Intracardial migration of a ventriculoperitoneal shunt

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Accepted 11 November 2022

DESCRIPTION

A man in his mid 30s was admitted to the hospital with cephalea, nausea and vomiting. Intubation was necessary after he developed severe disorder of consciousness. Medical history was unremarkable.

CT revealed massive subarachnoidal haemorrhage (Hunt & Hess 4) due to an aneurysm of the anterior communicating artery (figure 1A). Surgical clipping of the aneurysm and implantation of an external ventricular drainage on both sides was performed. One month after being hospitalised, a ventriculoperitoneal shunt was implanted without any complications.

During neurological rehabilitation a control CT scan was initiated due to persisting psychotic disorder and lack of sustained clinical improvement. CT showed dilated hydrocephalic lateral ventricles with the tip of the shunt in the left lateral ventricle (figure 1B). A presumptive diagnosis of hydrocephalus due to shunt dysfunction was made.

Chest radiograph and CT (figure 2) revealed dislocation of the distal catheter. The shunt runs through the superior vena cava (SVC), the right atrium and right ventricle into the pulmonary arteries forming a loop from right to left and back to the right pulmonary artery.

The patient was immediately transferred to the department of neurosurgery for shunt revision. The dislocated catheter was carefully removed and a new ventriculoperitoneal shunt was implanted. Follow-up CT scans after revision showed reduction of ventricular size accompanied by neurological improvement.

Implantation of ventriculoperitoneal shunts is a common therapeutic option to treat hydrocephalus. In addition to the most common complications such as infection, abdominal pseudocysts, ascites, hernia, intestinal obstruction, shunt-fracture/dislocation,[1] intracardial migration of the distal catheter like in this case is rare.[2]

Literature reports two possible pathophysiological mechanisms for intracardial migration of ventriculoperitoneal shunts. One hypothesis in the literature is that migration into the venous system occurs to gradual erosion over time.[3]

In our case, the dislocation of the distal catheter was diagnosed only 2 months after implantation, so the possible mechanism in this case might be iatrogenic perforation of the SVC during the process of catheter-tunnelling in the cervicothoracic region.[4] In both possible mechanisms negative pressure during inspiration and movement of the head support the process of migration. Also venous blood flow towards the heart could support the protrusion and migration of catheters over time in case of perforation during the tunnelling process.

Possible complication of intracardial migration range from arrhythmia, cardiac insufficiency, pleural effusion to pulmonary embolism.[2]

Independent of the exact mechanism of shunt dysfunction the resulting neurological symptoms due to raised intracranial pressure[5] point to the importance of early diagnosis of shunt complications.

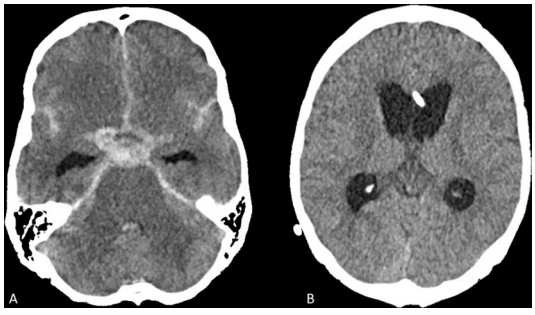

Figure 1 CT revealed subarachnoidal haemorrhage due to an aneurysm of the anterior communicating artery (A). One month after being hospitalised a ventriculoperitoneal shunt was implanted (B).

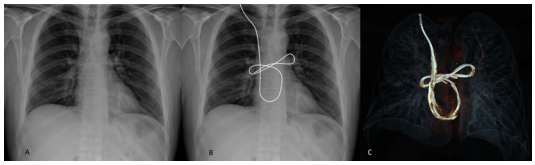

Figure 2 Chest X-ray showed intracardial dislocation of the ventriculoperitoneal shunt. The shunt runs through the superior vena cava, the right atrium and right ventricle into the pulmonary arteries forming a loop from right to left and back to the right pulmonary artery (A, B). Partial 3D reconstruction (C).3D, three dimension.

Learning points

- Lack of clinical improvement after hydrocephalus can occur due to migration of the shunt.
- Chest X-ray and chest-CT are useful in detection of a possible shunt migration.
- Early diagnosis of shunt complications is important.

Contributors FH and AO contributed to patient management and design of case report; FL and CB contributed to data interpretation and revision of the article; all authors are in agreement with the content of the manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Consent obtained directly from patient(s).

To cite: Hack F, Oder A, Baumgartner C, *et al*. *BMJ Case Rep* 2022;**15**:e253118. doi:10.1136/bcr-2022-253118

Provenance and peer review Not commissioned; externally peer reviewed.

Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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