Fibrin glue: An alternative method of wound closure in glaucoma surgery.

Authors: O'Sullivan F., Dalton R., Rostron C.K.

Publication Date: 1996

Abstract:

Purpose and Methods: A commercially available tissue glue has been used to effect conjunctival wound closure after trabeculectomy. In four cases it was used in conjunction with sutures and in two cases alone to achieve watertight closure of the conjunctiva. A small transient leak was noted postoperatively in one case, and no case of flat anterior chamber occurred. Results and Conclusion: Intraocular pressure was controlled in all cases 3 months postoperatively. Tissue glue can be an effective method of achieving conjunctival wound closure in glaucoma surgery.

Preparation and use of fibrin glue in surgery.

Authors: Silver F.H., Wang M.-C., Pins G.D.

Publication Date: 1995

Abstract:

Fibrin glue (FG) is used to control bleeding, to adhere tissues together, and to seal tissue defects. FG is prepared from platelet-rich plasma or by mixing concentrated fibrinogen solutions with thrombin. Concentrated fibrinogen solutions are produced by cryoprecipitation or by chemical precipitation of plasma. The literature on FG preparation is reviewed in order to compare the advantages and disadvantages of the different products reported and to summarize the clinical applications. It is concluded that additional studies are needed to fully evaluate the advantages and disadvantages of fibrinogen concentrated using cryoprecipitation and chemical precipitation and that specific advantages exist for use of both pooled homologous and autologous blood.

Use of fibrin glue in otomicrosurgery. [Japanese]

Authors: Terayama Y.

Publication Date: 1995

Abstract:

Fibrin glue is very useful but difficult to use in otomicrosurgery. A simple method is as follows: two drops of component A (fibrinogen) and component B (thrombin) are separately dropped on two aseptic slide glasses from each syringe. Small piece (1 mm³) of Gelfoam is picked up by Rosen needle, immersed in the drop A and painted to a target. Then, another piece picked up by another needle is immersed in component B and sufficiently mixed with A. Each Gelfoam piece can also be left to support tissue or ossicles. Each drop is available within 4 hours if not mixed.

Properties of a new fibrin glue stable in liquid state.

Authors: Chabbat J., Tellier M., Porte P., Steinbuch M.

Publication Date: 1994

Abstract:

A pasteurized preparation of fibrin glue composed of two separate stable, liquid components: highly purified human thrombin and fibrinogen concentrate is described. The components are mixed extemporaneously during application. Thrombin was prepared using a prothrombin complex concentrate as starting material which was activated by calcification and then heated in solution during 10 hours at 60degreeC in the presence of stabilizers. The isolation of thrombin was carried out using a column of benzamidine-Sepharose 6B. The eluate contained thrombin with a high degree of purity (more than 95% assessed by SDS-PAGE) with a specific activity > 2,500 IU/mg protein. The purified liquid thrombin preparation remained stable for at least 6 months. The fibrinogen concentrate was prepared from cryoprecipitate after removal of factor VIII and then virally inactivated by pasteurization in the presence of glucose and sorbitol. After purification the concentrate containing a high level of fibrinogen was formulated with urea 0.5 M or arginine 5% before conditioning. Both components of the fibrin glue kept its biological properties for more than 6 months at +4degreeC.

Hemostasis and healing of superficial splenic injuries using Nd:YAG laser and nonsuture techniques: Preliminary report.

Authors: Vanterpool C.C., Alrashedy F.H., Gurchumelidze T., Gales III M.E., Silva Y.J., Libcke J., Schork M.A.

Publication Date: 1994

Abstract:

This study was designed to compare Nd:YAG laser to fibrin glue, electrocautery, and avitene in the management of superficial splenic injury. Six dogs were submitted to laparotomy. A 11 blade scalpel was used to sharply excise the splenic capsule inflicting four 1" x 1" superficial injuries on each spleen. The lesions were treated. All animals had a second laparotomy ('first relaparotomy'); 2 dogs each were reexplored on postop days 3, 7, and 14. Morphologic and histologic observations were made. A third and final relaparotomy was performed on all dogs at 21 days with repeated morphologic and histologic assessments. Hemostatic times, grades of adhesions, and microscopic changes were not significantly different among the various treatments ($P > 0.25$). Capsular plaque formations were significantly different at the first relaparotomy ($P < 0.01$) and at final relaparotomy ($P < 0.05$). Both adhesions and capsular plaque formation were least at fibrin glue-treated sites, whereas Nd:YAG (1.06 mum) was most effective for average hemostatic time (mean = 109.67 s). Electrocautery produced the greatest necrosis at treatment sites. We conclude that all modalities are effective in controlling hemorrhage.

Autologous fibrin glue for tympanoplasty.

Authors: Park M.S.

Publication Date: 1994

Abstract:

To produce autologous fibrin glue (AFG) of improved quality, the concentration and amount of materials for AFG were modified. The quality of AFG was assessed through determination of fibrinogen level in plasma, observation of product during production, and testing for bonding strength before application. The AFG produced under these conditions was used successfully as a helpful adjunct in middle ear surgery.

Benefits of adjuvant fibrin glue in skin grafting [5].

Authors: Cederholm-Williams S.A., Dean M.G., Nicholls M.D.

Publication Date: 1994

Abstract:

Not Available

Fibrin glue.

Authors: Atrah H.I.

Publication Date: 1994

Abstract:

Not Available

The hemostatic effect of fibrin glue on graft donor sites.

Authors: Achauer B.M., Miller S.R., Lee T.E.

Publication Date: 1994

Abstract:

One of the main uses of topical fibrin glue is hemostasis. Fibrin glue from pooled human plasma has been used in Europe for many years. It was used for fixation of skin grafts as early as 1944. Because of the risk of hepatitis and now of acquired immunodeficiency syndrome, this compound has not been approved by the U.S. Food and Drug Administration for use in the United States. It is now possible to make fibrin glue from a single unit of blood. Many blood banks have this capability, and burn centers in the United States are beginning to report its use in skin grafting procedures performed on patients with burns. In an effort to document a hemostatic effect, a prospective double-blind study was designed. Donor sites of patients with burns undergoing skin grafting were studied to provide a uniform wound; anatomic location varied, particularly with respect to gravity. Half of each donor site was sprayed with thrombin and fibrin glue, and the other half was sprayed with thrombin and placebo. A large absorbent pad was placed over the gauze dressing, and all dressings were collected and weighed by the investigators at 6 and 18 hours after the operation. Ten patients have been studied to date. In five patients slightly more bleeding occurred in the site treated with fibrin. One patient had no difference, and four had slightly less bleeding on the donor site treated with fibrin. No significant difference could be found in this initial study group. In this prospective double-blind study of skin graft donor sites, no significant difference in blood loss between areas treated with thrombin and fibrin glue and areas treated with thrombin and placebo could be found. It is recommended that additional work be done to determine the role of topical fibrin in burn care.

The use of the fibrin adhesive (Beriplast P) in oral and maxillofacial surgery.

Authors: Kyogoku J., Mizuki H., Kanda T., Masuda H., Ishibe K., Takahashi Y., Kawano K., Matsushima R., Yanagisawa S., Simizu M.

Publication Date: 1993

Abstract:

Not Available

Laparoscopic injection of fibrin glue to arrest intraparenchymal abdominal hemorrhage: An experimental study.

Authors: Salvino C.K., Esposito T.J., Smith D.K., Jacobs H.K., Candel A.G., Dries D., Gamelli R.

Publication Date: 1993

Abstract:

The laparoscope offers a novel avenue for the diagnosis of intra-abdominal injury and the use of fibrin glue (FG) as a treatment for hemorrhage in trauma patients. This study was undertaken to assess the practicality and effectiveness of FG injection under laparoscopic direction to arrest hemorrhage in solid viscera. Twenty dogs were randomized into a control group (CG) and a treatment group (TG). All animals underwent laparotomy to surgically induce uniform injuries to the hepatic and splenic parenchyma. The TG animals (n = 12) were allowed to hemorrhage for 30 minutes. The injuries were then visualized and FG injected intraparenchymally under laparoscopic direction. The average duration of the procedure was 25 minutes (range, 15- 50). No hemostatic interventions were performed on the CG animals (n = 8). Mortality in the CG was 63% (5 of 8); there were no deaths in TG animals prior to sacrifice. Necropsy of TG animals revealed progressively healing hepatic and splenic injuries with no gross evidence of pulmonary FG emboli, intraparenchymal microemboli, or increased adhesion formation. No other complications were noted. This study demonstrates that hemorrhage from the liver and spleen can be successfully controlled using the laparoscope to direct the intraparenchymal injection of FG. In this experimental model, the procedure can be performed expeditiously. It is associated with reduction of mortality to zero when compared with controls. No complications associated with laparoscopy or FG injection were recognized. This technique may have potential for application in the management of stable patients who manifest evidence of intraperitoneal hemorrhage as a result of solid organ injury.

Effect of Tisseel on healing after periodontal flap surgery.

Authors: Warrer K., Karring T.

Publication Date: 1992

Abstract:

Not Available

Fibrin glue improves the healing of irradiated bowel anastomoses.

Authors: Saclarides T.J., Woodard D.O., Bapna M., Economou S.G.

Publication Date: 1992

Abstract:

Many surgeons are reluctant to construct a bowel anastomosis with irradiated intestine. Previous studies have demonstrated diminished tensile strength of rat small bowel anastomoses that have been irradiated intraoperatively. To determine whether fibrin glue, a known tissue adhesive, improves the healing of these anastomoses, 69 male Sprague-Dawley rats were randomized into three anastomotic groups: Group 1, sutured ileal anastomosis without radiation or fibrin glue; Group 2, irradiated sutured ileal anastomosis without fibrin glue; and Group 3, irradiated ileal anastomosis with fibrin glue added to the suture line. Groups 2 and 3 received a single dose of 2,000 R intraoperatively. At seven days, the rats were sacrificed and the anastomotic segment was tested for breaking (tensile) strength. Anastomotic collagen content was evaluated using a hydroxyproline assay. Tensile strength results demonstrated that Group 2 was significantly weaker than Groups 1 and 3 ($P = 0.001$) and that the hydroxyproline content of Group 3 was significantly greater than that of Group 2 ($P = 0.015$). These results show that the addition of fibrin glue to an intraoperatively irradiated small bowel anastomosis improves healing, as demonstrated by both tensile strength and hydroxyproline content studies.

Closure of fornix-based posttrabeculectomy conjunctival wound leaks with autologous fibrin glue [1].

Authors: Graham S.L., Murray B., Goldberg I.

Publication Date: 1992

Abstract:

Not Available

Minimal suture blepharoplasty: Closure of incisions with autologous fibrin glue.

Authors: Mandel M.A.

Publication Date: 1992

Abstract:

Blepharoplasty incisions can be closed safely with autologous fibrin glue. The fibrinogen, prepared either from a whole-blood or plasmapheresis source, is mixed with commercially available thrombin to form a seal that is both hemostatic and adhesive. The complication rate is low and primarily due to technical factors in the initial cases. When compared with standard suture techniques, the incidence of minor problems such as milia formation was much lower. In select cases, the technique of using fibrin glue and a minimal number of sutures may be useful as an alternative method of would closure in blepharoplasty patients.

The use of autologous fibrin adhesive in skin transplantation.

Authors: Dahlstrom K.K., Weis-Fogh U.S., Medgyesi S., Rostgaard J., Sorensen H., Toriumi D.M.

Publication Date: 1992

Abstract:

A method for preparing concentrated fibrinogen for use in autologous fibrin adhesive is described. The adhesive was used in seven patients with eight chronic leg ulcers. The ulcers were divided into two equal sections, and the adhesive was used to seal split-thickness skin grafts in one section, while no adhesive was used to seal the grafts in the other section of the ulcer. The strength of adhesion was measured 3 1/2 minutes after transplantation of a 1-cm² test split-thickness skin graft. In the sealed grafts, the breaking strength varied from 12 to 26 gm. In the unsealed transplants, the strength was less than 5 gm. The take of the meshed split- thickness skin grafts was equal in the sealed and the unsealed areas, varying from 90 to 100 percent. Biopsies taken on day 7 showed a splitting between graft and recipient bed in half the unsealed grafts; none of the sealed grafts showed splitting, indicating a more stable graft in the sealed areas. Biopsies taken on day 21 showed no difference between sealed and unsealed grafts.

Spraying of aerosolized fibrin glue in the treatment of nonsuturable hemorrhage.

Authors: Kram H.B., Shoemaker W.C., Clark S.R., Macabee J.R., Yamaguchi M.A.

Publication Date: 1991

Abstract:

In the present report, the authors describe the use of aerosolized fibrin glue (FG) to achieve hemostasis in patients with nonsuturable hemorrhage. The multicomponent FG was sprayed on bleeding tissues with a dual chamber spray head that allowed simultaneous application and mixing of fibrinogen and thrombin on the tissue surface. Sterile propellant gas was passed through tubing to the spray head and independently controlled, allowing for drying of the tissue surface immediately before FG application. This technique was found to be effective in achieving hemostasis of parenchymal organs, retroperitoneal surfaces, and skin graft donor sites. Additional potential applications of this technique include the control of hemorrhage from mediastinal and pleural surfaces.

Preliminary data on the preparation of a fibrin glue from the patient's plasma and its utilization in ORL surgery. [Romanian]

Authors: Cucuianu A.M., Tomescu E., Galea F., Cucuianu M.

Publication Date: 1988

Abstract:

Not Available

Experience in Lille with use of a fibrin adhesive in plastic and reconstructive surgery. [French]

Authors: Pellerin P., Huart J.J., Galizia J.P., Dhellemmes P.

Publication Date: 1987

Abstract:

Not Available

Animal experimented investigations on the effectiveness of the fibrin adhesive by the treatment of achilles tendon injuries. [German]

Authors: Blume M., Lauschke G.

Publication Date: 1987

Abstract:

Not Available

Fibrin glue application through the flexible fiberoptic bronchoscope: Closure of bronchopleural fistulas.

Authors: Glover W., Chavis T.V., Daniel T.M.

Publication Date: 1987

Abstract:

Closure of bronchopleural fistulas can be accomplished by applying fibrin glue through a flexible fiberoptic bronchoscope. The advantages of this method include the avoidance of general anesthesia and thoracotomy and the excellent extended access to the bronchial tree provided by the flexible bronchoscope.

Fibrin glue in nasal septal surgery.

Authors: Hayward P.J., Mackay I.S.

Publication Date: 1987

Abstract:

We have successfully used fibrin glue to avoid operative nasal packing in 30 cases of septal surgery. Avoiding a nasal pack is not only more acceptable to the patient but may also reduce hospital stay. Analysis of our results showed some minor short-term complications but initial post-operative septal deviation tended to resolve spontaneously. Transient oedema and hyperaemia occurred in 37 per cent of cases and may represent an allergic response despite few classical allergic reactions having been reported.

Fibrin glue in the surgical repair of experimental spleen and liver injuries in the rat. [Italian]

Authors: Bencini C., Giacomina S., Macaluso C., Mori A.

Publication Date: 1986

Abstract:

Not Available

A simple autologous fibrinogen glue for otologic surgery.

Authors: Moretz Jr. W.H., Shea Jr. J.J., Emmett J.R., Shea III J.J.

Publication Date: 1986

Abstract:

A simple method of concentrating a patient's own fibrinogen for use with a thrombin/calcium solution - to produce a coagulum-type tissue glue for otologic surgery - is presented. The principal advantages of this system include a simple modification of the cryoprecipitate technique, which can be easily performed in any hospital laboratory using a minimal amount of the patient's blood, and the use of autologous fibrinogen, which completely rules out the possibility of transmission of hepatitis or AIDS viruses. Useful tips on preparation and use of this autologous tissue glue, based on experience over the past 2 years, will be presented.

Life salvage with fibrin glue in three cases of exsanguinating hemorrhage.

Authors: Errett L., Walsh G.

Publication Date: 1986

Abstract:

Fibrin glue, although widely used in Europe for a decade, has not been commercially available in North America because its fibrinogen component is obtained from multiple, pooled, human blood donors with the subsequent increased risk of blood transmissible diseases. Techniques developed recently to isolate fibrinogen from single-donor plasma will circumvent these potential hazards. In Canada the use of fibrin glue has not been widespread even though biologic fibrin glue can be made from components readily available within most hospitals. Equal amounts of cryoprecipitate from fresh frozen plasma and bovine thrombin will combine within 2 minutes to form the fibrin glue. Simultaneous injections of each component at bleeding sites form a film of the glue that will effectively control even small arterial bleeding. The authors present three case reports to illustrate how use of the glue can save lives in cases of exsanguinating hemorrhage. They discuss the multiple applications of the fibrin glue which they believe will soon be part of the armamentarium of all Canadian surgeons.

Adhesive effect of beriplast, a fibrin adhesive agent, and its influence on the spontaneous wound-healing process. [Japanese]

Authors: Inoue T., Kitatani T., Kobayashi T., Hayashi S.

Publication Date: 1986

Abstract:

Not Available

Clinical application of a new fibrin adhesive (Tisseel) in urologic surgery. [Japanese]

Authors: Miyake K., Gotoh M., Sai S.

Publication Date: 1985

Abstract:

Not Available

Comparison of two fibrin adhesives. Influence of ionic additives on the structure of the fibrin meshwork and its effect on the proliferation of human fibroblasts. [German]

Authors: Redl H., Schlag G., Dinges H.P.

Publication Date: 1985

Abstract:

Not Available

Fibrin seal: The state of the art.

Authors: Matras H.

Publication Date: 1985

Abstract:

Not Available

Tracheal repair with fibrin glue.

Authors: Kram H.B., Shoemaker W.C., Hino S.T.

Publication Date: 1985

Abstract:

Not Available

Vesico-perineal fistula. Obliteration by fibrin glue. [German]

Authors: Grumbt H., Kurz W., Knoth H.-J.

Publication Date: 1984

Abstract:

Not Available

Clinical use of fibrin glue in plastic surgery. [Japanese]

Authors: Sawada Y., Nakajima H., Fujino T.

Publication Date: 1984

Abstract:

This report is on clinical experience with the use of biological fibrin glue. This system consists of highly concentrated human fibrinogen, thrombin, CaCl<inf>2</inf> and aplotinin. Satisfactory results were obtained in these clinical trials of 20 cases of skin graft and flap operations for the purposes of adhesion, hemostasis and temporary covering of wounds. In our series, post-operative hemorrhage, hematoma, infection and dead space formation were not seen. No immunological side effects or post-operative deterioration of the liver function were observed, although three patients received treatment with this system two times. It is suggested that fibrin glue is effective for extensive skin grafting. Moreover, hemostasis and suture procedures will be simplified technically, and blood loss and time of operation will be reduced. This system will also be effective for temporary covering of the raw surface.

Tissue sealing by local application of coagulation factors. [German]

Authors: Stemberger A., Blumel G.

Publication Date: 1983

Abstract:

Not Available

Intraluminal application of fibrinogen adhesive by the example of the endarterectomised pig aorta.

Authors: Rendl K.H., Waldstein N., Waclawiczek H.W.

Publication Date: 1983

Abstract:

In vascular surgery, the method of gluing of tissue with highly concentrated fibrinogen has been used up to now for sealing sutures, especially in clotting disorders, for anastomosis of arteries alone or in combination with sutures, especially in the microsurgical field, for sealing of prostheses, and for plugging fistulating lymphatic vessels with more or less success. The danger of thrombotic vascular occlusion in intravascular application has been pointed out. This is also clearly noted on the proprietary pack. However, experience with preclotting of Dacron prostheses indicates that specific application of a thin layer of fibrin glue should be possible. The possibility of intravascular glue application was investigated in animal experiments. Studied were moderately large arteries (diameter about 5 mm), the reconstruction of which occurs frequently in vascular surgery. The following questions were of interest: 1. Does intraluminal fibrin gluing lead to thrombotic vascular occlusion? 2. Does intraluminal fibrin gluing have an influence on the healing or intimal regeneration after limted endarterectomy?

The concentrated autologous tissue glue. [German]

Authors: Wolf G.

Publication Date: 1983

Abstract:

Since 1980 an autologous tissue glue has been used for microsurgery and plastic surgery at the University of Graz, Clinic for Oto-rhino-laryngology. This tissue glue is made from the patient's own blood plasma. The advantages are: No danger of an immune reaction or infection by virus hepatitis, no storage problems, easy to synthesize, few expenses. Because of the low concentration of fibrinogen, the stability at the beginning of gluing, compared to the other tissue glues, was less. We succeeded in producing a new autologous tissue glue with a highly concentrated amount of fibrinogen, which provided a better stability at the beginning of gluing. According to application, the content of fibrinogen can be varied. The adhesiveness of the concentrated autologous tissue glue was tested and compared to another kind of homologous tissue glue.

Surgical technique and postoperative treatment in perforating injuries of the lens. [German]

Authors: Buschmann W.

Publication Date: 1983

Abstract:

Extensive experimental research proved that the healing of lens capsule wounds can be supported effectively by application of a fibrin tissue adhesive. The result is a circumscribed scar in an otherwise clear lens. The clinical application of the method was successful as well. Preliminary results have been published and a review covering all patients treated is in preparation. This paper is devoted to the indications, techniques and postoperative treatment. The application of the fibrinogen tissue adhesive is indicated if spontaneous healing cannot be expected or has failed and the major parts of the lens are still clear. Even very large traumatic posterior subcapsular rosettes may disappear after closure of the lens capsule wound. Therefore, they are by no means a contraindication for this lens-saving fibrinogen application. The tissue adhesive should be applied as soon as possible after injury. Especially in larger lens capsule lesions we apply it regularly as part of primary surgical care. Successful application of the tissue adhesive is still possible in the days following a perforating injury if the lens capsule wound is small and the progress of lens opacification is slow. Up to now we have used only the easiest application technique in clinical work. Thrombin solution and fibrinogen concentrate were applied successively to the lesion area and its surroundings, using thin, blunt needles. Swollen, denaturated lens fibers should be removed before application. In case of perforation of the anterior and posterior lens capsule, fibrin closure of the anterior lesion usually suffices. A corneoscleral incision and full exposition of the lens wound to be sealed will be preferred in future in larger lens capsule wounds, particularly equatorial ones. Topical and systemic application of antibiotics is used postoperatively as in all perforating injuries. In lens

injuries, we apply topical atropine for 4-6 months after surgery. The importance of this long-term postoperative treatment is illustrated by one of the cases treated. After complete perforation of the lens and fibrinogen application good regression of the lens opacities was observed; however, the atropine treatment was discontinued too early, and the result was that the capsule wound was leaking again. A second fibrinogen adhesive application followed by 6 months of topical atropine treatment again resulted in regression of the lens opacities and a corresponding increase in visual acuity. The recommendation to use miotics in the postoperative treatment of lens injuries no longer appears to be justified.

Experience with a fibrin adhesive. [Spanish]

Authors: Mallea I., Ochandio J.L., Almagro J.L., Marco J.

Publication Date: 1983

Abstract:

Not Available

Haemostasis on the liver by fibrin glue and GRF glue; A comparative study. [German]

Authors: Stenzl W., Hofler H., Tscheliessnigg K.H.

Publication Date: 1982

Abstract:

After experimental hepatic resection in rabbits and piglets, haemostasis was achieved by using two types of tissue glue - fibrin glue and gelatin-resorcin-formaldehyde glue (GRF-glue). With both glues, an elastic adhesive film could be produced. Fibrin glue was completely absorbed by granulation tissue at the 11th postoperative day. After using GRF-glue a toxic necrosis and a subsequent demarcation of necrotic tissue could be observed, with the adhesive substance being not absorbed after 11 days. When used together with a collagen fleece, fibrin glue was not spilled away by tissue haemorrhage. Therefore it seems to be especially suited for haemostasis on the liver. With both glues, no leakage was observed after raising the portal vein pressure to 300 mm Hg during in vitro experiments.

Fibrin glue in dermatosurgery. [German]

Authors: Staindl O.

Publication Date: 1982

Abstract:

Highly concentrated human fibrinogen as a biological tissue-adhesive-system was successful in a variety of clinical applications during the last few years. The adhesive-technique imitates the second phase of blood-coagulation, i.e. the tranformation of fibrinogen to fibrin by addition of a thrombin solution. The advantages of fibrin glue in operative dermatology are based on the possibility of flat tissue adhesion as well as the local sealing of small and medium sized vessels. Three groups of indications are reported: 1. Local blood-coagulation, demonstrated in our surgical management of rhinophyma. 2. The flat tissue adhesion without surgical suture, mainly used in fixation of skin transplants. 3. In cases of extended regional flap-transpositions or tissue transplantation using microvascular anastomoses a combined suture- and adhesive-technique is described.

Preventive Measures for Postoperative Bile Leakage After Central Hepatectomy: A Multicenter, Prospective, Observational Study of 101 Patients.

Authors: Ishii T, Hatano E, Furuyama H, Manaka D, Terajima H, Uemoto S

Publication Date: 2016

Abstract:

BACKGROUND: There are no conclusive measures for preventing postoperative bile leakage (POBL).

METHODS: First, 310 patients who underwent hepatectomy were analyzed retrospectively to clarify risk factors for POBL. Then, focusing on operations at high risk of POBL, patients who underwent central hepatectomy were recruited prospectively among 18 institutions, to evaluate various preventive measures for avoiding POBL. The primary endpoint was the frequency of POBL.

RESULTS: The retrospective analysis revealed central hepatectomy and repeated hepatectomy to be independent risk factors for POBL. One hundred and one patients undergoing central hepatectomy were enrolled in the prospective study. POBL developed in 13 patients (12.9 %). Intraoperative bile leakage was recognized in 42 of the 101 patients (41.6 %), and 10 of the 42 patients developed POBL (23.8 %). Primary closure of the site of bile leakage and/or biliary drainage tube placement was preferable for preventing POBL in the patients with intraoperative bile leakage. Although 59 patients (58.4 %) did not show intraoperative bile leakage, three patients (5.1 %) developed POBL. In the group without intraoperative bile leakage, treatment with fibrin glue with a polyglycolic acid (PGA) sheet or collagen sheet coated with a fibrinogen and thrombin layer (CSFT) had good results.

CONCLUSIONS: Primary closure of the site of bile leakage and/or placement of biliary drainage tubes may be recommended in cases involving intraoperative bile leakage. Treatment with fibrin glue with a PGA sheet and/or CSFT might have preventive effects in patients without intraoperative bile leakage.

Experiences with TachoSil in microneurosurgery.

Authors: Kivelev J, Gohre F, Niemela M, Hernesniemi J

Publication Date: 2015

Abstract:

BACKGROUND: We analyze our experience of using TachoSil (Takeda Austria GmbH: Linz, Austria) in microneurosurgical procedures as a hemostat and also as a sealant to patch dural defects.

MATERIALS AND METHODS: Beginning on January 1, 2012, we prospectively analyzed 100 consecutive surgeries where TachoSil was used. The patient group included 58 women (58 %) and 42 men (42 %); the mean age was 52 years (range, 3-85 years). Indications for surgery included removal of the tumor (53 cases; 53 %), clipping of the cerebral arterial aneurysm (31 cases; 31 %), and treatment of other pathologies, including AVM (four cases; 4 %), cavernomas (four cases; 4 %), spinal tumor, and traumatic subdural hematoma. Patients received postoperative care according to local neurosurgical department protocol, including a postoperative CT scan after each craniotomy. Primary assessment of the wound took place during the hospital stay as well as at discharge or transfer to a rehabilitation unit. Mean follow-up time was 4 months (range, 1-12 months).

RESULTS: None of the patients developed postoperative hematoma after craniotomy or spinal procedure. At primary assessment during hospital stay, 93 patients (93 %) had had no wound-related problems over the normal course of healing. No case registered any liquor leak from the wound, and none of the patients showed any signs of allergic response related to TachoSil usage. At the last follow-up, 96 patients (96 %) experienced uneventful wound healing, and in four patients (4 %), superficial wound infection was successfully treated with oral antibiotics.

CONCLUSIONS: Our results indicate that TachoSil can serve in neurosurgical practice at no additional risks. TachoSil proved to be an effective hemostat, sealant, and adhesive in either cranial or spinal procedures.

Safety and efficacy of a novel, dry powder fibrin sealant for hemostasis in hepatic resection.

Authors: Ruitenbeek K, Ayez N, Verhoef C, de Wilt JH, Bottema J, Rijken AM, van Rij M, Koopman J, Zuckerman LA, Frohna P, Porte RJ

Publication Date: 2014

Abstract:

BACKGROUND/AIMS: Fibrocaps is a dry powder fibrin sealant containing human plasma-derived fibrinogen and thrombin. The safety, efficacy, and application methods for Fibrocaps were evaluated in an exploratory, first-in-human, noncomparative, clinical study.

METHODS: Patients with minor bleeding/oozing after elective partial hepatic resection had Fibrocaps applied to the bleeding site either directly from the vial or from a spray device, with manual pressure applied using a cellulose, collagen, or gelatin sponge, if needed. Safety was evaluated at screening and postoperative days 1, 2, and 5, and weeks 4 and 12. The formation of anti-thrombin antibodies was assessed at baseline, and after 4 and 12 weeks. Time to hemostasis (TTH) within 10 min was determined.

RESULTS: Twenty-nine patients were treated with Fibrocaps; 6 experienced serious adverse events that were not related to the course of treatment. Adverse events occurring in >10% of patients were nausea, constipation, hypotension, obstipation, hypokalemia, and postoperative pain. Most adverse events were mild or moderate in severity. No patient developed anti-thrombin antibodies. The percentage of patients who achieved hemostasis was 93%; the median TTH was 3.8 min (range 0.3-10.3). Manual pressure was applied with Fibrocaps in 19 patients and considered beneficial in most.

CONCLUSION: Fibrocaps was well tolerated in patients undergoing elective hepatic resection and resulted in rapid hemostasis. These safety and efficacy results support further clinical testing of this ready-to-use fibrin sealant as an adjunct to surgical hemostasis.

Prevention of subcutaneous seroma formation in open ventral hernia repair using a new low-thrombin fibrin sealant.

Authors: Kohler G, Koch OO, Antoniou SA, Lechner M, Mayer F, Emmanuel K

Publication Date: 2014

Abstract:

BACKGROUND: Seroma formation is a frequent postoperative complication following open ventral hernia repair (OVHR), especially in cases requiring wide subcutaneous dissection (WSD). The aim of this study was to evaluate the effectiveness of a new low-thrombin fibrin sealant for seroma prevention.

METHODS: A total of 60 consecutive patients with median incisional hernias who required OVHR with WSD of at least 100 cm(2) were included in the prospective non-randomized study. The fibrin glue group (FG) comprised 30 patients who had undergone OVHR with sublay mesh placement as well as subcutaneous application of low-thrombin fibrin sealant. This cohort of patients was compared with a control group (CG) of 30 consecutive patients who had previously undergone OVHR without prevention of seroma formation with regard to outcome measures such as seroma formations and wound complications.

RESULTS: Though the median extent of subcutaneous dead space was larger in the FG than in the CG (229 vs.174 cm(2); $p = 0.012$), seroma formation occurred in three of the FG versus 16 of the CG patients ($p = 0.003$). Postoperative wound complications occurred in two of the FG versus nine of the CG patients ($p = 0.002$). Four patients in the CG and none in the FG required re-operation within 30 days ($p < 0.001$).

CONCLUSION: The use of a new low-thrombin fibrin glue demonstrated a protective effect against formation of seromas and decreased the rate of wound complications in OVHR, with consecutive shorter length of hospital stay (5.8 vs. 10.4 days; $p = 0.04$).

Transporous hernia mesh fixation with fibrin sealant in an in vitro model of spray application.

Authors: Brand J, Gruber-Blum S, Gruber K, Fortelny RH, Redl H, Petter-Puchner AH

Publication Date: 2013

Abstract:

BACKGROUND: The spray application of fibrin sealant (FS) is widely used for atraumatic mesh fixation in open and laparoscopic hernia surgery. Studies focusing on the optimization of sealant distribution are rare. This study elucidates the impact of spray distance and pressure, the thrombin concentration of the FS, as well as the mesh design on the spray process and the resulting sealant distribution. Furthermore, the effect of interrupting the spray process on sealant distribution was investigated.

MATERIAL AND METHODS: Three different meshes were sprayed in a vertical test arrangement with 0.4 mL FS. Fibrin sealants containing 4 and 500 IU/mL thrombin (Tisseel and Artiss; Vienna, Austria) provided by Baxter Biosciences were used. The application distances varied from 5 to 8 cm. The relative fibrin sealant distribution on the individual mesh surfaces was evaluated and compared, as well as loss of FS and patterns of clot formation.

RESULTS: Spray distances between 5 and 8 cm led to a homogenous sealant distribution. Lower thrombin concentrations led to significant losses of FS due to slower polymerization. Differences of the fibrin sealant distribution and mesh pore sizes were found. No differences between continuous and discontinuous application were observed.

CONCLUSION: The spray application of FS provides a uniform sealant film in a defined range of

distances. However, design and pore size of different meshes substantially impact sealant distribution. These findings should be considered when selecting prosthesis for hernia repair. In general, the amount of sealant should not exceed 0.08 mL per cm(2) to avoid obstruction of mesh pores.

Biologic sealants: the next great thing in gastrointestinal surgery?.

Authors: Eisenberg D

Publication Date: 2013

Abstract:

Not Available

[The effect of fibrin gluing and its important components on fibrosis of nerve anastomoses]. [German]

Authors: Herter T, Anagnostopoulos-Schleep J, Bennefeld H

Publication Date: 1989

Abstract:

The fibrinous adhesion, although generally adopted and more and more successfully applied in many sectors of surgery, is not yet fully established in the anastomosis of separated nerves. Initially, the adhesion was expected to offer some essential advantages in this domain, especially in the prevention of suture granulomas. However, the blood clots dissolved too early, and this resulted in the formation of dehiscences. So antifibrinolytic substances had to be added to the adhesive, and this led to a frequent appearance of fibroses. The adhesion of nerves is still hampered by this fact. Now we have examined the fibrosis-inducing effect of different factors of the adhesive system. We found that aprotinin and the fibrin clot as an obstacle to supply had no additional fibrotic effect, whereas thrombin, factor XIII and fibronectin promoted the formation of fibroses.

Intraoperative intrasac thrombin injection to prevent type II endoleak after endovascular abdominal aortic aneurysm repair.

Authors: Zanchetta M, Faresin F, Pedon L, Ronsivalle S

Publication Date: 2007

Abstract:

PURPOSE: To report a prospective, nonrandomized pilot study to determine whether fibrin glue aneurysm sac embolization at the time of endovascular aneurysm repair (EVAR) is a safe and effective procedure to primarily prevent type II endoleaks.

METHODS: Between June 2003 and December 2005, 84 consecutive patients (79 men; mean age 73.8+/-7.8 years, range 64-86) with degenerative infrarenal abdominal aortic aneurysm underwent EVAR with bifurcated stent-grafts and fibrin glue injection into the aneurysm sac at the conclusion of the endovascular procedure. A total of 424 imaging studies and 348 visits were recorded during the study period and reviewed.

RESULTS: Selective catheterization of the aneurysm sac and fibrin glue injection immediately after initial stent-graft deployment was successful in 83 (99%) of 84 cases; there was one failure to access the excluded aneurysm sac due to severe iliac artery calcification. The estimated primary and assisted clinical success rates at 2 years were 91.3% and 98.8%, respectively, but the major findings were the low rate of delayed type II endoleak (2.4%) and the statistically significant decrease in the maximum transverse aneurysm diameter (50.40+/-6.70 versus 42.03+/-6.50 mm, p = 0.0001) at follow-up. In addition, of 31 patients available for 24-month follow-up, 14 (45.2%) patients showed a reduction in maximum transverse aneurysm diameter by >or=5 mm; 16 (51.6%) patients had no significant changes, whereas only 1 patient showed a >5-mm enlargement.

CONCLUSION: This clot engineering approach to aneurysm sac embolization at the time of endografting appears to be safe and may spare the patient a repeated catheter-based intervention or surgical procedure.

Tensile strength of biological fibrin sealants: a comparative study.

Authors: Lacaze L, Le Dem N, Bubenheim M, Tsilividis B, Mezghani J, Schwartz L, Francois A, Ertaud JY, Bagot d'Arc M, Scotte M

Publication Date: 2012

Abstract:

BACKGROUND: Fibrin sealants are commonly used in liver surgery, although their effectiveness in routine clinical practice remains controversial. Individual sealant characteristics are based on hemostatic effects and adhesion properties that can be experimentally measured using the 'rat skin test' or the 'pig skin test'. This study used a more relevant and realistic experimental canine model to compare the differences in the adhesive properties of four fibrin sealants in hepatectomy: Tisseel/Tissucol, Tachosil, Quixil, and Beriplast.

MATERIALS AND METHODS: A partial hepatectomy was performed in beagle dogs under general anesthesia to obtain liver cross-sections. Fibrin sealants were allocated to dog livers using a Youden square design. The tensile strength measurement was performed using a traction system to measure the rupture stress point of a small wooden cylinder bonded to the liver cross-section.

RESULTS: Significantly greater adhesion properties were observed with Tisseel/Tissucol compared with Quixil or Beriplast (P = 0.002 and 0.001, respectively). Similarly, Tachosil demonstrated significantly greater adhesive properties compared with Beriplast (P = 0.009) or Quixil (P = 0.014). No significant differences were observed between Tisseel/Tissucol and Tachosil or between Beriplast and Quixil.

CONCLUSIONS: The results of this comparative study demonstrate that different fibrin sealants

exhibit different adhesive properties. Tisseel/Tissucol and Tachosil provided greatest adhesion to liver cross-section in our canine model of hepatectomy. These results may enable the optimal choice of fibrin sealants for this procedure in clinical practice.

Use of fibrin-based sealants and gelatin-matrix hemostats in laparoscopic liver surgery. [Review]

Authors: Saif R, Jacob M, Robinson S, Amer A, Kei-Hui D, Sen G, Manas D, White S

Publication Date: 2011

Abstract:

BACKGROUND: During surgery, liver tissue is particularly prone to bleeding which can be difficult to control, especially in patients with liver disease-associated coagulopathy. Topical sealants and hemostats can enhance clot formation and wound healing, and can be useful for controlling or preventing troublesome bleeding during surgical interventions where conventional methods of hemostasis are inadequate.

METHODS: An extensive customized literature search was conducted using medical reference databases to identify publications related to the use of potential agents in laparoscopic liver surgery. Citations from these articles were also used. Details of the authors' own experience in this area is also included.

RESULTS: Routine use of fibrin-based sealants in open liver surgery now seems to be widespread. Data from several large prospective randomized controlled clinical trials have indicated that application of fibrin-based sealants to the cut liver surface during hepatectomy does provide some benefit in terms of a shorter time to hemostasis and a reduction in postoperative drainage fluid, even when compared with argon beam coagulation. Another trial found no additional benefit of fibrin sealants when applied after coagulation of the cut liver surface. A prospective, uncontrolled study found that application of the flowable gelatin matrix-based hemostat Floseal provided rapid effective control of mild-to-severe bleeding during surgical removal of primary or metastatic liver tumors, even

in those with cirrhosis. Some of these topical hemostatic agents are already being used on a routine basis by many surgeons performing laparoscopic liver surgery. Although there are no randomized clinical trials, there are several anecdotal or case reports of their effective use during laparoscopic liver surgery.

CONCLUSIONS: On the basis of current evidence of using hemostats and sealants in open liver surgery, there is potential of developing these strategies in laparoscopic liver surgery.

Anastomotic sealing with a fibrin-coated collagen patch in small-diameter bowel.

Authors: Chmelnik M, Lasch L, Weih S, Wink E, Romero P, Holland-Cunz S

Publication Date: 2011

Abstract:

PURPOSE: The aim of this study was to evaluate the complication rates and inflammatory response in TachoSilTM-sealed small-diameter anastomoses with conventional and reduced suture number as a model for neonatal bowel surgery.

METHODS: Ileo-ileal anastomoses were performed in 73 rats. In the control group, the anastomosis was accomplished with the conventional technique, using nine interrupted sutures. In the other groups with nine, six, and three interrupted sutures, the anastomotic line was additionally sealed with a fibrin-coated collagen patch (TachoSilTM). The rats were sacrificed on days 0, 2, and 10. Clinical and functional parameters included the rates of ileus, insufficiency and death, operating time, adhesions, bursting pressure, and preanastomotic dilatation. The histological examination of the anastomoses concentrated on assessing the inflammatory cell infiltration of the TachoSilTM patch and the intestinal wall.

RESULTS: Severe preanastomotic dilatation was observed in additionally sealed ileo-ileal anastomoses with conventional suture number and high complication rates (ileus, perforation, death) occurred in additionally sealed anastomoses with reduced suture number. We found a massive microabscess-forming inflammation in additionally sealed anastomoses. Inflammatory cell infiltration was highest in the collagen layer of the sealing patch ($p<0.05$ vs. fibrin layer of the sealing patch and vs. intestinal wall).

CONCLUSIONS: As a result of our findings, additional sealing of small-diameter intestinal anastomoses with TachoSilTM cannot be recommended.

The effect of sealing with a fixed combination of collagen matrix-bound coagulation factors on the healing of colonic anastomoses in experimental high-risk mice models.

Authors: Pantelis D, Beissel A, Kahl P, Wehner S, Vilz TO, Kalff JC

Publication Date: 2010

Abstract:

PURPOSE: Experimental and clinical studies on the sealing of colorectal anastomoses in order to reduce the rate of leakage have previously been performed with divergent results. However, comparatively few studies have been performed on anastomotic healing using a fibrin glue-coated patch. The aim of this experimental basic scientific study in mice was to investigate the effect of fibrin glue-coated collagen patches on the healing process of colonic anastomoses in situations of adverse healing process (technical deficiency and peritonitis).

METHODS: Colonic anastomoses were carried out in 206 mice and randomized into six groups (I: complete anastomoses, II: sealed complete anastomoses, III: incomplete anastomoses, IV: sealed incomplete anastomoses, V: complete anastomoses in the presence of bacterial peritonitis, VI: sealed complete anastomoses in the presence of bacterial peritonitis). Tissues from the anastomoses were removed and used for functional, histochemical, molecular, and biochemical investigations.

RESULTS: The evaluation of postoperative course data revealed the beneficial effect of additional sealing with a fixed combination of collagen matrix-bound coagulation factors I and IIa (Tachosil(), Nycomed Austria, Linz) in high-risk experimental anastomotic healing. Sealing incomplete anastomoses resulted in significantly lower lethality and leakage rates, as well as significantly higher

bursting pressure values and histopathologic scores. Collagen 1 and 3 expressions and hydroxyproline concentrations are greatly increased with additional sealing in all high-risk anastomoses.

CONCLUSIONS: In our current model, we demonstrate that additionally sealing high-risk experimental colonic anastomoses provides a positive effect on the healing process. The effect on the molecular level in particular seems to be essential and requires further experimental studies to evaluate the mechanism.

Reduction in bile leaks following adult split liver transplant using a fibrin-collagen sponge: A pilot study.

Authors: Toti L, Attia M, Manzia TM, Lenci I, Gunson B, Buckels JA, Mirza DF, Mayer AD, Bramhall SR, Wigmore SJ

Publication Date: 2010

Abstract:

INTRODUCTION: Bile leaks are a frequent complication of adult split liver transplantation. We compared surgical complications in patients who had the cut surface of the donor liver treated with a patch to those in whom the cut surface of the liver was treated with fibrin glue.

MATERIAL AND METHODS: Two consecutive cohorts of 16 patients undergoing adult right lobe split liver transplant were compared. In the first cohort, the liver surface was treated with fibrin glue and in the second the liver surface was treated with TachoSil fibrinogen-thrombin-collagen patches. Post-operative complications were analyzed.

RESULTS: Bile leaks were significantly fewer among patients in whom the cut surface of the liver was treated with fibrin-collagen sponge compared to those where fibrin glue was used on the cut surface: 1/16 (6.25%) vs. 7/16 (43.75%), respectively; p=0.03. There were some differences in biliary anastomotic techniques used in the two groups but 7/8 leaks (87.5%) arose from the cut surface, and only one was from the anastomosis.

CONCLUSION: Using a fibrinogen-thrombin-collagen sponge patch may reduce bile leaks from the cut surface of the liver during adult right lobe split liver transplants.

The use of Tachosil surgical patch or fibrin glue in coronary artery surgery does not affect quality of anastomosis or provoke postoperative adhesions in pigs.

Authors: Erb MA, Claus T, Hartrumpf M, Bachmann S, Albes JM

Publication Date: 2009

Abstract:

OBJECTIVE: Fibrin glue products and collagen surgical patches (TachoSil) coated with coagulation factors I and IIa are increasingly being used to prevent oozing from distal or proximal coronary anastomosis. Furthermore, an increasing number of patients are being operated upon anti-platelet therapy. These patients often exhibit diffuse bleeding. Especially in an off-pump scenario surgeons refrain from placing additional stitches in order to avoid an impairment of the graft. In these situations, a biological glue can help resolve this dilemma. It is, however, assumed that these products may exert negative effects on the anastomosis. For obvious reasons a systematic histological assessment in humans is impossible. Therefore, a chronic, large animal model was developed to study the fate of these products on a coronary anastomosis.

METHODS: In 15 pigs receiving off-pump coronary artery bypass graft of the left mammary artery to the left anterior descending coronary artery, three groups were defined. Group A served as control. In group B the anastomosis was covered with 1 ml fibrin glue; in group C TachoSil coverage was performed. Bypass flow (BF) was measured using a Doppler probe. After 3 months the pigs were sacrificed and the anastomoses were evaluated macroscopically and by means of light microscopy regarding patency and fibrosis.

RESULTS: In group A, all five animals survived, three of the five anastomoses were patent and the

mean BF was 26 ml min(-1). In group B, three of the five animals survived, all anastomoses were patent. The BF was 21 ml min(-1). In group C, all five animals survived, four of the five anastomoses were patent and BF was 21 ml min(-1). Macroscopic and histological evaluation showed no differences between the groups. Remnants of Tachosil or fibrin glue were not observed.

CONCLUSIONS: In the chronic course, no evidence of adverse effects of TachoSil or fibrin glue was noted. Both agents can therefore be used safely in clinical practice for haemostyptic or positioning purposes.

Is tisseel a viable option in posterior lamellar keratoplasty?.

Authors: Oberg TJ, Friday JW, Ursea R, Snyder RW

Publication Date: 2009

Abstract:

PURPOSE: It is well known that Tisseel Fibrin Sealant provides an excellent tissue adhesive. However, its thick and viscuous nature makes it nearly impossible to apply it in a uniform and thin layer. We propose applying the sealant phase as a dry powder and polymerizing it in-vivo by exposing it to thrombin solution after a graft has been placed.

METHODS: For each experiment two rabbit corneal buttons were affixed to each other using either Tisseel or thrombin plus dry fibrinogen component, the tensile strength of the bond was then tested in the tension box. Balanced salt solution was used as an aqueous substitute.

RESULTS: Tisseel was demonstrated to create significant adhesive tensile force (expressed as N/m) between corneal buttons ($P < 10$). Using only the dry fibrinogen component followed by injection of the thrombin solution directly into the balanced salt solution did not significantly alter the strength of the bond ($P = 0.18$).

CONCLUSION: The use of the dry fibrinogen component followed by injection of thrombin solution into the balanced salt solution, without the accompanying fibrinolysis inhibitor, is equally effective in adhesive strength when compared to complete Tisseel. This technique may be used in lamellar corneal surgery, although there would be potential difficulties with its application in the in vivo setting.

Fibrin glue injection method with diluted thrombin for refractory postoperative digestive fistula.

Authors: Murakami M, Tono T, Okada K, Yano H, Monden T

Publication Date: 2009

Abstract:

BACKGROUND: The injection of the biological adhesive fibrin glue is often performed to treat postoperative digestive fistulas. However, it is not always effective especially in case of complex fistulas with large cavities, because the fibrin glue will coagulate before the mixed solutions fill the cavity, creating dead space. We report the results of fibrin glue injection with diluted thrombin solution.

METHODS: We studied the tensile strength and coagulation time of the resulting fibrin glue at each dilution of the thrombin solution. Based on in vitro study, 18 patients who had developed postoperative digestive fistula were treated by fibrin glue injection with diluted thrombin solution.

RESULTS: In vitro study proved that the dilution of thrombin prolonged the coagulation time of the fibrin glue to more than 1 minute with almost no change to the tensile strength of the glue until a certain dilution was reached. The fistulas of 16 patients were successfully closed.

CONCLUSIONS: Our simple method of fibrin glue injection is useful for refractory postoperative digestive fistula, even in cases of complex fistula with large cavities.

Haemostatic sealants in nephron-sparing surgery: what surgeons need to know. [Review] [47 refs]

Authors: Dalpiaz O, Neururer R, Bartsch G, Peschel R

Publication Date: 2008

Abstract:

Surgical haemostatic agents have been increasingly applied for the control of bleeding, and have excellent potential in laparoscopy. Several factors are important when evaluating the use of sealants. We present a brief overview of the history, composition and mechanism of action of sealants, together with a report on experimental studies and clinical experience with haemostatic sealants. We searched for reports on haemostatic agents and their use in renal parenchymal haemostasis; 15 animal models studies and 11 papers on clinical experience were included. The development of haemostatic agents and instruments is allowing the wider diffusion of challenging procedures. Several experimental animal studies have shown the efficacy and safety of sealants for haemostasis during nephron-sparing surgery. Clinical studies confirm the effectiveness of synthetic or fibrin glue, in particular during laparoscopic surgery. Sealants are effective and safe topical agents to control bleeding during nephron-sparing surgery. They should not be viewed as an alternative, but as complementary agents to be used to improve surgical outcomes. Further prospective studies are necessary to validate their role in relation to other haemostatic support techniques. [References: 47]

Commercial fibrin sealants are not equivalent in a rabbit liver-resection model which quantitatively evaluates hemostasis and formation of adhesions.

Authors: Nur I, Lyahovetsky Y, Bar L, Schon M

Publication Date: 2005

Abstract:

A rabbit partial liver resection model was used to determine the hemostatic effectiveness of a new fibrin sealant. Persistent bleeding, with a mean bleeding time of 372 s and blood loss of 18 ml, from a resected lobe of the liver was achieved after rabbits in the untreated control group had been infused continuously with unfractionated heparin over 20 min with 0.2 IU/ml at a rate of 1 ml/min. Spraying the resected surface with the new fibrin sealant, Quixil, reduced bleeding to < 1 ml and the post-resection bleeding times was 25 s. Bleeding time, blood loss and the volume of sealant used in the rabbit model were inversely correlated with the thrombin concentration in the sealant. In direct comparisons with Tissucol and Beriplast, Quixil was associated with the shortest bleeding times, the lowest volume of sealant used and the lowest score of abdominal adhesions.

Adjuvant methods in macular hole surgery: intraoperative plasma-thrombin mixture and postoperative fluid-gas exchange.

Authors: Blumenkranz MS, Ohana E, Shaikh S, Chang S, Coll G, Morse LS, De Bustros S

Publication Date: 2001

Abstract:

BACKGROUND AND OBJECTIVE: The optimal method for surgical management of idiopathic macular holes remains unknown. Adjuvant methods including intraoperative cytokines and postoperative fluid-gas exchange with and without laser have been described. We report on the safety and final results of routine intraoperative autologous plasma-thrombin mixture and postoperative fluid-gas exchange when necessary as an adjunct to the surgical therapy of this disease.

PATIENTS AND METHODS: A consecutive series of 114 patients (mean age 66.9 years) with primary idiopathic full thickness Stage II, III, and IV macular holes were primarily treated by vitrectomy, fluid/perfluorocarbon gas exchange, and application of autologous plasma-thrombin mixture to the macular hole. Visible epiretinal membranes were peeled but the normal appearing internal limiting membrane was not routinely stripped. Outcome measures included final Snellen visual acuity, rate of macular hole closure, complications, and number of supplemental procedures performed.

RESULTS: Closed at one month, were 110 of 121 (91%) macular holes, including two that underwent repeat fluid/gas exchange and laser within the first two weeks after surgery. At the time of final follow-up (mean: 10.9 months), 110 of 121 (91%) macular holes were closed. This included 8 of 9 eyes that had reopening of the macular hole between one and 21 months successfully treated

by repeat fluid-gas exchange and 2 eyes that underwent a second successful pars plana vitrectomy, membrane peeling, and repeat fluid-gas exchange. Overall, 98 of 121 eyes overall (81%) were successfully treated by a single surgery; 94 of 121 (78%) achieved two lines or greater of visual improvement; 83 of 121 (69%) achieved 20/70 or better vision; and 47 eyes (39%) achieved 20/40 or better vision. Complications in this series included infectious endophthalmitis (1 eye), intraoperative retinal break (2 eyes), late retinal detachment (5 eyes), transient mild intraocular pressure elevation (46 eyes), inflammatory response (six eyes), epiretinal membrane (6 eyes), intraretinal hemorrhages (1 eye), and cataract (33 of 99 phakic eyes underwent cataract extraction during the follow-up).

CONCLUSION: A combination of intravitreal perfluorocarbon gas and autologous plasma-thrombin mixture (tissue glue) was well tolerated in most patients and did not result in any specific long-term complications. The use of supplemental fluid-gas exchange when necessary improved the final success rate. Further well-controlled and randomized studies will be required to determine the efficacy of this as an adjunct or alternative to other methods of treatment for macular holes.

Management of a patient with a mechanical aortic valve and antibodies to both thrombin and factor V after repeat exposure to fibrin sealant.

Authors: Zumberg MS, Waples JM, Kao KJ, Lottenberg R

Publication Date: 2000

Abstract:

We describe a patient who developed a markedly prolonged PT, PTT, and thrombin time 13 days after repeat exposure to fibrin sealant during coronary artery bypass grafting and aortic valve replacement. Evaluation revealed an inhibitor to bovine thrombin that cross-reacted with human thrombin. In addition an inhibitor to human coagulation factor V was identified. Despite coagulation abnormalities there was no evidence of bleeding. Nevertheless, effective anticoagulation was required to minimize the thrombotic complications associated with the patient's prosthetic valve. We elected to take a conservative approach and not utilize pharmacologic anticoagulation until there was diminution in the effect of the acquired inhibitors. We report on our patient's course and review the available literature addressing the management of patients demonstrating inhibitors to blood coagulation factors after repeat exposure to fibrin sealants.

Hemostatic efficacy of fibrin sealant (human) on expanded poly-tetrafluoroethylene carotid patch angioplasty: a randomized clinical trial.

Authors: Jackson MR, Gillespie DL, Longenecker EG, Goff JM, Fiala LA, O'Donnell SD, Gomperts ED, Navalta LA, Hestlow T, Alving BM

Publication Date: 1999

Abstract:

PURPOSE: The efficacy of solvent-detergent-treated fibrin sealant (human [FSH]) for controlling anastomotic bleeding from expanded polytetrafluoroethylene (ePTFE) patch angioplasty during carotid endarterectomy was evaluated, and FSH was compared with thrombin-soaked gelatin sponge (Gelfoam; TSG).

METHODS: The study was of a randomized, open-label, single-site, single-treatment, parallel design that took place in a referral center with hospitalized patients. Forty-seven adult patients (33 men, 14 women) underwent elective carotid endarterectomy. Patients were randomized to receive either FSH (N = 24) or TSG (N = 23). FSH was obtained as an investigational new drug. FSH was applied as a liquid by means of a dual-syringe technique. Heparin anticoagulation, patch thickness, and suture type were standardized. Two different needle sizes were used (CV-6, PT-13: N = 21 [FSH: N = 10, TSG: N = 11]; CV-6, PT-9: N = 26 [FSH: N = 14, TSG: N = 13]). The FSH or TSG was applied to the ePTFE patch, and then blood flow was restored through the carotid artery. Degree of anticoagulation was assessed by anti-factor Xa activity. The time from restoration of carotid blood flow until achieving hemostasis was recorded. The blood loss from patch suture hole bleeding was measured. Completion intraoperative duplex ultrasound scanning was performed in all cases. Heparin was reversed with protamine sulfate. The primary end point was successful hemostasis

within 15 minutes of restoration of carotid blood flow. The secondary end points were the amount of blood loss caused by suture line bleeding and the time to achieve hemostasis.

RESULTS: There was no difference in the number of patients with complete hemostasis at 15 minutes (TSG, 13 of 23; FSH, 12 of 24; P =.77). The measured blood loss was 99.0 +/- 119.9 (SD) mL for TSG, and 105.0 +/- 107.9 mL for FSH (P =.86). The time to hemostasis was the same for both groups (TSG, 16.5 +/- 16.5 minutes; FSH, 16.6 +/- 14.2 minutes; P =.97). Within both treatment groups, the use of larger needles (PT-13) was associated with greater blood loss (FSH, 169.7 +/- 124.2 mL; TSG, 172.7 +/- 151.5 mL) than was the use of smaller needles (PT-9; FSH, 58.8 +/- 66.3 mL; TSG, 34.1 +/- 25.6 mL; P =.036, P =.001, respectively). There were no postoperative strokes or bleeding complications in either group. No abnormalities were shown in either group by means of completion carotid duplex ultrasound scanning.

CONCLUSION: FSH was equivalent, but not superior to, TSG in achieving hemostasis during carotid endarterectomy performed with ePTFE patch angioplasty. Adhesion properties of FSH to ePTFE are possibly different than those to native tissue and warrant additional investigation.

Antiphospholipid antibodies in left-ventricular assist system recipients after exposure to topical bovine thrombin.

Authors: Fastenau DR, Hormuth DA, McIntyre JA

Publication Date: 1999

Abstract:

Not Available

[Choice of thrombin concentration of common fibrin glue systems for nerve anastomosis]. [German]

Authors: Herter T, Windmann D

Publication Date: 1992

Abstract:

Although fibrin glue has been used in several areas of surgery with increasing success, it has not become fully established in nerve coaptation. Initially, significant advantages were expected, however, as the fibrin clot dissolved prematurely, gapping occurred and antifibrinolytic substances had to be added to the glue. Following this procedure, fibrosis occurred frequently. This remains a problem. Therefore, the dosage dependent fibrosis-inducing effect of thrombin was investigated in an animal experimental study. Thrombin demonstrates a fibrosis-promoting effect and we therefore recommend 1-1.5 NIH thrombin/ml glue, as lower concentrations increase the clotting time.

The use of TachoSil associated to fibrin glue as dural sealant in spinal intradural tumors surgery.

Authors: Montano N., Papacci F., Fernandez E.

Publication Date: 2017

Abstract:

Not Available

Fibrin sealant patch (TachoSil) vs oxidized regenerated cellulose patch (surgicel original) for the secondary treatment of local bleeding in patients undergoing hepatic resection: A randomized controlled trial.

Authors: Genyk Y., Kato T., Pomposelli J.J., Wright J.K., Sher L.S., Tetens V., Chapman W.C.

Publication Date: 2016

Abstract:

Background Local hemostatic agents are important for the control of bleeding during liver resection when standard surgical techniques are insufficient. Study Design This was a multicenter, randomized, open-label study to compare fibrin sealant patch (FSP; TachoSil; Takeda Pharma A/S) with oxidized regenerated cellulose gauze (ORCG; Surgicel Original; Ethicon) for the secondary treatment of local bleeding after hepatic resection in adult and pediatric patients. Primary end point was the proportion of adult patients with intraoperative hemostasis at the target bleeding site within 3 minutes of application of treatment. Results Of 321 adult patients screened, 224 patients had minor to moderate bleeding from the hepatic resection area after primary hemostatic treatment and were intraoperatively randomized to FSP (n = 114) or ORCG (n = 110). Hemostasis within 3 minutes was achieved in 92 patients in the FSP group (80.7%) and 55 patients in the ORCG group (50.0%) (odds ratio = 4.87; 95% CI, 2.55-9.29; $p < 0.001$). The proportion of patients with hemostasis at 5 minutes was also higher in the FSP group (94.7% vs 76.4%; odds ratio = 6.24; 95% CI, 2.39-16.30; $p < 0.001$), and time to hemostasis was shorter ($p < 0.001$). At 10 minutes, hemostasis was achieved in all patients in the FSP group and 12 patients in the ORCG group (10.9%) had visible bleeding and required hemostatic rescue therapy. In pediatric patients, hemostasis at 3 minutes was achieved in 17 of 20 (85.0%) patients with FSP and 4 of 9 (44.4%) patients with ORCG. Both treatments were well tolerated in adults and children. Conclusions The FSP (TachoSil) was safe and

superior to ORCG (Surgicel Original) for achieving hemostasis in patients undergoing hepatic resection. ClinicalTrials.gov ID NCT01192022.

Slow versus rapid fibrin glue for the prevention of seroma in abdominoplasty.

Authors: Toman N., Lange V., Rosenthal A., Reuther P., Turan O.

Publication Date: 2015

Abstract:

Background: The formation of a seroma is one of the most frequent complications following an abdominoplasty. A preventive effect on seroma formation by using fibrin glue in an operation is discussed. The effect of operative fibrin sealant on the formation of seromas was investigated in patients who had an abdominoplasty. The relevance of slow versus accelerated fibrin polymerization was determined. Methods: Two different thrombin concentrations (4 IE vs. 500 IE thrombin/ml) of the fibrin sealant were used in two groups of 60 patients. The control group consisted of 60 patients who underwent abdominoplasties without using a fibrin glue adhesion. One patient had to be excluded. Results: Patients in the group with the slow reacting fibrin sealant (4 IE) had a significantly lower rate of seroma formation when compared to the high concentration fibrin group and the control group ($p< 0.04$ and $p< 0.05$, respectively). In addition, the amount of postoperative drainage was significantly lower in the low-dose group ($p<0.001$). Patients with a seroma had a significantly higher resected tissue weight ($p<0.0001$). A higher body-mass-index ($p<0.0001$) and the amount of postoperative drainage ($p< 0.0001$) were found to be significant risk factors for the development of a seroma. The Age had no significant impact on the prevalence of complications. Conclusion: The use of slow reacting, low-dose fibrin glue demonstrated a protective effect against the formation of a seroma following abdominoplasty. The amount of postoperative drainage was significantly lower.

Use of fibrin glue in the prevention of seroma formation after axillary lymphadenectomy.

Authors: Sanchez-Mendez J.I., Roman Guindo A., Marti Alvarez C., Rychlik A., Serrano Velayos S., Steinberg Contreras G., Alonso Fernandez P., Lombarte Garcia M., Santisteban Padro J., De Santiago Garcia J.

Publication Date: 2015

Abstract:

Goals: The primary objective of this study was to determine the effectiveness of a fibrin sealant in the prevention of seroma formation after axillary lymphadenectomy, in a group of breast cancer patients. Secondary objectives included a comparison with another group of patients, in which an usual surgical drainage was used, regarding hospital stay, operating time, and main postoperative complications. (Table presented) Methods: We completed an analytical retrospective observational study of patients with breast cancer for whom a fibrin sealant was applied to the surgical site after an axillary lymphadenectomy (fibrin sealant group) and those for whom it was not applied (drain group), based on a review of breast cancer patient records from June 2006 to February 2014. Results:We studied a total of 317 patients of whom in 192 no sealant was applied to the surgical site after axillary lymphadenectomy, and were managed conventionally with the placement of an axillary drain (drain group). These were compared with 125 patients to whom a fibrin sealant was applied to the surgical site after axillary lymphadenectomy, without drain (fibrin sealant group), over the same time period. In 88.9% of cases of the sealant group the procedure was a complete success and no seroma formation was observed. Only 14 patients from a total of 125 in the fibrin sealant group required percutaneous drainage due to the delayed appearance of seroma. Overall, early discharge - 24 to 48 hours after surgery - was possible in 91.2% of patients. The volume of fluid obtained in the group with drains was significantly larger (361 ml) compared with the volume collected in the

fibrin sealant group (170 ml) ($p < 0.05$). Also significant differences in the number of punctures needed to evacuate the seroma between the two study groups were found (3.1 vs 2.3; $p < 0.05$). A logistic regression analysis was performed, using the hospital discharged (greater than or less than 48 hours) as dependent variable, and age, surgical technique (classic or Ivanovic), histological type (ductal, lobular, others), histological grade (1, 2-3) as independent ones. Only the use or not of fibrin sealant presents statistical significance ($p < 0.005$). . Conclusion: The use of fibrin sealants with low thrombin concentration is an effective means of preventing the formation of axillary seroma after lymphadenectomy, removing the need for a drain and reducing hospitalization time, with early autonomous discharge.

The effects of low-thrombin fibrin sealant on wound serous drainage, seroma formation and length of postoperative stay in patients undergoing axillary node dissection for breast cancer: A randomized controlled trial.

Authors: Benevento R., Santoriello A., Pellino G., Sciaudone G., Candilio G., De Fatico G.S., Selvaggi F., Canonico S.

Publication Date: 2014

Abstract:

Background: Breast cancer surgery with axillary lymphadenectomy may be associated with prolonged stay of the drain in the axilla due to high wound output, which may require further treatments and prolong the length of stay, impairing quality of life. No definitive data are available concerning how to prevent this complication. Our aim was to assess the efficacy of a new low-thrombin fibrin glue in reducing the serous output from the axillary surgical wound in patients undergoing axillary node dissection for breast cancer, and its long-term effects on lymphedema. Methods: Sixty patients undergoing surgery between September 2012 and June 2013 were enrolled. Thirty patients received Artiss(Baxter, UK) fibrin glue plus drainage, and 30 drainage alone. A multivariate analysis was performed to identify predictors of seroma, and subgroup analyses were performed. Lymphedema was assessed 12 months after surgery. Results: Patients who received fibrin glue had reduced serum output collected in the drain after surgery (94.3+/-22.4 vs 176+/-24.6ml p<0.001) and shorter length of postoperative hospital stay (p=0.001). Incidence of seroma at 4-week follow-up did not differ between groups. At multivariate analysis, BMI >=30kg/m² was the only independent predictor of seroma formation (OR=2.7, 95%CI 1.4-5.3; p=0.002). Overweight patients receiving Artiss had fewer seroma at 4-week follow-up compared with control overweight patients (0% vs 55.6%, p=0.03). No differences were

observed in lymphedema between groups (6.7% vs 10%, p>0.99). Conclusions: Low-thrombin fibrin glue reduced the amount of fluid produced in the axilla after breast surgery. Overweight patients may be the ideal candidates for this treatment. Such sealant did not increase the rates of lymphedema.

The Use of a Fibrin Glue with a Low Concentration of Thrombin Decreases Seroma Formation in Postbariatric Patients Undergoing Circular Abdominoplasty.

Authors: Pilone V., Vitiello A., Borriello C., Gargiulo S., Forestieri P.

Publication Date: 2014

Abstract:

Background: The serum collection under the abdominal flap is the most common complication after a lipo-abdominoplasty. The frequency of seroma increases further among obese patients, who have achieved massive weight loss after bariatric surgery. The purpose of this study is to demonstrate the effectiveness of fibrin glues with a low concentration of thrombin in reducing seroma formation after a lipo-abdominoplasty.Methods: Thirty patients, that had achieved a significant weight loss after an intervention of laparoscopic adjustable gastric banding (LAGB), underwent a circular lipo-abdominoplasty at our bariatric surgery department. Patients were divided into two groups of 15 subjects each: group A underwent traditional surgery; in group B, we applied a slow-clotting variant of fibrin glue (ARTISS, Baxter) under the abdominal flap. All subjects were evaluated clinically using an ultrasound device on postoperative day 15. We considered positive for seroma, those cases with a liquid collection greater than 20 cc.Results: The groups were homogeneous for age, BMI, male/female ratio, and diabetic or smoker patients. The mean hospital stay was significantly longer in group A than in group B. We found eight cases of serum collection >20 cc in group A and only one case in group B. Hematoma, umbilicus necrosis, and surgical site infection occurred in both groups, but overall complication rate was lower in group B.Conclusions: The use of a fibrin glue with a low concentration of thrombin could be useful during wound closure and may decrease seroma formation in postbariatric patients undergoing lipo-abdominoplasty.

Novel surgical technique to solidify cyst-type metastatic brain tumors using autologous fibrin glue for complete resection.

Authors: Okuda T., Fujita M., Yoshioka H., Tasaki T., Kato A.

Publication Date: 2014

Abstract:

Background: An outstanding issue regarding the surgical treatment of cyst-type metastatic brain tumors is the incomplete resection of cyst walls. Herein we propose a novel surgical technique that can overcome this issue. During a surgical procedure for cystic tumors, autologous fibrin glue is to be injected into the tumor cysts, which solidifies the cyst lumens and cyst walls en bloc with reducing the tumor size. As a result, tumor masses and cyst walls can be removed completely in an en bloc fashion in all cases. Copyright:

Methods: The illustrative case presented in this report is a patient with metastatic brain tumors in the frontal lobe. When we reached the tumor wall surgically, we first suctioned out the cyst content and subsequently injected autologous fibrin glue into the cyst lumen. The autologous fibrin glue solidified the tumor en bloc, and we resected the tumor mass and the cyst walls in an en bloc fashion.

Results: We have applied this technique to four cases with cyst-type metastatic brain tumors. This approach made it possible to perform ideal en bloc resection in all cases. There were no adverse events due to the autologous fibrin glue.

Conclusion: We developed a novel surgical technique to solidify cyst-type metastatic brain tumors using autologous fibrin glue, which allows en bloc resection of tumor masses and cyst walls quite safely using inexpensive materials. Given these advantages, it appears a promising surgical strategy for cyst-type metastatic brain tumors.

Complex reconstructive surgery following removal of extra-intracranial meningiomas, including the use of autologous fibrin glue and a pedicled muscle flap.

Authors: Giugno A., Maugeri R., D'Arpa S., Visocchi M., Iacopino D.G.

Publication Date: 2014

Abstract:

Background: Skull reconstructive surgery is critical to prevent cerebrospinal fluid (CSF) fistulas and infections, and to ensure good aesthetic results in meningiomas surgery.

Methods: A 65-year-old woman was surgically treated for a bilateral parasagittal meningioma with complete superior sagittal sinus (SSS) involvement, and an intra-extracranial extension, determining a significant cranial defect at the vertex. A Simpson I resection was achieved. Postoperatively a considerable and not conservatively repairable CSF leak was detected. Surgical revision of the wound with repair of the fistula and complex reconstructive operation was performed including a combination of techniques and devices such as autologous fibrin glue and reparation of the extracranial planes by an autologous vascularized vastus lateralis pedicled muscle flap.

Results: No postoperative complications, infections or new neurological deficits were detected, and the CSF leak definitively ceased after surgery; the aesthetic results were satisfactory.

Conclusions: Reparation of CSF fistulas that arise after meningioma surgery can require a complex reconstructive surgery of the superficial layers; when cranioplasty is not feasible or indicated, a meticulous reconstruction of the extracranial soft tissues is possible also by using vascularized autologous distal muscular tissue, with close interdisciplinary cooperation.

Effectiveness of an absorbable fibrin sealant patch to reduce lymphoceles formation after axillary lymphadenectomy for breast cancer: A matched-pair analysis.

Authors: Navarro-Rodriguez E., Gomez-Luque I., Diaz-Jimenez N., Rioja-Torres P., Bascunana-Estudillo G., Ruiz-Rabelo J.F., Ciria-Bru R., Alvarez-Benito M., Rufian-Pena S., Briceno-Delgado J.

Publication Date: 2014

Abstract:

Background This study evaluated the use of TachoSil as an adjunctive therapy for reducing axillary lymphocele formation.

Methods Eighty-six patients diagnosed with breast cancer N+ and treated with axillary lymphadenectomy received a TachoSil patch in the axillary wound. Using a database of patients without placing a hemostatic patch, we applied a matched case-control in a 1-to-2 fashion. Multiple and logistic regression analyses were used to evaluate postoperative results.

Results Patient group with TachoSil showed a significantly lower drainage volume (P <.001) and the length of stay was significantly shorter (P <.001). The number of patients with evacuative punctures was 24.5% in the group with patch versus 51.2% in the control group (P <.001). In multivariate analysis, the use of TachoSil was a significant predictor of reducing axillary drainage volume (P <.001), mean length of hospital stay (P =.001), and number of evacuative punctures of lymphocele (odds ratio.264, 95% confidence interval.144 to.484, P <.001).

Conclusion The use of TachoSil in axillary lymphadenectomy may be a safe and useful treatment option for reducing axillary drainage volume, incidence of symptomatic lymphocele, and hospital stay.

Clinical experience using a combination of PGA sheet and spraying of fibrin glue to cover partial resection of buccal mucosa carcinoma.

Authors: Sato Y., Sato S., Hada S., Nakajima J., Yokoe H., Nozawa H., Yoshikawa S., Shoji I., Kinoda J.

Publication Date: 2014

Abstract:

Introduction: In the cases of partial resection of soft tissue of oral cancer such as buccal mucosa cancer etc. reduced suture, free skin grafting, DP flap and forearm flap have been mainly selected for reconstruction considering the postoperative quolity of life(QOL). Currently a combination of polyglycolic acid sheet (PGA) and spraying of fibrin glue is tried to use for repair after resection of oral tumors. We report a case in which this method was used to cover part of the cut surface after resection of buccal mucosa carcinoma. Subject and Methods: A 59-year-old man was admitted to our department with a chief complaint of tumor in the left buccal mucosa in 2013. A 16x10 mm tumor with ulcer was found in the region. The clinical diagnosis was buccal mucosa carcinoma and the lesion was excised under general anesthesia. A combination of PGA sheet and spraying of fibrin glue was used to cover the cut surface after resection of buccal mucosa lesion. Baccul fat was exposed at the cut surface and PGA sheet was placed on the buccal fat. Histopathologic diagnosis was squamous cell carcinoma of buccal mucosa.The prognosis is good after operation until now. Results: Postoperative wound contraction of the scar is slight and the wound is covered with normal mucosa using a combination of PGA sheet and spraying of fibrin glue. Discussion: Technique of using a combination of PGA sheet and spraying of fibrin glue was as follow. We used a fibrin glue(The Bolheal,Teijin, Osaka, Japan) composed of fluid A, a fibrinogen preparation, and fluid B, a thrombin preparation. The two atomized fluids of fibrinogen preparation and thrombin preparation adhere firmly to the wound equally fast. The composition, when mixed at the site, undergoes instant

fibrinogenesis with immediate tissue adhesion. The PGA sheet we used was NeoveilR(Gunze, Kyoto, Japan). The progress of the patient is good and there were no adverse events or side effects of this method. Conclusions: This method of a combination of PGA sheet and spraying of fibrin glue is considered to be useful for maintaining QOL of the patients after partial resection of baccul mucosa depending on the extent of tumor resection without using another reconstruction methods.

Prevention of subcutaneous seroma formation in open ventral hernia repair by using a new lowthrombin fibrin sealant.

Authors: Kohler G., Koch O., Emmanuel K.

Publication Date: 2014

Abstract:

Background: Seroma formation is a frequent postoperative complication following open ventral hernia repair (OVHR), especially in cases requiring wide subcutaneous dissection (WSD). The aim of this study was to evaluate the effectiveness of a new low- thrombin fibrin sealant for seroma prevention. Methods: Twenty consecutive patients with median incisional hernias who required OVHR with WSD > 100 cm² were included in the study. Ten patients comprised the fibrin glue group (FG) and received either a sublay mesh or an open intraperitoneal onlay mesh (IPOM) repair with ventral fascial closure, as well as a subcutaneous application of low- thrombin fibrin sealant. This cohort of patients was compared to a control group (CG) of 10 consecutive patients undergoing previously OVHR without prevention of seroma formation with regard to outcome measures such as seroma formations, wound complications, seroma aspirations or unplanned re-operations, and length of hospital stay. Results: Though the median extent of subcutaneous dead space was larger in the FG than in the CG (266 vs. 174 cm²; p = 0.012) seroma formation occurred in none of the FG vs. 4 of the CG patients (p = 0.003). Postoperative complications occurred in 1of the FG vs. 4 of the CG patients (p = 0.05). Three patients of the CG and none of the FG required a re-operation within 30 days (p < 0.001). Conclusions: The use of a new low- thrombin fibrin glue demonstrated a protective effect against formation of seromas and decreased the rate of wound complications in OVHR.

Fibrin sealant to reduce lymphatic drainage after axillary dissection.

Authors: Olsha O., Hadar T., Noy V., Verocherinsky N., Abu Dalo R., Ashkenazi I.

Publication Date: 2014

Abstract:

Background: After axillary dissection drains are left in place 5 to 10 days until 24 hour drainage decreases to less than 50 ml/day in most centers. Use of harmonic scalpel (Harmonic Focus, Ethicon Endo-Surgery, Cincinnati, OH) and electrothermal bipolar vessel sealing (Ligasure, Covidien, Dublin, Ireland) have shown promise in reducing axillary drainage when compared with unipolar diathermy, but are expensive. TachoSil (Nycomed, Linz, Austria) is a fibrin sealant that is used to control surgical hemorrhage in a variety of tissues. There is evidence that it reduces axillary drainage after axillary dissection, and it is less expensive by 30-40% than instruments for vessel sealing. Fibrin sealant as standard treatment in axillary dissection and we documented the duration of drainage and incidence of adverse effects. Methods: The use of fibrin sealant in patients having axillary dissection was prospectively documented. A fibrin sealant patch 9.5 cmx4.8 cm in size was placed over the axillary vein to cover the vein and the space between pectoralis minor and the chest wall medially, and the area over the entrance of the axillary vein laterally. Axillary drains were removed when drainage was less than 50 ml/24 hours or if there was leakage around the drain sufficient to stain the patient's clothing. Results: 23 consecutive patients undergoing axillary dissection who had fibrin sealant were included in this study. 7 had neoadjuvant chemotherapy. One patient had sentinel node biopsy before axillary dissection and the rest had known lymph node metastases. One patient had axillary dissection without breast surgery for axillary recurrence a year after mastectomy and negative sentinel node biopsy. 12 patients had a simultaneous mastectomy. One patient had axillary dissection for axillary recurrence a year after mastectomy and negative sentinel node biopsy. All 12 patients with concurrent mastectomy and 7 other patients with

oncoplastic resections had an additional breast drain. The mean number of lymph nodes removed was 25 (median 23, range 10-59). The mean number of metastatic lymph nodes was 6 (median 3, range 0-59). Axillary drains were removed at a median of 4 days (mean 5.0, range 1-14). 15 (65%) of the axillary drains were removed on or before the 4th postoperative day (Table). Complications were axillary seroma that did not require drainage (1), axillary cellulitis that resolved with oral antibiotics (2), fever without an identifiable source (1), breast flap seroma (2), infection under breast flaps requiring open drainage (2). Conclusion: The use of fibrin sealant limited the number of days of axillary drainage compared with that quoted in the literature and may be an easy, useful and less expensive alternative to vessel sealing instruments. (Table Presented).

Polyglycolic acid sheets with fibrin glue (MCFP technique) for resection of oral mucosa.

Authors: Yonezawa H., Yanamoto S., Kawasaki G., Umeda M.

Publication Date: 2012

Abstract:

Not Available

Biochemical substantiation for combined use of polymer fibrin with antimicrobial, immunoactive, and antitumor preparations. [Ukrainian]

Authors: Veremeenko K.N., Kizim A.Y., Zinchenko D.A., Nosenko O.A.

Publication Date: 1999

Abstract:

The authors have studied the effect of claforan, dioxidine, lapheron, and cyclophosphan on functional activity of protein components fibrin glue 'Bioadgesive' - fibrinogen and trombin. It was shown that fibrinogen and trombin maintained their activity in the presence of therapeutic doses of dioxidine, lapheron, and cyclophosphan. These data provide a substantiation for using Bioadhesive in complex with mentioned anti-microbial, immunoactive and antitumor preparations, that allows for prolonging their therapeutic effect, promoting the wound healing, decreasing the risk of relapsing the malignant neoplasms in the patients with ENT- organs cancer.

The use of fibrin glue to prevent seroma formation following sentinel node biopsy [3] (multiple letters).

Authors: Falworth M.S., Butler P.M., Powell B.W.E.M., Silverman R.P., Elisseeff J., Passaretti D., Randolph M.A., Yaremchuk M.J.

Publication Date: 1999

Abstract:

Not Available

Comparison of topical fibrin glue, fibrinogen, and thrombin in preventing seroma formation in a rat model.

Authors: Lindsey W.H., Becker D.G., Hoare J.R., Cantrell R.W., Morgan R.F.

Publication Date: 1995

Abstract:

Fibrin glue has been shown to decrease seroma formation in animal models. To further delineate this mechanism, the efficacy of fibrin glue was compared to topical fibrinogen and thrombin in preventing postoperative seromas. A model consistently producing seromas was developed by bilateral neck dissection, lymphadenectomy, and submandibular sialoadenectomy in the Sprague-Dawley rat. Groups of 20 rats underwent this procedure and were blindly treated with either fibrin glue, fibrinogen, thrombin, or saline control. Necropsy on postoperative day 5 revealed a statistically significant (chi-squared) decrease in seroma incidence using fibrin glue (0%) and fibrinogen (15%), while thrombin (95%) and saline (100%) were ineffective in preventing seromas. The use of fibrin glue and fibrinogen in this role merits further investigation.

Human fibrin sealant in pancreatic surgery: Is it useful in preventing fistulas? A prospective randomized study.

Authors: D'Andrea A.A., Costantino V., Sperti C., Pedrazzoli S.

Publication Date: 1994

Abstract:

Some authors have suggested the use of human fibrin sealants in pancreatic surgery to prevent fistulas. We performed a prospective randomized study including 97 patients (34 F, 63 M). Forty six were affected by pancreatic inflammatory diseases and 51 had pancreatic or peripancreatic neoplasms. All the patients were managed by the same surgical staff. Surgical treatment included 30 pancreaticoduodenectomies, 40 pancreatico-jejunostomies, 23 left pancreatic resections and 4 tumour excisions. The patients were randomized at the moment the surgical treatment was chosen and divided into 2 different groups: group A, including 43 subjects who had intraoperative fibrin sealing, and group R, including 54 patients who had no fibrin sealing during surgery. At the end of the trial, 6 patients in group A (13.9%) and 6 in group B (11.1%) developed a pancreatic fistula. No statistically significant difference was detected between the 2 groups. The highest incidence of fistulas was observed in the patients with pancreatic cancer in group A (18.7%) and in the patients who underwent pancreatico-duodenectomy in group A (25.0%).

Assessment of cryoprecipitate-thrombin solution for dural repair.

Authors: Wiegand D.A., Hartel M.I., Quander T., Latz B., Dankle J.A.

Publication Date: 1994

Abstract:

Background. After resection of cranial and skull base tumors, fibrin- thrombin solutions can provide a temporary biologic seal of dural closures until final healing occurs. We investigated several variables affecting the strength of these 'tissue glues' for repair of dural defects using in vitro methods to model clinical repairs. Methods. The competence of human cryoprecipitate-thrombin (CPT) 'tissue glues' in providing a watertight seal for patched rat fascia and human cadaveric dural defects was assessed. A saline column was fabricated to allow for controlled pressure (up to 700 mm) to be applied over an open aperature containing the repaired defect. Variables of repair included time after repair, defect size, and mixing temperature. Results. Wide variations in the strength of different cryoprecipitate glues were found. Time allowed after repair did not significantly affect the repair strength. Cooling the components of the glue solution prior to mixing significantly increased repair strength. Similar results were found for different defect sizes. Conclusions. Under controlled in vitro conditions, integrity of fibrin glue repairs varied widely. This was not attributable to differences in solution fibrinogen concentration. Cooling the 'tissue glue' components prior to mixing significantly increased repair strength of patched tissue defects.

Prospective study of using fibrin glue to prevent leak from esophagogastric anastomosis.

Authors: Hsu H.-K., Hsu W.-H., Huang M.-H.

Publication Date: 1992

Abstract:

Not Available

Pancreatic duct occlusion with fibrin sealant and pylorus preserving technique after duodenocephalopancreasectomy for periampullary carcinoma. [Italian]

Authors: Cavallini M., Tallerini A., Stipa F.

Publication Date: 1991

Abstract:

Dehiscence of pancreaticojejunostomy represent the main technical postoperative complication after duodenocephalopancreasectomy for periampullary carcinoma. The incidence of this complication is particularly high in cases of narrow duct and a tender pancreatic gland. In this case the authors suggest a technique of occlusion of the residual pancreatic stump using a fibrin sealant. This approach was utilized in 6 consecutive patients affected by resectable periampullary carcinoma. No postoperative mortality was observed. Pancreatic fistula developed in 5 cases and all of them resolved spontaneously in 1-4 months. The sixth patient underwent, at 3 months p-o, a CT-guided percutaneous aspiration of an intraabdominal fluid collection and with no further complications. 3 patients died at 3, 9 and 11 months because of liver metastases. Currently 3 patients are alive and apparently disease free at 25, 7 and 5 months. Pancreatic endocrine function was assessed in 5 patients at 3 months p-o. Blood glucose and insulin, glucagon and C-peptide plasma levels, all fasting and 1 our after a standard meal, revealed a normal glucose metabolism. The authors conclude that, since fibrin sealant avoids the pancreatic fibrosis which could be induced by non-absorbable polymers and the benign evolution of this type of pancreatic fistula, this method for handling the exocrine secretion is a safe and satisfactory approach which is particularly indicated in case of a pancreatic stump at risk for intestinal anastomoses.

Use of fibrin components from autogenous blood in the surgical treatment of malignant neoformations of the larynx. [Russian]

Authors: Veremeenko K.N., Opanashchenko G.A., Kizim A.I.

Publication Date: 1989

Abstract:

This paper describes the use of fibrin compositions derived from autogenous blood, contrykal, a fibrinolysis inhibitor, and thrombin combined with calcium chloride for fortifying sutures applied in the laryngoesophageal defect area at the final stage of laryngectomy.

Fibrin glue for the treatment of persistent lymphatic drainage.

Authors: Giberson W.G., McCarthy P.M., Kaufman B.H.

Publication Date: 1988

Abstract:

A 7-year-old girl underwent resection of an abdominal wall lymphangiomatous tumor. Postoperative serous drainage, up to 300 mL per day, developed despite application of external pressure to the wound. Thirty-three days after the initial procedure, fibrin glue was applied to the draining tract. Concentrated fibrinogen was prepared from one unit of blood donated by the patient's mother. Ten milliliters fibrinogen and 10 mL thrombin (1,000 U/mL) were injected simultaneously through the wound drain as it was slowly removed, and pressure was reapplied for 48 hours. No further drainage occurred, and at 2- and 14-week follow-up examinations the wound had healed normally without reaccumulation of fluid. Fibrin glue successfully sealed this persistently draining abdominal wall tract. It is a painless, safe, and effective biologic sealant, and when prepared from homologous plasma it carries a low risk of virus transmission.

Sealing of gastrointestinal anastomoses with fibrin glue coated collagen patch.

Authors: Nordentoft T

Publication Date: 2015

Abstract:

BACKGROUND: Colorectal cancer (CRC) is the most common cancer of the gastrointestinal tract. In Denmark is CRC the 3. most frequent form of cancer and the 3. leading cause of cancer-related death. Anastomoses: Surgical resection is the only curative treatment of CRC and in Denmark about 85% of patients with CRC are therefore operated. An anastomosis will be established in most cases. Colorectal anastomoses are established in the treatment of benign diseases too, i.e. as part of the surgical treatment of inflammatory bowel disease and in acute surgery. Furthermore anastomoses are conducted in other parts of the gastrointestinal tract i.e. esophagus, stomach, small bowel and bile system. Anastomotic leakage (AL): AL is the most serious complication of gastrointestinal surgery with a 30-day mortality of 13-27%. The reported AL rate ranges from 1 to 39%. In addition to immediate clinical consequences AL is an independent predictor of reduced general and cancer-specific survival. Leakage can manifest as generalized peritonitis, requiring acute resurgery or as a more localized accumulation/abscess or as a subclinical leakage. Sealing of anastomoses: Numerous studies on anastomotic sealing have been conducted with the aim of reducing the number of AL's. The results of these are conflicting and predominantly disappointing. The drug Tacho-Sil (TS) consists of a collagen patch, which on the one side is coated with fibrin glue (FG), which gives it an adhesive property. TS is registered for use in surgical hemostasis. Animal models: Spontaneous AL in animals is infrequent. It is therefore necessary to use a model of AL. No such model exists and must be developed.

OBJECTIVE: To clarify if the sealing of anastomoses with TS is feasible and safe in an experimental design. To develop a standardized model of AL in pigs. To clarify if sealing of colon-anastomoses with TS can reduce the number of clinical ALs in an experimental design. To clarify whether there is evidence that FG influences healing of gastrointestinal anastomosis.

STUDIES: Safety study, that examines whether it is safe to seal anastomoses with a TS. Experimental study on pigs. Two anastomoses on each pig, one sealed with TS. After 1-6 weeks of observation the anastomosis were examined for AL, stenoses, strength and compared microscopic.

RESULTS: No difference between sealed and unsealed anastomosis. This study is completed and published. Model study, to develop model of AL on pigs. A total of 22 pigs had an anastomosis of colon. All anastomoses were left with a standardized defect on 5-21 mm. The pigs were observed in order to assess how big the defect should be before the pigs developed visible leakage and/or fecal peritonitis.

RESULTS: Model developed. 21 mm defect significant. This study is completed and published. Efficacy study, testing if TachoSil can seal an AL and thus prevent that this becomes clinically significant. A total of 20 pigs had a colon-anastomoses with a standardized defect of 21 mm. The pigs were randomized to sealing with TS or no sealing. Re-laparotomy after 7 days examining for visible leakage and/or fecal peritonitis.

RESULTS: TachoSil able to seal the defect ($p=0.0055$). This study is completed and published. Systematic review, with the purpose to study whether there is evidence that FG influence the healing of gastrointestinal anastomosis.

RESULTS: Conflicting. FG does not seem to have an effect. This study completed and published.

CONCLUSIONS: Sealing of GI-anastomosis with TachoSil is safe and feasible. A defect of at least 21mm must be left in colon anastomosis to induce clinical peritonitis. Sealing of defect colon-anastomosis in pigs with TachoSil can prevent clinical leakage and peritonitis. FG has no positive effect on microscopically healing of GI-anastomosis.

Response to the article by Rodriguez et al: "effectiveness of an absorbable fibrin sealant patch to reduce lymphoceles formation after axillary lymphadenectomy for breast cancer: a matched-pair analysis." Am J Surg 2014.

Authors: Barranger E, Bricou A

Publication Date: 2015

Abstract:

Not Available

Collagen sealant patch to reduce lymphatic drainage after lymph node dissection.

Authors: Di Monta G, Caraco C, Crispo A, Marone U, Mozzillo N

Publication Date: 2012

Abstract:

BACKGROUND: Seroma formation is a frequent complication following radical lymph node dissection (RLND) in patients with metastatic melanoma. Several strategies have been used to prevent fluid accumulation and thereby reduce the duration of postoperative drainage, including fibrin sealants.

METHODS: This was a prospective, single-center study in which consecutive patients undergoing surgical treatment of stage III metastatic melanoma by axillary or ilio-inguinal RLND were randomized to receive standard treatment plus fibrinogen/thrombin-coated collagen sealant patch (CSP) or standard treatment alone. The primary endpoint of the study was postoperative duration of drainage.

RESULTS: A total of 70 patients underwent axillary (n = 47) or ilio-inguinal (n = 23) RLND and received CSP plus standard treatment (n = 37) or standard treatment alone (n = 33). Mean duration of drainage was significantly reduced in the CSP group compared with standard treatment (ITT analysis: 20.1 +/- 5.1 versus 23.3 +/- 5.1 days; p = 0.010). The percentage of patients drainage-free on day 21 was significantly higher in the CSP group compared with the standard treatment group (86% versus 67%; p = 0.049).

CONCLUSIONS: Use of the tissue sealant resulted in a significant reduction in duration of drainage.

Further studies are warranted to confirm these results in different and selected types of lymphadenectomy.

Life-threatening pleural hemorrhage following intrapleural enzyme therapy and successful treatment with fibrin-thrombin sealant pleurodesis: A case report.

Authors: Vun S.V., Lance D.G.

Publication Date: 2015

Abstract:

Introduction: Intrapleural fibrinolytic enzyme therapy is a potentially surgery-sparing treatment for poorly resolving parapneumonic effusion and empyema. It is safe in the majority of patients, however the most significant risk associated with this treatment is severe bleeding secondary to pleural hemorrhage. Contraindications for intrapleural enzyme therapy are not widely agreed upon and little is known about how to treat this difficult and potentially lethal hemorrhagic complication. Case presentation: An independent 82-year-old Caucasian man presented to hospital with an empyema complicating community-acquired pneumonia and coincidental pulmonary embolus. He was initially commenced on intravenous antibiotics, pleural drainage and anticoagulation, however failed to improve significantly and was commenced on intrapleural fibrinolytic enzyme therapy. Shortly after, he suffered severe pleural hemorrhage that was uncontrollable despite emergency thoracotomy and washout. Subsequent hemostasis was achieved after re-exploration and application of topical fibrin-thrombin sealant spray. The patient survived and was discharged home. Conclusions: Intrapleural enzyme therapy can be effective in loculated parapneumonic effusion and empyema, but massive pleural hemorrhage can complicate its use. Pleural hemorrhage appears to be associated with anticoagulation or coagulopathy, and can be difficult to manage. This case adds to the body of data on bleeding complications following intrapleural enzyme therapy, and to the best of our knowledge is the first report of fibrin-thrombin sealant use in this setting.

Laboratory indicators of the efficiency of fibrin glue in laparoscopic surgery.

Authors: Stanojkovic Z., Antic A., Stanojkovic M., Jelic M., Dencic S., Sokolovic D.

Publication Date: 2014

Abstract:

BACKGROUND: Fibrin glue (FG) is a blood-derived tissue adhesive that mimics the natural coagulation process. It consists of two basic components - fibrinogen and thrombin, where activation of fibrinogen and its transformation into fibrin under the action of thrombin is the third phase of blood coagulation. FG is used to promote wound healing, skin grafting, to provide hemostasis in microvascular surgery and parenchymal injury and to serve as a matrix for repair of bone defects. The aim of this study was to analyze laboratory indicators of the metabolic response to surgical trauma, when applying different means of hemostasis during laparoscopic cholecystectomy. METHODS: The study included a total of 40 experimental pigs in which was performed laparoscopic cholecystectomy and intraoperative artificially damage of gallbladder boxes, which was repaired using FG in animals of experimental group (EG) or using standard means in animals of the control group (CG). FG was homemade, prepared from two components, of which the first was prepared from the cryoprecipitate with the addition of antifibrinolytic agents (aprotinin). The second component was a commercial bovine thrombin with calcium chloride. During 30 days of follow-up we have taken blood samples for following biochemical tests: general laboratory tests (glucose, bilirubin, cholesterol, triglycerides), enzyme markers of hepato-biliary damage (AST, ALT, AP, GGT), parameters of synthetic liver function (total protein and albumin), electrolytes (Na, K). RESULTS: There is a statistically significant higher levels of AST and ALT in CG ($p<0,05$), while the level of GGT and AP is less in EG from the fifth to thirtieth day, but without statistical significance. The elevated values of AST and ALT in EG faster return to normal (day 5th in EG vs day 14th in

CG). Postoperative concentration of Na+ does not show a statistical difference between groups, while the concentration of K+ in CG is high statistical decreased until the 14th day (3,725+/-0,386 in CG vs 5,025+/-1,237 in EG, p<0,0001). CONCLUSIONS: Application of FG provides less parenchyma destruction and faster liver recovery and thus can be used as efficient hemostatic agent in laparoscopic surgery.

Evaluation of using fibrin tissue adhesive (Beriplast) and preparations of thrombin and adrenalin in injection hemostasis methods for gastric and duodenal ulcer hemorrhage. Randomized, prospective clinical trial. [Polish]

Authors: Babicki A., Dobosz M., Marczewski R., Wajda Z.

Publication Date: 1997

Abstract:

A prospective randomized trial involving 30 patients was performed to assess whether second-look endoscopy could improve the efficacy of injection therapy for bleeding peptic ulcers. The inclusion criteria were the presence of active arterial bleeding or a non-bleeding visible vessel at emergency endoscopy. All the patients received emergency injection of thrombin with adrenaline solution and were subsequently randomized (15 patients in each group). All the patients receive a second elective endoscopy within the first 24 hours with repeated injection of thrombin-adrenaline solution (Group I) or fibrin sealant-Beriplast-(Group II). A tendency towards better results was noted in the Group II. Recurrent bleeding was observed in 6.6% versus 26.6% patients in Group I. The need for emergency surgery occurred in (6.6% in Group I versus 0 in Group II) and length of hospital stay was (13.2 in Group I versus 7.4 in Group II [$p < 0.05$]). No mortality was observed in both of the groups. In conclusion, our data suggest the possibility of a small benefit with second-look endoscopy with repeated injection of fibrin sealant.

Fibrin sealant: A review of its use in surgery and endoscopy.

Authors: Dunn C.J., Goa K.L.

Publication Date: 1999

Abstract:

Fibrin sealant (fibrin adhesive; fibrin glue; Beriplast P) is a haemostatic and wound support product consisting of the blood coagulation factors fibrinogen, factor XIII and thrombin, the antifibrinolytic agent aprotinin and calcium chloride. Fibrin sealant has been used to good effect in a wide variety of surgical and endoscopic procedures. Suture support was provided in series of patients with oesophageal, gastric, colonic or rectal anastomoses, and fibrin sealant was as effective in haemostasis as microcrystalline collagen powder in hepatic surgery. It did not reduce postoperative peritoneal drainage after elective cholecystectomy, however. A 41% reduction ($p < 0.02$) in incidence of air leakage was achieved when fibrin sealant was added to sutures in patients undergoing pulmonary resection in a randomised single-blind study. A high rate of complete remission of malignant pleural effusion has been reported after intrapleural instillation of fibrin sealant, and successful sealing of CSF leaks after trauma or surgery has also been achieved. Attenuation of prolonged or excessive haemorrhage after dental extraction has been achieved in patients on anticoagulant therapy or with haemorrhagic disorders who received fibrin sealant with packing and suturing. Repeated endoscopic injection of fibrin sealant was superior to single injection sclerotherapy with polidocanol 1% in a randomised study in 805 patients with bleeding peptic ulcers. Other data suggest that endoscopic injection of fibrin sealant is associated with lower recurrence of bleeding and need for emergency surgery than thrombin with adrenaline (epinephrine) or hypertonic saline with adrenaline. Similar haemostatic efficacy to laser photocoagulation or sclerotherapy was reported in a retrospective comparison. A statistically significant reduction relative to suturing in the incidence of wound dehiscence was reported after the use of fibrin sealant in cataract surgery, and

benefit of the sealant has also been noted in patients receiving skin grafts and in those undergoing transurethral resection of the prostate gland. Conclusions: Although comparative studies would assist in the clarification of the place of the product discussed with respect to other haemostatic or wound support techniques and to other fibrin sealants, the formulation reviewed here has been shown overall to be effective and well tolerated in a variety of haemostatic and wound healing support roles in numerous types of surgery. Fibrin sealant has also been shown to be useful when administered endoscopically, with superiority over sclerotherapy being shown after repeated application in patients with peptic ulceration. Fibrin sealant can therefore be considered useful in a number of surgical and endoscopic settings.

The future of surgical tissue adhesives.

Authors: Spotnitz W.D.

Publication Date: 1998

Abstract:

This guest editorial commentary outlines both the background and probable future developments of surgical tissue adhesive use in the United States and highlights the contributions made by the authors of this issue of the Journal of Long-Term Effects of Medical Implants. In addition, several issues specifically relevant to fibrin tissue adhesives in the United States are addressed. These include commercially available fibrin sealants and blood bank-produced products, as well as the proper nomenclature for such materials.