Case reports

A case report aims to explore the cause of pressure adjustment dysfunction in a programmable shunt valve in a middle cranial fossa arachnoid cyst-peritoneal shunt patient and to underscore this dysfunction as an indicator of shunt valve obstruction.

A child with a ruptured giant arachnoid cyst in the left middle cranial fossa presented with acute intracranial hypertension following head trauma. The cystoperitoneal shunt for intracranial arachnoid cyst surgery rapidly alleviated symptoms, including headaches, vomiting, and left cranial nerve palsy, stabilizing the clinical condition. However, between 20 and 24 months after the initial shunt surgery, the patient developed intermittent shunt dysfunction, experiencing recurrent headaches and vomiting, during which the programmable valve's pressure setting had become fixed and was no longer adjustable. A second surgery was then performed to remove the existing shunt, excise the fibrotic cyst wall, fenestrate the basal cistern, and establish temporary subdural drainage. During this operation, extensive fibrosis of the cyst wall in the subdural space was discovered, forming a tough and hypertrophic fibrotic membrane that encased the cerebral hemispheres. This fibrotic material nearly filled the shunt valve chamber, causing valve obstruction and immobilizing the pressure control rod, resulting in pressure adjustment dysfunction. As the patient could not maintain stability without continuous drainage, a third surgery was ultimately necessary to place a subdural-peritoneal shunt. Five years of follow-up revealed no significant clinical symptoms, and the patient has maintained a normal life.

Shunt obstruction is an underestimated cause of cerebrospinal fluid shunt malfunction, with no current definitive method for early diagnosis. Fibrotic deposition is a primary mechanism underlying shunt valve obstruction. Pressure adjustment dysfunction in a programmable shunt valve serves as a reliable indicator of shunt valve obstruction. Further research should prioritize the treatment and prevention of shunt valve obstructions to improve outcomes in neurosurgical practice [1].

This case report highlights an important and underrecognized issue in programmable shunt valve management, effectively associating pressure adjustment dysfunction with valve obstruction. While it provides a strong clinical narrative and useful insights, its broader relevance is limited by the absence of contextual discussion and exploration of diagnostic or preventive strategies. Future research should aim to address these gaps, fostering improvements in the management and outcomes of cerebrospinal fluid shunt malfunction.

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A 4-year-old boy who had a complex history of posthemorrhagic hydrocephalus and who underwent more than 40 surgeries related to this condition. In the course of trying to treat his condition, ventriculoperitoneal, ventriculoatrial, and ventriculopleural shunts were inserted and failed. The child presented with a dysfunction of his shunt system. A ventriculopleural shunt was inserted, but within days the patient developed dyspnea as a clinical symptom of pleural effusion that required repeated thoracentesis. A bipleural drainage system was inserted, and no relevant pleural effusions developed during the follow-up period. Although the authors' experience is based on a single case, they do suggest bipleural drainage in patients with clinically relevant pleural effusions when the more

common alternatives are not a good choice. Bipleural drainage might particularly be an option in children, who are prone to pleural effusion because of the smaller absorbing pleural surface. The authors reviewed the English-language literature on PubMed dating back to 1952. To their knowledge, this is the only published case in which a patient was treated with a ventriculo-bipleural shunt [2].

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Cao H, Guo G, Wu W, Cheng Z. Nonadjustable state of programmable shunt valve: obstruction of middle cranial fossa arachnoid cyst-peritoneal shunt. Chin Neurosurg J. 2024 Dec 26;10(1):34. doi: 10.1186/s41016-024-00386-z. PMID: 39726045.
2)
Ratliff M, Unterberg A, Bächli H. Ventriculo-bipleural shunt as last resort in a 4-year-old child in whom a VP and VA shunt failed. J Neurosurg Pediatr. 2016 Mar;17(3):285-8. doi: 10.3171/2015.7.PEDS15218. Epub 2015 Nov 27. PubMed PMID: 26613270.