Bioprosthetic leaflet perforation due to repetitive trauma by overknotted sutures

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Five years after aortic intra-annular valve replacement using a Carpentier—Edwards Perimount bioprosthesis, a 72-year-old man was reoperated due to progressive aortic regurgitation. At surgery, several prosthetic tissue disruptions were discovered. Both our and Edwards Lifesciences laboratories agreed these perforations were caused by continuous trauma of the leaflets against the overknotted sutures (Figs. 1 and 2).

Fig. 1. As the malfunctioning bioprosthesis was explanted, no evidence of tissue deterioration or calcification was evident in either pericardial leaflets after five years.

Fig. 2. Four lesions in the right and non-coronary cusps were detected, two being complete tissue tears (A and B). The macroscopic, microscopic and radiological studies were compatible with prosthetic dysfunction due to repeated abrasion of the leaflets against the suture material during systolic movement. This mechanism was suggested because the tissue erosions matched with the knots of the interrupted 2/0 Tycron sutures used to implant the prosthesis through the sewing cuff. At some suture ends, up to seven to eight knots were roughly counted. Note the big perforating abrasion (B) matching the white knotted suture (slightly out of focus).