Endolymphatic seal for persistent secondary chyle leak following aortic valve replacement

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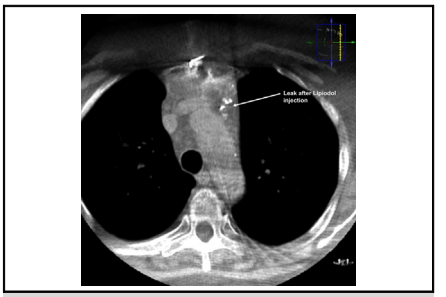

XperCT scan after ethiodized oil injection showing leak.

CENTRAL MESSAGE

If chylous leakage persists despite conservative measures, ethiodized oil injection can aid in complete sealing of the chyle leak and should be considered.

▶ Video clip is available online.

Chylopericardium (CPE), a rare phenomenon characterized by chyle accumulation in the pericardial space, can arise from idiopathic or secondary causes. Although secondary CPE is often associated with various factors, including surgical trauma, malignancies, and infections, its occurrence following specific aortic valve replacement (AVR) remains underexplored.[1]

CASE REPORT

A 74-year-old woman presented 17 days post-AVR with symptoms of exertional breathlessness, orthopnoea, and gross pitting pedal edema that did not improve with diuretic therapy. On examination, she was tachypnoeic with elevated jugular venous pressure, muffled heart sounds, and tachycardia (heart rate, 150 bpm). Her National Early Warning Score 2 score was 4, indicating clinical deterioration. An urgent chest radiograph revealed cardiomegaly (Figure 1), whereas electrocardiogram showed poor R-wave progression in V2 to V4 and intermittent atrial fibrillation. Transthoracic echocardiography confirmed a large pericardial effusion measuring 4.8 cm around the posterior left ventricle, raising concerns for hemodynamic compromise.

She was immediately taken to the operating theatre, where subxiphoid pericardial drainage yielded 900 mL milky chylous fluid (Video 1). Postoperatively, her National Early Warning Score 2 score improved from 4 to 2, with a systolic blood pressure of 107 mm Hg and oxygen saturation at 95% on room air. Laboratory analysis of the pericardial fluid confirmed chyle, with an elevated triglyceride-to-cholesterol ratio (8.3:1.6 mmol/L). Renal function was impaired, with elevated urea (16.9 mmol/L) and creatinine (150 mmol/L) levels, raising concerns about possible acute kidney injury.

The patient remained hospitalized for a total of 3 weeks with 24Fr chest drain in place. In line with standard protocols, she was started on a modified medium-chain triglycerides, total parenteral nutrition, and octreotide, which led to some improvement within a week but drainage persisted.

Despite being clinically stable by the second week, her pericardial drain output remained significant, averaging 320 mL on average over a 24-hour period. Given the persistent leakage, we decided to proceed with a lymphangiogram with a view to embolize. Overnight normal fat-rich diet was resumed in preparation for the procedure. Two inguinal lymph nodes on the right side and 1 on the left were cannulated using a 21G needle and a total of 20 mL ethiodized oil was injected slowly. Lymphatic duct opacification was monitored under fluoroscopy. Subsequently, a XperCT (Philips) performed on the angiography table confirmed leak of the injected ethiodized oil from the superior mediastinum likely from an injured thoracic duct (Figure 2).

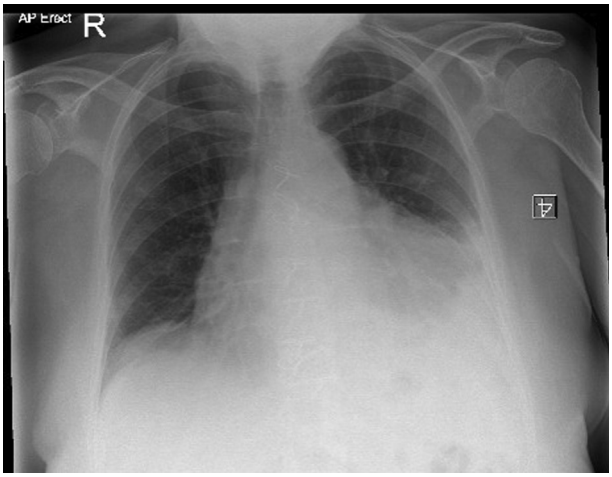

FIGURE 1. Chest radiograph showing cardiomegaly on initial admission.

Remarkably, overnight chest drainage showed complete cessation of chyle leakage and this did not recur despite starting on a normal-fat diet. For the remainder of her hospital stay, her clinical course was uneventful. Follow-up transthoracic echocardiography, performed 1 and 4 months postdischarge, showed no reaccumulation in the pericardium.

DISCUSSION

In this case report, we present the first documented case of a 74-year-old woman with secondary persistent CPE following AVR successfully treated with lymphangiography using ethiodized oil.

The origins of this technique trace back to 1955 when Kinmonth and colleagues[2] introduced ethiodized oil for pedal lymphangiography, injecting it into the foot to visualize the lymphatic system.[2] By the 1970s and 1980s, its embolization properties became more apparent, particularly in the management of chylous lymphatic leaks. Since then, ethiodized oil lymphangiography has been well documented and successfully employed in identifying and treating lymphatic leakage such as chylothorax, lymphatic chylous fistulas, chylous ascites, and chyloretroperitoneum.[3] One of the earliest documented uses of computed tomography lymphangiography in CPE dates back to 1977, when Gallant and colleagues[4] employed it to visualize the site of lymphatic leakage.

We observed that performing a lymphangiogram with ethiodized oil injection not only aided in locating the lymphatic leak but also resulted in its complete sealing—an outcome not previously documented in cases of CPE. Until now, ethiodized oil has primarily been used in CPE to identify the leak site and guide subsequent interventions such as thoracic duct embolization or thoracic duct ligation. Several studies have suggested that ethiodized oil may have an intrinsic embolic effect, successfully sealing lymphatic leaks without the need for additional procedures in roughly 60% to 80% of cases.[5] However, to our knowledge, no prior reports have documented this phenomenon in the context of CPE.

VIDEO 1. Chest drainage with subxiphoid incision. Video available at: https://www.jtcvs.org/article/S2950-6050(25)00012-9/fulltext.

Favorable conditions likely contributed to the success of lymphangiography with ethiodized oil. Conservative management with dietary modifications and octreotide may have reduced chylous drainage, enhancing leak sealing. A single leak point with no diversion to alternate pathways further improved the likelihood of a successful outcome. Our case is among the first in post-AVR patients to demonstrate chyle leak closure via ethiodized oil lymphangiography, preventing repeat open surgery.

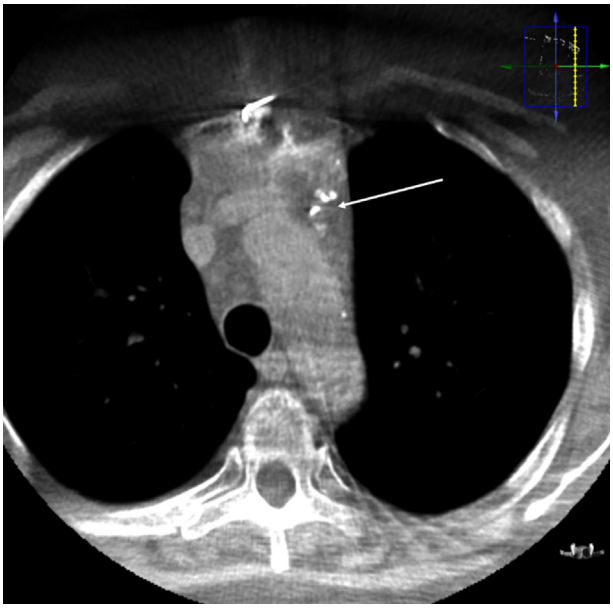

FIGURE 2. XperCT scan (Philips) after ethiodized oil injection showing leak. The *arrow* shows the area of leak of the ethiodized oil.

CONCLUSIONS

We present a case of secondary persistent chylopericardium following AVR surgery that was successfully treated with surgical drainage, conservative dietary modification, total parenteral nutrition, and octreotide. However, it was the ethiodized oil injection that resulted in complete seal of the chyle leak and avoided further extensive exploratory surgery. This should be kept in mind as part of our armamentarium when dealing with similar cases. IRB approval was not required; verbal and written consent was obtained and provided.

Conflict of Interest Statement

The authors reported no conflicts of interest.

The Journal policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

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