



Case report

Pericardioperitoneal and pericardiopleural windows: A drainage technique for the treatment of recurrent cardiac tamponade. A case report

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ABSTRACT

Introduction: Given that pericardial effusion may sometimes lead to cardiac tamponade and chronic heart failure, its management seems absolutely essential. In case of a poor response to medical therapy, surgical drainage of the effusion is required. Although some drainage procedures for pericardial effusion (e.g., temporary puncture, pericardiopleural drainage, and pericardioperitoneal drainage) are currently used in clinical practice, their long-term efficacy remains unclear.

Presentation of case: We present a case of a 58-year old female with recurrent pericardial effusion secondary to systemic lupus erythematosus. Since she was relatively young and on steroids, long-term patency of pericardial fenestration needed to be insured without any device. Hence, we created 2 pericardial windows, pericardioperitoneal and pericardiopleural, via a single-incision subxiphoid approach to allow the effusion to drain into the abdominal and thoracic cavities.

Discussion: It is important to efficiently manage pericardial effusion because it can lead to more serious conditions such as cardiac tamponade and chronic heart failure. Our technique, which involves making a small incision, can reduce the risk of recurrence.

Conclusion: Simultaneous creation of pericardioperitoneal and pericardiopleural windows is simple and can be feasibly performed to prevent the recurrence of pericardial effusion.

1. Introduction

Caused by various disorders, recurrent pericardial effusion sometimes leads to cardiac tamponade, which can be difficult to manage. If medical therapy fails to control the disease, drainage of the effusion is required. Most of such severe cases are malignant. Here, we present a case of recurrent cardiac tamponade in a female with systemic lupus erythematosus (SLE) who was referred for surgical drainage. Because of the patient's medical history and her relatively young age, it was deemed necessary to keep the drainage route patent for a long time without using any device (e.g., a tube). Thus, we created both pericardioperitoneal and pericardiopleural windows at the same time by making a small incision to allow for proper drainage of the pericardial fluid. This case has been reported in line with the SCARE criteria [1].

2. Case report

A 58-year-old woman presented with dyspnea on exertion. She had a

medical history of SLE and was on prednisolone. She also reported having undergone percutaneous drainage for cardiac tamponade 1 year ago, followed by a repeated operation 9 months later. Pericardial fluid analysis after both operations had revealed no findings indicative of malignancy or tuberculosis, thus suggesting the possibility that the recurrent effusion might have been caused by SLE. Her chest X-ray and computed tomography showed cardiac tamponade resulting from a reaccumulation of fluid in the pericardial cavity (Figs. 1 and 2). Percutaneous drainage was performed for the third time, and the patient was placed on standard medical therapy with diuretics, aspirin, and colchicine. Nevertheless, the disease recurred after a short while; hence, we opted for pericardial window creation.

Following induction of general anesthesia and single lumen orotracheal intubation and ventilation, the pericardium and peritoneum were opened via a longitudinal subxiphoid approach. Dissection of the diaphragm along with the pericardium and peritoneum led to the creation of an opening (4 × 4 cm) between the pericardial sac and the abdominal cavity above the left hepatic lobe. The cut edges of the

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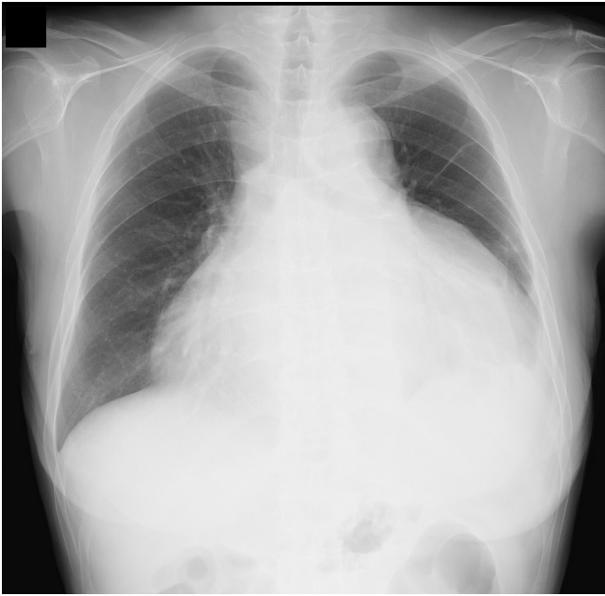


Fig. 1. Preoperative chest X-ray shows cardiomegaly.

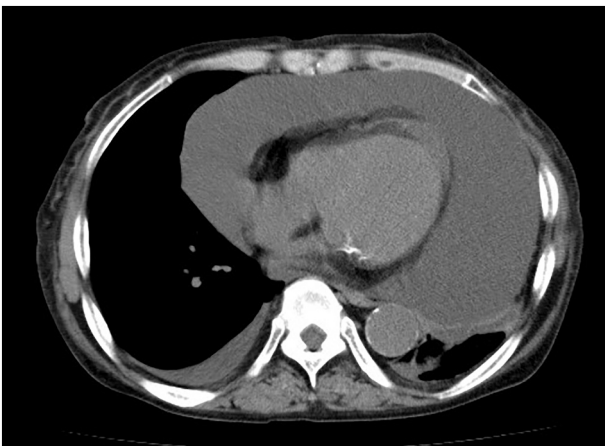


Fig. 2. Preoperative computed tomography shows massive pericardial effusion.

pericardium, diaphragm, and peritoneum were then sutured together with a polypropylene suture to prevent hole shrinkage. Next, the right mediastinal pleura was incised and resected (4×2 cm) immediately above the diaphragm to join the pericardial and right thoracic cavities in front of the inferior vena cava (Fig. 3). Care was taken not to damage the phrenic nerve. No drainage tube was required (Fig. 4). The post-operative course was uneventful, and the patient is currently free from clinical recurrence. The effusion was mainly diverted into the abdominal cavity (Fig. 5). The patient had recurred cardiac tamponade frequently, but has not recurred for the last two years after undergoing the above-mentioned technique.

3. Discussion

Pericardial effusion can be caused by several different factors such as cancers, inflammatory diseases, autoimmune disorders, and post-operative complications [2,3]. It is crucially important to efficiently manage pericardial effusion because it can lead to more serious conditions like cardiac tamponade and chronic heart failure. Generally, pericardial drainage is performed when the disease is uncontrollable by medical therapy and recurrence prevention is of high priority.

Temporary puncture, pericardiopleural drainage, and pericardioperitoneal drainage are currently practiced as common drainage methods [4]. The patient reported here was relatively young, which highlighted the importance of selecting a drainage procedure with superior long-term patency, and was a steroid user, which made us hesitate about implanting any device (e.g., a tube), for fear of infection. In other words, we had to choose a procedure that was capable of preventing disease recurrence, involved using or implanting no specific device, and could be carried out through as small an incision as possible. Accordingly, we simultaneously created pericardioperitoneal and pericardiopleural windows via a subxiphoid approach. Diversion of pericardial effusion into the chest cavity through thoracotomy or into the abdominal cavity via the subxiphoid approach has been previously reported; however, the efficacy and patency rates remain unclear [5]. To incorporate the benefits of both procedures, we opened the pericardium to both of the chest and abdominal cavities. In doing so, a pericardial incision was made slightly to the right of midline so that we could easily incise the right mediastinal pleura. Additionally, we could create a pericardioperitoneal window on the liver via this approach, thereby preventing the abdominal viscera from herniating. To the best of our knowledge, we are the first to conduct this procedure. Therefore, the recurrence rate of pericardioperitoneal connection and that of the pericardiopleural window are not clear. Furthermore, owing to the paucity of information on long-term complications such as a herniating, further follow-up and studies on this technique are needed.

In conclusion, simultaneous creation of pericardioperitoneal and pericardiopleural windows is simple and can be feasibly performed to prevent the recurrence of pericardial effusion.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Ethical approval

There is no ethical approval was obtained as it's a case report.

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Not applicable.

Guarantor

Shinichi Ishida.

CRediT authorship contribution statement

Shinichi Ishida (1) the conception and design of the study, acquisition of data, analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content, (3) final approval of the version to be submitted.

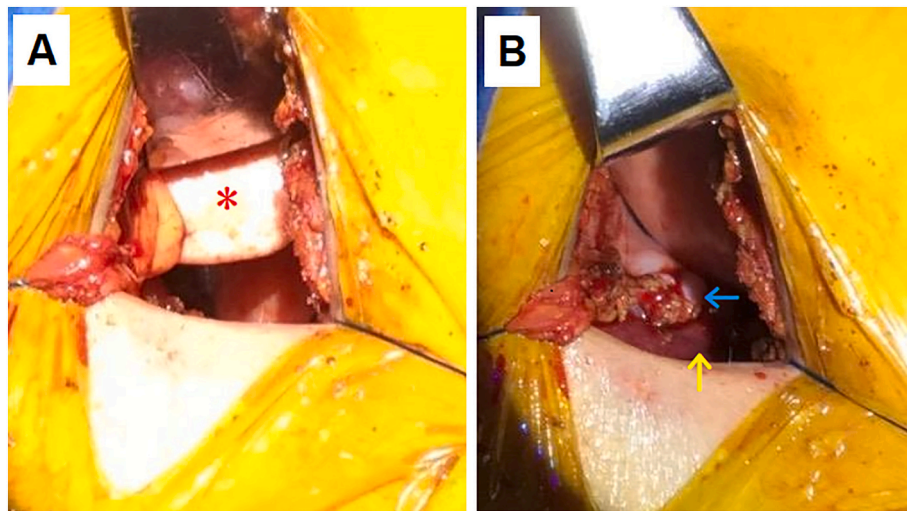


Fig. 3. Intraoperative images. (A) The right lung (red asterisk) is exposed via right thoracotomy. (B) The pericardioperitoneal window (blue arrow) is seen by retracting the right lung. A continuous suture is placed on the cut edges. The left hepatic lobe can be observed directly below the pericardioperitoneal window (yellow arrow).

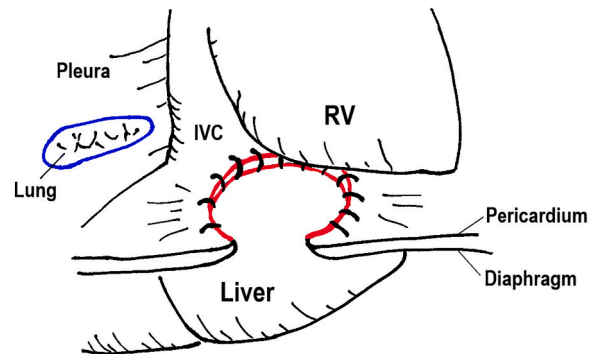


Fig. 4. Schematic view of the surgical field. The edge of the pericardioperitoneal window (red line) is sutured using a continuous suture. A pericardiopleural window (blue line) is created by incising the right mediastinal pleura above the diaphragm. RV: Right ventricular, IVC: Inferior vena cava.

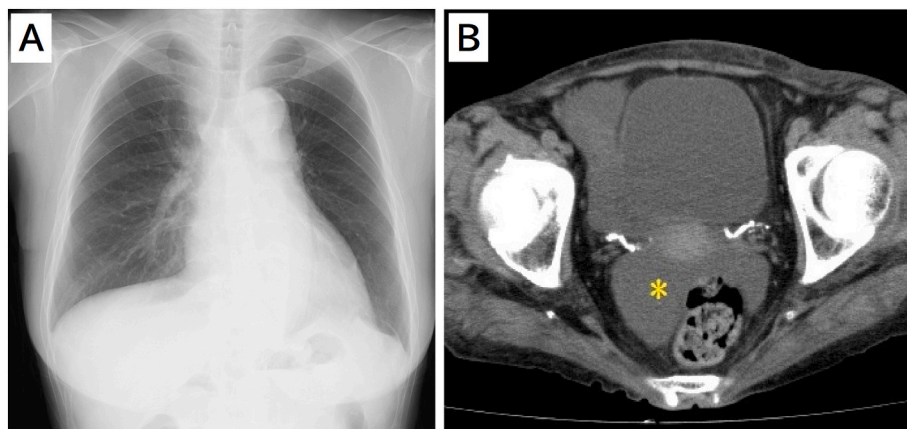


Fig. 5. A. Postoperative chest X-ray demonstrates no pericardial effusion. The pleural effusion on the right is also inconspicuous. B. Postoperative computed tomography illustrates a small amount of fluid in the pelvic floor (yellow asterisk).

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Declaration of competing interest

The authors declare having no conflicts of interest for this article.

References

- [1] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, SCARE Group, The SCARE 2020 guideline: updating consensus surgical CAse REport (SCARE) guidelines, *Int. J. Surg.* 84 (2020) 226–230.
- [2] T.S. Tsang, J.K. Oh, J.B. Seward, Diagnosis and management of cardiac tamponade in the era of echocardiography, *Clin. Cardiol.* 22 (1999) 446–452.
- [3] D.W. Moores, S.W. Dziuban Jr., Pericardial drainage procedures, *Chest Surg. Clin. N. Am.* 5 (1995) 359–373.
- [4] J.M. Piehler, J.R. Pluth, H.V. Schaff, G.K. Danielson, T.A. Orszulak, F.J. Puga, Surgical management of effusive pericardial disease. Influence of extent of pericardial resection on clinical course, *J. Thorac. Cardiovasc. Surg.* 90 (1985) 506–516.
- [5] N. Wang, J.R. Feikes, T. Mogensen, et al., Pericardioperitoneal shunt: an alternative treatment for malignant pericardial effusion, *Ann. Thorac. Surg.* 57 (1994) 289–292.