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Spontaneous Extrusion of Migrated Ventriculoperitoneal Shunt Catheter Through Chest Wall: A Case Report

Ventrikülоperitoneal Şant Takılması Sonrası, Peritoneal Ucun Kendiliğinden Göğüs Duvarından Dış Ortama Açılması: Vaka Sunumu

Sachin A. BORKAR[1]
G.D. SATYARTHEE[2]
Rehan Nabee KHAN[3]
B.S. SHARMA[4]
A.K. MAHAPATRA[5]

[1,3,4,5] Department of Neurosurgery, A.I.I.M.S. New Delhi, India
[2] Department of Emergency Medicine, A.I.I.M.S. New Delhi, India

ABSTRACT

Ventriculoperitoneal (VP) shunt is the most commonly performed procedure for the management of hydrocephalus. VP shunt related complications remain a persistent problem in clinical practice. However, extrusion of components of shunt apparatus is very rare. Extrusion of ventriculo-peritonea l(VP) shunt catheter is an unusual complication of ventriculoperitoneal shunt Surgery. The authors report a case of a 17-year old female who presented with spontaneous extrusion of VP shunt catheter through the anterior chest wall. Pertinent literature is reviewed regarding the etiology and remedial measures to minimize this unusual complication of a very commonly performed neurosurgical procedure.

KEY WORDS: Ventriculoperitoneal shunt, Complications, Spontaneous catheter extrusion

ÖZ

Hidrosefali tedavisinde en yaygın tedavi metodu ventrikuloperitoneal şant uygulamasıdır. Ventrikuloperitoneal şant uygulamasına bağlı komplikasyonlar hidrosefali tedavisinde önemli bir problemdir. Şant sisteminin parçalarından herhangi birisinin olması gereken anatomik oluşum dışına çıkması nadir görülen bir komplikasyondur. Ventikuloperitoneal şant uygulaması yapılan 17 yaşında hastada peritoneal ucun göğüs boşluğuna penetre olması ile gelişen komplikasyon yazarlar tarafından sunulmuş ve bu tip komplikasyonların önlenmesi için gerekli önlem ve yöntemler ilgili literatür gözden geçirilerek tartışılmıştır.

ANAHTAR SÖZCÜKLER: Ventrikülоperitoneal şant, Komplikasyon, Spontan şant, Yer değiştirme

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Correspondence address:
Sachin A. BORKAR
Department of Neurosurgery,
All India Institute of Medical Sciences,
New Delhi,India-110029.
Phone -91 9212015938
E-mail:sachin.aiims@gmail.com

INTRODUCTION

Ventriculoperitoneal shunt is one of the most commonly performed neurosurgical procedures for the management of hydrocephalus. A wide range of complications, neurological as well as non-neurological, has been reported following this procedure. Complications can be encountered either in the immediate perioperative or in postoperative follow-up period.

VP shunt-related complications may occur anywhere along its course from the ventricle cranially to the peritoneal cavity caudally. Commonly encountered complications include mechanical obstruction of distal peritoneal catheter by omentum or other structures leading to shunt malfunction, formation of abdominal pseudocyst, spontaneous bowel perforation, intestinal obstruction, inguinal hernia and development of liver abscess (2, 3, 5). Rare complications consist of migration of the peritoneal catheter into the stomach, gallbladder, urinary bladder, vagina, liver, bowel, colon, scrotum and diaphragm (6, 7). However, extrusion of components of shunt apparatus is very unusual. Cases of extrusion of the distal shunt catheter through healed abdominal and neck incisions have been reported in literature (4, 8). Spontaneous extrusion of distal peritoneal catheter through the normal anterior chest wall is an extremely rare complication of VP shunt. We report a 14 year-old girl who presented the spontaneous extrusion of VP shunt catheter through anterior chest wall three years following surgery.

Case report: A 14-year-old female presented to our outpatient clinic in May 2004 with complaints of left sided deafness and tinnitus. Investigations revealed a left cerebellopontine angle mass with obstructive hydrocephalus. VP shunt was carried out to relieve hydrocephalus. She was taken up for definitive surgery. Left retromastoid suboccipital craniectomy with total excision of left acoustic schwannoma was done 2 weeks following the VP shunt. Patient had a left sided facial nerve paresis following the surgery. The post-operative course was otherwise uneventful and she was discharged from hospital on the seventh post-operative day. She was doing well during regular follow-up at six and twelve month following surgery.

Three days prior to her current admission in March 2007, she noticed a painless small blister on anterior chest wall along the shunt tract that ruptured spontaneously after two days with slowly progressive extrusion of shunt tubing. She had associated fever and headache. She was evaluated by a private practitioner at a remote village who connected a urobag to the extruded end of shunt catheter (Figure 1).

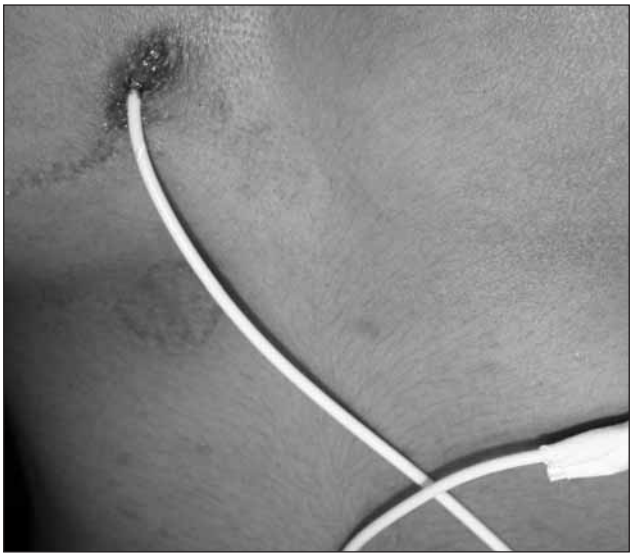
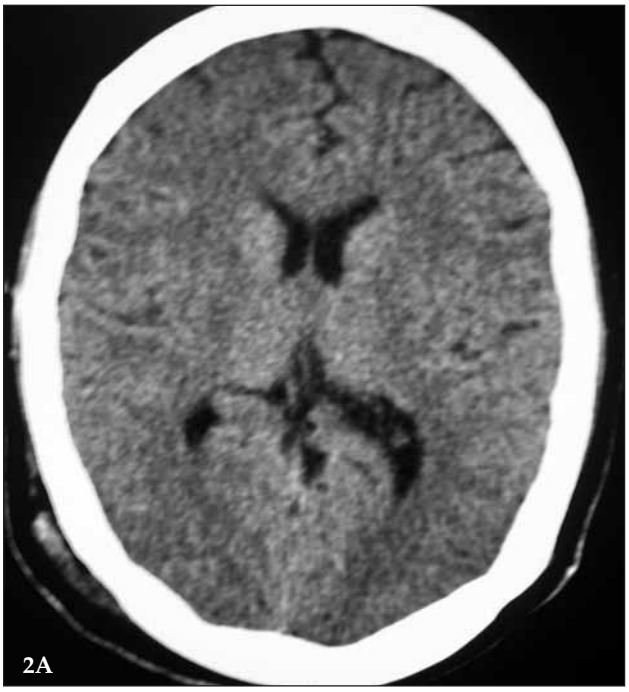


Figure 1: *Showing distal shunt catheter extruding through right anterior chest wall with inflammatory changes in the skin surrounding the extruded end.*

On examination, she was febrile and vital signs were stable. The rest of the general physical examination was within normal limits. Neurological examination was unremarkable except for residual left facial nerve paresis and left sided deafness. There were no signs of meningeal irritation. Local examination revealed extruded shunt catheter at the anterior chest wall at the level of right fourth intercostal space medial to the midclavicular line with surrounding erythematous skin. It was draining around 200 ml of clear cerebrospinal fluid (CSF), per day, which on culture no growth of any organism.

Non-contrast computerized tomography (NCCT) of the head showed no evidence of residual left acoustic schwannoma or ventriculomegaly. The ventricular end of the shunt was in situ (Figure 2A, 2B).

She was immediately put on intravenous antibiotics and taken to surgery. The shunt assembly with the reservoir and extruded distal end was entirely removed. The ventricular end was stuck however and was left behind. No fresh VP shunt was



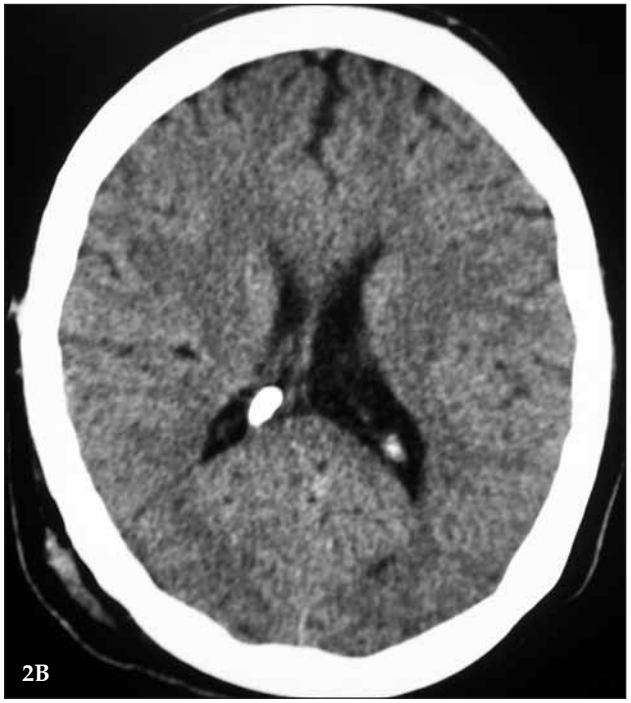
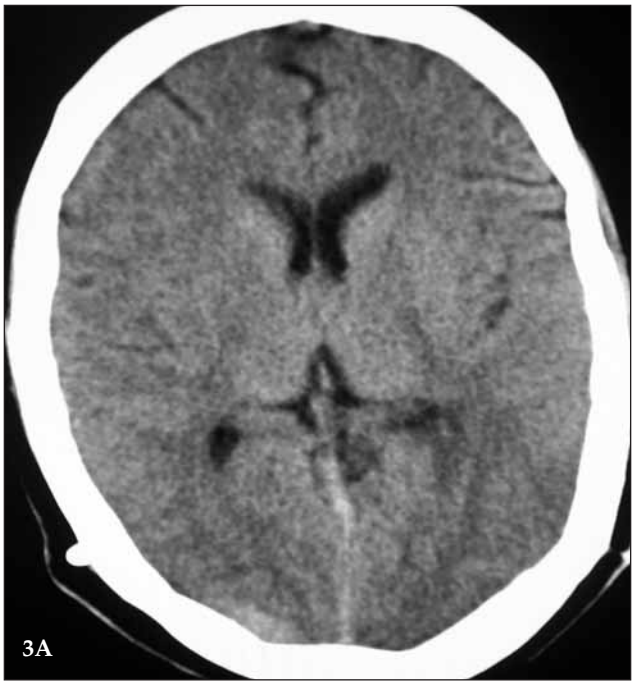


Figure 2A,B: *Non-contrast computerised tomography (NCCT) scan of head showing no ventriculomegaly with shunt tip in situ.*



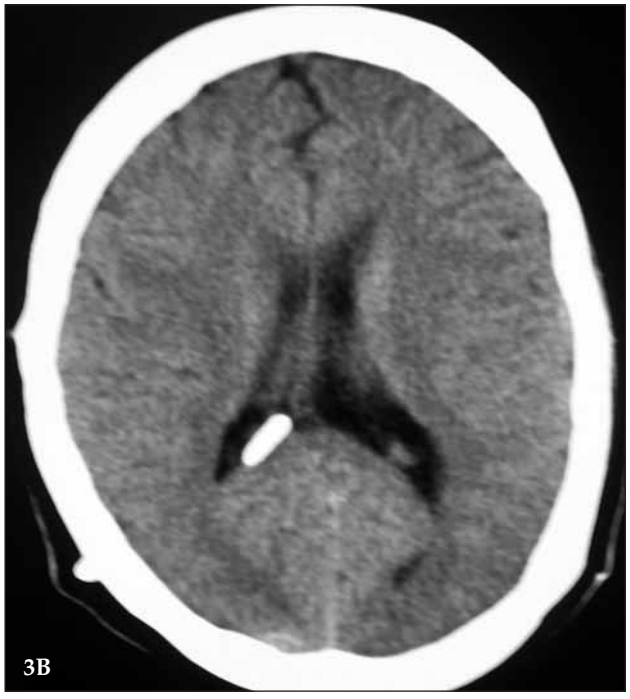


Figure 3 A,B: *Non-contrast computerised tomography (NCCT) scan of head after removal of shunt assembly with retained ventricular end. There is no evidence of further ventricular dilatation.*

placed. She was doing well in the post-operative period. Repeat NCCT of the head showed no further increase in ventricular size (Figure 3A, 3B). Fever and headache completely subsided. She was doing well at the last follow-up visit 3 months after the surgery.

DISCUSSION

Ventriculoperitoneal shunt is the most commonly performed procedure for the management of hydrocephalus. VP shunt related complications remain a persistent problem in clinical practice.

Mechanical obstruction of different shunt parts and infection are the common complications.

A wide variety of abdominal complications have been reported with VP shunt and the incidence ranges from 5-25 % (2). These include mechanical blockage of the distal end by omentum causing shunt failure, formation of abdominal pseudocyst, hollow viscus perforation, intestinal obstruction, formation of liver abscess, CSF ascites (2,3,5). Thoracic complications are relatively less common and include CSF hydrothorax and abnormal migration of the distal catheter into the heart (7, 9). Spontaneous extrusion of shunt components is relatively rare. Literature search revealed cases of extrusion of distal shunt catheter through umbilicus, healed abdominal incision, neck incision and through a thoracic skin fistula (1,4,8,10). Spontaneous extrusion of the distal peritoneal catheter through the anterior chest wall is very rare.

Various hypotheses have been put forward regarding causes of extrusion of VP shunt. Etiology of early extrusion of shunt may include focal wound dehiscence and infection while delayed presentation may be attributed to ischemic necrosis of dermis overlying shunt components. Other factors that may contribute to shunt extrusion include poor host immunity, factors related to surgical technique and bioreactivity of shunt components. 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 (8).

It appears that mechanism of shunt extrusion in our case was dermal infection overlying the shunt tubing with subsequent inflammatory effusion and wound dehiscence.

Various methods have been put forward to reduce the chances of catheter extrusion along the shunt tract. During subcutaneous tunneling, it is advisable to tunnel and bury the peritoneal catheter at a deeper level beneath the skin in order to avoid epidermal trauma which predisposes to subsequent focal skin infection, while simultaneously providing protection against dermal erosion by shunt components (8).

CONCLUSION

Our case highlights the importance of optimal surgical technique, precise location of subcutaneous tunneling device during placement of peritoneal catheter in order to minimize complication of this nature. However, if such complication is encountered, immediate prophylactic antibiotics should be started and shunt assembly should ideally be removed completely.

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