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CASE REPORT

Late Sterile Abscess Formation in Carotid Endarterectomy Following Use of BioGlue: A Word of Caution

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Introduction: BioGlue (CryoLife Inc., Kennesaw, GA) is a commonly used surgical adhesive, designed to achieve haemostasis following large vessel cardiovascular operations.
Report: An 88-year-old female presents with an enlarging right sided neck mass 9 months after carotid endarterectomy with bovine pericardial patch repair which utilised BioGlue seal the patch suture line.
Conclusion: BioGlue should be used properly and with caution. In cases of late wound complication following BioGlue use, simple drainage, debridement, and removal of BioGlue remnants may be a satisfactory approach.
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INTRODUCTION

BioGlue (CryoLife Inc., Kennesaw, GA, USA) is a bovine serum albumin–glutaraldehyde tissue sealant used to reinforce suture lines during cardiovascular operations to achieve effective haemostasis. Safety concerns have been reported concerning wound healing complications, local tissue damage, nerve injury, and aseptic cyst formation.[1–5] A novel case of sterile abscess formation 9 months after carotid endarterectomy following the use of BioGlue is presented.

CASE REPORT

An 88 year old female underwent right carotid endarterectomy for a symptomatic right internal carotid artery stenosis. The endarterectomy was closed with a bovine pericardial patch, with BioGlue used to seal the suture line. The post-operative recovery was uneventful and there were no signs of surgical site infection. The wound had healed well at outpatient review at 8 weeks and the patient was discharged.

Nine months later, the patient was re-admitted, presenting with a 1 week history of an enlarging right sided neck mass. The patient was apyrexial and systemically well. Examination revealed a non-tender, fluctuant, 5 cm subcutaneous mass, antero-medial to the right sternocleidomastoid muscle. The overlying skin was normal, with white cell count 9.72×10^9/L and CRP 31 mg/L.

A computed tomography angiogram revealed soft tissue thickening surrounding the right internal carotid artery, with an associated anterolateral 26 mm × 19 mm × 22 mm collection (Fig. 1). Radiological features were suggestive of an abscess. Needle aspiration of the superficial collection was performed under ultrasound guidance, obtaining 5 mL of grey purulent fluid, with no bacterial growth on microbiological analysis.

The neck mass continued to enlarge, prompting early surgical exploration. A subcutaneous abscess cavity was encountered, with a deeper fistulous tract leading to the cranial apex of the patch. A small dark, irregular mass of artificial material, macroscopically consistent with BioGlue remnants, was identified at the apex of the tract, surrounded by a chronic foreign body type reaction. The patch itself did not appear infected and the surrounding tissue was healthy.

BioGlue remnants were removed, followed by debridement and operative washout. A drain was placed deep to the platysma and skin edges were left open.

Empirical antimicrobial therapy of 7 days of teicoplanin followed by 7 days of doxycycline was initiated. All microbiological specimens (routine culture, extended anaerobic culture, *Actinomyces* and acid fast bacillus culture, 16S RNA viral assay) were negative for bacterial growth. The wound healed rapidly following surgery and the patient remained well 6 months following surgery.

DISCUSSION

BioGlue was initially used to reinforce the carotid patch suture line following carotid endarterectomy. When the patient later presented with an enlarging neck mass, the primary concern was carotid patch infection. Patch removal with venous reconstruction was anticipated, but on surgical

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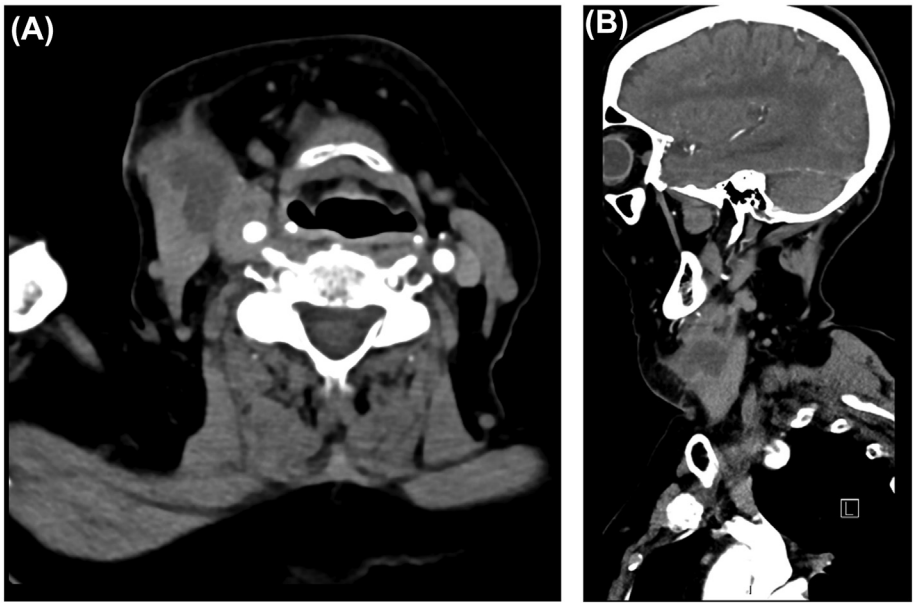

Figure 1. Collection relating to the right internal carotid artery demonstrated in axial (A) and sagittal (B) CT images.

exploration atypical macroscopic appearances consistent with a chronic foreign body reaction to BioGlue remnants were identified, leading to simple drainage and debridement.

BioGlue may predispose to late wound complications for several reasons. It has been suggested that the glutaraldehyde component in BioGlue initiates an immediate acute phase inflammatory reaction by directly injuring surrounding tissue. This may be followed by a long-term chronic, granulomatous response. A massive foreign body inflammatory response in the surroundings of the glue has been described, with histiocytes and granulocytes full of glue remnants.[1] Histological analysis of the Bioglue remnants and surrounding tissues in this case was not performed, but in retrospect this may have provided additional evidence to support the macroscopic findings.

Although no similar cases have been reported in vascular surgery, a strong association has been reported concerning the use of BioGlue and delayed wound complications following paediatric neurosurgical procedures.[2] Subsequent wound debridement was required on average at 12.5 weeks (range 2.5—28 weeks). Late foreign body reactions relating to BioGlue have also been reported after transapical aortic valve implantations, requiring surgical wound revision at 41—115 days.[3] When applied to deep thoracic structures, BioGlue may produce a sterile abscess reaction, reported in a similar case of aseptic mediastinal cyst formation 7 months after cardiac surgery.[4]

It is important to emphasize technical aspects of BioGlue application. Manufacturer recommendations advise an adhesive coating of 1.2—3 mm thick for vessels greater than 2.5 cm in diameter and 0.5—1 mm thick for vessels less than 2.5 cm. After the adhesive polymerizes, any excess should be trimmed away. A thicker adhesive coating may predispose to a foreign body reaction and BioGlue may have accumulated at the apex of the carotid patch in this case, increasing the risk of a late wound complication.

Therefore BioGlue should be used properly and with caution, limited to cases in which it is absolutely indicated. In patients presenting with late wound complications following BioGlue use, simple drainage, debridement, and removal of BioGlue remnants may be a satisfactory approach.

CONFLICT OF INTEREST

None.

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