

Malignant Pericardial Effusion

Malignant pericardial effusion is common in patients with cancer, and it may be life-threatening when associated with cardiac tamponade. Cancers associated with malignant pericardial effusion include lymphoma, leukemia, breast cancer, lung cancer, melanoma, and sarcoma. Unfortunately, prognosis in these patients is often poor which is an important factor to consider in the overall treatment plan.

Pathophysiology

Pericardial effusions in patients with cancer may occur through multiple mechanisms:

- Pericardial metastases
- Chemotherapy side effects
- Radiation toxicity
- Infection
- Impaired lymphatic drainage

The accumulation of fluid leads to the following:

- **Decreased venous return** to the RV
- **Equalization of the intraventricular pressures and ventricular interdependence**
 - Under normal circumstances, venous return to the RV increases and pulmonary venous return to the LV falls during inspiration.
 - In tamponade the RV free wall cannot bow outwards to accommodate this increased fluid and instead the interventricular septum moves into the LV cavity, causing a further drop in cardiac output.

Clinical Presentation

Symptoms may be non-specific such as shortness of breath on exertion, chest discomfort, palpitations, orthopnea, or generalized malaise. If the effusion is chronic, peripheral edema and ascites may also occur. Patients can be asymptomatic and then rapidly decompensate so a high index of suspicion is needed.

Be on the look out for features suggestive of tamponade:

Clinical Symptoms and Signs

- Sinus tachycardia, hypotension, pre-syncope/syncope
- Shortness of breath
- Muffled heart sounds
- Elevated JVP
- Pulsus paradoxus: Decrease in systolic blood pressure >10mmHg during inspiration

Investigations

- Chest x-ray: Large cardiac silhouette
- ECG: Electrical alternans or low voltages
- CT chest: Large effusion, IVC dilation, cardiac compression, bowing of the septum (may also be incidentally seen on abdominal imaging)
- Transthoracic echocardiogram (see diagnosis section)

The classic Beck's Triad (elevated jugular venous pressure, muffled heart sounds, hypotension) is uncommonly seen.

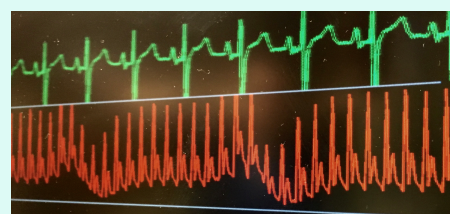
Diagnosis

The diagnosis of malignant pericardial effusion should be suspected in any hemodynamically unstable cancer patient. Although the diagnosis is of tamponade is a clinical one, an **urgent echocardiogram** should be arranged to rule out features of tamponade.

Echo findings of cardiac tamponade include the following:

- Right atrial diastolic collapse (corresponds to ventricular systole)
- Right ventricular diastolic collapse
- Dilated inferior vena cava

In addition to checking for pulsus paradoxus with a manual blood pressure cuff, it may also be manifested by inspiratory variation in blood pressure on the arterial line as demonstrated below.



Approach to Management

1

Initial Stabilization for Patients in Shock:

- Arranging pericardial drainage is the first priority
- Temporizing measures while waiting:
 - IV fluids to maintain preload
 - Vasopressors to maintain MAP
 - Avoid any vasodilators

Induction for intubation may result in cardiovascular collapse due to drop in pre-load → **Avoid intubation if possible**. If it cannot be avoided, call for advanced airway expertise and consider awake approach.

2

Echo-Guided Pericardiocentesis

This is the mainstay of treatment for most patients with malignant pericardial effusion and it has been shown to be safe and effective.

- Relative Contraindications: Severe coagulopathy, anticoagulation, platelets < 50
- Pericardial drain should be left in place until output is < 30mL/24hrs

3

Additional Considerations:

- Even if the patient is not in shock on presentation, malignant effusions tend to progress over time → Drainage may be considered to prevent future complications.

Recurrence rates are high so additional interventions may be needed to prevent fluid re-accumulation:

- Pericardial window
- Systemic chemotherapy or radiation therapy
- Balloon pericardiotomy
- Direct instillation of sclerosing agents or chemotherapy into the pericardium

Characteristics of the underlying cancer, patient's prognosis, and quality of life should be discussed with the patient and their Oncologist prior to pursuing more definitive management options.