Pulmonary embolism due to biological glue after repair of type A aortic dissection

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Abstract

Biological glue is increasingly used in cardiac surgery. We report a case of type A aortic dissection repair that was complicated by subsequent pulmonary embolism due to Biogluce (Cryolife Inc. Hennesaw GA, USA). To our knowledge this is the first report of a case with this complication.
Case Report

The use of biologic glue in cardiac surgery is widely accepted (1) but complications following the use of surgical tissue adhesives have risen in recent years. We present an extremely rare case in which a patient developed pulmonary embolism due to biological glue use after the repair of type A aortic dissection.

A 73 year-old man was referred to our hospital with a diagnosis of acute aortic dissection. Thoracoabdominal computerized tomography scan (CTS) showed a type A aortic dissection from the left coronary sinus of Valsalva to the descending aorta.

Emergency surgery was performed. After right axillary artery cannulation, median sternotomy was performed and cardiopulmonary bypass began with right atrial cannulation. A thin layer of Bioglue was deposited within the false lumen under hypothermic circulatory arrest. The aortic root and the distal aortic anastomotic site were reconstructed using two strips of teflon felt placed externally and into the true lumen. A supracommissural graft (32 mm) replacement of the ascending aorta was performed and the proximal and distal suture lines were reinforced with the application of Bioglue on the outside of the suture line. Immediately after release of the aortic cross clamp, suture hole bleeding was encountered in the left corner of the proximal anastomosis close to the pulmonary artery. A repair was performed with 3/0 prolene stitches and we decided to apply Bioglue on the stitches. The patient was separated from cardiopulmonary bypass without difficulty and returned to the recovery unit in satisfactory condition. There was no significant postoperative bleeding and the man was discharged in good condition 10 days after the operation.

The patient remained asymptomatic for four months. He then presented with chest pain and was again transferred to our hospital. CTS demonstrated a proximal aortic pseudoaneurysm (Fig 1) and also revealed an intraluminal mass in the right pulmonary artery. (Fig 2). Another operation was performed. The patient developed severe hypotension after right axillary artery cannulation and went into cardiac arrest. Median sternotomy was performed and a ruptured pseudoaneurysm was present. It was no possible to restore normal hemodynamic parameters and the patient died.
Figure 1.- The computerized tomography scan showed an aortic pseudoaneurysm and a hematoma around the ascending aorta.

Figure 2.- A volume rendering reconstruction showed an intraluminal mass in the right pulmonary artery.

The right pulmonary artery was opened for inspection and a hard black mass was removed (Fig 3). No thrombus was present.
Comment

The use of biological glue in aortic dissection is widely accepted for reinforcing aortic anastomotic sites (1). Bioglue is a biological protein matrix consisting of 45% bovine serum albumin solution and 10% glutaraldehyde that was approved by the US Food and Drug Administration in 1999 for use in the repair of acute aortic dissections. The Bioglue is independent of the coagulation cascade and uses cross-linking agents to covalently bind to tissue surfaces. It has adhesive as well as sealant properties. Bioglue begins to polymerize within 20 to 30 seconds of application and reaches maximum bonding strength within 2 to 3 minutes (2). Its use has been associated with acute intraoperative malfunction of aortic valves (3, 4), acute limb ischemia (5) and fatal myocardial infarction due to embolization (6). There are no reports of pulmonary embolization associated with Biogluce although Lustgarten and Coll (7) reported a patient with pulmonary embolism after use of Biogluce, they did not attribute the pulmonary complication to Biogluce.
Carrel (8) speculated that biological glue seeps into the vessel lumen through needle holes and Le Maire (2) reported that Biogluce leaked through suture tracts and into the lumen in 18 of 180 anastomosis. We think this is what happened in our patient. Surgical sealants represent an important surgical adjunct but complications can occur despite proper application. Thus, such sealants should be used only when necessary to optimize hemostasis. We believe that the recommendations of Le Maire et al. (2) for prevention of complications are very easy to put into practice and should be used routinely.
References


