

TECHNIQUE

Percutaneous balloon pericardiotomy in the management of recurrent malignant pericardial effusions

Graham Jackson, David Keane, Bet Mishra

Abstract

Two patients with recurrent symptomatic pericardial effusions secondary to malignant disease were successfully treated by percutaneous balloon pericardiotomy. Open surgery was avoided and the procedure was completed under local anaesthesia in less than 40 minutes. The first patient was free of recurrence at nine months but pericardial effusion recurred at two months in the second patient.

Percutaneous balloon pericardiotomy offers a potentially important new means of relieving recurrent tamponade and substantially reduces trauma to the patient.

(*Br Heart J* 1992;68:613-5)

Recurrent symptomatic pericardial effusions can complicate malignant disease. They usually lead to increasing breathlessness as the tamponade develops. When conventional catheter drainage does not relieve symptoms and prevent recurrence the creation of a pericardial window by open surgical techniques has until now been the only other available treatment.¹ Unfortunately a 30 day mortality of up to 60% has been reported: this probably reflects the severity of the systemic illness.² A safe and effective non-surgical method to relieve symptoms in these patients would avoid the risks of general anaesthesia and surgery. Palacios *et al*³ reported on the effectiveness of creating a pericardial window with a percutaneous balloon technique and in a multicentre study of 55 patients the success rate was 93%.⁴

We report our experience of this technique in the management of two patients with recurrent malignant pericardial effusions.

Patients and methods

METHOD

The procedure was performed in the cardiac catheterisation laboratory with aseptic technique under fluoroscopic and echocardiographic guidance. The patients were sedated with intravenous diazepam, and intravenous pethidine was administered for analgesia. Local anaesthesia was achieved with 1% lignocaine.

We used a percutaneous subxiphoid approach to insert an 0.32 inch guide wire into the pericardial space. A 7 French pigtail catheter was passed over the wire. After 500 ml of fluid was removed to relieve symptoms the catheter was withdrawn and the wire was left in place. A 14 F dilator was inserted through the fibrous and parietal pericardium over the wire (fig 1). A low profile balloon dilating catheter (23 mm diameter, 4 cm long) (Mansfield Scientific) was exchanged over the wire and advanced into the pericardial space. The balloon was partly inflated with a mixture of contrast medium and saline under low pressure and gradually withdrawn until the waisting of the balloon by the pericardium was at its midpoint (fig 2). The balloon was then manually inflated to its maximum pressure of 3.5 atmospheres until the waisting disappeared (fig 3). It was kept inflated for five minutes.

A 7 F pigtail catheter was then exchanged over the wire and the effusion was completely drained. The pigtail catheter was left in place and drained every four hours for 24 hours. The catheter was removed after complete resolution of the effusion had been confirmed by echocardiography. A chest x ray was taken before, immediately after and 24 hours after the procedure to exclude a pneumothorax.

PATIENTS

Both patients had had two previous pericardiocenteses for relief of cardiac tamponade. In both cytology of the pericardial fluid showed a metastatic adenocarcinoma.

Case 1

The first patient was a 44 year old women with a four year history of ductal carcinoma of the breast. She had been managed with post-operative radiotherapy to the right chest wall and had had adjuvant hormonal therapy. In addition she subsequently received systemic chemotherapy for metastatic cutaneous disease and pulmonary metastases. Four months before percutaneous balloon pericardiotomy she had presented with cardiac tamponade which was relieved by pericardiocentesis. Cardiac tamponade recurred one month later and as the patient was keen to avoid open surgery, pericardiocentesis was repeated. She remained symptom free for three months until peri-

Cardiology
Department, Guy's
Hospital, London
G Jackson
D Keane
M Mishra

Correspondence to:
Dr Jackson, Cardiology
Department, Guy's Hospital,
St Thomas Street, London
SE1 9RT.

Accepted for publication
10 August 1992.

Figure 1 Guide wire in pericardial space and dilating sheath in situ.

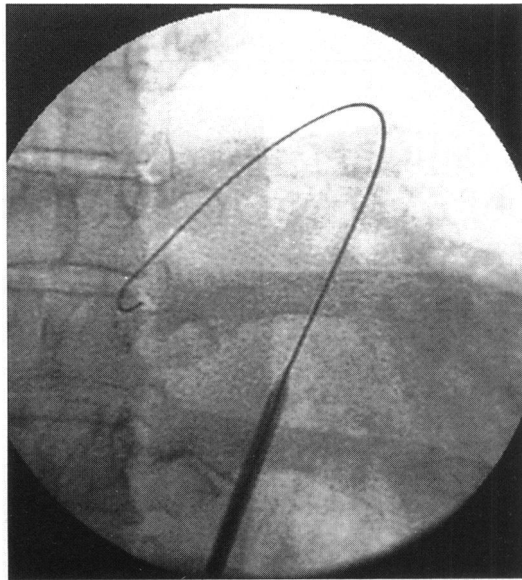


Figure 2 Fluoroscopy showing waisting of the balloon by the pericardium.

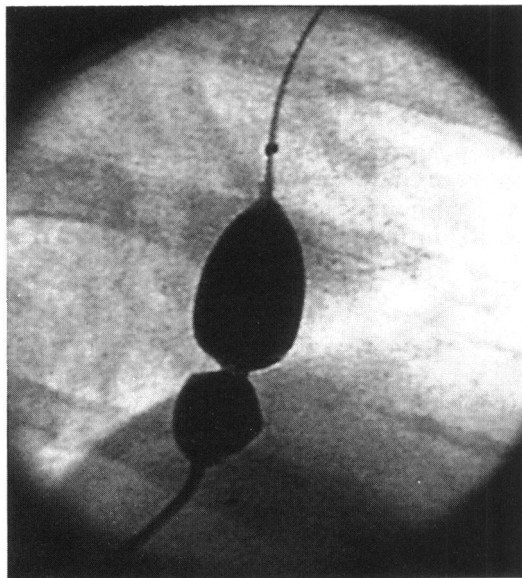
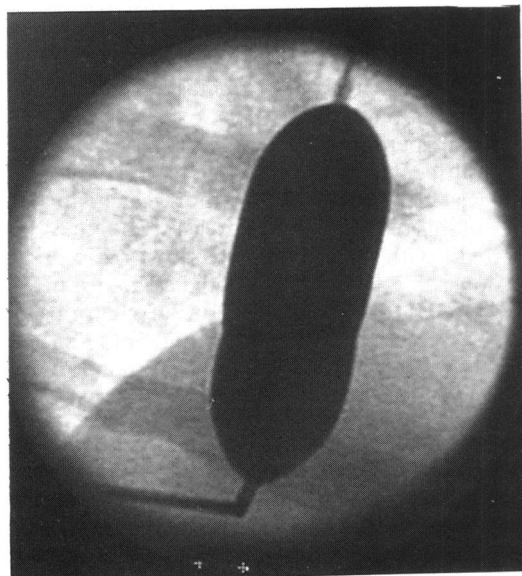


Figure 3 Fluoroscopy showing minimal residual waisting of the balloon after full inflation and creation of a window in the pericardium.



cardial effusion recurred and percutaneous balloon pericardiectomy was performed.

Case 2

The second patient was a 47 year old man who had presented nine months earlier with haemoptysis and pericardial tamponade which was managed with pericardiocentesis. Cervical and axillary lymph node histology showed a poorly differentiated adenocarcinoma: the site of the primary tumour, however, remains undetermined. Despite systemic chemotherapy, the pericardial effusion recurred after six months and a second pericardiocentesis was performed. Nine months later when the effusion again recurred percutaneous balloon pericardiectomy was performed.

Both patients tolerated the procedure very well but the first patient found the moment of balloon dilatation painful. So the second patient was given more analgesic and he felt no pain throughout the procedure. They were both ambulant 24 hours after the procedure. Their prognosis was poor, and they were pleased to have avoided open surgery.

Both patients were followed up with serial echocardiography. The first patient was free of recurrence of pericardial effusion (<1 cm) at nine months but a pericardial effusion recurred after two months in the second patient. He had a further pericardiocentesis, and three months later he died of a pulmonary embolus.

Discussion

Recurrent pericardial effusions leading to tamponade are an uncommon but distressing manifestation of malignant disease. When repeated aspiration has been unsuccessful management has included instillation of chemotherapeutic agents, radiotherapy, indwelling catheter drainage, or open surgery to the pericardium under general anaesthesia. There is no convincing evidence that instillation of therapeutic agents into the pericardium improves the clinical outcome and it can be associated with patient discomfort; radiotherapy carries a risk of cardiac damage; and prolonged indwelling pericardial catheter drainage carries a risk of introducing infection.

Because many patients are systemically ill surgery that can adversely affect the general condition of the patient is best avoided.

Ziskind *et al*⁴ reported the experience of the American registry of percutaneous balloon pericardiectomy and cited a 93% success rate (51 of 55 patients). In 48 patients malignancy was the cause of tamponade. Thirty two of these patients had died at 3.3 months with no recurrence of tamponade. Pleural effusions needing drainage occurred in eight patients and the four patients in whom drainage was unsuccessful had surgical procedures.

We report the use of percutaneous balloon pericardiectomy in the treatment of two patients with recurrent malignant effusions. The recurrence of pericardial effusion in our second patient is of interest. It has previously been shown that whereas survival after open surgery is not influenced by the extent of pericardial resection, recurrence of pericardial effusion is

more common in patients who have a limited pericardiectomy (2×2 cm) rather than a more extensive pericardial resection.² It seems that percutaneous balloon pericardiectomy which produces a tear in the pericardium of approximately 2.0 cm in diameter,⁵ is likely to be most useful in patients with terminal disease who may not live long enough for a recurrence to develop. Additionally, balloon pericardiectomy may be performed at more than one pericardial site through one percutaneous puncture. This may possibly offer further protection from recurrence of pericardial effusion after percutaneous balloon pericardiectomy.

Percutaneous balloon pericardiectomy seems to be useful in patients with malignant disease and a short life expectancy. It avoids the morbidity and the discomfort of open surgery in terminally ill patients. It has the advantages of avoiding general anaesthesia, of being a relatively short procedure, and of facilitating rapid mobilisation. A carefully controlled study is required to determine whether its use

can be extended to tamponade with other aetiologies and whether it is effective for longer periods.

- 1 Park J, Rentschler R, Wilbur D. Surgical management of pericardial effusion in patients with malignancies. *Cancer* 1991;67:76-80.
- 2 Palantianos G, Thurer R, Kaiser G. Comparison of effectiveness and safety of operations on the pericardium. *Chest* 1985;88:30-3.
- 3 Palacios I, Tuzcu E, Siskind A, Younger J, Block P. Percutaneous balloon pericardial window for patients with malignant pericardial effusion and tamponade. *Cathet Cardiovasc Diagn* 1991;22:244-9.
- 4 Ziskind AA, Pearce AC, Bustein S, Herrmann HC, Gimple LW, Block PC, Waldman HM, Tuzcu EM, Lemmon C, Palacios IF. Percutaneous balloon pericardiectomy for the treatment of Pericardial Effusion and Tamponade: Report of the Registry. *J Am Coll Cardiol* 1992;265:788-1.
- 5 Ziskind AA, Pearce AC, Lemmon C, Knox JG, Beauman GJ, Mergner WJ, Herzog WR, Rodriguez S, Gurbel PA, Stafford JL. Feasibility of percutaneous balloon biopsy and pericardioscopy as an adjunct to balloon pericardiectomy for the diagnosis and treatment of pericardial disease [abstr]. *J Am Coll Cardiol* 1992;19:267.

Addendum

A United Kingdom registry for percutaneous balloon pericardiectomy is being formed. Please contact GJ for further information.