Chylothorax – do standard management techniques shorten pleural drainage in post-operative cardiac surgery patients?

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Introduction

Chylothorax is an uncommon complication of paediatric heart surgery, with reported incidences of 0.5-2%.[1,2]

The diagnostic criteria for this condition, based on pleural fluid analysis, are the presence of chylomicrons, triglyceride concentration, total cell count, and lymphocyte percentage.[2,3]

Chylothorax is typically managed with low-fat diet, medium-chain triglyceride substitution, TPN and octreotide. A variety of surgical techniques may be used when medical management fails.[4]

The aims of this study were to investigate the correlation between investigation results and duration of drainage and length of hospital stay, and to determine the impact of interventions on these outcomes.

Method

The audit looked at all patients who had been investigated with both chyle/lipid testing and aspiration cytology during the period 1st of Aug 2007 – 31st of May 2010. 113 patients were initially identified – of these 79 patients aged <16 who were post-cardiac surgery and survived until discharge were eligible for inclusion in the study. The total number of operations carried out in this centre during this period was ≈1100, giving an incidence of ≈3%.

Key outcomes were duration of drainage (DOD) and length of hospital stay (LOS). 79 patients were allocated to four groups based on the results of protocol based investigations:

Investigation Criteria	Protocol-based groups	
• Chylomicrons present • Triglyceride > 1.1 • Cell count > 1.0 x10^9 • Lymphocytes > 80%	C+	Chylomicrons present
	C- +3	chylomicrons absent, 3 remaining criteria positive
	C- +1_2	chylomicrons absent, 1 or 2 remaining criteria positive
	C- 0	chylomicrons absent, all other criteria negative

Data were analysed using SPSS (Chicago, SPSS Inc).

Results

	Positive (C+)	Borderline		Negative (C- +0)	p—value
		C- +3	C- +1_2		
No. of patients	35	6	20	18	
Age (median (range))	8 months (10 days – 10 years)	10 months (7 days – 8 years)	1 year (25 days – 7 years)	3.5 years (1 year – 10 years)	
DOD (median)	10	11.5	9.5	14	0.774 *
LOS (median)	20	39.5	17	19.5	0.580 *
	Positive and borderline patients only				
	Treated	**Untreated**			
DOD (median)	12	7			0.004 ‡
LOS (median)	22	16			0.041 ‡

*** Kruskal-Wallis analysis; ‡ Mann-Whitney U analysis**

• There were no significant differences between groups in terms of duration of drainage or length of stay.

• Low fat diet and medium chain triglyceride substitution did not show a significant impact on these outcomes.

• TPN and octreotide were associated with poorer outcomes (p=0.002).

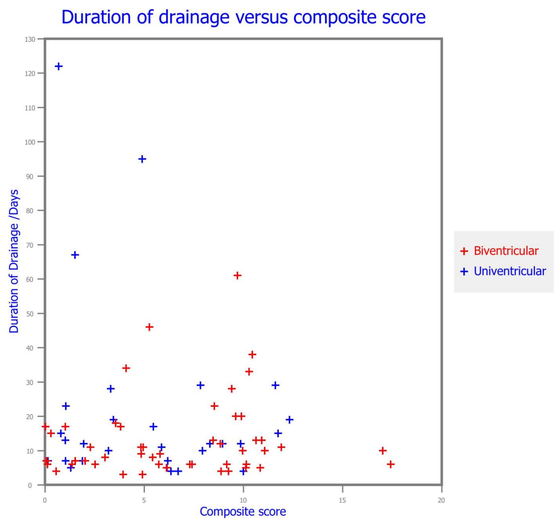

Figure 1. Duration of drainage plotted against composite score of investigation criteria
Composite score = (Triglyceride count/5) + (Chylomicrons * 5) + (Cell Count/5) + (Lymphocyte percent/20)

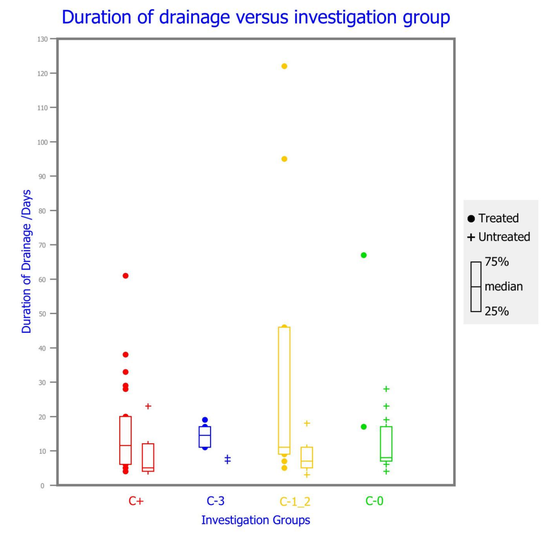

Figure 2. Duration of drainage for each group (sub-divided into treated vs untreated patients).

• Composite scores of investigation criteria were calculated for each patient and plotted against duration of drainage (Fig 1). Contrary to expectation, no significant association was observed between these two variables (p = 0.737, Spearman's rank correlation).

• Drainage times were compared between treated and untreated patients within each group (Fig 2). Positive (C+) and Borderline (C- +3 and C- +1_2) patients who received treatment had significantly longer duration of drainage (p = 0.004) and length of hospital stay (p = 0.041) than untreated patients.

Discussion

Although chylothorax patients are expected to drain for longer compared to patients without chylothorax, there were no significant differences in duration of drainage or length of stay between the 'positive', 'borderline' or 'negative' groups. A positive diagnosis, therefore, may provide little assistance when considering the likely clinical course of an individual patient. Interventions appear to have no significant effect on duration of drainage or length of stay. In fact TPN and octreotide appear to be associated with longer DOD and LOS; however, it seems most likely that TPN and octreotide are given because the patient is continuing to drain rather than *vice versa*.

The literature regarding treatment options is based on small case series and retrospective audits. No randomised controlled trials have been published. Since interventions for chylothorax have adverse nutritional effects, may be associated with secondary complications (e.g. line infection, biliary stasis) and in some cases are completely anecdotal, we feel a randomised trial of active vs expectant management is indicated.

Following a review of this data, our department has instituted a policy of expectant management for seven days after diagnosis. Of eight patients who received a positive diagnosis of chylothorax, five resolved without treatment. One patient was intended to be managed with a low fat diet, but did not eat and was recommenced on normal diet; drainage subsequently resolved. Another initially received Monogen but was found to be lactose intolerant and so recommenced his normal milk; drainage stopped without further treatment.

References

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