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BRIEF COMMUNICATION

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Sub-galeal coiling of the proximal and distal components of a ventriculo-peritoneal shunt

An unusual complication and proposed mechanism

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Abstract We describe the case of a child in whom proximal migration of the peritoneal catheter and extrusion of the ventricular catheter resulted in the entire ventriculo-peritoneal shunt along with the shunt chamber (Orbis Sigma II valve) lying in a sub-galeal pocket in the occipital region in a tightly coiled fashion. This coiling was very similar in appearance to that of the pre-insertion shunt in the packaging when it is supplied; hence it is postulated that the migration was secondary to retained 'memory' of the shunt tubing. This is a rare complication of ventriculo-peritoneal shunt, which has not been described before.

Keywords Hydrocephalus · Ventriculo-peritoneal shunt · Proximal and distal migration · Sub-galeal coiling · Retained memory

Introduction

The commonest form of treatment for hydrocephalus is still the placement of a ventriculo-peritoneal shunt. Numerous unusual complications related to the proximal migration of the distal end of a ventriculo-peritoneal shunt have been reported. These include: respiratory complications with transdiaphragmatic migration, tension hydrothorax, respiratory distress and ventriculo-bronchial fistula formation [2, 7, 9]; and cardiovascular problems with migration into the heart and pulmonary artery [4, 8]. Scalp migration and subcutaneous coiling of the peritoneal end have been described [3, 5]. Intraventricular migration of the peritoneal end has also been described [11, 12]. The combination of ventricular and peritoneal migration with subgaleal coiling has not been reported previously.

Case report

This baby boy was born as the second of twins at 29 weeks of gestation. He developed intraventricular haemorrhage and post-haemorrrhagic hydrocephalus. A right ventriculo-peritoneal (V-P) shunt was inserted at 42 weeks. An Orbis Sigma II valve with integral peritoneal catheter was used along with a Cordis right-angle ventricular catheter. Postoperative abdominal X-ray demonstrated the shunt to be in a satisfactory position intraperitoneally (Fig. 1A, B). On routine follow-up 2 months after V-P shunt insertion, a fluid collection was noticed around his shunt chamber on the right side of the occiput. In view of his satisfactory clinical condition no further action was taken, and the collection eventually resolved spontaneously. A year later the baby was reviewed and found to be progressing satisfactorily; a CT head scan was done as a baseline study. Surprisingly, this demonstrated the lack of an intraventricular catheter (Fig. 2). A skull X-ray revealed that the entire shunt, including the ventricular catheter, shunt chamber and the peritoneal catheter, was lying sub-galeally in the occipital region and was tightly coiled (Fig. 3) As he was clinically well, conservative management was adopted. Two months later the child developed intermittent episodes of irritability. It was decided to remove the shunt system and monitor the intracranial pressure (ICP) in view of the symptoms. During the procedure the ventricular and peritoneal ends were found to be coiled in the sub-galeal space around the antechamber in a pocket of fibrotic tissue. The ICP was monitored, and as it was felt to be within normal limits the child was discharged.

Discussion

Proximal migration of the peritoneal catheter has been reported in the literature with migration into the ventricle [11, 12], into subcutaneous tissue of the head and chest

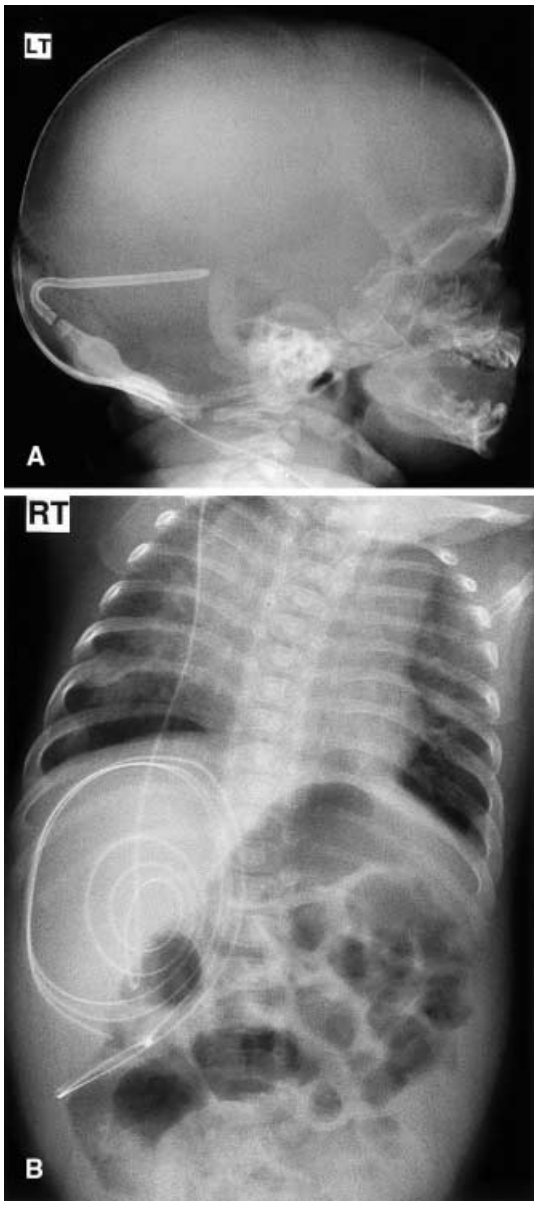

Fig. 1 **A** Plain skull X-ray demonstrating the intraventricular position of the catheter. **B** Thoraco-abdominal plain X-ray showing intra-peritoneal position of the distal catheter. Note early coiling in the peritoneum

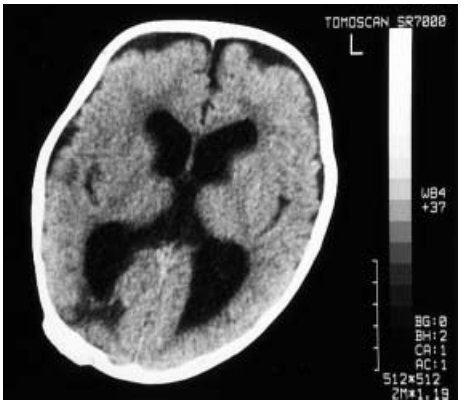

Fig. 2 CT head scan showing absence of ventricular catheter and coiling of shunt occipitally

Fig. 3 Plain skull X-ray demonstrating ventricular and peritoneal ends coiled around valve in a manner similar to the coiling in the packaged shunt

[3, 5], and to the subdural space [6]. Total migration of the shunt, as in our case, with extrusion of the ventricular catheter as well as proximal migration of the peritoneal catheter into the sub-galeal space in the occipital region, has not been reported previously. Various hypotheses have been put forward to explain proximal migration of a peritoneal catheter. Scott et al. [10] postulate that flexion–extension movement of the patient's head acts as a windlass facilitating upward movement of the peritoneal catheter. Other mechanisms suggested by Abou el Nasr [1] are negative suction from the intraventricular pressure and positive intra-abdominal pressure. A role of loose subcutaneous tissue has been suggested by Kim et al. [5]. In our patient we believe that proximal migration of the peritoneal catheter and its coiling in the sub-galeal space were due to "memory" – a phenomenon whereby even though a specimen is deformed, it regains its original shape – retained by the plastic of the shunt tubing, as when the OSV II shunt is distributed it is tightly coiled in the packaging (Fig. 4). The migrating peritoneal catheter mimicked the degree of coiling. This migration could be prevented in the future by decreasing the degree of coiling of the shunt tubing as it is supplied in the packaging.

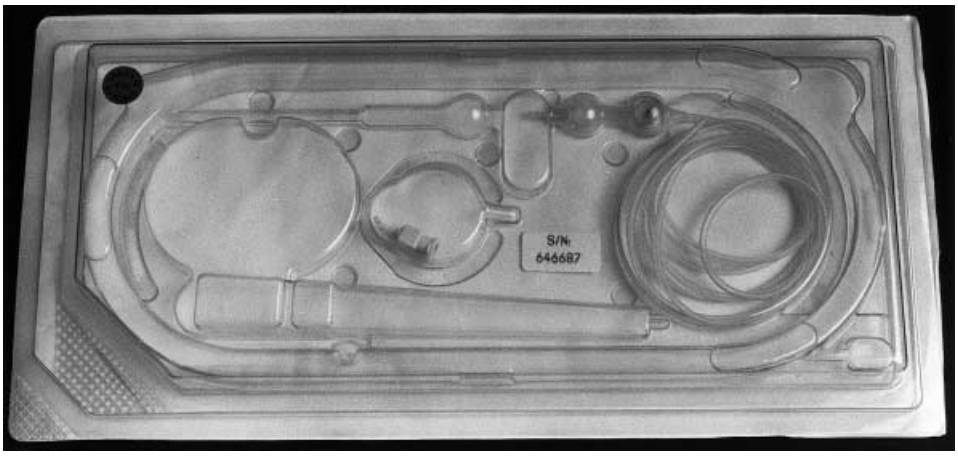

Fig. 4 OSV-II shunt package

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