	Operation
1.	6	13.5	M	Fallot's tetralogy	Modified Blalock-Taussig shunt
2	3	8	F	PDA	PDA ligation
3	1	5	M	PDA	PDA ligation
4	2	7.2	M	PDA	PDA ligation
5	4	12	M	Fallot's tetralogy	Modified Blalock-Taussig shunt
6	12	30	M	Single ventricle	Bidirectional Glenn shunt

**Discussion:**

Postoperative chylothorax is associated with high morbidity and mortality that may reach 50% in nontreated patients<sup>1</sup>. The incidence of chylothorax after surgical repair of congenital heart disease varies in the literature from 0.5% to 2%<sup>2</sup>. This coincides with the incidence of our series that was 1.1% of postoperative

patients. In our series, all postoperative chylothorax were caused by direct injuries of the thoracic duct. This had occurred either after patent ductus arteriosus ligation (3 cases), modified BT shunt (2 cases), and bidirectional Glenn shunt (1 case). Postoperative chylothorax was presented by left sided massive effusion.

Postoperative chylothorax can also occur without direct injury of the thoracic duct. After bi-directional Glenn shunt or Fontan procedure lymph fistulla may occur due to increase in systemic venous pressure that is transmitted to the lymphatic system<sup>3</sup>. This type of fistulla is also recorded after Senning or Mustard procedure in transposition of great arteries and after total correction of Fallot tetralogy<sup>4</sup>.

A diet with medium chain triglycerides (MCT) results in significant decrease in the lymph flow through the thoracic duct, and hence, through the lymph fistulla. Knowing this, the use of MCT diet is crucial in the management of postoperative chylothorax and gives excellent results in controlling the lymph fistulla<sup>5</sup>.

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