

## Successful Treatment of Congenital Chyloperitoneum with Platelet-Rich Fibrin Glue

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### Abstract

**Background:** Congenital chyloperitoneum is an uncommon clinical condition. A few cases of congenital chyloperitoneum in children have been described who were treated in a variety of methods.

**Case Presentation:** Congenital chyloperito was diagnosed in a 5-day-old baby boy with a significant abdominal distension. Due to the failed conservative managements by medium-chain triglycerides (MCT) enriched milk and partial parenteral nutrition (PPN), the authors tried platelet rich fibrin glue (PRFG) as an alternative choice which was applied through an already inserted intra-abdominal catheter. PRFG successfully stopped the lymph leakage from all over the small intestinal mesentery; thereby PRFG may be considered as an effective alternative treatment before surgical intervention.

**Conclusion:** Applying PRFG is an easy, safe, and effective alternative option that may be used to close the chylous ascites lymph leakage in children if conservative management with PPN fails.

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**Key Words:** Chyloperitoneum; Platelets; Fibrin Glue; Congenital

### Introduction

Congenital chyloperitoneum is an uncommon clinical condition with a tendency of spontaneous improvement. Chylous ascites is most commonly secondary to abdominal surgery, abdominal neoplasia, or trauma but it can be a congenital event<sup>[1-3]</sup>. A few cases of congenital chyloperitoneum in children have been described who were treated in a variety of methods including low-fat diet complemented with medium chain triglycerides, partial parenteral nutrition (PPN), diuretics, surgical exploration (it is difficult to locate the lymph leakage area), and internal peritoneo-venous shunting; all without defining a gold standard consensus treatment<sup>[1,4]</sup>.

The authors of this case report consider the platelet-rich fibrin glue (PRFG) as an effective alternative to the traditional approaches.

### Case Presentation

The patient, a 5-days old boy, with a huge intra abdominal mass was operated and a very big mesenteric cyst situated on small intestine, without significant gastrointestinal tract involvement, was found and excised. On the 6<sup>th</sup> post operative day, by starting

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oral feeding, his abdomen became distended gradually. The abdominal ultrasonography revealed massive intra abdominal free fluid. Aspirating and laboratory tests marked that milky fluid to be chyle.

Nil per os (NPO) and total parenteral nutrition (TPN) was ordered and somatostatin analogue started at 11th day of life and was continued for about 2 weeks. However, upon restarting the oral feeding with medium chain triglycerides the abdomen started to distend again and therefore he was referred to our tertiary care center.

The patient was reevaluated and hyponatremia (Na 120mmol/L), hypokalemia (K 2.3mmol/L), as well as hypoalbuminemia (Alb 1.4g/dl) were corrected. Other laboratory tests were as follow: TG<sub>(abdominal fluid)</sub> 260mg/dl; Chol<sub>(abdominal fluid)</sub> 150mg/dl; TG<sub>(plasma)</sub> 65mg/dl; Chol<sub>(plasma)</sub> 100mg/dl; AST 40U/L; ALT 32U/L.

A central vein catheter was placed and PPN started plus oral feeding with medium chain triglycerides. After one week intra abdominal fluid volume showed no change. Hence oral feeding ceased and thereafter the rate of fluid administration during the 2nd week of management was reduced. Abdominal re-exploration and placing of an intra abdominal catheter for eventual fluid aspiration was decided. A silicone catheter was inserted at the mesentery alignment since lymph leakage all over the small intestinal mesentery was observed.

Although the patient received PPN for 2 weeks after the operation, 30-50 ml lymph was accumulating daily in the peritoneal cavity. It had been impossible to perform any kind of surgical procedure because of the widespread leakage of fluid considering his general condition. Fibrin glue as a final step of treatment was considered.

A home-made PRFG was prepared (aprotinin was not used for avoiding probable anaphylactic shock<sup>[5]</sup> and viral inactivation also was done in process of PRFG preparation). After taking 400 ml peripheral blood from ABO matched donor into commercial 450 ml triple blood donation bags and passing all viral safety tests according to blood transfusion regulation, platelets and fibrin glue were prepared according to standard procedures<sup>[6,7]</sup>. The platelets were prepared by first centrifugation at 2000×g for 2 min and then second centrifugation at 4000×g for 8 min and the supernatant plasma was separated and 15 ml platelet rich plasma was left. The fibrinogen concentrate was prepared from separated plasma by cryoprecipitating method. Following a -70°C freeze and a 4°C thaw, plasma was centrifuged at 6500×g for 5 minutes. The supernatant plasma was removed to a final volume of 15 ml, and 15 ml concentrated fibrinogen mixed with platelets (final volume 30 ml). One milliliter of thrombin was prepared from removed plasma by adding 10% calcium

gluconate. When using, 30 ml PRFG was mixed with 1 ml thrombin and calcium gluconate and applied by infusion through the already placed abdominal catheter that was repositioned in various postures<sup>[6,8,9]</sup>. Twenty four hours after the PRFG infusion the controlled abdominal ultrasonography (AUS) revealed some fluid containing cysts around the small intestinal mesentery (ranging in size from 1cm to 3 cm) without any free intra peritoneal fluids.

Five days after the infusion oral feeding (medium chain triglycerides) was re-started. The second follow up AUS on the 6<sup>th</sup> post infusion day was similar to the first one. On the 10<sup>th</sup> day, the patient was breastfed complemented with formula and the AUS revealed small cysts (maximum size of 1 cm) all around mesentery without any intra abdominal free fluid. The daily intra abdominal catheter excretion was about 5 ml of clear fluid.

The patient was discharged with the catheter placed and a mixed diet of breast feeding and formula with gradual reducing its ratio to the former. One month later he was fed only with breast milk, no secretion through the catheter was observed, and AUS was completely normal. Hence the catheter was removed.

## Discussion

We present here a case of congenital chyloperitoneum where PRFG offered a simple and effective treatment for closure of the ruptured lymphatic vessels and its leakage as complication of surgery.

Congenital chyloperitoneum, a well known entity in pediatric surgery, has a tendency for spontaneous improvement with conservative management. A study on 103 Japanese cases showed 63.9% cure by only conservative approach. The difficulty of locating the exact area of chylous leakage intra-operatively and because of the very small lymphatic vessels, especially in neonates, puts the surgery last on the treatment options list and undertaken only after conservative therapy failure. It has been reported that only 20 out of 103 Japanese children underwent surgery and only in 6 of them the location could be identified<sup>[10,11]</sup>. In some case reports, idiopathic chylous ascites in adults rapidly resolved when treated with NPO, TPN and somatostatin analogue<sup>[12]</sup>.

Our patient was given these treatments without successful result, so we tried the method recommended by Antao et al<sup>[1]</sup>, who described a child with persistent congenital chyloperitoneum treated successfully with application of fibrin as an effective alternative to traditional approaches. The same author mentioned

that repeated applications of fibrin glue may be required in case of relapse. Zeidan<sup>[13]</sup> reported that fibrin glue spray application is routinely used as a preventive measure against postoperative chylous ascites after major abdominal surgery with extensive retroperitoneal dissections. Fibrin glue is a topical biological adhesive, the effect of which mimics the final stages of coagulation, wherein thrombin splits off fibrinopeptide A and B from the fibrinogen chain to form a monomer, which polymerizes to form a fibrin clot at the site of application. Fibrin glue is a promising adjunct treatment in many fields of surgery and is beneficial in procedures involving high risk of postoperative bleeding or leakage of air, blood, and other fluids. Preparation involves viral inactivation, and it is relatively safe and easy to use<sup>[14,15]</sup>. In regenerative medicine, it is documented that PRFG has numbers of platelet derived growth factors in comparison to fibrin glue; these factors along with fibrin glue could effectively repair the damaged tissue better than fibrin glue alone<sup>[16]</sup>. In our case, we decided to use PRFG in place of fibrin glue, because this may be obviating the need for repeating applications of fibrin glue.

## Conclusion

Applying PRFG is an easy, safe, and effective alternative option that may be used to close the chylous ascites lymph leakage in children if conservative management with PPN fails. Also application of PRFG may obviate the need for repeated applications of fibrin glue.

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