
Spontaneous extrusion of ventriculoperitoneal catheter through anterolateral chest wall: a case report and review of literature

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Summary

Ventriculo-peritoneal shunting is the commonest surgery for management of hydrocephalus. However, about 80% develop complications in their lifetime. These include common ones like shunt blockage and infection, to rare ones like shunt migration, extrusion and perforation of viscus. The authors present a rare case of shunt extrusion through the chest wall of an 8 year old male. The shunt was inserted 3years earlier for post-meningitic hydrocephalus. Clinical Examination revealed extrusion of the peritoneal end of the shunt at the level of the 6th rib with cloudy CSF dripping from the tube. A chest radiograph done outlined the shunt. This is an unusual extrusion of a peritoneal shunt and literature search did not reveal any papers with a similar case in the region. We hope clinicians will always be wary of these rare complications for early recognition to improve outcome.

Introduction

Hydrocephalus is a common disease in the pediatric neurosurgical population whose prevalence has been estimated as 0.48 to 0.81 per 1000 live and still births¹. Moreover, this prevalence has been reported to be higher in the developing world partly due to higher birth rates and consequently higher occurrence of congenital anomalies, as well as higher rates of neonatal infections (2). Ventriculoperitoneal (VP) shunting is the commonest surgery performed for the management of hydrocephalus as it is not a technically demanding neurosurgical procedure (3).

Despite its significant complication rate, VP shunt insertion remains the mainstay treatment for the management of hydrocephalus. The reported worldwide complication rates range widely from 1% to 40%³. These include infection with reported rates varying from 10%–15% (4,5), shunt blockage and shunt migration (6). Rare forms of shunt complications are shunt migration into the scrotum, liver, thoracic cavity, heart and cranium. In addition, there have been reports in literature of shunt extrusion into anal canal, oral cavity and peritoneal catheter perforation of hollow viscera such as the intestine, urinary bladder, and stomach (7, 8). Hydrocele, hydrothorax, ascitis, and pseudo cyst in the ab-

domen have also been reported.

Most reports of thoracic migration are into the pleural cavity, lung parenchyma, heart where they may cause pleural effusion, bronchial perforation, pneumothorax, and pneumonia (9, 10). Shunt extrusion through the chest wall is an extremely rare complication. In our literature search we found only one reported case of shunt extrusion through the anterior chest wall. In the present report we describe a case of an 8 year old boy who presented with shunt extrusion through the posterolateral chest wall.

Case Report

An 8 year old male child (F.M) was admitted on the 25th May 2008 to the Nakuru Provincial General Hospital with a one day history of leakage of clear fluid from the lateral chest wall (figure 1). This was followed by extrusion of a white tube through the same site (figure 2). A week prior to admission the child had complained of pain and itchiness on the right lateral chest wall. However, there was no report of cough, fever or convulsions. He had a history of ventriculoperitoneal shunt insertion in March 2005 at age 5years for postmeningitic hydrocephalus. At that time the child was already blind, had weakness in the lower limbs and ataxia. He had been

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treated for meningitis two months prior to admission in March 2008.

At admission the patient had normal vital signs. Examination of the central nervous system revealed a soft neck with an equivocal Kerning's sign. The lower limbs were hypertonic. The main findings were in the right posterolateral chest wall where there was extrusion of the peritoneal end of the shunt at the level of the 6th rib. There was cloudy CSF dropping from the end of the tube. There were excoriation marks around the site. Pressure on the shunt reservoir resulted in release of drops of fluid from the site.

An antero-posterior chest radiograph outlined the course of the shunt (figure 3). Counseling of the parents was done, consent for surgery obtained and the patient started on anti-meningitic treatment. The patient was prepared for surgery which was performed on 16th June 2008. He underwent a VP shunt removal during which a right postauricular incision was made; the catheter identified and gently pulled out. The course of the shunt was entirely subcutaneous. Reversal from anaesthesia was successful and uneventful. Post operatively the patient was started on acetazolamide once daily and antibiotics.

Discussion

Ventriculoperitoneal shunting is the commonest surgery performed for the management of hydrocephalus. This is still true despite the major advances being made in endoscopic procedures including endoscopic third ventriculostomy (ETV). Limited resources, as well paucity of endoscopic units and trained neurosurgical personnel make this form of intervention unavailable to the majority of patients in the developing world. As such great strides have been made in shunt technology but these do not obviate the complications associated with the procedure.

The global reported incidence rate of complications following VP shunting ranges from 1% to 40% (3). Within the East African region, Kinasha et al (6) reported that VP shunt blockage was the commonest complication (32.3%) followed by shunt infection. However, Mwan'gombe and Omulo (5) reported an infection rate of 24.6% among children operated for non-tumor hydrocephalus in Nairobi. A review of literature revealed cases of extrusion of distal shunt catheter through the umbilicus, healed abdominal incision, rectum/anus, lumbar region, oral cavity neck incision and through a



Figure 1: Photo of the right posterolateral chest wall showing extrusion of the distal end of the peritoneal catheter.



Figure 2: Note the leakage of cloudy fluid from the lateral chest wall



Figure 3: Anteroposterior chest radiograph showing the course of the peritoneal catheter

thoracic skin fistula (7,8).

Spontaneous extrusion of the distal peritoneal catheter through the chest wall is very rare. The reports that were found in literature of thoracic migration are into the pleural cavity, lung parenchyma and heart through diaphragmatic erosion (9,10).

The exact etiology is not known. Akyuz et al (8) hypothesized that the extrusion may be due to the catheter tip adhering to the visceral wall; a local inflammatory process weakens the bowel wall or skin and the tip then erodes over a period of time. This favors the tip migration through the abnormal site. Other reported causes of early extrusion of shunt may include focal wound dehiscence and infection. Delayed presentation may be due to many factors including ischemic necrosis of overlying dermis, immunosuppression and poor surgical technique. Superficial shunt catheter placement during subcutaneous tunneling can also predispose to infection from overlying dermal folliculitis to spread to the subcutaneous space causing dehiscence of overlying skin and extrusion of shunt catheter. The type of catheter or the length of the abdominal part of the catheter may also be implicated in the perforation and shunt migration and finally silicon allergy may result in a foreign body-like reaction (11).

In our patient it was difficult to establish the exact etiology of shunt extrusion. However, with the observed local hyperemia we inferred that a local inflammatory response may have had a contributory role in the pathogenesis.

Conclusion

Extrusion of VP catheter through the chest wall is a rare complication of VP shunts. This case highlights rare complications that should be anticipated for timely intervention. Removal of the shunt, prompt institution of antibiotics and placement of another VP shunt when appropriate offers a good treatment option.

We recommend meticulous surgical technique during VP shunt placement to avoid such complications.

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References

1. Bondurant CP, Jimenez DF. Epidemiology of cerebrospinal fluid shunting. *Pediatr Neurosurg* 1995; 23:254.
2. Warf BC: Hydrocephalus in Uganda: the predominance of infectious origin and primary management with endoscopic third ventriculostomy. *J Neurosurg* 2005;102 (1 Suppl):1-15.
3. Gathura E, Poenaru D, Bransford R, et al. Outcomes of ventriculoperitoneal shunt insertion in Sub-Saharan Africa. *J Neurosurg Pediatrics* 2010; 6:329-335
4. McGirt MJ, Leveque JC, Wellons JC, et al. Cerebrospinal fluid shunt survival and etiology of failures: A seven-year institutional experience. *Pediatr Neurosurg*. 2002;36:248-55.
5. Mwang'ombe NJ, Omulo T. Ventriculoperitoneal shunt surgery and shunt infections in children with non-tumour hydrocephalus at the Kenyatta National Hospital, Nairobi. *East Afr Med J* 2000; 77 (7): 386-90
6. Kinasha A, Kahamba JF, Semali IT. Complications of ventriculoperitoneal shunts in children in Dar es Salaam. *East Afr Med J* 2005;10(2):55-59
7. Kothari PR, Shankar G, Kulkarni B. Extruded ventriculoperitoneal shunt: An unusual complication. *J Indian Assoc Pediatr Surg* 2006;11:255-6
8. Akyuz M, Ucar T, Goksu E. A thoracic complication of ventriculoperitoneal shunt: symptomatic hydrothorax from intrathoracic migration of a ventriculo-peritoneal shunt catheter. *Br J Neurosurg* 2004; 18: 171-173.
9. Doh JW, Bae HG, Lee KS, Yun IG, Byun BJ: Hydrothorax from intrathoracic migration of a ventriculoperitoneal shunt catheter. *Surg Neurol* 1995;43:340-343,
10. Sahin S, Shaaban AF, Iskandar BJ. Recurrent pneumonia caused by transdiaphragmatic erosion of a ventriculoperitoneal shunt into the lung. *J Neurosurg* 2007;107:156-158.
11. Vinchon M, Baroncini M, Laurent T, Patrick D: Bowel perforation caused by peritoneal shunt catheters: diagnosis and treatment. *Neurosurgery* 2006, 58:76-82