

TachoSil[®] for postinfarction ventricular free wall rupture

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Abstract

Despite a decline in the last three decades, postinfarction ventricular free wall rupture still complicates more than 3% of acute ST-elevation myocardial infarctions and remains a surgical challenge. TachoSil[®] (Nycomed, Zurich, Switzerland) is an equine collagen patch coated with human fibrinogen and human thrombin, which has recently been used for haemostasis in cardiovascular surgery, but its potential usefulness in free wall rupture has not been reported. Initial clinical experience with an on-pump sutureless technique without cardioplegia, using wide TachoSil[®] patching to achieve free wall rupture repair, has been described.

Keywords: Acute coronary syndrome • Cardiovascular surgical procedures • Heart rupture • Postinfarction • Haemostasis • Haemostatic techniques • Myocardial infarction

INTRODUCTION

The incidence of ventricular free wall rupture (FWR) has declined in the last three decades, paralleled by an increasing use of reperfusion therapy. However, FWR still complicates more than 3% of acute ST-elevation myocardial infarctions (STEMI) [1]. Despite improved results with wide epicardial patching and sutureless techniques compared with conventional infarctectomy [2–4], FWR still remains a surgical challenge. TachoSil[®] (Nycomed, Zurich, Switzerland), an equine collagen patch coated with human fibrinogen and human thrombin, has also recently been used as a haemostatic agent in cardiovascular operations, including coronary perforation during percutaneous interventions [5, 6], but its use for FWR has not been previously reported. We describe our initial experience, using TachoSil[®] for FWR repair.

MATERIALS AND METHODS

After the institution of a central or peripheral cardiopulmonary bypass and venting of the right superior pulmonary vein, the FWR was identified. Several patches were then trimmed from the TachoSil[®] fleece and applied to widely cover the FWR and the adjacent infarcted tissues until haemostasis was secured on the assisted heart without cardioplegic arrest (Fig. 1). Thereafter, a generous pericardial patch (autologous in one case; bovine in two cases) was fixed as proximally as possible (up to the atrioventricular groove in the case of posterior FWR) with a few separate 4-0 or 5-0 stitches and trimmed distally to obtain the maximal adhesion to the epicardial surface covered by the TachoSil[®] fleece. Fibrin glue was injected to seal the two layers before weaning from the cardiopulmonary bypass.

This technique was applied to three patients at our institution: two men and one woman (mean age, 71 years), and the STEMI was inferolateral in two cases and anteroseptal in one. The time interval from STEMI was 3.7 days. No patient had undergone primary coronary intervention because of delayed presentation after STEMI, and all patients were referred for surgery immediately after the diagnosis of FWR. Consequently, all operations were lifesaving emergencies, due to tamponade, with or without ischaemic shock. In one patient, femoral-femoral bypass was started during cardiopulmonary resuscitation. Aortic counterpulsation was initiated preoperatively in one patient and prior to weaning from cardiopulmonary bypass in all. The patient with extensive anteroseptal STEMI and ischaemic shock also received triple coronary bypass grafting. In one case, multiple bleeding sites were identified intraoperatively.

RESULTS

No patient died or required re-exploration for postoperative bleeding. Mean cardiopulmonary bypass time was 113 min. One patient with inferior STEMI underwent subsequent right coronary artery stenting, 1 month after FWR repair. No false aneurysm was observed during the follow-up.

DISCUSSION

Haemostasis may be challenging in cardiovascular surgery, which generally implies heparinization and cardiopulmonary bypass and, consequently, an impaired coagulation system. TachoSil[®] has been used safely and successfully in patients undergoing lung, kidney or liver resection, and, more recent-

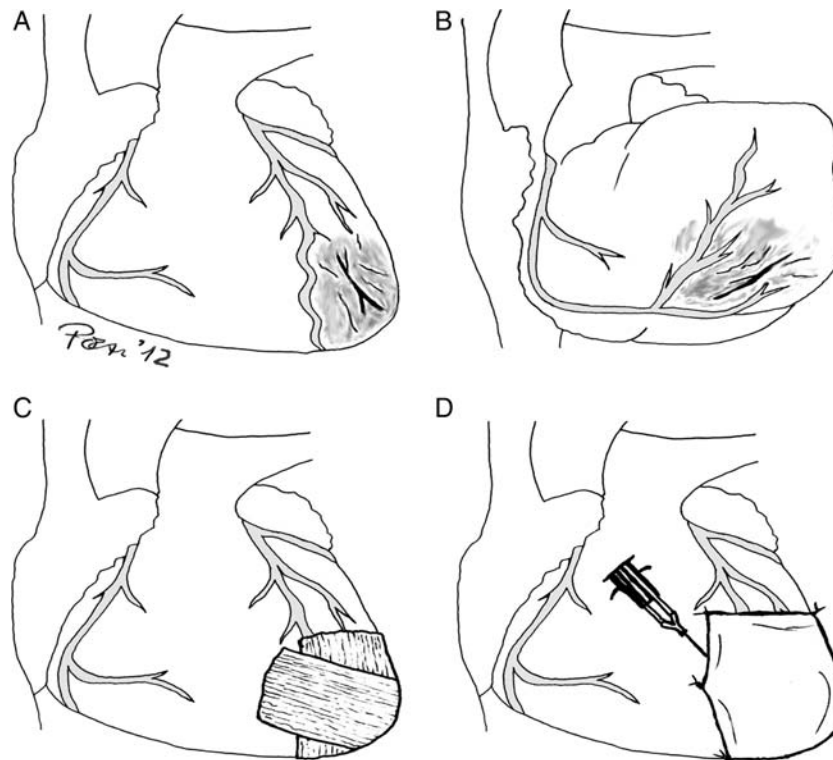


Figure 1: (A, B) Typical sites of FWR following anterior and inferoposterior myocardial infarction. (C) Ruptured infarcted area widely covered with the TachoSil® fleeces. (D) Pericardial patch secured with few separate stitches to healthy endocardium, and sealed with fibrin glue. In the case of inferoposterior rupture, the external patch is secured proximally to the atrioventricular groove.

ly, also in cardiovascular operations [5]. In isolated reports, it has also been applied to control high-pressure bleeding related to coronary perforation during percutaneous interventions [6]. However, no report exists regarding its use for FWR repair.

Our initial experience suggests that the haemostatic and sealing properties of TachoSil® may be crucial in successfully controlling bleeding in heparinized patients, without the necessity for a dry operative field. This always allowed FWR repair to be effectively carried out on the decompressed beating heart, avoiding the drawbacks of cardioplegia in the setting of complicated STEMI. Hypothetically, a less invasive approach through a left thoracotomy using transfemoral cardiopulmonary bypass might provide similar results, particularly in the case of anterior/apical FWR. Although active bleeding was always controlled after applying the fleeces, we preferred to further reinforce the repair with a second sutureless pericardial layer. This precaution did not complicate the repair or add any significant technical risks and may prevent further aneurysm formation. Finally, although we applied this technique only in oozing-type FWR, the properties of TachoSil® in the case of altered coagulation may equally be useful in reinforcing the surgical repair of blowout-type FWR [4]. This condition may require a tighter attachment of the pericardial layer with a continuous suture, which could further be fixed maintaining cardiac decompression with extracorporeal membrane oxygenation and minimal anticoagulation for 24 or 48 h.

In conclusion, this preliminary case study indicates that TachoSil® is a ready-to-use sealant which facilitates FWR repair in selected cases.

Conflict of interest: none declared.

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