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Chylothorax After Repair of Congenital Diaphragmatic Hernia – A Case Report

F C Cheah, M H S Noraida, N Y Boo, T Y M Amin

ABSTRACT

Chylothorax is a rarely recognised post-operative complication following repair of congenital diaphragmatic hernia. We report here a newborn infant with this condition which resolved with percutaneous chest drainage, total parenteral nutrition and enteral feeding of a formula high in medium-chain triglycerides.

Keywords: Chylothorax, congenital diaphragmatic hernia, total parenteral nutrition, medium-chain triglycerides

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INTRODUCTION

Chylothorax following repair of congenital diaphragmatic hernia was first reported by Wiener et al in 1973[1]. Although there have not been many reports after this[2-5], it was not until recently that chylothorax was recognised as a relatively common cause of effusion after repair of congenital diaphragmatic hernia[6]. We describe here one such case that we treated conservatively and successfully.

CASE REPORT

TKW is a Chinese baby boy who was born at term with a birth weight of 3.1 kg. He developed respiratory distress soon after birth and a chest radiograph confirmed the presence of a left congenital diaphragmatic hernia. His initial condition was stable and he underwent a surgical correction of the hernia within the first 24 hours of life. Intra-operatively, a large posterolateral defect of the left hemidiaphragm was found. There was no hernial sac covering the intrathoracic portion of the abdominal viscera which comprised of small bowel, stomach, spleen and proximal two-thirds of the colon. He was extubated from mechanical ventilation on the second post-operative day. His recovery was initially uneventful and feeding was gradually introduced with no problem encountered. However, five days later he developed progressive respiratory distress. Ultrasound of the chest showed significant accummulation of fluid in the left pleural cavity (Fig. 1). Pleuracentesis produced about 100 millilitres of milky looking fluid. The gross appearance of this fluid was very suggestive of chyle and biochemical analysis confirmed its very high triglyceride (400 mg/dL) but low cholesterol (40 mg/dL) content .

Deterioration in the patient's clinical condition with respiratory distress suggested re-accummulation of pleural fluid which required insertion of a chest tube for continuous drainage (Fig. 2). For a period of five days, the drainage of effusion averaged about 100 millilitres a day. The patient was put on full enteral nutrition with a semi-elemental formula (Pregestimil) and occasional breastfeeding. Pregestimil was added because of its relatively higher corr.position of medium-chain triglycerides (about 40% of its total fat blend). Despite this and in view of a persistently high production of chyle in the chest drainage and the infant's decreasing body weight, total parenteral nutrition was commenced.

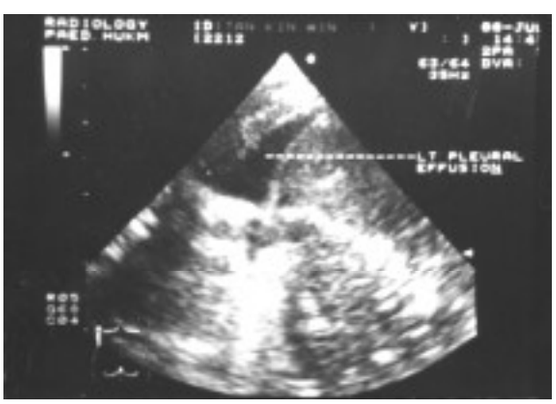

Fig. 1

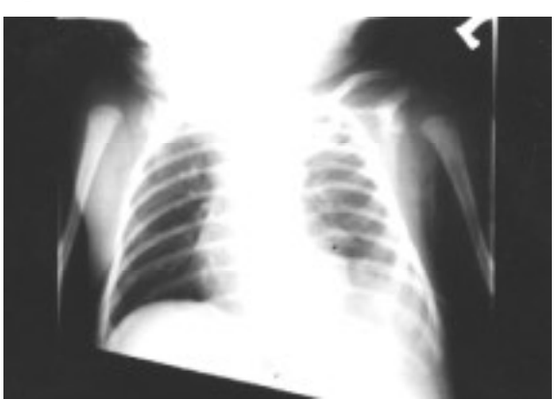

Fig. 2

Department of Paediatrics
Faculty of Medicine
Hospital UKM
Jalan Tenteram
Bandar Tun Razak
56000 Kuala Lumpur
Malaysia

F C Cheah, MRCP
MMed (Paeds)
Lecturer

M H S Noraida, MBBS

N Y Boo, FRCP

Department of Surgery
Faculty of Medicine
Hospital UKM and Ampang Puteri Specialist Hospital

T Y M Amin, FRCS

Correspondence to:
Dr F C Cheah

Subsequently, the chylous effusion gradually became less and the chest tube was removed after ten days of thoracocentesis, when the drainage of chyle was less than five millilitres a day, and at the same time, when he developed nosocomial pneumonia. The parenteral nutrition was gradually weaned off and a specialised milk formula (Portagen) indicated for patients with impaired fat absorption was introduced. The fat blend in Portagen constitutes almost completely of medium-chain triglycerides. After removal of the chest tube, intermittent pleurocentesis was performed on three occasions over a period of one week for clinically and radiographically significant chylous effusion. The patient was discharged home at one month old when he attained satisfactory weight gain, had established full enteral feeding with the high medium-chain triglyceride formula (Portagen) and had no significant re-accummulation of chylous effusion. He was put on this milk formula for a total period of eight weeks with gradual re-introduction of breast and ordinary infant formula milk. At four months of age, he was completely symptom-free and ultrasonography showed a complete resolution of left chylous effusion.

DISCUSSION

Until recently, chylothorax following repair of congenital diaphragmatic hernia has rarely been recognised as a complication post-operatively[6]. The pathogenesis of chylothorax formation following repair of diaphragmatic hernia is still unclear but operative injury to the thoracic duct and diaphragmatic lymphatics is implicated. The abnormal position of the thoracic duct and malformation of the abdominal lymphatics that may co-exist in this condition could predispose to injury even from minor trauma during surgical repair. In addition, the presence of a hernial sac which occurs in about 10% of cases of congenital diaphragmatic hernia[7], has been found to be a predisposing factor to chylothorax presumably secondary to division of the lymphatic vessels within the sac itself[8,9].

Chylous effusion is odourless and initially (prior to feeding), may not be milky in appearance. In addition, Staats et al reported that chylous effusions were milky in less than 50 percent of all cases[10]. Chyle has high triglyceride (greater than 110 mg/dL) but low cholesterol levels[10] and contains predominantly lymphocytes (400 - 6800/mm^3), majority of which are the T-cells type[11,12].

The loss of chyle with high content of triglycendes and lymphocytes is associated with nutritional and possibly infectious complications. The patient in this report manifested these two complications when he had initial poor weight gain (despite full feeding) and also nosocomial pneumonia. However, Allen et al in their series of cases with post operative chylothorax did not find a significant relationship between infection and lymphocyte count[13]. The commencement of empirical antimicrobial therapy, therefore, should not be based solely on lymphocyte count. Conservative management of chylous effusions is preferred to surgical intervention. Continuous chest drainage accelerates healing by enhancing the apposition of pleural surface to the fistula. Enteral feeds may need to be ceased initially to decrease lymphatic production and nutritional support in the form of total parenteral nutrition will need to be commenced, as in this patient. Subsequently, enteral feeds with a fat content comprising mainly medium-chain triglycerides should be offered for a period of time until recovery. Medium-chain triglycerides are absorbed directly into the portal system and, therefore, minimize thoracic duct flow and promote healing of any chyle leakage. This baby was initially fed with Pregestimil and breast milk (contain long-chain triglycerides) but was later introduced to Portagen which provided exclusively medium-chain triglycerides as fat, in an attempt to accelerate healing by this mechanism. Surgical intervention by ligation of the thoracic duct is considered only when there is profuse chyle loss (100 ml/kg/day)[14], failure of an adequate trial of conservative management and presence of nutritional compromise despite optimal therapy.

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