Unusual association of diseases/symptoms

Cardiac tamponade and heart failure secondary to ventriculo-pleural shunt malfunction: a rare presentation

M Zaman,¹ H Akram,² N Haliasos,³ S Bavetta³¹A&E, Newham University Hospital, London, UK;²Victor Horsley Department of Neurosurgery, The National Hospital for Neurology and Neurosurgery, London, UK;³Neurosurgery, Queens Hospital, Romford, UK

Correspondence to: M Zaman mousumi0001@yahoo.com

Summary

We report an unusual case of a patient with a ventriculo-pleural shunt presenting with signs and symptoms of heart failure due to massive pericardial effusion. Imaging revealed the distal shunt catheter end within the middle mediastinum to have migrated from the pleural space. The patient underwent a shunt revision procedure resulting in complete resolution of the presenting pathology. We intend to draw the reader's attention to this rare presentation of ventriculo-pleural shunt malfunction.

BACKGROUND

This patient has presented to his local A&E with an ongoing cardiac sign and symptoms included difficulty in breathing, pedal oedema and bi-basal crepitations. He was initially diagnosed with congestive cardiac failure and secondary ascites, however, further investigations revealed erosion of pericardium by the shunt tip causing a massive pericardial effusion. Considering it is an extremely rare presentation of ventriculo-pleural shunt complication and can be quite confusing at an early stage, we felt that this is an important case for doctors working in emergency departments as well as for neurosurgeons.

CASE PRESENTATION

A 34-year-old male patient with learning disability presented to the hospital with a gradual onset of breathing difficulty, ankle swelling and abdominal distension. The symptomatology manifested slowly over 4 months mainly with recurrent alternating unilateral leg swellings and worsening mobility, which was, in retrospect, identified as also due to gradual shortness of breath according to the patient's carer. At that time, however, the main focus fell on the lower limbs that were investigated with an ultrasound scan showing no pathological findings. The patient had planned to consult with the cardiology team as an outpatient when the problem presented itself as a case of severe acute shortness of breath leading to him being hospitalised. The patient has had multiple cerebrospinal fluid (CSF) shunting procedures since childhood for hydrocephalus, which occurred as sequelae of bacterial meningitis. In 2004, his ventriculo-peritoneal shunt was changed to a ventriculo-pleural shunt due to peritoneal thickening resulting in shunt malfunction. On examination, signs of cardiac failure, like bilateral pedal oedema and bi-basal crepitations, had been noted.

INVESTIGATIONS

A chest x-ray on admission showed an enlarged cardiac shadow (figure 1). Echocardiography showed a significant

pericardial effusion while subsequent chest CT scan displayed the surprising finding of the tip of the ventriculo-pleural shunt eroding into the pericardial sac (figure 2). The patient had no other significant comorbidities or any anatomical/structural abnormalities in his chest.

DIFFERENTIAL DIAGNOSIS

This is a case of congestive cardiac failure.

TREATMENT

Emergency revision of the ventriculo-pleural shunt was performed. This was a challenging procedure with both the neurosurgeon and the cardiothoracic surgeon involved due to possible adhesions of the shunt tip causing injury to the pericardial sac and heart during extraction. A small opening was made to the right chest wall below the clavicle and above the nipple. After carefully disengaging the distal catheter from inside the pericardium, the shunt tip was shortened and placed away from the pericardial sac to the right side of the pleural space. Postoperative imaging showed an appropriately placed ventriculo-pleural shunt and the patient showed a significant clinical improvement with complete resolution of the pericardial effusion.

OUTCOME AND FOLLOW-UP

- Immediate clinical improvement, supported by radiological evidence of resolution of the pericardial effusion.
- Regular outpatient follow-up has been arranged in the neurosurgery outpatient clinic.

DISCUSSION

Cerebrospinal shunts are commonly used to treat hydrocephalus in children and adults. They were introduced in the beginning of the twentieth century and have been evolving ever since.¹

There are various types of shunts and shunting procedures. They all work by creating a diversion or an alternate route for CSF drainage. The commonest of these are

Figure 1 AP chest x-ray showing signs of cardiomegaly.

Figure 2 CT chest (A) before the shunt revision, the arrow shows the shunt tip lying into the pericardium; (B) three weeks after the shunt revision, arrow shows the correct position of the revised shunt into the pleural space. There is significant reduction of the pericardial effusion.

the ventriculo-peritoneal shunts that divert the CSF into the peritoneal cavity. Other less used procedures include ventriculo-atrial and ventriculo-pleural shunts. Lumbo-peritoneal shunts drain CSF from the lumbar thecal space into the peritoneal cavity. Shunts carry a wide range of complications including shunt malfunction, infection and catheter migration.¹

Complications from shunts have indeed been described extensively in the literature with some authors reporting a complication rate of up to 25.7%.² Common complications include mechanical malfunction, infection, bowel perforation and obstruction, ascites and CSF loculation in

the abdomen, pleural effusion and empyema, and distal catheter migration.^{3 4}

Unusual cases of catheter tip migration have been reported: vaginal perforation,⁴ bowel perforation and trans-anal prolapse of catheter tip,⁵ migration into the scrotum through a patent processus vaginalis⁶ in ventriculo-peritoneal shunts and migration into the right ventricle and even into the pulmonary artery in ventriculo-atrial shunts.⁷

While cases of catheter tip migration and erosion into the pericardial space have been described as a complication for ventriculo-atrial shunts, we could not find reports suggestive of previous occurrence in ventriculo-pleural shunts.⁸

Learning point

Heart failure secondary to tamponade can present as a rare complication of ventriculo-pleural shunting and distal catheter migration should be considered as part of the differential diagnosis in those patients.

Ventriculo-atrial and ventriculo-pleural shunts have gone out of fashion due to the higher complication rate associated with those procedures, however, ventriculo-pleural shunts can be an alternative to ventriculo-peritoneal shunts when the use of the latter is not possible due to abdominal sepsis, scarring, fibrosis and bowel perforation.

Competing interests None.

Patient consent Obtained.

REFERENCES

1. **Robertson JS**, Maraga MI, Jennett B. Ventriculoperitoneal shunting for hydrocephalus. *Br Med J* 1973;**2**:289–92.
2. **Agha FP**, Amendola MA, Shirazi KK, *et al.* Unusual abdominal complications of ventriculo-peritoneal shunts. *Radiology* 1983;**146**:323–6.
3. **Iosif G**, Fleischman J, Chitkara R. Empyema due to ventriculopleural shunt. *Chest* 1991;**99**:1538–9.
4. **Davidson RI**. Peritoneal bypass in the treatment of hydrocephalus: historical review and abdominal complications. *J Neurol Neurosurg Psychiatr* 1976;**39**:640–6.
5. **Matsuoka H**, Takegami T, Maruyama D, *et al.* Transanal prolapse of a ventriculoperitoneal shunt catheter—case report. *Neurol Med Chir (Tokyo)* 2008;**48**:526–8.
6. **Crofford MJ**, Balsam D. Scrotal migration of ventriculoperitoneal shunts. *AJR Am J Roentgenol* 1983;**141**:369–71.
7. **Walter S**, Aurora DG, Howard AJ, Antonio AG. Intracardiac catheter as a foreign body of six years' duration resulting in endocarditis. *Chest* 1971;**59**:344–6.
8. **El-Eshmawi A**, Onakpoya U, Khadrugui I. Cardiac tamponade as a sequela to ventriculoatrial shunting for congenital hydrocephalus. *Tex Heart Inst J* 2009;**36**:58–60.

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