

QUILOTÓRAX

Qual a melhor estratégia de tratamento do paciente com quilotórax pós cirúrgico?



Revisando

FUNÇÕES DO SISTEMA LINFÁTICO

- Coleta de fluidos e proteínas
- Transporte de lipídios e vitaminas lipo-solúveis
- Retorno dos linfócitos à circulação sistêmica

Causas

- Quilotórax congênito
 - * Malformações linfáticas congênitas
 - * Associado com síndromes
- Associado com tumores
- Outros
- Traumático
 - * Após cirurgia
 - ★ Cirurgias cardíacas
 - * Pressão venosa central aumentada
 - ★ Trombose de veia cava superior
 - ★ PO de cirurgia de Fontan

Incidence and treatment of chylothorax after cardiac surgery in children: Analysis of a large multi-institution database

Carlos M. Mery, MD, MPH,^{a,b} Brady S. Moffett, PharmD, MPH,^{c,d} Muhammad S. Khan, MD,^e Wei Zhang, PhD,^b Francisco A. Guzmán-Pruneda, MD,^{a,b} Charles D. Fraser, Jr, MD,^{a,b} and Antonio G. Cabrera, MD^d

The Journal of Thoracic and Cardiovascular Surge

Incidence and Etiology of Chylothorax after Congenital Heart Surgery in Children

Parvin Akbari Asbagh, MD¹, Mohammad Ali Navabi Shirazi, MD¹, Aliakbar Soleimani, MD¹, Maryam Razzaz, MD¹, Naseradine Akbari Asbagh, MD², Hussein Rayatzadeh, MD¹, Mamak Shariat, MD^{3*}

The Journal of Tehran University Heart Center 2014

TABLE 2. Incidence of chylothorax associated with selected procedures according to *International Classification of Diseases, Ninth Revision, Clinical Modification* procedure codes

Procedures (ICD-9-CM procedure codes)	Incidence (No. and %)
Atriopulmonary and cavopulmonary anastomoses; Fontan (35.94, 39.21)	430/7589 (5.7)
Total correction of transposition of great vessels (35.84)	125/2887 (4.3)
Heart transplant (37.51)	53/1329 (4.0)
Repair of congenital aortic arch anomalies* (38.34, 38.35, 38.44, 38.45, 38.64, 38.65, 38.84, 38.85)	241/6515 (3.7)
Total repair of total anomalous pulmonary venous connection (35.82)	71/1916 (3.7)
Total repair of tetralogy of Fallot (35.81)	182/5322 (3.4)
Repair of endocardial cushion defect (35.54, 35.63, 35.73)	158/4682 (3.4)
Total repair of truncus arteriosus (35.83)	23/742 (3.1)
Systemic to pulmonary artery shunt† (39.0)	64/3396 (1.9)
Repair of ventricular septal defect (35.53, 35.55, 35.62, 35.72)	150/9299 (1.6)
Patent ductus arteriosus‡ (38.34, 38.45, 38.64, 38.85)	14/1241 (1.1)
Repair of atrial septal defect (35.51, 35.52, 35.61, 35.71)	59/6660 (0.9)

ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification. *Includes patients with ICD-9-CM diagnosis codes 747.10 (coarctation of aorta), 747.11 (interrupted aortic arch), and 747.21 (congenital arch anomalies) as the primary diagnosis. †Includes only patients with a Risk Adjustment for Congenital Heart Surgery-1 score of 3. ‡Includes patients with ICD-9-CM diagnosis code 747.0 (patent ductus arteriosus) as the primary diagnosis.

Aumento da incidência em 2 anos de menos de 2% para cerca de 5%

Diagnóstico

- Drenagem torácica > 10 ml/kg/dia
- >1.000 células por ml de fluido, > 70% linfócitos
- Proteínas > 2g/dl
- Triglicérides > 110 mg/dl, > seu nível no soro

Efeitos do quilotórax nos resultados

Quilotórax aumenta

*Tempo de permanência hospitalar ($p < .0001$)

*Riscos de mortalidade hospitalar
(OR, 2.13; 95% CI, 1.75-2.61)

*Custos da hospitalização

TABLE 4. Effects of chylothorax on outcomes

	Hospital stay (d, median and interquartile range)		Mortality (No. and %)		Cost (\$1000 US, median and interquartile range)	
	No chylothorax	Chylothorax	No chylothorax	Chylothorax	No chylothorax	Chylothorax
	Age					
Neonates	20 (13-36)	47 (30-74)	849/17,648 (4.8)	87/771 (11.3)	99 (63-165)	210 (132-332)
Infants	7 (5-13)	17 (9-36)	276/26,628 (1)	38/886 (4.3)	42 (30-69)	82 (48-160)
Young children	5 (3-9)	17 (10-30)	98/17,831 (0.5)	5/456 (1.1)	34 (24-53)	74 (47-127)
Older children	4 (3-6)	14 (6-27)	33/6316 (0.5)	1/60 (1.7)	35 (25-53)	59 (26-162)
Teenagers	5 (4-7)	10 (7-41)	28/6249 (0.45)	0/32 (0)	41 (30-62)	50 (32-198)
Type of procedure						
RACHS						
1	4 (3-5)	8 (5-26)	46/8975 (0.5)	7/91 (7.7)	25 (19-35)	36 (25-70)
2	6 (4-10)	17 (9-38)	168/26,446 (0.6)	22/560 (3.9)	39 (29-59)	78 (50-151)
3	9 (5-17)	23 (14-40)	436/26,688 (1.6)	21/808 (2.6)	53 (35-89)	106 (63-187)
4	13 (6-23)	23 (10-47)	233/7980 (2.9)	22/374 (5.9)	70 (36-121)	116 (42-213)
5-6	26 (17-41)	46 (35-62)	179/2477 (7.2)	19/136 (14)	134 (92-200)	223 (151-314)
Heart transplant	36 (17-72)	92 (52-138)	27/1276 (1.2)	4/53 (7.6)	279 (196-449)	450 (347-809)
Multiple procedures	40 (19-87)	66 (42-106)	195/1730 (11)	36/183 (19.7)	196 (101-392)	316 (202-582)
Neck or upper vein thrombosis						
No	16 (4-16)	39 (12-49)	1264 (1.7)	120 (5.6)	82 (30-85)	186 (56-224)
Yes	70 (24-91)	80 (36-101)	20 (15.9)	11 (22.5)	366 (136-498)	447 (175-614)
Hospital volume						
First quartile	7 (4-17)	23 (11-48)	386/19,255 (2)	41/594 (6.9)	47 (31-85)	98 (56-206)
Second quartile	7 (4-16)	28 (13-52)	394/19,982 (2)	33/560 (5.9)	46 (30-87)	126 (66-263)
Third quartile	7 (4-16)	27 (13-49)	231/16,556 (1.4)	37/706 (5.2)	48 (30-94)	129 (62-229)
Fourth quartile	7 (4-15)	23 (12-51)	273/19,779 (1.4)	20/345 (5.8)	42 (28-79)	93 (45-226)

RACHS, Risk Adjustment for Congenital Heart Surgery-1.

cardiac surg
 children: Analysis of a large multi-institution database
 The Journal of Thoracic and Cardiovascular Surgery –
 February 2014

Manejo

- Drenagem
- Prevenção da recorrência pelo tratamento da causa subjacente
- Prevenção/Tratamento da desnutrição e imunodeficiência

Não Cirúrgico

- Tratamento conservador inicial é bem sucedido em 20 a 80% dos casos
- Dieta com baixo teor de gordura e enriquecida com TCM
 - *TCM: absorvido diretamente no sistema porta, sem passar pela drenagem linfática
- Nutrição parenteral total
 - *Paciente não responsivo ao regime enteral
 - *Aumento da drenagem quilosa com nutrição enteral

Table 2 Characteristics of patients with chylothorax

	median (range)
Duration of drainage (days)	9 (3- 59)
Duration of sedation (days)	2 (0-20)
Duration of relaxation (days)	0 (0-4)
Max. loss of chyle within 24 hours (ml/kg)	43 (18 - 183)
Day of max. loss (post-op day)	8 (5-52*)
Start of MCT-diet (post op-day), n = 24	9 (5-52*)
Start of octreotide (post op-day); n = 3	10, 17, 20
Duration of TPN treatment (days); n = 4	6 (2 -54)
Lowest serum total protein (g/l)** , ***	39 (30-49)
Lowest serum antithrombin III (%)**	59 (32-85)
Lowest serum quick (%)**	75 (42-101)
Lowest serum immunoglobulin G (mg/dl)**	220 (64-346)

*One patient developed chylothorax the first time on post-op-day 51st

**Lab-analyses during chylous-loss

***Significantly lower compared to day 5 post-op analyses [40 (33-50) g/l],

p < 0.05

Revisão retrospectiva

Hospital de Freiburg entre janeiro 2000 e outubro 2006

282 pacientes analisados > 26 pacientes com quilotórax

Em 24 casos foi iniciada dieta com TCM

Dieta com TCM > Sucesso em 17 dos 24

Chylothorax after surgery on congenital heart disease newborns and infants – risk factors and efficacy of MCT diet

Journal of Cardiothoracic Surgery 2010, 5:127

Não Cirúrgico

- Octreotide 0,5 a 10mcg/kg/h
- Somatostatina 3,5-10mcg/kg/h

Octreotide use in post-cardiac surgery chylothorax: a 12-year perspective

Abdulrazaq Sheikh Aljazairi, Tauhid Ahmed Bhuiyan, Abdullah Hasan Alwadai and Rayd Abdulaziz Almehizia

- Estudo de coorte retrospectivo
- Analisados todos os pacientes (< 18 anos) que receberam Octreotide para tratamento de quilotórax após cirurgia cardíaca entre janeiro 2003 e agosto 2015
- Endpoint primário – resolução do quilotórax (drenagem < 2ml/kg/dia)
- Octreotide mostrou-se seguro e com mínimos efeitos colaterais

Asian Cardiovascular and Thoracic

Annals 0 (0) 1-7 2016

	Lone Fat-Free n=26	Fat-Free + Octreotide n=5	Fat-Free + Steroids n=7	Fat-Free+ Steroids+Octreotide n=2
Time to diagnose chylothorax (days)	3	6	5	5
Mean Chest tube drainage/kg (ml)/day in the 1st week	22.2	19.5	21	23.7
Mean Chest tube drainage/kg (ml)/day after 1st week	14.6	18.5	17.9	16.2
Mean duration of chest tube drainage (days) after the start of each treatment	18	14.5	13	15.5
ICU Stay	8.9	4.7	7	5
Hospital stay	21.3	27	30	25
Failure	0	0	1	0
Recurrence	0	0	0	0

Table 3. Results of the 4 groups.

Chylothorax after surgery for congenital heart disease in children: a retrospective observational study

The Journal of Egyptian Society Cardiothoracic Surgery – Volume 18, Number (3-4)

Cirúrgico

○ A cirurgia é recomendada

* Se a drenagem persiste por mais de 2 semanas

* Outros consideram um volume particular de > 100 ml/ ano de idade da criança

➤ Muitos autores recomendam um período mais extenso de manejo clínico antes da cirurgia (cerca de 3 a 4 semanas)

o Ligadura do ducto torácico

Thoracic Duct Ligation for Persistent Chylothorax After Pediatric Cardiothoracic Surgery

Dilip S. Nath, MD, Jainy Savla, BS, Robinder G. Khemani, MD,
Daniel P. Nussbaum, BS, Christina L. Greene, BS, and Winfield J. Wells, MD

Division of Cardiothoracic Surgery, Childrens Hospital Los Angeles, Keck School of Medicine, University of Southern California,
Los Angeles, California

(Ann Thorac Surg 2009;88:246–52)

o Pleurodese

o Shunt pleuroperitoneal

Concluindo

- Controversias
 - Necessidade de estudos randomizados, controlados e multicêntricos
 - Fundamental que exista um protocolo clínico de manejo
- 

Utility of a Clinical Practice Guideline in Treatment of Chylothorax in the Postoperative Congenital Heart Patient

Jay Yeh, MD, Erin R. Brown, RD, Kimberly A. Kellogg, MS, CPNP, Janet E. Donohue, MPH, Sunkyung Yu, MS, Michael G. Gaies, MD, MPH, Carlen G. Fifer, MD, Jennifer C. Hirsch, MD, MS, and Ranjit Aiyagari, MD

Division of Pediatric Cardiology, Nutrition Services, and Department of Cardiac Surgery, University of Michigan, C.S. Mott Children's Hospital Ann Arbor, Michigan

-
- Guideline clinico institucional
 - Coortes retrospectivas
 - Analisar a eficácia do uso de um protocolo clínico

Table 1. Demographic and Clinical Characteristics in Patients Diagnosed and Treated for Chylothorax Before and After Initiation of Clinical Practice Guideline (n = 163)

Characteristic	All	Early Cohort (n = 118)	Late Cohort (n = 45)	p Value ^a
Weight at admission, kg	4.4 (3.2–8.9)	4.1 (3.1–9.2)	5.2 (3.5–7.9)	0.24
Male sex	99 (60.7)	71 (60.2)	28 (62.2)	0.81
Age at surgery, days	90 (7–278)	72 (7–354)	123 (9–229)	0.55
Number of patients with age at surgery ≤30 days	67 (41.1)	52 (44.1)	15 (33.3)	0.21
Primary diagnosis/procedure				
Single ventricle without arch repair	52 (31.9)	38 (32.2)	14 (31.1)	0.92
Single ventricle with arch repair	26 (16.0)	20 (17.0)	6 (13.3)	
Two ventricles without arch repair	70 (42.9)	49 (41.5)	21 (46.7)	
Two ventricles with arch repair	15 (9.2)	11 (9.3)	4 (8.9)	
RACHS-1 classification				
1–3	99 (60.7)	69 (58.5)	30 (66.7)	0.43
4–6	61 (37.4)	46 (39.0)	15 (33.3)	
Zero	3 (1.8)	3 (2.5)	0 (0.0)	
Age at chylothorax diagnosed, days	95 (18–288)	79 (18–387)	127 (24–237)	0.84
Time from surgery to chylothorax diagnosis, days	8 (5–11)	9 (5–12)	6 (4–8)	0.004
Chest tube output, mL/kg/day	16.2 (8.8–28.1)	17 (8.5–28.5)	15.1 (9–27)	0.94
Patients with bilateral chylothorax	90 (55.2%)	68 (57.6%)	22 (48.9%)	0.32
Low/high output				
Low	97 (59.5)	70 (59.3)	27 (60.0)	0.98
High	65 (39.9)	47 (39.8)	18 (40.0)	
Missing data	1 (0.6)	1 (0.8)		
Patients with measured triglyceride levels	56 (34.4)	41 (34.7)	15 (33.3)	0.87
Pleural triglyceride levels, mg/dL	309.5 (228–462.5)	311 (235–426)	286 (227–600)	0.83
Clinical practice guidelines followed	N/A	N/A	39 (86.7)	N/A

^a p value from χ^2 test for categorical variables and Wilcoxon rank sum test for continuous variables on comparison of each characteristic between patients in both cohorts.

Data presented as n (%) for categorical variables and median (interquartile range) for continuous variables.

N/A = not applicable; RACHS-1 = Risk Adjustment for Congenital Heart Surgery.

Table 2. Comparison of Medical and Surgical Treatments for Chylothorax in Patients Diagnosed and Treated for Chylothorax Before and After Initiation of Clinical Practice Guideline (n = 163)

Treatment	All	Early Cohort (n = 118)	Late Cohort (n = 45)	p Value
Surgical intervention				
Mechanical pleurodesis	7 (4.3)	6 (5.1)	1 (2.2)	0.67
Time from surgery to mechanical pleurodesis, days	32 (20–54)	31 (20–33)	54	0.36
Time from chylothorax diagnosis to mechanical pleurodesis, days	24 (10–46)	22.5 (10–25)	46	0.36
Thoracic duct ligation	21 (12.9)	16 (13.6)	5 (11.1)	0.68
Time from surgery to thoracic duct ligation, days	20 (19–27)	21.5 (19.5–31.5)	20 (15–27)	0.57
Time from chylothorax diagnosis to thoracic duct ligation, days	13 (10–20)	13 (10–22)	14 (9–19)	0.90
Octreotide				
Treated with octreotide	29 (17.8)	18 (15.3)	11 (24.4)	0.17
Time from surgery to octreotide treatment, days	14 (10–23)	20.5 (14–29)	9 (6–10)	0.00
Duration on octreotide, days	10 (6–16)	11 (7–20)	7 (6–14)	0.28

Value from χ^2 test or Fisher exact test for categoric variables and Wilcoxon rank sum test for continuous variables on comparison of each characteristic between patients in both cohorts.

Data presented as n (%) for categoric variables and median (interquartile range) for continuous variables.

Table 3. Comparisons of Clinical Outcomes in Patients Diagnosed and Treated for Chylothorax Before and After Initiation of Clinical Practice Guideline (n = 163)

Outcome	All	Early Cohort (n = 118)	Late Cohort (n = 45)	p Value ^a
ICU stay				
Total number(s) of ICU admission				
1	128 (78.5)	92 (78.0)	36 (80.0)	0.78
≥2	35 (21.5)	26 (22.0)	9 (20.0)	
ICU length post-extubation, days	3 (1–5)	3 (1–6)	3 (2–4)	0.71
Total ICU length of stay, days	16 (6–31)	18 (7–39)	9 (5–18)	0.01
Hospital stay				
Total hospital length of stay, days	28 (18–53)	30 (22–54)	23 (14–34)	0.005
Weight at discharge, kg	5.2 (3.7–9.5)	5.0 (3.6–9.6)	5.5 (4.1–8.1)	0.63
Mortality				
Death during initial ICU stay	10 (6.1)	9 (7.6)	1 (2.2)	0.29
Hospital death	13 (8.0)	10 (8.5)	3 (6.7)	1.00
Mechanical ventilation				
Total number of intubations				
1	89 (54.6)	57 (48.3)	32 (71.1)	0.01
≥2	74 (45.4)	61 (51.7)	13 (28.9)	
Total duration of mechanical ventilation, days	9 (3–20)	11 (3–24)	5 (3–12)	0.02
Chest tubes				
Total number of chest tubes placed				
1	11 (6.8)	4 (3.4)	7 (15.6)	0.01
≥2	152 (93.2)	114 (96.6)	38 (84.4)	
Total duration of chest tubes, days	18 (11–27)	20 (12–30)	14 (10–23)	0.01
Chest tube removal to discharge, days	6 (2–17)	8 (3–20)	4 (1–13)	0.08
Central venous lines				
Total number(s) of central venous lines				
None	1 (0.6)	1 (0.9)	0 (0.0)	0.94 ^b
1	65 (39.9)	47 (39.8)	18 (40.0)	
≥2	97 (59.5)	70 (59.3)	27 (60.0)	
Total duration of central venous lines, days	23.5 (12–50)	27 (16–54)	15 (8–26)	0.001
NPO				
Total number(s) of time(s) NPO				
1	65 (39.9)	44 (37.3)	21 (46.7)	
2	42 (25.8)	28 (23.7)	14 (31.1)	0.08
≥3	56 (34.4)	46 (39.0)	10 (22.2)	
Treated with NPO for chylothorax	76 (46.6)	58 (49.2)	18 (40)	0.30
Total duration NPO, days	9 (3–18)	9.5 (4–19)	6 (2–14)	0.04
Interval from surgery to NPO treatment, days	13 (10–20.5)	15 (11–22)	9 (7–13)	0.006
Resumption of enteral nutrition to discharge, days	14 (8–27)	16 (10–30)	11 (6–19)	0.02
Total parenteral nutrition				
Total duration on total parenteral nutrition, days	12 (5–22)	13 (5–24)	10 (4–21)	0.29

^a p value from χ^2 test or Fisher exact test for nominal variables, Mantel-Haenszel χ^2 test for ordinal variables, and Wilcoxon rank sum test for continuous variables on comparison of each outcome between patients in both cohorts. ^b Comparison was made as none/1 (combined 'none' into '1' category) versus 2 and p value was from χ^2 test.

Data presented as n (%) for categoric variables and median (interquartile range) for continuous variables.

ICU = intensive care unit; NPO = nil per os.



OBRIGADA

Slide 22

mc1

manuela camões; 10/5/2017