Anticoagulation

Closure of guide wire-induced coronary artery perforation with a two-component fibrin glue.

Authors: Storger H., Ruef J.

Publication Date: 2007

Abstract:

Perforation or rupture of a coronary artery with subsequent pericardial effusion and cardiac tamponade is a potentially life-threatening complication of percutaneous coronary intervention (PCI). Several emergency treatment strategies exist to close the perforation including reversal of anticoagulation, prolonged balloon inflation, implantation of stent grafts, local injection of thrombogenic molecules, placement of microcoils, or open heart surgery. Here we report on a 66-year-old patient who underwent urgent PCI for acute stent thrombosis in the proximal LAD. The artery was reopened, a new stent implanted successfully, and a GPIIb/IIIa-antagonist was given. Shortly thereafter the patient suffered from cardiac tamponade requiring pericardiocentesis and pericardial drainage. The coronary angiogram indicated a severe guide wire-induced perforation and pericardial effusion originating from a distal diagonal branch segment. Prolonged balloon inflation did not stop the leakage. Therefore the monorail balloon was exchanged for an over-the-wire balloon. A two-component commercial fibrin glue consisting of fibrinogen and thrombin was rapidly but separately injected through the wire channel of the balloon into the distal segment of the diagonal branch. The coronary leak was successfully closed and the patient recovered quickly. In comparison with the previously reported cases of thrombin injection important differences should be noticed: (1) a two-component hemostatic seal was used without reversal of anticoagulation, (2) rapid injection instead of prolonged infusion of the hemostatic drugs was performed, and (3) the rescue technique was applied in a cath lab that routinely uses monorail catheter systems. Therefore we consider this a novel and effective approach for closure of coronary ruptures.

Inc.

Patient-derived fibrin sealant: Clinical, preclinical, and biophysical aspects.

Authors: Kjoergard H.K.

Publication Date: 2003

Abstract:

Today, there is an enormous interest in surgical sealant, not only for hemostasis, but also for binding of tissues together during surgery, and to improve wound healing. Man has imitated nature in developing fibrin sealant that is biodegradable. However, the risk of transmission of both known and unknown infectious agents can generally not be ruled out completely for plasma products from donors. In addition there is a considerable immunologic risk of using biological products of animal origin. Preclinical and clinical data has demonstrated that a safe and useable surgical fibrin sealant can be prepared from the patient's own blood using the enzyme batroxobin. Experimental data showed that patient-derived fibrin sealant provided enhanced instant adhesion strength and elasticity compared with conventional fibrin sealant due to its faster polymerisation rate. Test methods for fibrin sealant were found to be inaccurate, and we constructed and validated a new computer assisted test method to get information about elasticity and other dynamic properties of biological sealant. The method is highly reproducible and is the first validated using vital human tissue as the adhesion substrate. It takes about one half hour to prepared patient-derived fibrin sealant, which may turn a good operation into a perfect operation without any known risk.

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.

Tranexamic Acid Mouthwash Versus Autologous Fibrin Glue in Patients Taking Warfarin Undergoing Dental Extractions: A Randomized Prospective Clinical Study.

Authors: Carter G., Goss A., Lloyd J., Tocchetti R.

Publication Date: 2003

Abstract:

Purpose: The aim of this prospective study was to compare the effectiveness of a 4.8% tranexamic acid mouthwash versus an autologous fibrin glue preparation to control hemostasis in patients therapeutically anticoagulated with warfarin who required dental extractions without interruption of their treatment. Patients and Methods: The 49 patients who underwent 152 dental extractions were randomly allocated to 2 groups: Group A were required to rinse with 10 mL of a 4.8% tranexamic acid solution 4 times a day for 7 days postoperatively. Group B received autologous fibrin glue intraoperatively. The international normalized ratio was measured on the day of the procedure. All procedures were performed on an ambulatory basis by the same surgeon. Results: Of the 49 patients, 2 presented with postoperative bleeding (4%). Both patients were from the autologous fibrin glue group and were found to have grossly elevated international normalized ratios on the day of the bleeding that was unaccounted for. Conclusions: This study supports the consensus that dental extractions can be performed without modification of oral anticoagulant treatment. Local hemostasis with an absorbable oxidized cellulose mesh, tranexamic acid, and sutures is the more cost efficient of the 2 methods compared; however, autologous fibrin glue has an important role in patients unable to use a mouthwash effectively.

Comparative study of the efficacy of the common topical hemostatic agents with fibrin sealant in a rabbit aortic anastomosis model.

Authors: Kheirabadi B.S., Field-Ridley A., Pearson R., MacPhee M., Drohan W., Tuthill D.

Publication Date: 2002

Abstract:

Objective. The purpose of this study was to compare the hemostatic efficacy of the common surgical hemostatic agents with fibrin sealant (FS) and to assess their functional strength to secure hemostasis in lieu of placing additional sutures. Methods. End-to-end anastomosis of transected abdominal aorta was performed in moderately anticoagulated rabbits using 4 or 6 interrupted sutures. The suture line was covered either with gauze alone ("untreated") or with gauze plus Gelfoam, Avitene, Surgicel, FloSeal, or FS, following which blood flow was restored. Blood loss was absorbed by gauze and measured. The surviving rabbits were recovered and the repaired vessel was examined histologically 4 weeks after operation. The investigators were blinded to the treatment groups. Aortic anastomoses using 8 or 12 sutures (untreated) were also performed. Results. Untreated 4-suture anastomosis of aorta resulted in a profuse hemorrhage with an average 108.0 +/- 19.2 (mean +/- SD) ml blood loss and 100% mortality (n = 4). FS application sealed the anastomoses, prevented blood loss ($P < 0.01$ vs untreated) and exsanguination of the rabbits (n = 4). Other hemostatic agents reduced the bleeding to varying degrees compared to the untreated animals (Gelfoam 66.4 +/- 17.6, Avitene 80.6 +/- 34, Surgicel 66.7 +/- 16.7, FloSeal 44.2 +/- 8.5 ml blood loss, n = 4/group), but the changes were not statistically significant. One to three rabbits in each group survived the operation. Six-suture aortic anastomoses, untreated, resulted in 67.7 +/- 21.8 ml blood loss and 100% survival (n = 6). Application of FS produced immediate and sustained hemostasis in all the animals ($P < 0.01$ vs untreated). Other hemostatic agents also reduced the bleeding (Gelfoam 42.5 +/- 10, Avitene 50.9 +/- 12.4, Surgicel 32.1 +/- 14, FloSeal 33.9 +/- 5.4 ml

blood loss, n = 6/group), but the changes were not statistically significant. The 8- and 12-suture aorta repairs resulted in a moderate blood loss (43.9 +/- 19 and 21.3 +/- 14.9 ml, respectively), followed by a stable hemostasis that precluded the need to use any hemostatic agent. The aortic cross-clamping time of the 12-suture and time to hemostasis for both the 8- and the 12-suture techniques were significantly longer than those of the 4-suture plus FS application ($P < 0.01$, $P < 0.01$ and $P < 0.05$, respectively). Conclusion. In a moderate coagulopathy, FS was proven to be the most efficacious hemostatic agent, producing immediate and sustained hemostasis at the arterial anastomotic site. This high efficacy is in part attributed to the strong tissue adhesive property of this agent. FS application may potentially ease the anastomosis and shorten the duration of timely critical vascular procedures.

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.