Chylothorax: A Retrospective experience of a tertiary PICU

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Introduction

Chylothorax is a collection of Chyle (Lymphatic fluid) in the pleural cavity secondary to obstruction or trauma to thoracic duct ,its tributaries or transdiaphragmatic flow from peritoneal cavity [1]. It is usually identified by its milky appearance and high triglyceride level ≥ 1.1mmol/L or WBC ≥ 1,000 cells/ul with Lymphocyte fraction > 80%[2].

Chylothorax predominantly occurs in infants and children following cardiac surgical procedures and contributes to significant morbidity and mortality. A previous national study in 2014 reported incidence to be around 3.2% in UK, with mortality of 12.2%[2].

Aims

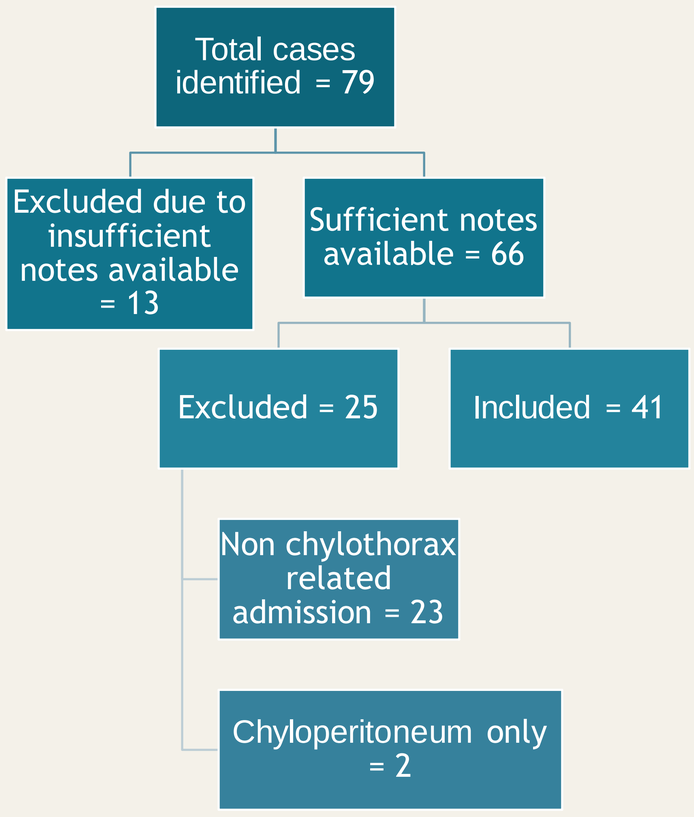
The aim of this retrospective study is to present a comprehensive evaluation of our experience of causes, clinical management and outcome of children with chylothorax in our tertiary PICU. Both conservative and surgical management strategies are employed but there are no guidelines to guide best management.

Objectives

- To identify incidence and outcome of chylothorax in patients admitted to PICU
- Investigations carried out in each case
- Risk factors associated with chylothorax and mortality
- Treatment modality used e.g. Monogen, PN
- Mortality and Morbidity

Method

Retrospective analysis of electronic data of all children under the age of 16 admitted to the PICU with chylothorax from any cause between 2016 and 2021.



Results

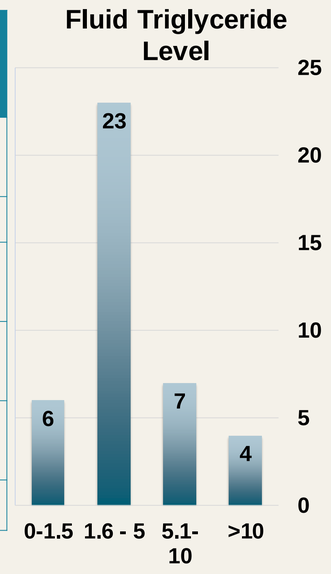
41 patients' data was included in this analysis. The majority of children, 97.5%, developed chylothorax post-operatively, with only one case of congenital lymphangiomatosis. 61% of patients had complicated heart surgery RACHS scoring ≥3.

Most cases occurred in children less than 6 months old and weighing less than 6kg.

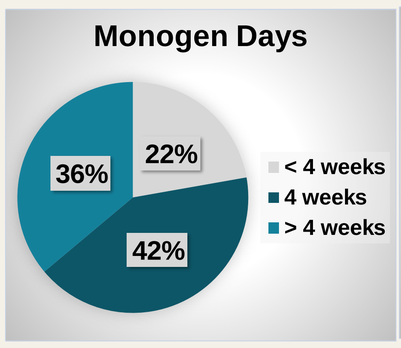
32% of patients had an underlying genetic diagnosis, with Trisomy 21 being the most common.

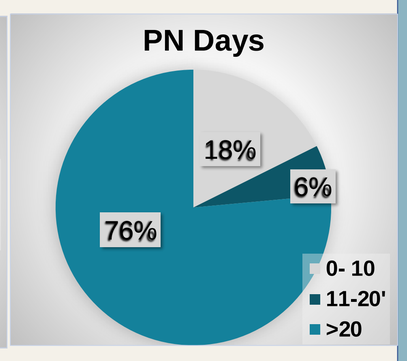
The diagnosis was confirmed in 97.6% of cases by measuring the fluid triglyceride level.

Investigations	Performed	Not Performed
Fluid Triglyceride	40(97.6%)	1(2.4%)
Cholesterol	1(2.4%)	40 (97.6%)
Fluid WCC	11 (26.8%)	30 (73.1%)
Lymphocyte Subset	6 (14.6%)	35 (85.4%)
Immunoglobulins	7 (17.1%)	34 (82.9%)
Radiology	9 (21.9%)	32 (78%)



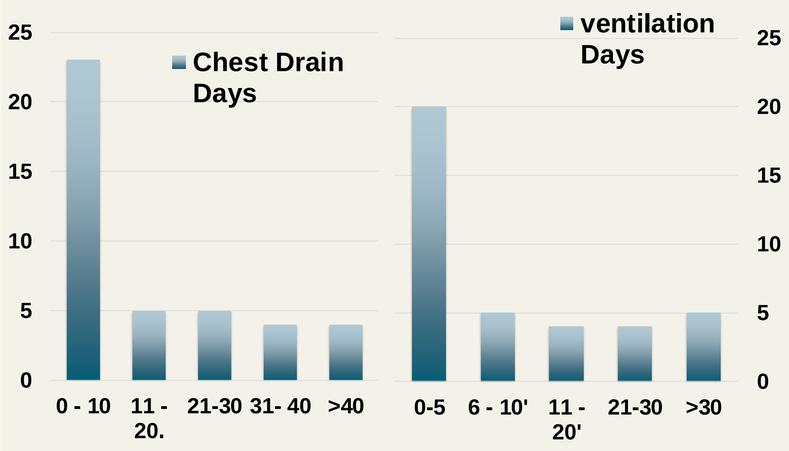
51.2% of children were managed with MCT feeds only while 46.3% received both MCT feeds and TPN. Among other medical managements, Octreotide (26.8%), Immunoglobulin (7%) and Trametinib (4%) were used. Surgical intervention was required in 19.5%



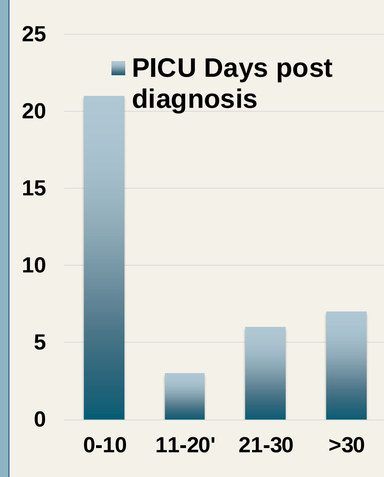


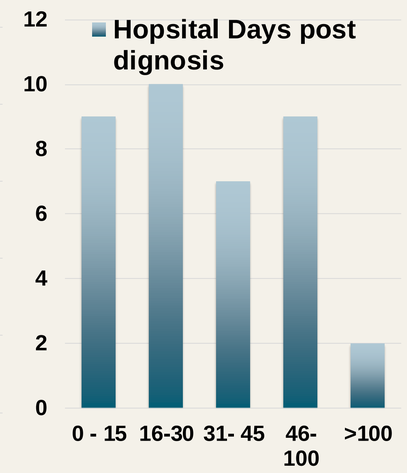
Treatment	Number of Patients
Monogen Only	21 (51.2%)
PN Only	1 (2.4%)
Both Monogen & PN	19 (46%)
Octreotide	11 (27%)
Heparin	10 (24%)
Trimitanab	2 (5%)
Immunoglobulins	3 (7.3%)
Surgical Interventions	7 (17%)

Most patients required ≤5 days of ventilation while 12% remained intubated for more than 30 days. In nearly half the patients, chest drain was removed within 10 days of initial chylothorax diagnosis.



One-third of patients stayed in the PICU for more than 21 days, and total hospital stay for nearly half of the patients was more than a month.





Resolution occurred in 85%, with recurrence in 22%. Sepsis (41.4%), PICU readmissions (14.6%), and failed extubation (12%) were common complications, while NEC and gastrointestinal haemorrhages were rare.

On overall mortality of 17.1% was observed in our study- higher than national study carried out in 2014

Increased mortality was associated with:

- Young age
- >20 ventilation days
- > 20 days PICU Stay
- Sepsis
- RACHS scoring ≥ 4

- Not associated with higher fluid triglyceride level at diagnosis

Conclusion and recommendations

Chylothorax was associated with significant morbidity and a mortality rate of 17.1% (7/41). Mortality was associated with young age (<13 months), sepsis, RACHS scoring ≥ 4, prolonged period of ventilation and lengthy PICU stay.

Combination of common conservative managements was successful in majority of our patients.

Prevention, early diagnosis and treatment of potential complications may further improve the morbidity and mortality in this group. Although common management strategies exist, protocol is needed to optimise and standardise diagnostic criteria and management modalities.

References

1. Riley LE, Ataya A. Clinical approach and review of causes of a chylothorax. Respir Med. 2019 Oct;157:7-13. doi: 10.1016/j.rmed.2019.08.014.

2. Haines C, Walsh B, Fletcher M, *et al.* Chylothorax development in infants and children in the UK *Archives of Disease in Childhood* 2014;**99:**724-730

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