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INTERMEDIATE

CASE REPORT: CLINICAL CASE

Recurrent Left Pleural Effusion Following Left Atrial Appendage Closure With the Watchman Device

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ABSTRACT

A 75-year-old woman with recent left atrial appendage closure with the Watchman device (Boston Scientific, Natick, Massachusetts) presented with recurrent left pleural effusion. The constellation of chest pain, pericardial effusion, and exudative pleural effusion were suggestive of an inflammatory process precipitated by microperforation of the fixation anchors during the Watchman placement. (**Level of Difficulty: Intermediate.**) (J Am Coll Cardiol Case Rep 2020;2:1789–92)

A 75-year-old woman with recent left atrial appendage (LAA) closure with the Watchman device (Boston Scientific, Natick, Massachusetts) 2 months before presentation was referred to our hospital for evaluation of progressive shortness of breath and chest pressure in the setting of recurrent left pleural effusion. Her symptoms started following her LAA closure procedure and progressed in severity requiring multiple emergency department visits and a prior hospitalization with 2 thoracenteses draining clear fluid from her left pleural space. She also reported subjective fevers and 20-pound weight loss that she attributed to lack of appetite from the severity of her symptoms.

PAST MEDICAL HISTORY

The patient had a history of paroxysmal atrial fibrillation and LAA closure with Watchman, hypertension, dyslipidemia, well-controlled diabetes mellitus type 2 (hemoglobin A1c 6.6%), and chronic kidney disease. Her home medications included aspirin, bisoprolol, evolocumab, ferrous sulfate, fluoxetine, gabapentin, rosuvastatin, semaglutide, and furosemide.

DIFFERENTIAL DIAGNOSIS

Differential diagnoses include Watchman erosion to the pericardial and pleural spaces, Watchman-related inflammatory process, pulmonary embolism, drug-induced pleural effusion, malignancy, and connective tissue disease.

INVESTIGATIONS

Chest radiograph on admission showed reaccumulation of the previously drained left pleural effusion (**Figure 1A**) for which she underwent placement of a chest tube and drainage of a clear yellow exudative pleural fluid with lymphocyte

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the *JACC: Case Reports* author instructions page.

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ABBREVIATIONS AND ACRONYMS

CT = computed tomography

hs-CRP = high-sensitivity C-reactive protein

LAA = left atrial appendage

NSAID = nonsteroidal anti-inflammatory drug

predominance. The detailed pleural fluid analysis was as follows: white blood cells 425 cells/μl, right blood cells 7,123 cells/μl, neutrophils 12%, lymphocytes 50%, eosinophils 1%, total protein 3.8 g/dl, glucose 176 mg/dl, cultures negative for any infection, and cytology negative for any malignant cells. Her laboratory tests were notable for chronic anemia and elevated high-sensitivity C-reactive protein (hs-CRP) at 63.9 mg/l. Chest computed tomography (CT) showed multiple subcentimeter lung nodules, not fluorodeoxyglucose avid on a subsequent positron emission tomography scan. There was a small-size pericardial effusion unchanged in size compared with a CT scan done 1 month prior at another hospital. The left ventricular ejection fraction was preserved and there were no signs of restriction or constriction on echocardiography. A transesophageal echocardiogram demonstrated the Watchman device seated in the LAA and a small 1-mm leak through the device (**Figure 1B**). Cardiac CT with contrast showed the occlusive device in the LAA with passage of contrast into the distal portion of the LAA confirming a small 1-mm peridevice leak, and without passage of contrast into the pericardial or pleural spaces (**Figure 1C**). The lack of passage of contrast into the pericardial and pleural spaces argued against direct communication between the LAA cavity and the pericardial or pleural space. The constellation of chest pain, stable pericardial effusion, recurrent pleural effusion, nonbloody nature of the pleural effusion, and the elevated hs-CRP were suggestive of an inflammatory process manifesting with pericarditis and recurrent left pleural effusion, likely precipitated by a microperforation of the fixation anchors during the Watchman placement.

MANAGEMENT

The patient was treated conservatively with nonsteroidal anti-inflammatory drugs (NSAIDs) and colchicine. She was not previously treated with anti-inflammatory medications after prior thoracenteses and during prior hospitalizations. Her symptoms of chest pain and shortness of breath gradually improved. Predischarge chest radiograph obtained 3 days following initiation of NSAIDs and colchicine showed left basilar atelectasis without reaccumulation of the left pleural effusion after chest tube removal. At discharge, she had significant improvement in her symptoms.

LEARNING OBJECTIVES

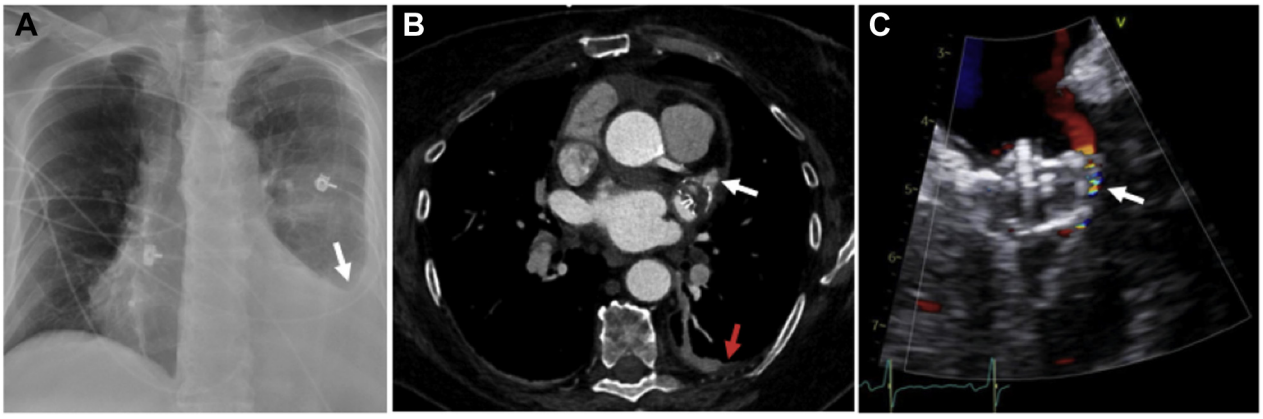
- The Watchman device is an LAA closure device that is increasingly used to prevent stroke among patients with atrial fibrillation. Complications associated with this device include pericardial effusion, tamponade, device erosion, and embolization. Although the safety profile of this device has improved with enhanced operator technical skills, it is important to recognize rare complications that may arise from the placement of this device. In this case report, we described the clinical presentation and management of recurrent pleural effusion and pericarditis following placement of the Watchman device.
- Pleural effusion is a rare complication of LAA closure with the Watchman device and can be the result of an inflammatory response due to intraprocedural pericardial injury.
- It is important to differentiate inflammation-related pleural effusion from bloody pleural effusion secondary to device erosion of the pericardial and pleural spaces.
- Conservative treatment with nonsteroidal anti-inflammatory drugs and colchicine can be successful in the treatment of post-Watchman pericarditis and exudative pleural effusion.

DISCUSSION

To the best of our knowledge, this is the first case of recurrent left pleural effusion after LAA occlusion with the Watchman device.

The Watchman device is an overall safe and effective device for LAA occlusion and protection of stroke among patients with atrial fibrillation (1). There were safety concerns with the initial experience with Watchman in the PROTECT-AF trial (WATCHMAN Left Atrial Appendage System for Embolic Protection in Patients With Atrial Fibrillation) given elevated risk of procedural complications, notably pericardial effusion and tamponade, device embolization, cardiac perforation, and air emboli (2); however, subsequent studies including the PREVAIL trial (Evaluation of the WATCHMAN Left Atrial Appendage [LAA] Closure Device in Patients With Atrial Fibrillation Versus Long-Term Warfarin Therapy) and prospective Watchman registries demonstrated an acceptable safety profile of the device with

FIGURE 1 Diagnostic Multi-Modality Imaging



(A) Chest radiograph shows left pleural effusion **(white arrow)**. **(B)** Cardiac computed tomography (CT) with contrast shows the Watchman device well seated in the left atrial appendage (LAA). There is passage of contrast into the distal LAA beyond the Watchman **(white arrow)**, suggestive of the presence of a device leak. There is a small pericardial effusion with no evidence of contrast in the pericardial space. A portion of the left pleural effusion is seen on this CT scan slice, with no evidence of contrast extravasation into the left pleural space **(red arrow)**. **(C)** Transesophageal echocardiogram shows the Watchman device seated in the LAA and a small leak measuring 1 mm **(white arrow)**.

improved operator technical experience (1,3). Although pleural effusion has not been previously reported following placement of Watchman, it has been described with the Lariat LAA ligation device, with an incidence of approximately 3% (4). The Lariat is an epicardial LAA occlusion device that requires both pericardial and transseptal access for percutaneous suture ligation of the appendage. Two types of pleural effusions were previously described with the Lariat: 1) exudative effusions thought to be related to local inflammation of the pleura adjacent to the pericardium covering the ligated necrotic LAA, often associated with pericarditis; and 2) transudative effusions possibly related to alteration of neuroendocrine regulation of fluid retention due to a decreased level of atrial natriuretic peptide that is usually produced by the LAA (5).

We hypothesize that the patient's Watchman placement procedure was complicated by pericardial microperforation of the small fixation anchors, leading to a small amount of hemopericardium with subsequent self-sealing of the perforation. The pericardial injury and hemopericardium likely triggered an inflammatory response that manifested as pericarditis and recurrent exudative pleural effusion. The mechanism of the pleural effusion is either irritation of the left pleura by the adjacent inflamed pericardium or an immune-mediated inflammatory response similar to post-pericardiotomy syndrome and Dressler syndrome.

FOLLOW-UP

The patient was discharged home on a 2-week course of NSAIDs and colchicine. A follow-up phone call at 3 weeks was performed and patient reported resolution of her symptoms while taking the anti-inflammatory medications; however, she started experiencing intermittent chest pain after completing her medical therapy. Repeat chest CT scans at 3 and 4 weeks showed unchanged small left pleural effusion and trace pericardial effusion. She was advised to take NSAIDs as needed, with relief of her chest pain. At 8 weeks, patient had complete resolution of her symptoms and she resumed her daily activities.

CONCLUSIONS

We report the first case of recurrent left pleural effusion in the setting of pericarditis after placement of the Watchman device. Physicians should be aware of this rare complication and treat it conservatively with NSAIDs and colchicine before considering invasive treatments.

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