



Case Report

Chylothorax after left side pneumothorax surgery managed by OK-432 pleurodesis: An effective alternative

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Abstract

Chylothorax, a relatively rare complication of thoracic surgery, mostly occurs on the right side. We present a 16-year-old male who received thoracoscopic surgery for left spontaneous pneumothorax. Chylothorax developed on the postoperative 2nd day and resolved after diet control on the 4th day. Unfortunately, chylothorax recurred 2 weeks later. Chest drainage and *nil per os* with total parental nutrition were given but in vain. Thereafter, chemical pleurodesis with OK-432 was performed. Chylothorax resolved on the next day. The relevant literature is reviewed and possible pathogenesis clarified.

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1. Introduction

Postoperative chylothorax is infrequent but potentially life-threatening and time-consuming to manage. Associated procedures are lung resection, mediastinal surgery, esophagectomy, and surgery for congenital heart disease in neonates and children. The reported incidence ranges from 0.5% to 6.5%.¹ Most instances of postoperative chylothorax after thoracic surgery occur on the right side, which is related to injury to the thoracic duct. Herein, we report an extremely rare case of chylothorax after thoracoscopic surgery for left spontaneous pneumothorax, and discuss the management and pathogenesis by reviewing the relevant literature.

Conflicts of interest: The authors declare that there are no conflicts of interest related to the subject matter or materials discussed in this article.

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2. Case Report

A 16-year-old male patient had the history of left chest pain for 5 days. Physical examination revealed decreased left-side breathing sounds, and plain chest radiograph disclosed left-side pneumothorax. Thoracoscopic wedge resection of blebs over the apical segment of the left upper lobe and superior segment of the left lower lobe were performed, followed by mechanical pleurodesis with violent abrasion of parietal pleura using surgical tip cleaners and chemical pleurodesis with intrapleural injection of 200 mg of minocycline in 100 mL normal saline under direct vision with a thoracoscope. Yellow turbid fluid was drained via chest tube on the 2nd postoperative day (POD 2). Triglyceride level of pleural fluid was elevated (772 mg/dL), so chylothorax was confirmed. A fat-free diet was prescribed, and chylothorax resolved on POD 4 (Fig. 1). Unfortunately, left chest tightness was noted during an outpatient visit on POD 17. Chest radiograph revealed left side pleural effusion (Fig. 1). Closed chest drainage was performed and recurrent chylothorax was noted (triglyceride: 3612 mg/dL). *Nil per os* with total parenteral nutritional (TPN) support was

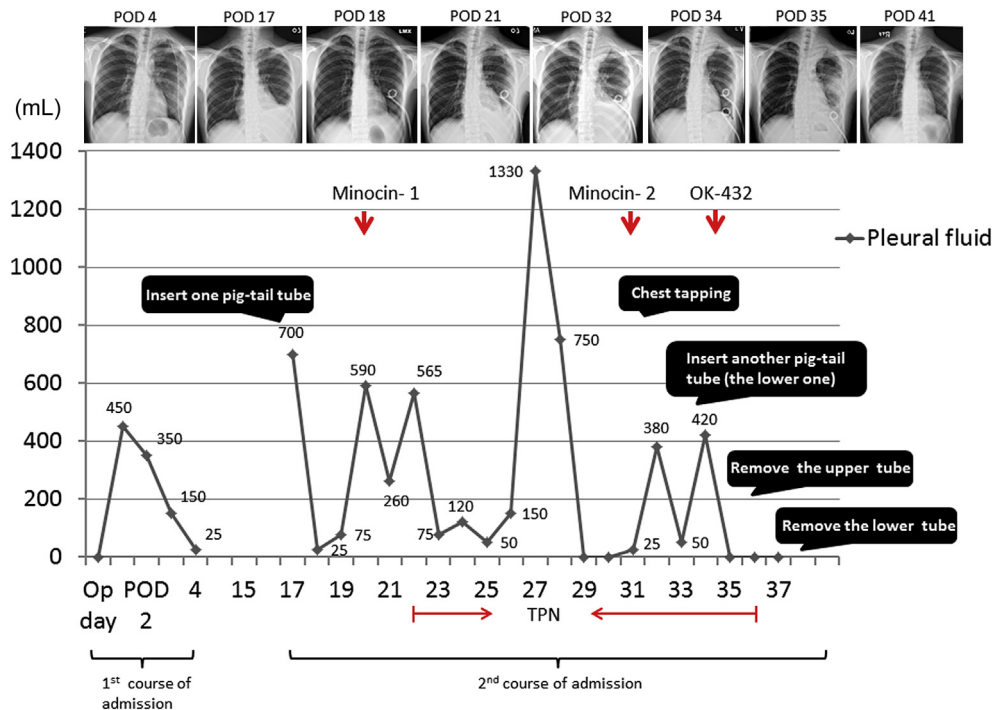


Fig. 1. The line chart shows the drainage amount of pleural fluid from the operation day (Op day) to 37 postoperative days (POD) during two admission courses. Duration of parenteral nutrition, time of minocycline, and OK-432 pleurodesis are marked, and the relevant chest radiographs are also shown on the top of the chart. TPN = total parenteral nutritional.

given. After 2 weeks' observation and two attempts at chemical pleurodesis with minocycline, chylothorax persisted (daily drainage amount around 300–400 mL). Another pig-tail drainage tube was inserted on POD 34 due to inadequate drainage of the first one although chest tapping was performed on POD 32 (Fig. 1). Therefore, another attempt at chemical pleurodesis with OK-432 (5 KE Picibanil, Chugai Pharmaceutical Co., Ltd. Tokyo, Japan) was performed on POD 35 (the 15th day of TPN usage). The pleural drainage amount decreased to zero on the following 2 days, and chest radiograph showed an ill-defined radiopaque patch over the left upper lung field (Fig. 1). The drainage tube was removed and the patient was discharged 3 days later with regular diet. Chest radiograph revealed full expansion of the left lung without pleural effusion (Fig. 1), and he was followed-up with good results for 1 year.

3. Discussion

Conservative management for postoperative chylothorax is still recommended in the initial period of complication, regardless of patient group and disease entities.^{1,2} Many authors suggest a diet of medium chain fatty acids or nil *per os* plus TPN with adequate drainage. No consensus has been obtained regarding the timing of radiological or surgical intervention, and most protocols suggest that leakage persists for more than 2 weeks.³ Zabeck et al⁴ concluded that the best indicator is the quantity of chyle drained per 24 hours rather than the duration of conservative treatment. Ulibarri et al⁵ first used intravenous somatostatin to reduce lymph output from a ruptured thoracic duct and succeeding studies revealed variable results of somatostatin and octreotide therapy.

In our case, minocycline was first attempted for pleurodesis based on previous experience with pneumothoraces after conservative treatment. However, the results were unsatisfactory with persistent leakage of chyle after two attempts at chemical pleurodesis by using minocycline. OK-432, an inactivated preparation of *Streptococcus pyogenes*, has been used successfully for malignant pleural effusion, lymphatic malformations, acquired chylothorax, congenital chylothorax, and *in-utero* treatment of fetal chylothorax.^{6,7} OK-432 therapy is a simple, easy, safe, and effective alternative to surgery that has been used to treat benign cystic lesions, especially lymphangioma (or cystic hygroma) in children since 1987. Some studies have suggested that inflammatory cytokines may play important roles because levels of various cytokines, such as tumor necrosis factor, interleukin-8, interleukin-6, interferon- γ and vascular endothelial growth factor, were significantly elevated after OK-432 therapy.^{7,8} Within 1 day after OK-432 injection in our patient, the quantity of chyle drained dramatically diminished, and chest images revealed no recurrent pleural effusion. Side effects encountered in our patient were only mild fever and chest discomfort, which gradually subsided after symptomatic treatment. The radiopaque patch of LUL was immediately noted on chest film, and the drainage amount from the pig-tailed tube decreased dramatically. Both probably resulted from the effect of local inflammatory reactions after OK-432 injection.

Iatrogenic injury to major lymphatic ducts such as the thoracic duct is rare following surgery for spontaneous pneumothorax, especially left thorax. The thoracic duct passes upward in the thorax to the right-hand side initially and then crosses to the left side at the level of the 7th thoracic vertebra. It reaches the left-side of the esophagus at the level of the 5th thoracic vertebra.⁹

Therefore, excessive mechanical pleurodesis over the left upper mediastinal side of the parietal pleura may lead to injury of the thoracic duct. In our case, injury to the thoracic duct is not likely, but injury to additional tributaries from the posterior mediastinum or intercostals spaces is a more plausible explanation. Although these tributaries are rarely seen in the higher left thorax above the level of the ninth thoracic vertebra,⁹ anatomic variations are numerous and must be considered.

In conclusion, chylothorax is a rare complication of thoracoscopic surgery for left-side primary spontaneous pneumothorax. Mechanical pleurodesis should not be performed excessively. As an alternative to chemical pleurodesis, OK-432 may provide instant resolution of chylothorax and shorten the patient's hospital stay.

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