Nuclear Medicine. London, Arnold Heinemann Publishers 1984, pp 311-333.

6. Gupta BD, Miglani N, Gupta GL. Bile ascites: A case report with review of literature. Indian Pediatr 1979, 16: 91-94.
7. Johnston JH. Spontaneous perforation of common bile duct in infancy. Br J Surg 1961, 48: 532-535.
8. Patterson A. Spontaneous perforation of common bile duct in an infant. Acta Clinic Scanda 1955, 110: 192-195.
9. Lees W, Mitchell JE. Bile peritonitis in infancy. Arch Dis Child 1966, 41: 188-192.

Intraperitoneal CSF Pseudocysts Following Ventriculo-Peritoneal Shunts

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During the last two decades ventriculo-peritoneal (VP) shunts have been increasingly used for the management of hydrocephalus in children. A wide spectrum of complications have been noted after this procedure. This communication deals with intraperitoneal pseudocyst formation following VP shunts.

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Case Reports

Case 1: This 6-year-old girl had been initially treated for congenital hydrocephalus at the age of 45 days by a ventriculoatrial (VA) shunt. Subsequently, she underwent revision of the lower end at 2½ years of age and the VA shunt was converted to VP shunt using the Upadhyaya shunt valve with placement of the peritoneal end in the sub-hepatic space. Six months following this revision, the patient presented with complaints of headache and non-bilious vomiting. On examination, the child was irritable and a non-tender cystic lump could be felt occupying the right hypochondrium and epigastric region. There was no guarding or rigidity. Clinically, the shunt reservoir required very high pressure to empty it. Routine laboratory investigations were normal; there was no leucocytosis. On abdominal exploration a large fluid filled cyst was found situated between the liver and stomach, its antero-inferior wall being formed by the omentum. The peritoneal end of the shunt was within this cyst. The cyst was partially excised and as the cerebro-spinal fluid (CSF) drainage was normal the distal end of the shunt was resited in the pouch of Douglas. The examination of CSF from the shunt and the cyst was biochemically, microscopically and bacteriologically normal. Seven years later she is well and has not had recurrence of CSF pseudocyst.

Case 2: This 5-year-old boy had presented with congenital hydrocephalus and a VP shunt was done at the age of 1 month using the Upadhyaya shunt valve. Four years later the child was brought to the hospital with complaints of headache, non-bilious vomiting, and lethargy for 2 weeks. On examination there was a large non-tender cystic swelling occupying most of the right side of the abdomen. The distal

end of the shunt opened with increased resistance. Ultrasound examination revealed a large area of fluid collection extending from the epigastric to hypogastric regions and surrounded by loops of bowel. Routine laboratory investigations were normal; there was no leucocytosis. On abdominal exploration a large cyst occupying the right side of the abdomen was found. The anterior and medial walls of this cyst were formed by the omentum and matted loops of small bowel, respectively. The cyst wall was partially excised. There was a free flow of CSF from the shunt and the peritoneal end was re-sited in the suprahepatic space. The examination of CSF from the shunt and cyst was normal. Histopathological examination of the cyst wall showed fibrous tissue with chronic inflammatory cells. Five years later the child is well and has no recurrence of the cyst.

Discussion

The unusual complications of VP shunts include ascites, inguinal hernia, intussusception, peritonitis, vaginal perforation, and pseudocyst(1,2). Guiterez and Raimondi(3) reported pseudocysts in 0.7% of their patients. We have performed 245 VP shunts in the last 15 years and only 2 patients have developed pseudocysts.

Ultasonography is the best diagnostic procedure(6). It not only diagnoses the lesion accurately but also demonstrates the relationship of the shunt tube with the pseudocyst.

The pathophysiology of encystment is not clearly understood. Infection, peritoneal adhesions, high protein content of CSF and an inflammatory response to the catheter material have been postulated as the responsible factors(3-5). In the cases being reported there was no evidence, either clinical or laboratory, to suggest infection or high protein content of the CSF. The possible causation could be an idiosyncratic inflammatory response to either the shunt or the CSF, both being foreign to the peritoneal cavity. The absence of recurrence may be a manifestation of an adaptive process.

Both the patients under review presented with symptoms of raised intracranial tension The symptoms were most likely due to functional obstruction produced by an increased pressure within the cyst with a pressure gradient exceeding that required for adequate CSF drainage through the shunt. The symptoms disappeared after the surgical drainage of the cyst and resiting of the peritoneal catheter in both the cases. CSF pseudocysts have also been treated by aspiration of the cyst fluid or by exteriorisation of the peritoneal catheter and replacement of the distal end into the peritoneal cavity after the infection has resolved(3,5,6). Both the present cases have done well with abdominal exploration, partial excision of the cyst wall and the peritoneal catheter. Recurrence of CSF pseudocysts has been reported by some authors(3,4) and has been observed to be often associated with peritonitis(7-9).

REFERENCES

1. Grosfeld JL, Coney DR, Smith J, *et al.* Intraabdominal complications following ventriculo-peritoneal shunt procedures. Pediatrics 1974, 54: 791-796.
2. Davidson RI. Peritoneal bypass in the treatment of hydrocephalus: Historical review and abdominal complications. J Neurol Neurosurg Psychiatry 1976, 39: 640-646.
3. Guiterreze FA, Raimondi JA. Peritoneal cysts: a complication of ventriculo-peritoneal shunts. Surgery 1976, 79: 188-192.

4. Fischer EG, Schilito J. Large abdominal cysts: A complication of peritoneal shunts. J Neurosurg 1969, 31: 441-444.

5. Davidson RI, Lingley JF. Interpretational pseudocyst. Treatment by aspiration. Surg Neurol 1975, 4: 33-36.

6. Rush SD, Walsh WJ, Belin PR, *et al.* Ventricular sepsis and abdominally related complications in children with cerebrospinal fluid shunts. Surgery 1985, 97: 420-427.

7. Perry SW, Schumacher JF, Llewellyn RC. Abdominal pseudocyst and ascites formation after ventriculoperitoneal shunt procedures. J Neurosurg 1975, 43: 476-480.

8. Nakagaki H, Matsunaga M, Maeyama R, Mizoguchi R. Intaperitoneal pseudocyst after ventriculopritoneal shunt. Surg Neurol 1979, 11: 247-250.

9. Luyendijk W, Noordijk JA. Surgical treatment of internal infantile hydrocephalus in infants and children. Acta Neurochir 1959, 7: 483-501.

NOTES AND NEWS

SECOND NATIONAL CONGRESS OF INDIAN SOCIETY FOR PRENATAL DIAGNOSIS AND THERAPY

The Second National Congress of Indian Society for Prenatal Diagnosis and Therapy is to be held from *February 19 to 21, 1993* at the All India Institute of Medical Sciences, New Delhi 110 029.

Scientific Programme

Workshop (February 19-20): On Obstetrical Techniques and Laboratory Diagnosis of Fetal Sex, Chromosomal and Biochemical Disorders plus Thalassemia and Muscular Dystrophy.

Congress (February 20-21): Guest lectures by leading International and National experts plus free papers and posters.

Post-Congress Training Course (February 22-25): Genetic Counselling, Biochemical and Molecular Genetic Techniques.

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