Images in cardio-thoracic surgery

Aortic root rupture during trans-catheter aortic valve implantation

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An 86-year-old woman underwent transfemoral aortic valve implantation (23-mm SAPIEN). She required immediate cardiopulmonary resuscitation. Contrast angiography revealed periaortic blood extravasation (Fig. 1, panel C). Immediate operation revealed an aortic tear in the suprannular position (Fig. 1, panel D) that was repaired with direct suture. A 19-mm Mitroflow was implanted. The patient was discharged home on postoperative day 9.

Fig. 1. Panel A: Transesophageal echocardiography short axis view showing a heavily calcified aortic valve leaflets. Panel B: Transesophageal echocardiography long axis view showing a not heavily calcified aortic root. Panel C: Contrast aortography after implantation showing periaortic contrast extravasation (white arrow). The complication was detected by contrast angiography after the observation of cardiogenic shock. The TEE examination did not reveal the complication but clearly evidenced the cardiac tamponade and, therefore, highlights the role and the value of TEE during this procedure. We believe that the aortic root rupture was caused by the mechanical trauma determined by the two balloon valvuloplasties that possibly had broken a calcified plaque of the aortic root. We cannot exclude a priori that the oversizing of the aortic prosthesis itself could determine the rupture of the aortic root. Panel D: Intraoperative image showing a leaflet retracting hook inside the aortic root tear below the left main ostium (black arrow) and above the aortic annulus (white arrow). The aortic annulus at surgical inspection was not heavily calcified and did not present any fracture but we have observed that the calcifications present at the level of native leaflets were fractured. To avoid this complication we propose to avoid aggressive balloon valvuloplasty because the stent of the SAPIEN prosthesis itself has the sufficient radial force to maintain the native calcified aortic valve against the wall of the aorta. It is also speculative, but we consider that an aggressive oversizing (3-4 mm like in our report) of the prosthesis can also be a dangerous aspect of the procedure. We believe that a wider range of size of prosthesis would be helpful to minimize the risk of aortic root rupture.

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