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اصول تنظیم قراردادها

آموزش مهارت های کاربردی در تدوین و چاپ مقاله
The Application of a New Cyanoacrylate Glue in Pediatric Surgery for Fistula Closure

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Abstract

Surgical glues have been used in pediatric surgery because of the fragility of tissue, and to prevent major surgeries. The present report describes our experience with using a new cyanoacrylate Glubran 2 (Viareggio, Italy) in the treatment of five cases of tracheoesophageal atresia with fistula (one fistula protection, three recurrent fistula, and one unstable patients), two cases of hypospadias, one case of vesicutanous fistula after bladder extrophy, and one case of cloacal extrophy from January–December 2008. Three cases of recurrent tracheoesophageal atresia with fistula were treated by bronchoscopic glue injection. The other two cases benefited from glue through its ability to plug the fistula and to act as a protecting layer on anastomosis. In two cases with hypospadias excessive use of the glue caused skin necrosis, which was repaired. The wounds of cloacal extrophy were protected from nearby colostomy contamination and infection, and the vesicocutaneous fistula was closed by deepithelialization and sealing with glue. Based on the outcomes of the cases, it may be possible to suggest that Glubran 2 may be used safely in Pediatric Surgery as a sealant for the prevention and treatment of fistulas.

Keywords ● Glubran 2 ● surgical glues ● tracheoesophageal atresia with fistula ● hypospadias ● fistula

Introduction

A number of glues have been used in pediatric surgery because of tissue fragility, and to protect reconstructive repair of injured organs. They have also been used to prevent in a small child a major surgery, which is usually associated with a high risk of mortality or morbidity. Glues, such as fibrin glue, have been shown to lack durability and impermeability to bacteria or fluid. However, a new cyanoacrylate glue (GLUBRAN 2, GEM, Viareggio, Italy), which is FDA approved, has opened a new horizon in reconstructive and minimally invasive surgeries. It may be used either internally or externally, and has an easy application, high adhesive properties, antiseptic barrier, and total impermeability to liquid.

The present study describes our experience with using cyanoacrylate glue in the treatment and prevention of fistulas in pediatric surgery.

Materials and Methods

The study was performed at Nemazee Hospital, a teaching hospital associated with Shiraz University of Medical Sciences, from January through December 2008.
The new polymerized cyanoacrylate glue was used during operation for the reinforcement or prevention of reoperation in fistula closure in pediatric surgery. The objectives of the study and likely risks involved were described to patients' parents, and written parental consents were obtained before using the product. The trial included five cases with tracheoesophageal fistula, one case of penoscrotaal hypospadias, one case of urethocutanouse fistula and two cases of extrophy complex with vesicocutanouse fistula.

1- Cases with Tracheosophageal Fistula

The glue was used in five cases of tracheoesophageal atresia and fistula (TEF). In a 2-day-old girl the glue was used to cover the native esophagus and fistula to minimize the incidence of reopening due to fragile tissue. Three of the patients (with an age range of two to eight months) had recurrent fistula following the esophageal dilatation. In such patients, under endoscopic guidance, the fistulas were first de-epithelialized with a Bugbee diathermy electrode (5-15 W), and then were sealed with the glue completely. Antibiotic (cefexime [Tolid Daro, Tehran, Iran] at 50 mg/kg/day) were used during the treatment. The closure of the fistula was checked by bronchoscopy four weeks later (figure 1). We also used the glue in a premature 5-day-old girl who had a very low birth weight and pneumonia. She underwent temporary sealing of the large carinal fistula with bronchoscope, for stabilizing her before the definitive operation.

One TEF case with a fragile anastomosis was protected by covering the anastomosis with glue, which prevented anastomosis leakage. The unstable TEF case with pneumonia, which had a temporary fistula closure, underwent a definitive operation later and survived.

2- Pediatric Urological Cases

Two pediatric urological cases were also used to examine the effectiveness of the glue. One was a two-year-old boy, who was a case of penoscrotaal hypospadias, and the other was a 4-year-old boy with urethocutanouse fistula. Both underwent glue coverage after surgery using a thin layer of glue on suture line of urethroplasty, and a thick layer of glue between dartus flap and skin coverage (figure 2,3). Two extrophy complex cases had vesicocutanouse fistulas. The fistula tracts were first deepithelized, and then were filled by glue. The free drainage of bladder was performed as well. The thick layer of glue, which was used between dartus flap and skin in the two cases of hypospadias caused necrosis of skin; therefore, the necrosis of skin was repaired again. A thin layer of glue on urethroplasty, not only caused the dehiscence of urethroplasty, but also helped the neourethra from collapsing after the removal of the temporary stent. Both vesicocutanouse fistulas in extrophy complex were closed in a matter of eight weeks.

Discussion

Fibrin glue has been widely used for tissue repair, but compared to a new generation of cyanoacrylate without cyanide toxicity, it has disadvantage of permeability and easy
degradability. The privilege of new polymer
of glue is that when it comes in contact with
living tissues in a moist environment, it po-
lymerizes rapidly to create a thin elastic film,
and is not impaired by blood or organic flu-
ids. Moreover, the glue has the advantage
that it does not cause tissue necrosis or ad-
verse reaction when it is used as a protective
layer or an easier way of the treatment for
postoperative complications.

Open surgical approaches for recurrent tra-
cheoesophageal fistulas have been associated
with substantial rates of morbidity and mortal-
ity. The outcomes of the present cases sug-
gest that compared to a number of previous
studies, we had a lower mortality and a
high rate of cure outcome.

Urethrocutaneous fistula is one of the
most common complications after hypo-
spadias surgery. Fibrin glue has been effec-
tively used in the treatment and prevention
of fistula tract. However, high durability and
impermeability of new cyanoacrylate glue
was helpful in protecting the wounds from
bacteria and dehiscence.

Conclusion

The findings of the present study suggest that
it might be possible to recommend Glubran 2
glue whenever there is a need for a safe mate-
rial as a sealant, or a protective layer to obvi-
ate a major surgery for fistula closure.

Conflict of Interest: None declared

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