

# Pericardiectomy and pericardium window creation to treat recurrent pericardial tamponade involving a borderline ovarian tumor

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## Summary

**Purpose of investigation:** Pericardial effusion with cardiac tamponade is an uncommon metastatic manifestation of ovarian tumors, with only one previously reported case involving a borderline ovarian tumor (BOT). **Case:** A 50-year-old woman was diagnosed and treated for a primary Stage IIc BOT. The disease recurred as an emergency pericardiocentesis eight years later, which was resected following pericardial effusion with a cardiac tamponade. This occurred two more times, and on the last occasion, drainage failed to relieve her symptoms. However, her symptoms resolved after the creation of a pericardium pleural window together with a pericardiectomy. **Conclusion:** For patients with a metastatic BOT, the creation of a pericardium pleural window and pericardiectomy is effective for recurrent pericardial tamponade, if the pericardial space is posteriorly located and/or segmented.

**Key words:** Pericardiectomy; Pericardium window creation; Pericardial tamponade; Borderline ovarian tumor.

## Introduction

Metastatic disease to the heart occurs most commonly with lung and breast cancers, melanoma, lymphoma, and leukemia. Metastatic spread to the pericardium is uncommon with malignant ovarian tumors. Ten cases of malignant ovarian tumors leading to malignant pericardial effusion have been reported, but only one of these involved a borderline ovarian tumor (BOT) (Table 1). Cardiac tamponade is life-threatening if not promptly treated, and in patients with a known malignancy, the development of a symptomatic pericardial effusion is usually associated with a short median survival (two to four months from the time of detection) [1-3]. The authors report a case of metastatic pericardial effusion from a BOT in which longer survival was achieved.

## Case Report

A 50-year-old woman, gravida two para two, presented with bilateral ovarian cysts. She had a history of cardio-pulmonary disease. Optimal tumor debulking surgery was performed followed by six cycles of chemotherapy consisting of paclitaxel and carboplatin for Stage IIc papillary serous BOT with non-invasive implants. She was disease-free for the next five years, after which mediastinal adenopathy was identified on surveillance imaging. Three cycles of systematic chemotherapy consisting of paclitaxel and carboplatin were administered, but no therapeutic benefit was obtained. The patient was asymptomatic and therefore discontinued chemotherapy.

Forty-two months after completing paclitaxel and carboplatin, the patient presented with a one-week history of a worsening cough, dyspnea, and fatigue. A computed tomography (CT) scan and echocardiogram revealed a pericardial effusion with cardiac tamponade, thickening of the pericardium, and bilateral pleural effusions. A heart catheterization was performed, followed by pericardiocentesis, from which 1,000 ml of malignant sanguineous fluid was obtained. The pericardial catheter was removed after an echocardiogram demonstrated minimal pericardial effusion. Pericardial cytology revealed malignant cells, which was consistent with the results of a subsequent biopsy from the primary ovarian tumor.

Pericardial effusion with tamponade and bilateral pleural effusions recurred after 14 months, and heart catheterization was performed again. A percutaneous pericardial drain tube was withdrawn after 1,000 ml of serosanguineous fluid had been removed.

The pericardial effusion with tamponade and bilateral pleural effusions then recurred four months later (Figure 1). Because a CT scan showed no growth of the mediastinal adenopathy and no abdominal metastasis, pericardial metastasis was considered unlikely. The pericardial space was segmented with multiple cystic walls, and effusion was still present in the posteriorly located cysts. Heart catheterization was repeatedly performed, but the percutaneous pericardial drain removed only 230 ml of serosanguineous fluid.

The patient's condition deteriorated. In these cases, pericardiectomy and creation of a pericardium pleural window can extend survival by at least six months. Therefore, the present authors excised the pericardium anterior to the bilateral phrenic nerve in this patient. After the operation, the patient's physical condition improved dramatically. The final histologic examination of the thickening pericardium revealed a metastatic papillary serous tumor of borderline malignancy (Figure 2).

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Table 1. — Characteristics of cases of malignant ovarian tumors leading to malignant pericardial effusion.

Authors	Age*/Stage	Ovarian tumor histology	Time interval †	Treatment of pericardial effusion	Time interval ‡
Current study	61/IIIC	Serous BOT	99 months	Pericardiocentesis; recurrent effusion treated by pericardium pleural window creation and pericardiectomy	35+ months
Micha <i>et al.</i> [7]	46/IIIC	Serous BOT	68 months	Pericardium window, talc pleurodesis, tube thoracostomy; recurrent effusion treated by pericardiocentesis and mitoxantrone instillation	25+ months
Petersen <i>et al.</i> [8]	52/IV	Serous adenocarcinoma	33 months	Pericardiocentesis, thiotepa instillation	12 months
Blich <i>et al.</i> [9]	74/IIIC	Serous adenocarcinoma	27+ months	Pericardiocentesis	1 month
Winter <i>et al.</i> [10]	43/NSb	Serous adenocarcinoma	Presentation	Pericardiocentesis	1 month
Maenpaa <i>et al.</i> [11]	67/IIIB	Serous adenocarcinoma	18 months	Pericardiocentesis, systemic chemotherapy	11 months
Donato <i>et al.</i> [12]	61/III	Poorly differentiated carcinoma	6 months	Pericardiocentesis, tetracycline instillation	Within 1 day
Lund <i>et al.</i> [13]	53/III	Serous adenocarcinoma	18 months	Repeated pericardiocentesis, tetracycline instillation	1 month
Lund <i>et al.</i> [13]	60/IV	Adenopapilliferous carcinoma	27 months	Repeated pericardiocentesis	3 months
Griffith <i>et al.</i> [14]	64/NSc	Undifferentiated carcinoma	Cancer diagnosis made at autopsy	Pericardiocentesis	2 months

BOT: borderline ovarian tumor; NSb: not staged secondary to poor medical condition; NSc: no surgery performed. \*age at initial pericardial effusion. †from diagnosis of the primary tumor to the discovery of pericardial effusion. ‡from diagnosis of the pericardium metastasis to death.

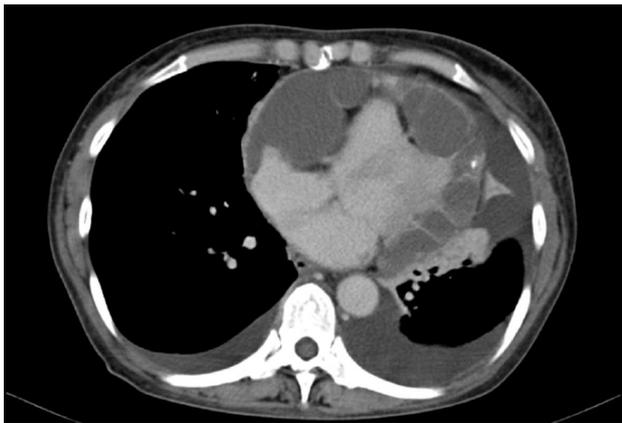


Figure 1. — A computed tomography scan demonstrating pericardial effusion with cardiac tamponade.

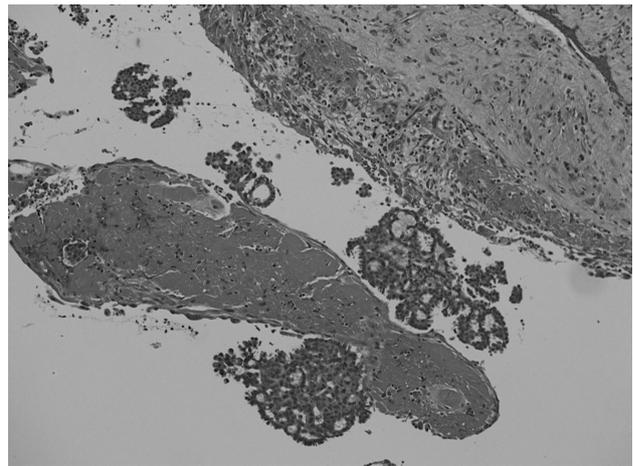


Figure 2. — Histological examination revealed that the pericardial mass was a metastatic papillary serous tumor of borderline malignancy.

The patient was discharged two weeks after surgery and at the time of reporting has remained asymptomatic for more than 31 months.

## Discussion

The management of malignant pericardial tamponade in cases of BOT needs to address a number of issues. The first of these is how to successfully treat a critical cardiac tamponade. In an emergency, the goal is simply to relieve the tamponade, which may be achieved with percutaneous drainage or by surgery. As pericardiocentesis is less invasive than pericardiectomy; the former is usually the first procedure performed in this situation. Pericardiocentesis is successful in more than 90% of patients with an anterior

effusion, but in less than 60% of patients with small, posteriorly located effusions [3]. When drainage is difficult, therapy in terminally ill patients should be limited only to the control of symptoms. However, if survival beyond a few months is possible, the objective should be to obtain a complete and stable control of effusion for as long as possible, and to extend survival. In cases of ovarian cancer, the mean survival is estimated to be two months after the discovery of peritoneal dissemination (Table 1). As a symptomatic pericardial effusion from a malignant ovarian tumor predicts a poor prognosis, pericardiectomy will not generally be performed. In the present case, the third percutaneous pericardial drain removed only 230 ml of

serosanguineous fluid, because the pericardial space was segmented by multiple cystic walls, and the posteriorly located effusion could not be reached. The present authors therefore used a more invasive treatment, but one that was more likely to provide a cure. They performed a pericardiectomy, in which they excised as much of the pericardium as possible, and created a pericardium pleural window. This was successful, and the patient remains asymptomatic at the time of reporting, more than 18 months after the procedure. Pericardiectomy should be considered when fluid re-accumulates [4, 5]. The emergency creation of a pericardium pleural window and pericardiectomy may be effective for a malignant pericardial tamponade in a BOT patient, particularly when the pericardial effusion is segmented and posteriorly located.

The second problem is how to prevent recurrence in the long-term. Pericardiocentesis alone may be sufficient for the resolution of large effusions, but recurrences are common. In the present case, pericardiectomy was finally performed after repeated pericardiocentesis failed to prevent the recurrence of pericardial effusion. For the long-term prevention of recurrences, various approaches have been proposed: extended drainage, pericardial window, sclerosing local therapy, local and/or systemic chemotherapy, and radiotherapy. The outcomes of various therapeutic approaches vary for different tumor types [4, 5]. Recurrent BOTs are sometimes resistant to chemotherapy, and in the present case, three cycles of chemotherapy, consisting of paclitaxel and carboplatin, were ineffective. As the tumors seemed to be resistant to chemotherapy, pericardiocentesis alone was performed. Local chemotherapy may be effective and less invasive, and platinum-based therapy is suggested in cases of ovarian cancer [5]. In the present review of ovarian cancer cases, pericardiocentesis and the administration of an antineoplastic drug or a cytotoxic sclerosing agent is more commonly performed than surgical treatment, to prevent recurrence (Table 1). However, these patients have a poor prognosis and on average survive for less than 12 months. In general, for BOTs with invasive implants, no effective chemotherapy has been reported [6]. Micha *et al.* reported that mitoxantrone instillation was effective in a case of BOT [7], and a survival of more than two years was expected (Table 1). Drainage and local chemotherapy may be good choices in these cases. In the present case, a pericardiectomy resulted in good long-term survival, comparable to a previous BOT case in which mitoxantrone instillation was performed. A pericardiectomy that excises as much of the pericardium as possible may be effective for preventing the recurrence of pericardial tamponade after metastatic spread from a BOT, especially when it is difficult to achieve drainage.

In conclusion, pericardiocentesis with local chemother-

apy or pericardiectomy, in which as much of the pericardium is excised as possible, may be a potential treatment to achieve long term disease-free survival in patients with a malignant pericardial tamponade arising from a BOT.

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