Case Report

Tube thoracostomy: One-off cause of chylothorax

Marcio Bottera,⁎, Gustavo Yaminb, Raul R. Urrahyb, Rafael Grunewaldb, Maria Carolina G. Mortatia, José Franklin S. Pompa Filhoa, Roberto Gonçalvesb, Roberto Saad Jra

ARTICLE INFO

Keywords:
Chylothorax
Thoracic duct
Drainage
Pleural effusion
Thoracoscopy

ABSTRACT

Chylothorax secondary to thorax drainage is a rare entity, with only five previously reported cases. A patient that sustained injuries after an accident involving a power tool, originally seen at another service, presented with a metal fragment embedded in the 4th intercostal space of the right hemithorax and ipsilateral pneumothorax. The patient underwent thoracic drainage and was referred to our hospital. After one day, the drained fluid became milky and laboratory tests confirmed chylothorax. Videothoracoscopy disclosed compression of the thoracic duct topography by the drainage tube.

Introduction

Traumatic chylothorax is an event resulting from structural discontinuity or obstruction in lymphatic circulation, predominantly of the thoracic duct, directly or indirectly, by external force with leakage of its content into the cavity.

Chylothorax secondary to thorax drainage is a rare entity, where the report by E. P. Churchill in 1948 apud Baldridge and Lewis [1] was the first of the five cases described in the literature to date [1–5]. We report a case of a patient that developed chylothorax after insertion of a chest drainage tube.

Case report

The case involved a 55-year-old man who sustained an accident with a power saw, initially seen at a hospital on the outskirts of São Paulo city. The presence of a penetrating wound in the anterior of the right hemithorax at the level of the 4th intercostal space (ICS) was diagnosed. Initial assessment revealed pneumothorax to the right and a metal fragment deeply embedded in the ipsilateral anterior chest wall. The patient was submitted to thoracic drainage. After a computed tomography (CT) scan disclosing thorax drain between the parietal pleura and the diaphragmatic surface of the right lung, and no evidence of pneumothorax or other abnormalities, the patient was referred to the Thoracic Service of the Santa Casa de Misericórdia de São Paulo Hospital.

The patient was stable on admission, with a sutured wound in the anterior wall of the right hemithorax at the 4th ICS, hemi-clavicular line, and pleural drain also to the right, without air leakage and with serosanguinous fluid (Fig. 1).

One day after admission to our service, there was a significant alteration in the aspect of the drain fluid, which became milky,
indicative of chylothorax. The laboratory analysis revealed pinkish-white cloudy exudate and the following biochemical profile:
LDH = 281 U/L, glucose = 331 mg/dL, pH = 6.8, total proteins = 3.9 g/dL, TRIGLYCERIDES = 974 mg/dL; confirming the suspected diagnosis.

The patient was submitted to videothoracoscopy to the right side, with the pleural cavity showing moderate accumulation of chylothorax, besides a small number of pleural adhesions to the anterior chest wall which, when released, revealed the presence of a penetrating metal fragment in the pleural space. The tip of the previously placed thorax drain was situated directly below the right lung, compressing the inferior part of the posterior mediastinum, a location anatomically corresponding to the topography of the thoracic duct. Removal of the pleural drain revealed no apparent lacerations or foci of fistulization, and the mediastinal pleura was intact. The foreign body was removed, the pleural cavity cleansed with saline solution and a n° 28F thoracic drain placed in a postero-superior position.

The patient was fasted post-operatively and fed parenterally for six days as a complementary procedure to the chylothorax treatment. After this period, biochemical analysis of the pleural liquid was repeated, showing normal triglyceride levels. Oral feeding was resumed and the pleural drain removed, with the patient discharged on the tenth post-operative (P.O.) day. The patient is being monitored through out-patient follow-up with good progress and no recurrence of chylothorax.

Discussion

In the present case, the possibility of a pleural empyema due to the trauma was initially entertained, based on macroscopic abnormalities in the drained fluid. However, this possibility was ruled out in view of the clinical and laboratory evidence rejecting an infectious cause of the condition. Biochemical analysis of the pleural fluid confirmed the diagnosis of chylothorax, using the same method employed in four of the previous reports [2–5], where no details on the fifth case were available [1].

In addition, the only abnormalities on the chest CT were the presence of a metal fragment embedded in the anterior wall of the right hemithorax and of the chest tube along a subpulmonary course, whose distal end reached the right-anterior part of the posterior mediastinum at the T11 level, a topography typically occupied by the thoracic duct (Figs. 2 and 3). Thus, there were no signs of the most common etiologies of non-traumatic chylothorax, such as lymphomas, other neoplasias or lymphadenopathies. Therefore, in view of the clinical course and intra-operative findings, including the absence of any macroscopic discontinuity of the thoracic duct or foci of fistulization, the cause of the chylothorax was attributed to iatrogenic compression by the pleural drain inserted during the
initial management of the trauma patient. This constitutes a late complication of the procedure (over 24 h after implementation), with an average delay of 7 days between injury and manifestation [3], although in the case reported fluid collection occurred in the pleural space on the 3rd day post-trauma.

Notably, this is the first case report of this complication during management of a trauma event. It is also noteworthy that none of the underlying events leading to the flawed procedure are the same in the other case reports. These events occurred during treatment of two cases of pneumothorax, in a case of complicated pneumonia and as a consequence of barotrauma due to mechanical ventilation, and also in the treatment of hemothorax secondary to puncture accident and massive pleural effusion with mediastinal displacement.

Conservative management of chylothorax entails implementation of fasting and total parenteral nutrition, dietary fat restriction or Medium Chain Triglyceride (MCT)-based diet, absorbed directly into enteral blood circulation. The classic indications for surgical management are clinical treatment failure or the diagnosis and intra-operative evidence of duct injury.

Exploratory surgery was not performed in any of the previously reported cases and no imaging exams were mentioned. It is

Figs. 2 and 3. Drainage situated right and laterally to the aorta, normal topography of the thoracic duct.
therefore unclear whether discontinuity or compression of the thoracic duct occurred. Four cases describe clinical treatment, where total parenteral nutrition was adopted in two cases [2,5], low protein/low fat diet in one case [3] and an MCT-based diet (followed by pleurodesis opted for by the family) in another case [4]. Control of lymphatic loss was favorable in all the patients, resolving within an average of 5.5 days of dietary adjustment and 5 days after total parenteral nutrition, respectively.

In the case reported, videothoracoscopy was indicated owing to the wound penetrating the pleural space. The need for surgical intervention was reinforced upon diagnosis of chylothorax, hitherto unexplained, given that the metal fragment embedded in the anterior chest wall was unlikely to have injured the thoracic duct, located posteriorly in the mediastinum. The cause of chylothorax was established intra-operatively, after confirmation of extrinsic compression of the thoracic duct by the previously placed drain. The patient was fasted and parenteral nutrition introduced because, despite the absence of macroscopic signs of injury of the mediastinal pleura or thoracic duct after removal of the drain, microstulas undetectable by the videothoracoscopic methods may have been present. The patient evolved satisfactorily and oral feeding was reintroduced on the 7th P.O. day, with subsequent hospital discharge on the 10th P.O. day.

Conclusion

Chylothorax as a complication of chest drainage is extremely rare, where this is the sixth such case reported in the literature, but is a condition that can lead to potentially serious repercussions. Although a one-off case, the fact that it was secondary to a routine widely performed intervention makes this potential complication relevant.

Upon transference, all interventions that referred patients went through must be revisited, still further invasive procedures. The possibility of chylothorax should be considered when other causes of lymphatic effusion are unlikely and when the technique used for pleural drainage is inadequate or unknown, as in our case. This entity, already hardly seen by itself, could have its occurrence brought about zero by the strict attendance to technique guidelines, underlining, once again, their importance.

Conflicts of interest statement

None.

Patient declaration statement

Written informed consent was obtained from the patient.

Financial statement

The authors declare no financial statement.

References

[1] R.R. Baldridge, R.V. Lewis, Traumatic chylothorax. A review of the literature and report of a case treated by ligation of the thoracic duct and cisterna chyli, Ann. Surg. 128 (1948) 1056–1078.
[2] S.P. Kumar, J. Belik, Chylothorax - a complication of chest tube placement in a neonate, Crit. Care Med. 12 (1984) 411–412.
[3] A. Sebastiao Porto, F.C. Ocariz Bazzano, A. Henrique Paiva, L.A. Marti Traver, S.R. Celeste Henriques, Iatrogenic chylothorax: a complication of the pleural drainage tube [Spanish], An Esp Pediatr 53 (2000) 492–494.
[4] A. Limskuon, D. Yick, N. Kamangar, Chylothorax: a rare complication of tube thoracostomy, J Emerg Med 40 (2011) 280–282.
[5] K.U. Choi, G.H. Kang, S.H. Kim, H.W. Seo, B.H. Jung, S.S. Kim, et al., A case of chylothorax after tube thoracostomy [Korean], Tuberc. Respir. Dis. 72 (2012) 59–62.