

MALIGNANT CHYLOTHORAX TREATED BY TALC PLEURODESIS: A CASE REPORT AND REVIEW OF THE LITERATURE

Ahmed H. Banjer, FRCS; Mohammed A. Siddiqui, FRCS;
Mohammed O. Al-Fattani, MRCP; Baker A. Nigme, MD

We report a case of malignant chylothorax due to Burkitt's lymphoma, treated successfully by talc pleurodesis. Various methods of treatment of chylothorax are discussed.

Case Report

A four-year-old non-Saudi boy, a known case of stage III Burkitt's lymphoma who was undergoing a chemotherapy program, presented two months following the diagnosis with severe shortness of breath and repeated cough. He was first seen in the Oncology Clinic as a follow-up visit after the induction of chemotherapy. The parents denied any history of fever or trauma.

Clinical examination revealed marked reduction of air entry, with stony dull percussion note on the right hemithorax. Other systemic examinations were normal. Results of blood investigations revealed the following: WBC $7.1 \times 10^9/L$; hemoglobin 11.1 g%; erythrocyte sedimentation rate 5 mm in the first hour; glucose 191 mg/dL; total protein 5.3 mg/dL; and arterial blood gases within normal range. Chest x-ray revealed complete opacification of right hemithorax (Figure 1). Thoracentesis was performed, and it revealed white milky aspirate, analysis of which showed WBC $1.1 \times 10^9/L$, with 90% lymphocytes and 10% neutrophils, glucose 181 mg/dL, total protein 8.8 g/dL, cholesterol 376 mg/dL, triglyceride 2980 mg/dL, and amylase 60 U/L. CT scan revealed left hilar and abdominal multiple lymph nodes enlargement, with right pleural effusion and no parenchymal lung disease.

The working diagnosis was malignant chylothorax due to obliteration of lymphatic channel. An intercostal tube was inserted, and 800 mL of aspirate was drained soon after insertion. The patient continued to drain 300-400 mL/day, despite a low-fat and medium-chain triglyceride diet.

As the patient failed to respond to conservative treatment of chylothorax for one week and the amount of tube drainage was not regressing, a decision was made to perform pleurodesis, using talc powder. At surgery, using single lumen endotracheal tube and through muscle-sparing mini-thoracotomy at the fifth intercostal space, 5 g of talc powder was sprayed over the lung and pleural surfaces with powder insufflator (GU medical system, London, UK). There was no identifiable site of chyle leak, only generalized oozing from the pleural surface. The postoperative period was uneventful and the second chest tube was removed on the seventh postoperative day. Serial follow-up chest x-ray, up to one year post-surgery, showed full expansion of the lung with no recurrence of pleural effusion (Figure 2).

Discussion

Chylothorax is one of the differential diagnoses of complete opacification of hemithorax on chest radiography, as seen in our reported case. Other causes include pleural effusion, hemothorax, empyema and lung collapse.¹ Chylothorax is usually found in malignant diseases and following cardiothoracic surgery or blunt trauma of the chest.²⁻³ In malignant diseases, such as lung cancer and lymphosarcoma, the thoracic duct can be involved by primary growth direct invasion, lymphatic permeation, or tumor embolization. Marts et al. reported 29 cases of chylothorax, 26 of which were due to surgical trauma.² Lymphoma and leukemia are known to be complicated by chylothorax,⁴⁻⁵ and lymphoma is said to be the most common cause of non-surgical chylothorax.³

The diagnosis of chylothorax includes chest radiography, but thoracentesis is the most important diagnostic tool to reveal milky colored aspiration with high levels of triglyceride and chylomicrons. Other methods described in the literature include lymphography of the thoracic duct. Nagan et al. described the role of lymphography in 10 patients with chylothorax following thoracic surgery, to identify the site of leakage and obstruction.⁶

Initial lines of treatment described in the literature include dietary modification with low-fat or medium-chain triglyceride diet, gut rest by giving parenteral nutrition,

From the Departments of Surgery (Drs. Banjer and Siddiqui), Pediatrics (Dr. Al-Fattani), and Anesthesia (Dr. Nigme), Al-Noor Specialist Hospital, Makkah, Saudi Arabia.

Address reprint requests and correspondence to Dr. Banjer: Thoracic Surgery Unit, Al-Noor Specialist Hospital, P.O. Box 6834, Makkah, Saudi Arabia.

Accepted for publication 22 August 1998. Received 26 April 1998.

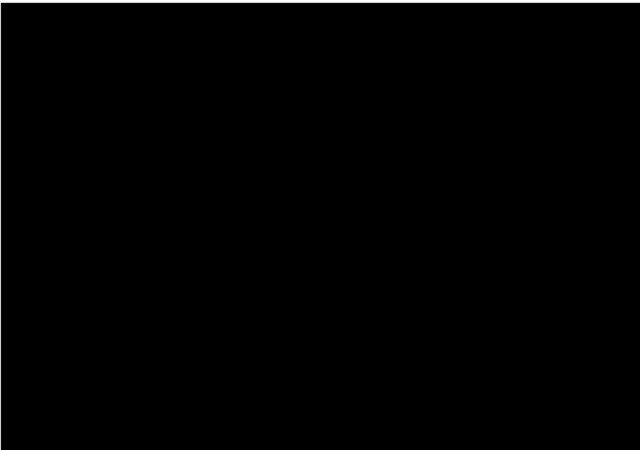


FIGURE 1. PA chest x-ray shows complete opacification of right hemithorax due to chylothorax.

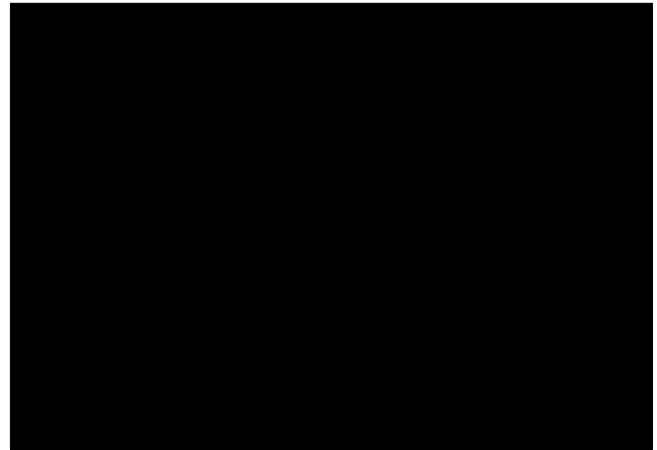


FIGURE 2. One-year postoperative chest radiograph shows complete expansion of right lung without recurrence of chylothorax.

and drainage maintained by tube thoracostomy. Marts et al. showed 79% of the cases with chylothorax resolved by these conservative methods, while only 21% of the cases required surgical ligation of the thoracic duct. Similar results have been described in another report.⁷ Other surgical methods include thoracoscopic ligation of thoracic duct,³ pleuroperitoneal shunt insertion⁸ in chylothorax following cardiac and non-cardiac surgery, and primary anastomosis of injured duct.

The most simple and effective method is chemical pleurodesis by talc powder. Talc powder is widely used for the treatment of malignant pleural effusion and pneumothorax.⁹ It is a strong sclerosing agent which can be instilled into pleural space through the chest tube or thoracoscopically by insufflation. Weissberg and Ben-Zeev reported their experience of talc pleurodesis in 360 patients, 169 with malignant effusion, and 122 with recurrent spontaneous pneumothorax. Their results were excellent in 84.4% and 86.6%, respectively.⁹

Some surgeons use additional procedures to talc pleurodesis at surgery, such as clipping of thoracic duct and application of fibrin glue,³ while others perform pleurectomy.⁷ In certain cases, decortication is advocated in long-standing chylothorax.¹⁰ The choice between various surgical interventions depends on the primary cause and available resources. Clipping or ligation might be required in traumatic injury of thoracic duct, however, we believe that primary anastomosis, as described by some surgeons, is time consuming and not mandatory. Furthermore, the use of fibrin glue injection intrapleurally or pleuroperitoneal shunting are much more expensive, compared to talc powder insufflation. In this reported case we performed mini-thoracotomy, as the facilities for thoracoscopy for children were not available in our hospital. We believe that instillation of the powder through intrathoracotomy (tube thoracostomy) as practiced by some surgeons, will give localized pleurodesis, and talc powder will not be distributed all over the pleural surfaces.⁹ Talc pleurodesis is not expensive and is easily applicable.

It does not require formal thoracotomy and is a bloodless intrathoracic procedure, as compared to pleurectomy, and is highly recommended in malignant effusion. It was sufficient to resolve the chylothorax without recurrence even after one year of follow-up, but chemotherapy for lymphoma should not be ignored, as it may play a part in its resolution.

In this reported case, we believe that talc pleurodesis is the main factor of resolution of chylothorax, as documented by early serial post-surgical chest x-rays. Talc powder is available in most of the hospital pharmacies in Saudi Arabia, but it is in an unsterile form. Unfortunately, sterilization facilities are not available in most of the hospitals. Talc powder requires either gamma radiation or prolonged heat sterilization for one hour at 160°C, which cannot be provided by ordinary hospital autoclaves.¹¹

Our source of sterile talc powder was Royal Brompton Hospital's pharmacy in London, U.K. We used only 5 g of purified talc powder in our case, because some workers observed the occurrence of mesothelioma after the use of unpurified talc powder.¹² Purified talc is free of carcinogenic contaminants and suitable for clinical use. Other reported complications are trapping of the lung and adult respiratory distress syndrome (ARDS).^{9,13} These complications are probably related to the amount of talc used. According to Rinaldo et al.,¹³ ARDS occurred in patients who have used 10 g of talc, but was not observed in patients who received 5 g of talc. Most surgeons advise the use of a minimal amount of talc powder to avoid these complications. The recommended dose range is between 2-5 g of purified powder.^{9,14} It is the responsibility of the surgeon to control and decide the amount of the talc powder insufflated into pleural space. The most important factor of the success of pleurodesis is that the powder is sprayed evenly all over the pleural surfaces.

In summary, talc pleurodesis is effective in malignant chylothorax. To our knowledge, this is the first case report in Saudi Arabia illustrating how a simple procedure such as talc pleurodesis can provide relief of dyspnea due to

malignant chylothorax as a result of central lymphatic obstruction.

References

1. Higgins JP, Shuttari M, Demmy T, et al. Diffuse large-cell lymphoma of the lung: an unusual cause of complete opacification of the hemithorax. *South Med J* 1994;87:1183-5.
2. Marts BC, Naunheim KS, Fiore AC, et al. Conservative versus surgical management of chylothorax. *Am J Surg* 1992;164:532-4.
3. Graham DD, McGahren ED, Tribble CG, et al. Use of video-assisted thoracic surgery in the treatment of chylothorax. *Ann Thorac Surg* 1994;57:1507-12.
4. O'Callaghan AM, Mead GM. Chylothorax in lymphoma: mechanisms and management. *Ann Oncol* 1995;6:603-7.
5. Zimhony O, Davidovitch Y, Shtalrid M. Chronic lymphocytic leukemia complicated by chylothorax. *J Intern Med* 1994;235:375-7.
6. Nagan H, Fok M, Wong J. The role of lymphography in chylothorax following thoracic surgery. *Br J Radiol* 1988;61:1032-6.
7. Puntis JW, Roberts KD, Handy D. How should chylothorax be managed? *Arch Dis Child* 1987, 62:593-6.
8. Murphy MC, Newman BM, Rodgers BM. Pleuroperitoneal shunts in the management of persistent chylothorax. *Ann Thorac Surg* 1989;48: 195-200.
9. Weissberg D, Ben-Zeev I. Talc pleurodesis, experience with 360 patients. *J Thorac Cardiovasc Surg* 1993;106:689-95.
10. Nilles A, Meyer E, Reinbold WD, et al. Surgical treatment of bilateral chylothorax due to benign lymphangioma of the thoracic duct. *Eur J Cardiothorac Surg* 1990;4:51-3.
11. Carter SJ. Sterilization by heat. In: Cooper J, Gunn C, editors. *Dispensing for Pharmaceutical Students*. 12th edition. Delhi, India: CBS Publishers & Distributors, 1987:400-1.
12. Wagner JC, Pooley FD. Mineral fibers and mesothelioma. *Thorax* 1986;41:161-6.
13. Rinaldo JE, Owens GR, Rogers RM. Adult respiratory distress syndrome following intrapleural instillation of talc. *J Thorac Cardiovasc Surg* 1983;85:523-6.
14. Webb WR, Ozmen V, Moulder PV, et al. Iodized talc pleurodesis for treatment of pleural effusion. *J Thorac Cardiovasc Surg* 1992;103:881-5.