

Fibrin Glue for Persistent Pneumothorax in an Extremely Low Birth Weight Infant

**Fuat Emre Canpolat
Murat Yurdakök
Sadik Yurttutan**

Pleurodesis with fibrin glue has been used to treat bronchopleural fistulas and persistent air leaks in adults and neonates. We report successful use of fibrin glue in an extremely premature infant to seal a pneumothorax that had persisted for more than one week despite high-frequency ventilation.

Key words: Fibrin glue, Pneumothorax, Low birthweight.

Pulmonary air leaks in neonates receiving mechanical ventilation usually respond to chest tube drainage and high-frequency ventilation. Some patients with large bronchopleural fistulas may not respond with this conventional treatment.

Fibrin glue is a plasma product which consists of mainly fibrinogen and thrombin. This material is used in cardiac, thoracic and maxillofacial surgery(1,2). The use of fibrin glue in persistent pneumothorax has been reported before(3). Here we report an extremely low birth weight infant with

persistent air leak treated with fibrin glue successfully.

Case Report

A preterm baby with a gestational age of 25 weeks and a birthweight of 790 g was born by cesarean section delivery to a 37 year old mother. Apgar scores were 6 and 7 at 1 and 5 minutes of life, respectively. Tracheal intubation was done soon after birth, he was mechanically ventilated and two doses of surfactant were given for respiratory distress syndrome (RDS). He had no critical problem until a left-sided pneumothorax was noted on 7th postnatal day. After chest tube replacement the chest X-ray was normal without any residual air leak. Two days later pneumothorax reappeared and it persisted during next week despite high-frequency ventilation. On 15 postnatal day, 3.5 mL of fibrin glue (CryoSeal©, Thermogenesis, Cal., USA) was injected through chest tube. A marked reduction in air leak was seen after this procedure and chest radiogram improved within two hours. Chest tube was removed after 48 hours and infant had no further problems.

Discussion

A pneumothorax is a rapidly developing, life-threatening complication of RDS and assisted ventilation in the neonatal intensive care units and has a high mortality(4,5) and morbidity(6). It occurs more frequently in the neonatal period than at any other time of life with a reported incidence of 1-2%(7). In the presence of respiratory distress syndrome studies describe an incidence of over 40%(6,7). The use of surfactant and more refined methods of ventilation in recent years are partly responsible for a reduction in this high incidence of pneumothorax in such infants. Persistence of air leaks is also a problem after chest tube placement. Some air leaks persist for

From the Departments of Pediatrics and Neonatology, Hacettepe University Ihsan Dogramaci Children's Hospital, Ankara, Turkey.

Correspondence: Dr. F. Emre Canpolat, Hacettepe Çocuk Hastanesi Yenidoğan Ünitesi 06100 Hacettepe Ankara Türkiye

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weeks. Because of risk of morbidities such as intracranial hemorrhage, acute hypotension, air embolus and circulatory failure related to pneumothorax, the persistence of air leaks should be treated.

The fibrin glue used in this case was CryoSeal© (Thermogenesis, Cal., USA) which consists of thrombin, fibrinogen, calcium, factor XIII, factor VIII, vWF (vonWillebrand factor) and fibronectin. The mechanism of fibrin glue formation is well described(8). The fibrin glue product consists of two components. Solution A is a protein concentrate consisting of fibrinogen, plasma fibronectin, factor XIII, and plasminogen, reconstituted in aprotinin solution. Solution B is thrombin reconstituted in calcium chloride solution. CryoSeal© is a collagen fleece coated with dry fibrinogen and thrombin on one side. Fibrin glue is used in numerous surgical procedures including cardiac, vascular, hepatic and maxillofacial surgery to make a natural adhesion for defective tissues and viscera.

There are a few studies about fibrin glue pleurodesis in neonates and preterm infants(3,9). There is only one report about extremely low birth weight infant in literature to our best knowledge (3). In this case fibrin glue was prepared with bovine thrombin and glue was given by intravenous catheter replaced in throacic space. In our case we injected fibrin glue which was derived from homologous human plasma via chest tube. We know that there are some risks such as bradycardia, significant hypercalcemia, diaphragmatic paralysis, pneumothorax on the contralateral side, and localized tissue necrosis (10). In this case we did not see any complication due to fibrin glue. Pleurodesis with fibrin glue in ventilated preterm infants seemed to be effective and safe. But there is a need for

controlled trials to observe efficacy and safety of different fibrin glue materials for neonates and premature infants.

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