JACC: CARDIOVASCULAR INTERVENTIONS
VOL. 9, NO. 7, 2016

ISSN 1936-8798/$36.00
PUBLISHED BY ELSEVIER
http://dx.doi.org/10.1016/j.jcin.2015.12.020

Cutaneo-Pericardial Fistula After Transapical Approach for Transcatheter Aortic Valve Replacement

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A 77-year-old male with severe aortic stenosis, prior coronary artery bypass graft, recurrent infective endocarditis, and chronic Q fever (taking hydroxychloroquine and doxycycline) underwent a transcatheter aortic valve replacement (TAVR) by the transapical (TA) approach via left thoracotomy. A 29-mm Edwards SAPIEN XT valve (Edwards Lifesciences, Irvine, California) was successfully deployed using the Ascendra 2 delivery system (Edwards Lifesciences). Purse-string sutures were placed at the left ventricular (LV) apex. Post-procedure development of a hemorrhagic pericardial effusion necessitated surgical re-exploration; bleeding from the LV apex was controlled with placement of pledgeted purse-string sutures. Further post-procedure recovery was complicated by gram-negative pneumonia (Serratia marcescens and Klebsiella pneumoniae) that improved with levofloxacin.

Two months later, the patient complained of swelling above the incision site. Chest computed tomography demonstrated a hematoma that was managed conservatively (**Figure 1A**).

Four months following TAVR, the patient developed a necrotic skin lesion with wound drainage (**Figure 1B**). Repeat computed tomography showed extravasation of contrast through the LV apex into the surrounding soft tissue and a fluid collection within the chest wall consistent with a LV apical pseudoaneurysm and cutaneo-pericardial fistula (**Figures 1C and 1D**). The patient underwent a left thoracotomy with rib resection, removal of the epicardial pacemaker lead, fistula repair, and replacement of the pledgets (**Figures 2A to 2C**). Cultures from the surgical specimen demonstrated no growth. The patient received prophylactic vancomycin and was subsequently discharged.

Unusual complications of a TA approach, including ventricular septal defect, apical pseudoaneurysm, and LV rupture, have been reported (1). In TAVR, TA access site infections have an occurrence rate of 3.2% (2). One of the rarest complications is cutaneo-pericardial fistula, with only 1 prior reported case; pledgeted sutures were attributed as the source of infection (3).

To our knowledge, this is the first reported case in the United States. The immunocompromised status of our patient (due to long-term hydroxychloroquine) possibly increased the risk of infection. Furthermore, chronic doxycycline therapy possibly obscured the search for causative organisms. Potential sources of infection were the presence of an epicardial pacemaker lead, need for surgical re-exploration, and the development of nosocomial pneumonia. Prior reports have implicated BioGlue (CryoLife Inc., Kennesaw, Georgia) as a source of infection (4); however, it was not used in this case.

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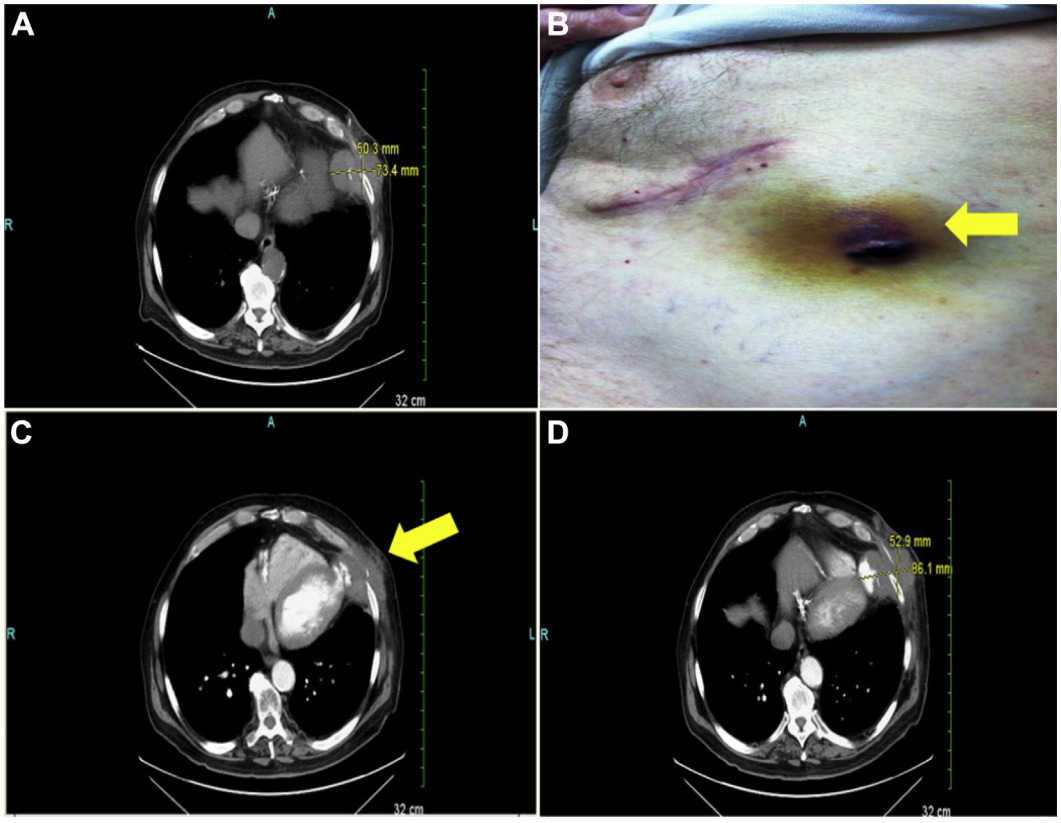
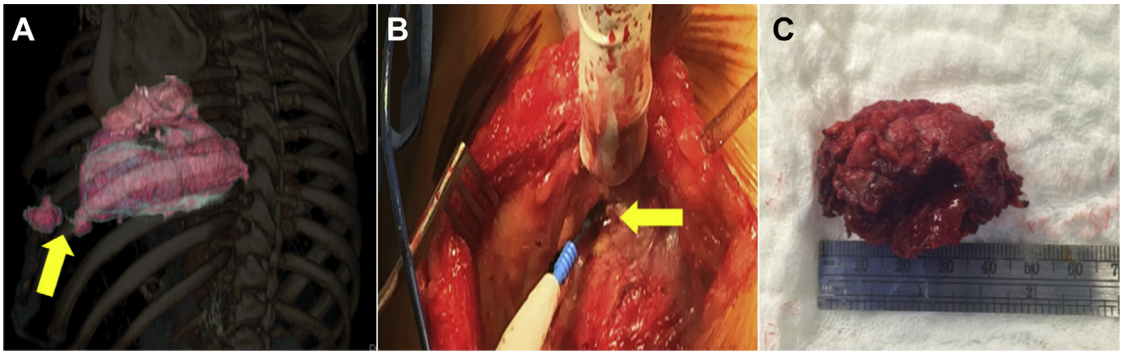
Manuscript received December 1, 2015; revised manuscript received December 7, 2015, accepted December 17, 2015.

FIGURE 1 Presentation/Imaging



(A) Computed tomography (CT) of the chest demonstrates a hematoma of 73.4 × 50.3 mm in the left chest wall. **(B)** Left lateral chest wall demonstrates a healed thoracotomy scar and a necrotic 1 × 2 cm abscess along the anterior axillary line **(arrow)**. **(C)** CT demonstrating extravasation of contrast from the left ventricular cavity into the pseudoaneurysm and fistula formation extending to the chest wall **(arrow)**. **(D)** CT demonstrating the contrast in left ventricle draining in the abscess under the chest wall of 86.1 × 52.9 mm.

FIGURE 2 Surgical Evacuation



(A) Left lateral view 3-dimensional reconstruction of computed tomography images showing the connection **(arrow)** between the left ventricle and the pseudoaneurysm. **(B)** Fistula opening **(arrow)** in the chest wall during surgical excision. **(C)** Excised pseudoaneurysm and clot, approximately 45 mm.

Cutaneo-pericardial fistula is a rare, but clinically significant, complication of the TA approach in TAVR. Infection control, meticulous procedural technique, heightened clinical suspicion, early recognition, and prompt treatment are all important measures in reducing adverse clinical outcomes.

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KEY WORDS cutaneo-pericardial fistula, transapical, transcatheter aortic valve replacement