piglet aorta [2]. Such findings were absent in control animals. Similarly, severe active inflammation surrounding BioGlue and a foreign body reaction at three months following application has been demonstrated by Erasmi et al. [3].

BioGlue is relatively more fluid than gelatin-resorcin-formalin (GRF) glue. In the supine patient who is undergoing aortic dissection repair, the left coronary ostium lies in a dependant position. Upon application of BioGlue between the dissected layers of the aortic root, the liquid glue would track under the influence of gravity towards the left coronary ostium. Over and above the aortic dissection, the glue serves as an additional nidus for tissue inflammation and hence more fibrosis. The fibrosis around the aortic root and the left coronary ostium is well demonstrated by increased tissue attenuation on CT-scan. In our patient, this eventually resulted in severe ostial coronary stenosis and unstable angina three months after the dissection repair.

Although BioGlue is an effective haemostat, it is of paramount importance that surgeons are aware of its potential dangers. In order to avoid this complication, we suggest that the aortic root should be reinforced with Teflon (PTFE) strips alone or that glue should be used sparingly and with extreme caution.

References


[4] LeMaire et al. in 2005, have supported experimentally the concerns related to the threat of adhesive embolization because of BioGlue leaks through needle holes in aortic tissue and prosthetic grafts [3].

In 2006, Szafranek et al. reported the successful management with thoracoscopic intervention of an aseptic mediastinal cyst caused by BioGlue seven months postoperatively in a 66-year-old man who underwent CABG and removal of thrombus from the apex of the left ventricle plus BioGlue application on the area of ventriculotomy [4].

In 2011, Ferraris et al., on behalf of the Society of Thoracic Surgeons (Blood Conservation Guideline Task Force) and the Society of Cardiovascular Anesthesiologists (Special Task Force on Blood Transfusion) provide recommendations for patients undergoing cardiac operations with difficult-to-control bleeding [5].

The authors, in their recommendation (class IIb) related to the use of topical hemostatic agents suggest that these agents may be considered for local hemostasis and as a part of a multimodality approach (level of evidence C) [5]. Regarding the use of BioGlue there is a prospective randomized controlled trial in its favour for the control of the anastomotic bleeding, however, there was no difference in blood transfusion and chest tube drainage [1, 5]. There are anecdotal reports of complications such as embolization, nerve injury, inflammatory and foreign body reaction, coronary stenosis [4, 5]. BioGlue has limited use in pediatric cardiac surgery (contra indication in growing tissues) [5].

Fig. 1. Left coronary angiogram revealing ostial stenosis with a smooth outline that indicates extrinsic compression by fibrosis/glue.

Fig. 2. Coronal oblique view on computed tomography scan demonstrating abnormal aortic wall thickening adjacent to the left coronary ostium, consistent with fibrosis.

eComment: Biological glue: a word of careful assessment!

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Modi et al. [1] have reported on the complication of ostial left coronary stenosis following aortic root reconstruction with BioGlue.

The authors illustrate, apart from the basic knowledge of the pathophysiology of biologic glue complications, the important role of careful assessment and judgment of its use [1]. We take this opportunity to share our experience and knowledge in this topic.

In 2004, Mahmood et al. reported the fatal right ventricular infarction caused by BioGlue coronary embolism in a 74-year-old woman six days after ascending aorta and hemiarch replacement due to type A aortic dissection [2]. BioGlue was injected within and around the false lumen at the level of the sinotubular junction and arch as well [2]. The glue emboli was confirmed with comparison between the BioGlue from the patient’s coronary arteries and freshly prepared BioGlue from the glue tube by means of dissecting microscopy [2].

LeMaire et al. in 2005, have supported experimentally the concerns related to the threat of adhesive embolization because of BioGlue leaks through needle holes in aortic tissue and prosthetic grafts [3].
It is very important to remember that there is no substitute for good operative technique and furthermore the biologic glues are not a hemostatic ‘panacea’ for cardiac surgery.

References


