



CIRUGÍA y CIRUJANOS

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Fundada en 1933

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CLINICAL CASE

Minimally invasive treatment for traumatic chylopericardium. Paediatric case report[☆]



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Received 25 June 2014; accepted 10 November 2014

Available online 12 February 2016

KEYWORDS

Chylopericardium;
Minimally invasive;
Thoracoscopic

Abstract

Background: Chylopericardium is a rare occurrence in children. The most common causes are associated with cardiac surgery, malformations of the lymphatic system, idiopathic reasons, among others.

Objective: The case is presented of a patient with traumatic chylopericardium, the diagnostic methodology, and in particular, its successful resolution by surgical means.

Clinical case: Male patient of 6 years old, previous accident of fall from patient's height. Chest X-ray showed evidence of cardiomegaly. An echocardiogram with pericardial effusion was performed. Pericardial puncture was performed with drainage of milky material, confirming chylous liquid. Treatment included pericardial catheterisation, total parenteral nutrition, octreotide, and diet with medium chain triglycerides, with persistent increased pericardial fluid. Lymphatic abnormalities were ruled out by MRI. He underwent surgical treatment due to failure of prior treatment. A thoracoscopic approach was adopted with a favourable outcome.

Conclusions: Chylopericardium occurs in children in most cases after cardiovascular surgery. The case presented here was classified as idiopathic. Patients with this condition may present with severe symptoms, such as tamponade, or can be asymptomatic as in the case presented. If medical treatment fails, it should be resolved by surgery; the best choice is minimally invasive treatment with its well-known advantages.

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[☆] Please cite this article as: García-Hernández C, Carvajal-Figueroa L, Calderón-Urrieta A, Lechuga-Tosqui A, Landa-Juárez S. Tratamiento por mínima invasión del quilo-pericardio traumático. Reporte de un caso pediátrico. Cir Cir. 2016;84:45–49.

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PALABRAS CLAVE

Quilopericardio;
Mínima invasión;
Toracoscopia

Tratamiento por mínima invasión del quilopericardio traumático. Reporte de un caso pediátrico**Resumen**

Antecedentes: El quilopericardio es una entidad rara en pediatría. Las causas más frecuentes están asociadas a cirugía cardíaca, malformaciones del sistema linfático o idiopáticas.

Objetivo: Presentar el caso de un paciente con quilopericardio traumático, su metodología diagnóstica así como su resolución quirúrgica.

Caso clínico: Paciente varón de 6 años de edad, con antecedente de caída desde su propia altura. Radiografía de tórax con evidencia de cardiomegalia. Ecocardiograma con presencia de derrame pericárdico. Se realizó punción pericárdica, con drenaje de líquido de aspecto lechoso, similar al quilo. El tratamiento fue mediante colocación de sonda pericárdica y NPT, octeótrido y dieta con triglicéridos de cadena media persistiendo el drenaje. Se descartaron anomalías linfáticas por resonancia magnética. Se sometió a tratamiento quirúrgico mediante un abordaje toracoscópico, por falla en la respuesta al manejo conservador, con resultado favorable.

Conclusiones: El quilopericardio en niños se presenta en la mayoría de los casos después de una cirugía cardiovascular. El caso aquí presentado ha sido catalogado como traumático. Los pacientes con este padecimiento pueden cursar con síntomas graves de tamponade o asintomáticos como el caso aquí reportado. Cuando hay falla al tratamiento médico se debe resolver con cirugía de mínima invasión, con las ventajas ya conocidas de estos abordajes.

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Background

Chylopericardium is the accumulation of chyle in the pericardial space. It is a rare disorder in children.^{1,2} The most frequent causes are associated with cardiac surgery or malformations of the lymphatic system, lymphangiomas or even mediastinal tumours.³⁻⁵ It is not always possible to establish its aetiology and these cases are referred to as idiopathic.⁶⁻⁹ Most reports refer to adult patients.¹ The few publications regarding children refer to patients who have undergone some form of cardiovascular surgery, there are very few reports on spontaneous chylopericardium in children.⁶⁻¹¹

Initial treatment should be medical, using parenteral nutrition, diets with medium chain triglycerides, and in some cases the use of octreotide has been recommended. When medical treatment has failed, if the initial symptoms are serious or there is a high volume of drainage, surgical treatment should be considered, which consists of ligating the thoracic duct.¹⁰⁻¹⁴

The *objective* of this study is to present the case of a child who developed a chylopericardium seemingly as a consequence of a fall, its diagnostic methodology and its successful resolution by means of minimally invasive surgery.

Clinical case

A 6-year-old male patient, with no history of significance, onset of the disorder was 3 weeks before his admission when he fell from his own height, presenting pain in the cervical and lumbar region. Chest pain started after 2 weeks, and a chest X-ray was requested which showed cardiomegaly (Fig. 1). It was evaluated by paediatric cardiology, who found

reduced cardiac tone, with no signs of tamponade or heart failure. An electrocardiogram was performed which showed a drop in voltage in all branches, and an echocardiogram was undertaken which showed the presence of pericardial effusion, which was quantified at 500 ml (Fig. 2).

Given these findings, a pericardial puncture was undertaken, and 300 ml of a milky fluid was obtained (Fig. 3), and an anterior pericardial tube was placed. Cytochemistry of the aspirated fluid reported: triglycerides 1910 mg/dl and 80 mg/dl cholesterol. Electrophoresis of the pericardial fluid showed: beta lipoproteins 13.6 mg/dl, pre beta lipoproteins 64.1 mg/dl, alpha lipoproteins 1 mg/dl, chylomicrons 21.3 mg/dl. Magnetic resonance was performed in order to rule out any lymphatic malformation or mediastinal tumour, and was normal.

Treatment was started with fasting, total parenteral nutrition and octreotide at a dose of 100 mcg/m², administered subcutaneously. Chyle loss through the drain on the first day was 0.3 ml/kg/h, which increased to 1 ml/kg/h, and therefore as medical treatment had failed, the option of surgical treatment was considered since, rather than reducing the loss, with medical treatment it had significantly increased.

The patient underwent surgery using a right-sided thoracoscopic approach; with patient in the left lateral position, 3.5 mm ports were inserted, the first 1 cm below the scapula for the 30° optic and 5 mm, insufflated at 5 mm Hg, and flow at 1 l/min. Then 2.5 mm ports were inserted in the anterior axillary line in the 4th and 7th intercostal space. The initial exploration revealed a haematoma in the mediastinum (Fig. 4). The thoracic duct was dissected at its inlet to the chest, and 3 silk ligatures 2-0 were placed (fig. 5). Then 2.5 mm ports were inserted in the posterior axillary



Figure 1 Chest X-ray showing enlarged cardiac silhouette.

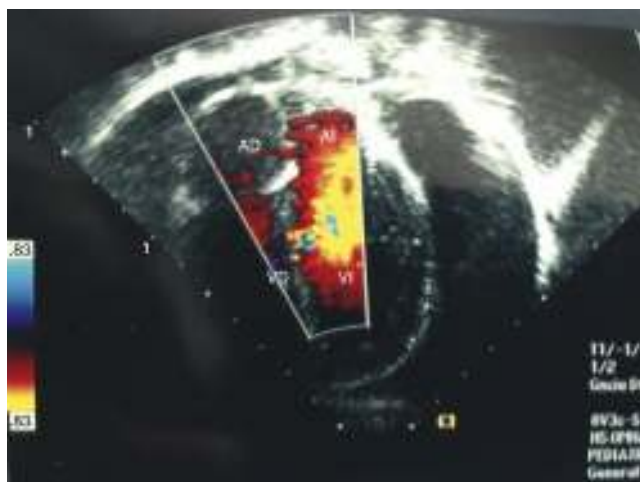


Figure 2 Ultrasound with radiolucent image, compatible with a pericardial effusion of approximately 500 ml.

line in the 4th and 7th intercostal space, the phrenic nerve was identified and above it the pericardium was incised, to create a window from the diaphragm to the union of the superior vena cava and the auricle and an enlarged pericardium was found (Fig. 6). A water seal chest drain was inserted, and the approaches were closed with 3 and 4-0 absorbable suture. Surgical time was 50 min, without incident or complications.

A normal oral diet was started 24 h post surgery, loss through the chest drain on the first post-operative day was



Figure 3 Milky appearance of the fluid obtained from pericardial puncture which cytochemical study revealed as a chylothorax.



Figure 4 Initial thoracoscopic image showing a haematoma in the upper third of the posterior mediastinum.

0.1 ml/kg/h until practically nil after 72 h, and therefore the drain was removed. The patient was discharged on the fourth postoperative day with no complications. Current follow-up is 12 months with no recurrence, with normal ultrasound and radiological monitoring.



Figure 5 Thoracoscopic image. The thoracic duct can be observed at the time of dissection.



Figure 6 Thoracoscopic image. Starting the pericardial window, showing the enlarged pericardium.

Discussion

Chylopericardium is a very rare disorder in children, which almost always presents after cardiovascular surgery or associated with lymphatic malformations or thoracic tumours.^{1-3,14-17} It is most likely that this case was associated with the traumatic event as this marked the onset of symptoms, for which a chest X-ray was necessary which revealed cardiomegaly, and because a haematoma was found in the upper part of the posterior mediastinum on thoracoscopic exploration. Regardless of the volume of accumulated fluid, and for some reason that we do not know, patients with this disorder can either have serious symptoms of tamponade or very few symptoms, as in the case we report here.¹⁻³ This disorder's physiopathology of an accumulation of fluid in the pericardium¹⁻⁶ and not in the pleural space is not well understood; it is believed that it might be a leak at the site where the thoracic duct enters the superior vena cava, and hence the build-up of chyle in the pericardial space. Once a diagnosis of chylopericardium has been made, and depending on the severity of symptoms, if the initial presentation is not severe medical treatment should

be attempted, with fasting, parenteral nutrition, the use of diets with medium chain triglycerides and even the administration of drugs such as octreotide,¹⁵ which in some cases reduces the production of chyle. But if it remains raised or if rather than decreasing it increases, or if the initial symptoms are severe, as with tamponade, surgical treatment is necessary. There are various surgical options, which might be to establish a communication of the pericardium towards the peritoneum, inserting a Denver valve, or establishing a communication towards the pleura with a wide pericardial window, or thoracic duct ligation.^{1,5,10} We opted for the latter option, along with construction of a wide pericardial window, which was performed with minimal invasion. This alternative enabled the leakage of chyle to be controlled, and the patient recovered rapidly due to the advantages of minimally invasive surgery.

Conclusion

Due to all of the above, we consider that thoracic duct ligation along with the creation of a pericardial window by thoracoscopy is a useful and safe alternative for the treatment of these patients.

Conflict of interests

The authors have no conflict of interests to declare.

References

1. Dib C, Tajik AJ, Park S, Kheir MEL, Khandieria B, Mookadam F. Chylopericardium in adults: a literature review over the past decade (1996–2006). *J Thorac Cardiovasc Surg.* 2008;136:650–6.
2. Campbell RM, Benson LN, Williams WW, Adatia I. Chylopericardium after cardiac operations in children. *Ann Thorac Surg.* 2001;72:193–6.
3. Densupsoontorn N, Jirapinyo P, Wongarn R, Thamonsiri N, Nana A, Laohaprasitiporn D, et al. Management of chylothorax and chylopericardium in pediatric patients: experiences at Siriraj Hospital, Bangkok. *Asia Pac J Clin Nutr.* 2005;14:182–7.
4. Nguyen DM, Shum-Tim D, Dobell AR, Tchervenkov CI. The management of chylothorax/chylopericardium following pediatric cardiac surgery: a 10-year experience. *J Card Surg.* 1995;10 Pt 1:302–8.
5. Kamada N, Mitani Y, Kihira K, Iwao A, Sinoki T, Ikeyama Y, et al. Images in Cardiovascular medicine. Fatal pulmonary lymphangiectasia manifesting after repeated surgeries for intractable chylopericardium and chylothorax in a 20-month-old girl. *Circulation.* 2008;117:1894–6.
6. Cervantes-Salazar JL, Calderón-Colmenero JE, Ramírez-Marroquín S. Quilopericardio idiopático. A propósito de un caso. *Rev Esp Cardiol.* 2007;60:884–5.
7. Chen YL, Lee CC, Yeh ML, Lee JS, Sung TC. Generalized lymphangiomatosis presenting as cardiomegaly. *J Formos Med Assoc.* 2007;106 Suppl. 3:S10–4.
8. Attias D, Ou P, Souillard P, Boudjemline Y, Sidi D, Bonnet D. Spontaneous idiopathic chylopericardium in childhood. *Arch Mal Coeur Vaiss.* 2006;99:529–31.
9. Abadir S, Acar P, de Maupeou F, Baunin C, Railhac JJ, Dulac Y, et al. Unusual association of chylopericardium and aortic hypoplasia in a neonate. *Arch Mal Coeur Vaiss.* 2005;98:579–81.

10. Stringel G, Ouzounian SP, Napoleon L, Permut LC, Golombek SG. Thoroscopic pericardial window creation and thoracic duct ligation in neonates. *JSLs*. 2003;7:353–7.
11. Ossiani MH, McCauley RGK, Patel HT. Primary idiopathic chylopericardium. *Pediatr Radiol*. 2003;33:357–9.
12. Pongprot Y, Silvilairat S, Cheuratanapong S, Woragidpoonpol S, Sittiwangkul R, Phornphutkul C. Isolated primary chylopericardium: a case report. *J Med Assoc Thai*. 2003;86:361–4.
13. Anil SR, Manoj P, Hejmadi A, Kumar RK. Massive primary chylopericardium in an infant. *Indian Heart J*. 2002;54:295–6.
14. Khattab T, Smith S, Barbor P, Ghamdi SA, Abbas A, Fryer C. Extramedullary relapse in a child with mixed lineage acute lymphoblastic leukemia: *Chylous pleuropericardial effusion*. *Med Pediatr Oncol*. 2000;34:274–5.
15. López-Castilla JD, Soult JA, Falcón JM, Muñoz M, Santos J, Gavilan JL, et al. Primary idiopathic chylopericardium in a 2 month old successfully treated without surgery. *J Pediatr Surg*. 2000;35:646–8.
16. Akashi H, Tayama K, Ishihara K, Tanaka A, Fujino T, Okazaki T, et al. Isolated primary chylopericardium. *Jpn Circ J*. 1999;63:59–60.
17. Lee YH, Im SA, Nam SH, Lee SN, Kim Y, Seong CM, et al. Challenging problems in advanced malignancy: Case 1. Chylopericardium during the treatment of non-Hodgkin's lymphoma. *J Clin Oncol*. 2003;21:3168–70.