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Case Report

An Asymptomatic Perigraft Seroma in a Patient who Underwent Aortic Root Replacement for Annulo-Aortic Ectasia

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Perigraft seroma, a sterile fluid accumulation around the graft, is a potential complication after thoracic aortic surgery. The optimal treatment strategy for a perigraft seroma with vascular compression after thoracic aortic surgery has been unclear. We describe the case of a 62-year-old Japanese male in whom an asymptomatic perigraft seroma was observed after he had undergone aortic root replacement for annulo-aortic ectasia. The seroma was successfully treated with thoracoscopic drainage and conservative therapy. Less invasive therapy, including conservative therapy, may also be an option for asymptomatic perigraft seromas observed after thoracic aortic root replacement.

Key words: perigraft seroma, aortic root replacement, thoracoscopic drainage, conservative therapy

 \mathbf{T} he development of a perigraft seroma, *i.e.*, a sterile fluid accumulation around the graft, is a potential complication after prosthetic graft replacement. Because perigraft seromas sometimes decrease with conservative therapy, the treatment strategy for asymptomatic perigraft seromas with vascular compression remain to be determined. We provide the case details of an adult patient in whom a perigraft seroma showing compression of the superior vena cava (SVC) was observed after he had undergone aortic root replacement for annulo-aortic ectasia. The seroma was successfully reduced by thoracoscopic drainage and conservative therapy.

Case Report

A 62-year-old Japanese man who presented with

frequent chest pain was admitted to our hospital after transthoracic echocardiography revealed severe aortic valve regurgitation and a dilatation of the aortic annulus, consistent with annulo-aortic ectasia. He had a 3-year history of chest pain, but coronary angiography showed no significant stenosis. Aortic root replacement (Magna EASE TFX 25 mm, Edwards Lifesciences, Irvine, CA, USA & Gelweave Valsalva graft 28 mm, Terumo, Tokyo) was performed under general anesthesia and cardiopulmonary bypass. The postoperative course was uneventful, and the patient was discharged 28 days after surgery.

A computed tomography (CT) examination on the 14th day after the surgery demonstrated a small fluid accumulation around the ascending aortic graft (Fig. 1A). A gradual increase in perigraft fluid accumulation was observed on CT at 3 and 6 months (Fig. 1B) post-discharge. Because the CT radiodensities in the

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fluid accumulation were 12-21 Hounsfield units (HU), a perigraft seroma was suspected. However, because the lumen of the SVC could not be observed at the narrowest point at CT 6 months post-discharge, at 7 months after the patient's initial discharge, we decided to perform a thoracoscopic drainage for the compression of the SVC, which resulted in the definitive diagnosis of a perigraft seroma. The patient's laboratory data before the thoracoscopic drainage procedure (white blood cell count: 4,480/µl, eosinophil granulocytes: 2%, C-reactive protein: 0.15 mg/dl) did not show any evidence of infection or allergic disease. With the



Fig. 1 A, Computed tomography (CT) on day 14 after the patient's surgery demonstrated a small fluid accumulation around the ascending aortic graft; B, The CT examination at 6 months post-discharge revealed increased fluid collection around the graft, suggesting a perigraft seroma; C, The evaluation by CT after thoracoscopic drainage showed a reduction in fluid accumulation around the graft; D, The CT findings at 13 months post-drainage demonstrated an enlargement of the perigraft seroma and compression of the superior vena cava (SVC); E, CT results obtained 26 months post-drainage revealed a reduction of the fluid accumulation around the graft; F, The CT examination at 93 months post-drainage showed no enlargement of the perigraft seroma.

patient under general anesthesia, thoracoscopic ports were placed through the right intercostal spaces, and a thoracoscope was inserted through the port into the right chest cavity. A serous fluid discharge was observed when the mediastinal pleura was opened (Fig. 2A), consistent with a perigraft seroma. The fenestration was enlarged until the graft surface could be observed (Fig. 2B).

At 13 days after thoracoscopic drainage, CT demonstrated a sufficient reduction of fluid accumulation (Fig. 1C), but the fenestration had already been closed. Because the patient had no symptoms, we chose to administer conservative therapy. At 13 months after the thoracic drainage procedure, CT showed re-enlargement of the perigraft seroma. It was compressing the SVC (Fig. 1D). However, there was no sign of the SVC



Fig. 2 A, Thoracoscopic drainage into the pleural cavity was performed with the patient under general anesthesia. A serous fluid discharge was observed when the mediastinal pleura was opened; B, The fenestration was enlarged until the graft surface could be observed.

syndrome, and the patient's treatment remained conservative. At 17 months after the drainage, CT showed a reduction in fluid accumulation, and at 26 months, a further decrease of fluid accumulation and the release of the SVC compression were observed (Fig. 1E). There was no enlargement of the perigraft seroma for 67 months (Fig. 1F).

Written informed consent for the publication of this information and the use of his images was obtained from the patient.

Discussion

A perigraft seroma is a sterile fluid accumulation surrounding a prosthetic graft [1]. Although perigraft seromas are commonly reported after abdominal aortic replacement [2], Suzuki *et al.* observed a 14.6% incidence after thoracic aortic replacement [3]. The cause of perigraft seromas has been unclear, but several possible causes have been proposed including ultrafiltration, immunologic reaction to the graft, and low-grade infection [3]. A differential diagnosis including lymphatic or anastomotic leakage would also be important. However, it is often difficult to distinguish these types of leakage from a perigraft seroma.

The optimal treatment strategy for a perigraft seroma with vascular compression after thoracic aortic surgery remains to be determined. Surgical intervention is a treatment option for a perigraft seroma that develops after thoracic aortic surgery. Kanemitsu et al. described the application of fibrin glue to the graft surface and wrapping with a new graft for a perigraft seroma after ascending aortic replacement [4]. A case involving wrapping with a bovine xenopericardial sheet for a perigraft seroma after ascending aortic replacement was reported by Takinami et al. [5]. Surgical drainage into the pleural cavity combined with fibrin glue application to the graft surface has also been applied in cases of perigraft seroma after total arch replacement [6,7]. However, because these procedures require a re-do median sternotomy, they can be very invasive for asymptomatic patients.

In our patient's case, the use of echo or CT-guided percutaneous aspiration carried a risk of pneumothorax. To reduce surgical invasion, we thus tried thoracoscopic drainage into the pleural cavity, and this treatment was initially successful. Although we had created a sufficiently large fenestration (>2 cm in dia.) while avoiding injury to the phrenic nerve, the fenestration was closed shortly after its creation. More extensive fenestration may be required for long-term adequate drainage. On the other hand, surgical intervention may not have been necessary in our patient's case because the seroma shrank while it was under observation.

Although the indication strategy for surgical intervention for an asymptomatic perigraft seroma remains to be determined, surgical intervention may be appropriate in cases in which the possibility of graft infection, hemorrhage, pseudoaneurysm or lymphorrhea cannot be completely excluded [4,5,7] or where compression of the pulmonary artery or SVC are present on CT images [4-7]. We selected surgical intervention for the present patient in order to reduce the risk of SVC syndrome since the SVC was compressed by the seroma (Fig. 1B). We were also prepared to convert to a median sternotomy if intraoperative findings suggested graft infection, hemorrhage, or pseudoaneurysm.

Endovascular treatment is another surgical option for perigraft seroma. Ohtake *et al.* reported their use of stent graft deployment to treat a perigraft seroma after the patient's descending thoracic aortic surgery [8]. Endovascular stent grafting was not an option in our patient's case because a prosthetic graft was placed on the ascending aorta.

Conservative therapy may be an option for the treatment of perigraft seromas. A decrease in the size of a perigraft seroma after the withdrawal of anticoagulants was observed by Kadakol et al. [2]. Kondo et al. described two cases in which a large perigraft seroma developed after Y-grafting for aortoiliac aneurysms; the seromas shrank within one year with the discontinuation of antiplatelet therapy [9]. Our patient was not given any anticoagulant or antiplatelet drugs after his initial operation, and the perigraft seroma in his case was assumed to have shrunk with the natural course of time. Because the natural history of perigraft seromas is unknown, conservative therapy with careful observation may be appropriate in asymptomatic patients. Our patient showed no evidence of SVC syndrome and had no symptoms, although CT showed SVC compression. We thus eventually chose to administer conservative therapy with careful observation, and the perigraft seroma shrank over a 2-year observation period.

However, Doita *et al.* reported a case in which a ruptured perigraft seroma caused a subcutaneous tumor, resulting in infectious mediastinitis [10]. It is therefore also important not to miss the optimal timing of the surgical intervention.

We have described a case of asymptomatic perigraft seroma after aortic root replacement that was successfully treated with thoracoscopic drainage and conservative therapy. Although the treatment strategy for perigraft seromas with vascular compression after thoracic aortic surgery remains unclear, less-invasive methods, including conservative therapy, may also be an option for the treatment of asymptomatic perigraft seromas.

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