

Important Steps to Avoid Tamponade in Minimally Invasive Aortic Valve Replacement.

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Objectives: The aim of this study is to describe and evaluate some important steps in avoidance of tamponade after minimally invasive aortic valve replacement.

Patients and methods: From 2003 – 2006, 45 patients had aortic valve replacement through a “mini sternotomy” an 8 cm long skin incision and a partial upper sternotomy (L-shaped from the jugulum through the third right intercostal space). The patients were 36 men and 9 women aged 37 - 78 years old, with a median age of 60 years. At the end of the operation a retrosternal drain was placed and connected to suction. It is not possible to drain large volumes of blood through one drain only and the pericardium is largely intact since it is only opened over the aorta and the

outflow tract of the left ventricle. Therefore excessive bleeding may result in early and life threatening tamponade in patients who has been operated with a “mini sternotomy”. In addition to meticulous surgical hemostasis a strategy to avoid tamponade were therefore implemented in all cases: Firstly after giving all heparin blood from the heart- and lung machine back to the patient, the ACT (activated clotting time) was reversed to less than 125 with protamine, and secondly

patient-derived fibrin sealant (Vivostat®) was used at all oozing bleeding sites and at the sternal marrow to enhance hemostasis, before the patients were closed up. The fibrin sealant was produced from 120 ml of the patient’s blood drawn from the heart- and lung machine and produced by a fully automated, microprocessor controlled process in less than 20 min. The resulting fibrin sealant

(volume 4-5 ml) was applied with a spraypen after the administration of protamine.

Results: The surgical mortality was 0 and no patients experienced tamponade. One patient had to be operated due to bleeding from an intercostal artery caused by a sternal wire and one patient had a right sided hemothorax caused by a lesion of the right internal thoracic artery by the sternal saw. The hemothorax was treated by drainage and blood transfusions.

Conclusion: Meticulous surgical hemostasis is crucial in minimally invasive aortic valve replacement to avoid tamponade. In addition, reversal of heparin with protamine after transfusion of blood from the heart- and lung machine, and the use of patient-derived fibrin sealant seem to be important steps to secure hemostasis.