

Chemical Pleurodesis with Oxytetracycline in Congenital Chylothorax

ALPANA UTTURE, VINAYAK KODUR AND JAYASHREE MONDKAR

From Department of Neonatology, Lokmanya Tilak Municipal Medical College & General Hospital, Sion, Mumbai, India

Correspondence to: Dr Alpna Utture, Associate Professor, Department of Neonatology, LTMMC and LTMGH, Mumbai, India. alpanau@hotmail.com. Received: November 21, 2015; Initial review: March 05, 2016; Accepted: August 09, 2016.

Background: Congenital chylothorax is an accumulation of chyle in the pleural space that may present in neonatal period with respiratory distress. **Case Characteristics:** A 34-week preterm who presented with massive congenital chylothorax complicated with hydrops fetalis. **Outcome:** The neonate was treated successfully by pleurodesis with Oxytetracycline. **Message:** Pleurodesis with oxytetracycline seems to be effective in treatment of congenital chylothorax.

Keywords: Chyle, Ligation, Management, Neonate, Pleural effusion.

Chylothorax may be congenital, and occurs due to lymphatic malformations like lymphangioma, lymphangiectasia and atresia of the thoracic duct. Acquired chylothorax occurs due to trauma and post-cardiac surgery. It is also known to be associated with conditions that increase intrathoracic pressure, like superior vena cava thrombosis [1]. As chyle is composed of fats, immune cells and proteins, chylothorax is also associated with metabolic, nutritional and immunological morbidities, apart from respiratory problems. When chylothorax is associated with hydrops, it is a potentially life-threatening condition. Initial treatment is conservative, and includes keeping the baby nil-by-mouth (NBM), and administration of total parenteral nutrition (TPN). Octreotide, a somatostatin analogue, has shown promising results in the treatment of congenital chylothorax [2]. However, when medical management fails, pleurodesis or ligation of thoracic duct is the definitive treatment [3,4].

CASE REPORT

A male newborn with a birthweight of 2.5 kg was born with hydrops fetalis at 34 weeks of gestation by a cesarean section. Antenatal ultrasound at 27 weeks showed bilateral pleural effusion with ascites and polyhydramnios. Mother's blood group was O Positive and Indirect Coomb's test was negative. Fetal echocardiography and hemoglobin electrophoresis of the parents were normal.

The neonate had severe respiratory distress, and was ventilated since birth. Chest X-ray revealed massive bilateral pleural effusion, and required pleural tapping

soon after birth. On day 2, bilateral intercostal drains (ICD) were inserted, because the effusion was refilling after the initial pleural tap. Initial pleural fluid was straw-colored, and had a white cell count of 1728 cells/mm³ with 90% lymphocytes and 10% polymorphs. Biochemical analysis showed glucose 54 mg/dL, total protein 2.8 g/dL, LDH 580 IU/L and triglyceride 98 mg/dL. On day 3, as soon as the baby was fed milk, the pleural fluid turned milky, and showed a triglyceride level of 171 mg/dL. A diagnosis of congenital chylothorax was made, and the baby was kept NBM, and started on TPN. In view of persistent intercostal drainage of chyle, the baby was started on intravenous Octreotide infusion on day 4 of life at 1µg/kg/hour, which was slowly increased to 7µg/kg/hr. Although the left ICD output stopped, right ICD output continued to be >100mL/day. In view of this, on day-20, a decision was made to carry out pleurodesis on the right side. Oxytetracycline with 2% lignocaine (Oxylab) was administered into the right pleural cavity at a dose of 20 mg/kg through the ICD, and the ICD was clamped for 2 hours. Due to failure of adequate response, a 2nd dose was given after 48 hours. The ICD output became nil after two days. There were no adverse effects noted. Initially, the baby was fed 'low fat milk' (containing <0.2% fat per 100 g). Eventually, the baby was breastfed, and discharged at 2 months of age. On follow up at 6 months of age, the baby was being breastfed, and was gaining weight adequately. Baby had also attained milestones as per the corrected age.

DISCUSSION

The conservative management of chylothorax is NBM and prolonged TPN [3]. However, this is associated with morbidities such as infections, hypoproteinemia and

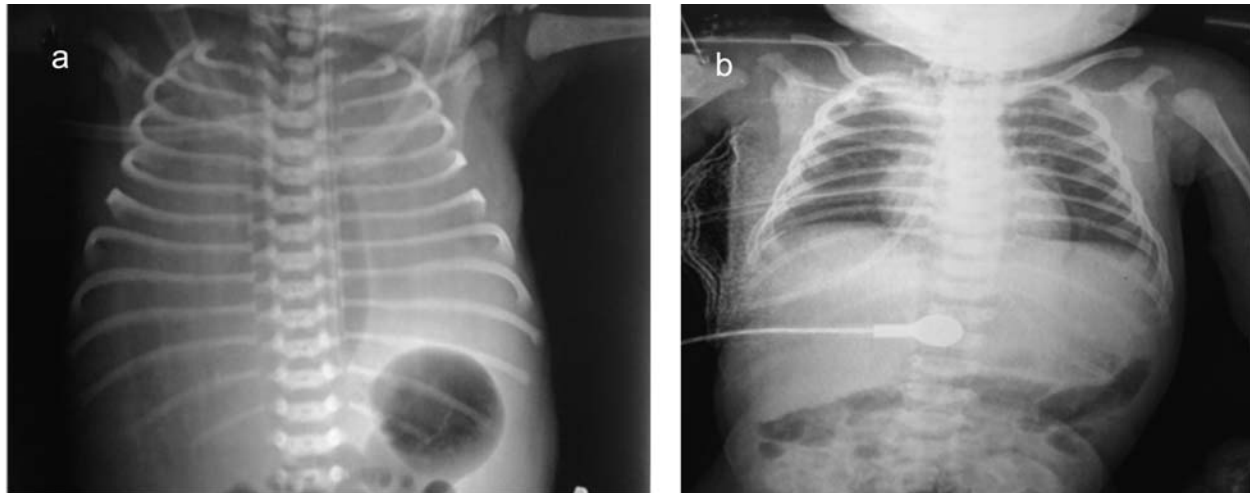


FIG. 1 Chest X-ray of patient showing (a) bilateral pleural effusion after birth; (b) after pleurodesis through the right sided intercostal tube.

thrombosis. Although intravenous octreotide has been used in treatment of chylothorax, but not all effusions respond to it [2]. Pleurodesis or ligation of thoracic duct is the definitive treatment option [3,4].

Our patient had a massive chylothorax with hydrops fetalis, which can have a high mortality. The baby was premature, and needed prolonged mechanical ventilation, including high-frequency oscillator. Given the respiratory morbidity, the nutritional and immunological complications, and a lack of response to octreotide, we decided to perform pleurodesis.

Various agents (Povidone iodine, OK 432, Tetracycline, Minocycline, Erythromycin and Talc) have been used for pleurodesis. However, there are no definite guidelines for the agent of choice [2]. Povidone iodine is known to be associated with renal side effects [5], and is painful, and intravenous analgesia is needed. oxytetracycline has been used in adults with malignant chylothorax at a dose of 20mg/kg [6]. However, there is no previous experience of its use in neonates. The mechanism of action of oxytetracycline is by initiation of the inflammatory cascade by mesothelial cells after contact with the chemical agent. There is activation of the coagulation cascade of the pleura, fibroblast recruitment, activation, and proliferation, and collagen deposition [7]. Although, lymphangiography and surgical ligation are other therapeutic options; due to lack of technical expertise, these could not be done in our patient. We

suggest that chemical pleurodesis with oxytetracycline is an effective treatment for congenital chylothorax.

Contributors: AU, VK: were involved in patient management and preparing the Manuscript. JM: reviewed the manuscript and approved the final version.

Funding: None; *Competing interest:* None stated.

REFERENCES

1. Soto-Martinez M, Massie J. Chylothorax: Diagnosis and management in children. *Paediatr Respir Rev.* 2009;10:199-207.
2. Das A, Shah PS. Octreotide for the treatment of chylothorax in neonates. *Cochrane Database Syst Rev.* 2010;9:CD006388.
3. Beghetti M, La Scala G, Belli D, Bugmann P, Kalangos A, Le Coultre C. Etiology and management of pediatric chylothorax. *J Pediatr.* 2000;136:653-58.
4. Merrigan BA, Winter DC, O'Sullivan GC. Chylothorax. *Br J Surg.* 1997;84:15-20.
5. O Brissaud, L Desfrere, R Mohsen, MFayon, JDemarquez. Congenital idiopathic chylothorax in neonates: chemical pleurodesis with povidone-iodine (Betadine). *Arch Dis Child Fetal Neonatal Ed.* 2003;88:F531-3.
6. Walker-Renard PB, Vaughan LM, Sahn SA. Chemical pleurodesis for malignant pleural effusions. *Ann Intern Med.* 1994;120:56-64.
7. Antony VB, Rothfuss KJ, Godbey SW, Sparks JA, Hott JW. Mechanism of tetracycline-hydrochloride-induced pleurodesis: Tetracycline-hydrochlorid-stimulated mesothelial cells produce a growth-factor-like activity for fibroblasts. *Am Rev Respir Dis.* 1992;146:1009-13.