

From hydrocephalus to hydrocele

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The incidence of complications associated with cerebrospinal fluid shunt procedures varies from low to high in different series and depending on the duration of follow up. We report an unusual case of a four-month-old male infant with hydrocephalus who developed bilateral hydroceles soon after ventriculo-peritoneal shunting. The possible aetiology is hypothesised and suggestions are made as to how this may be avoided in other infants undergoing shunt procedures.

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Introduction

Ventriculoperitoneal (VP) shunting for hydrocephalus is one of the most common operations in paediatric neurosurgery. However, the intra-abdominal complications unique to this procedure can be difficult to treat and distressing to the patient's family. We report a known, but uncommon, complication of VP shunting, which resulted in bilateral hydroceles, several months after the initial shunt procedure, and suggest how this may be prevented.

Case report

A four-month-old male infant was referred to our unit with a history of abdominal discomfort for several days and bilateral scrotal swelling. A VP shunt (Denver hydrocephalus shunt system, Codman 82-3950, Codman & Shurtleff Inc., Johnson & Johnson, Rnadolph, Ma, USA) high-flow, low-profile, 91 cm, had been inserted shortly after birth to treat hydrocephalus resulting from congenital aqueduct stenosis.

On examination, he was found to have bilateral hydroceles with the peritoneal shunt tubing palpable in the right scrotal sac. The ventricular component of the shunt had been inserted in the posterior aspect of the right parietal bone, and was functioning satisfactorily.

A plain abdominal X-ray showed the shunt tubing extending into the scrotum (Figure), which was confirmed by ultrasound scan. The patient underwent surgical exploration during which the shunt tubing spontaneously returned to the peritoneal cavity. Bilateral ligation of the patent processus vaginalis was performed. Following surgery, there were no further complications and he was discharged home on the fifth post-operative day.

Discussion

Although VP shunting may seem to be a relatively simple procedure, intra-abdominal complications unique to the peritoneal tubing include intraperitoneal pseudocysts,¹ inguinal hernia, and hydrocele,^{2,3} bowel perforation,⁴ and migration of tubing to unusual sites.^{5,6} The incidence of inguinal hernia associated with VP shunting was reported to be 16.8% in one series.⁴ The reason is presumably that the processus vaginalis is still patent in this age group at the time when the shunting is undertaken.

Several factors may contribute to hydrocele formation. The cerebrospinal fluid (CSF) that collects in the peritoneal cavity may not be reabsorbed fast enough, resulting in an increase in intra-abdominal fluid that keeps the processus vaginalis open. One theory is that a flow of CSF into the patent processus vaginalis creates a trough effect, which draws the shunt tip into the centre of the trough and maintains the patency of the processus vaginalis.⁷ In addition, the almost vertical anatomical relationship between the superficial and deep inguinal rings in the infant increases the opportunity for the tubing to pass directly into the scrotum.

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Figure. Abdominal X-ray showing peritoneal shunt tubing descending into the scrotum

This is further aggravated by the practice amongst some surgeons of using the longest possible tubing so as to avoid revisions as the child grows.⁸

We therefore recommend that the choice of shunt should be carefully made in terms of appropriate flow rate and tubing length in each case. High CSF flow rates may not be needed in all cases, depending on the cause of hydrocephalus. Indeed, excessive CSF drainage can produce a variety of problems including slit ventricles,² subdural haematomas,² and premature sutural synostosis.⁹ The careful choice of tubing length

in accordance with body size may also pre-empt complications caused by long peritoneal catheters, which have included bowel obstruction.¹⁰ Subsequent revisions for growth can then be planned in an elective manner. In some fortunate cases, the hydrocephalus may arrest when CSF production and reabsorption balances and shunt independence may then be achieved.

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