PROXIMAL MIGRATION OF THE HAKIM'S VALVE INTO A PORENCEPHALIC CYST

CHEE PIN CHEE, F.R.C.S.(Ed.),F.R.C.S.(Glasg.)

Department of Surgery,
University of Malaya,
59100 Kuala Lumpur,
Malaysia.

ABSTRACT

An unusual case of proximal migration of a Hakim's valve intracranially into a porencephalic cyst two years after insertion of the ventriculo-peritoneal shunt in a neonate is reported. The underlying cause is discussed. It is recommended that all shunt should be anchored with non-absorbable suture material properly on to the pericranium.

Keywords: Hydrocephalus, porencephalic cyst, ventriculoperitoneal shunt.

INTRODUCTION

Since the first commercially available valve controlled shunt became available in 1956, shunting the ventricular fluid to a body cavity outside the cranium has become the preferred method of treatment of hydrocephalus. Shunt blockage and infections remained the two commonest complications after the placement of a CSF shunt[1,2,3,4]. An unusual case of intracranial migration of the Hakim's is presented.

CASE REPORT

The patient a $2\frac{1}{2}$ year old Malay boy was born by lower section Caesarian section for obstructed labour. At birth he was found to have a large head with a circumference of 42 cm. There was a right occipital transilluminant area. Ultrasonography demonstrated communicating hydrocephalus but there was marked variation of cortical thickness being 14 mm at the frontal lobe and almost absent in the right occipital area. A right ventriculoperitoneal (VP) medium pressure shunt using Cordis Hakim Mod V Valve System was inserted at the age of three days*. The head circumference decreased remarkedly to 36 cm over a three month period with overlapping of the suture. However, from then onwards, despite therapy with anticonvulsants, he had been having grand mal seizure once monthly. One month before the present admission, there was an increase in the frequency of fits to twice or thrice weekly.

The child's developmental milestone was very much delayed : being unable to sit or roll over, talk and reach out for objects. There was poor head control and he would not turn to direction of sounds. There was a dense left spastic hemiparesis which was noted after the last episode of fits a week earlier. The head circumference was then 47.5 cm. Computed tomography (CT) of the head revealed a large right parieto-occipital porencephalic cyst with dilatation of all the ventricles (Fig. 1). The tip of the ventricular catheter was in the brain parenchyma of the left frontal lobe. Two metallic parts along the shunt were further detected in the porencephalic cyst (Fig. 2 and 3).

* Cordis Hakim Mod V Valve System developed by Salomon Hakim, M.D., and manufactured by Cordis Corporation, Miami, U.S.A.

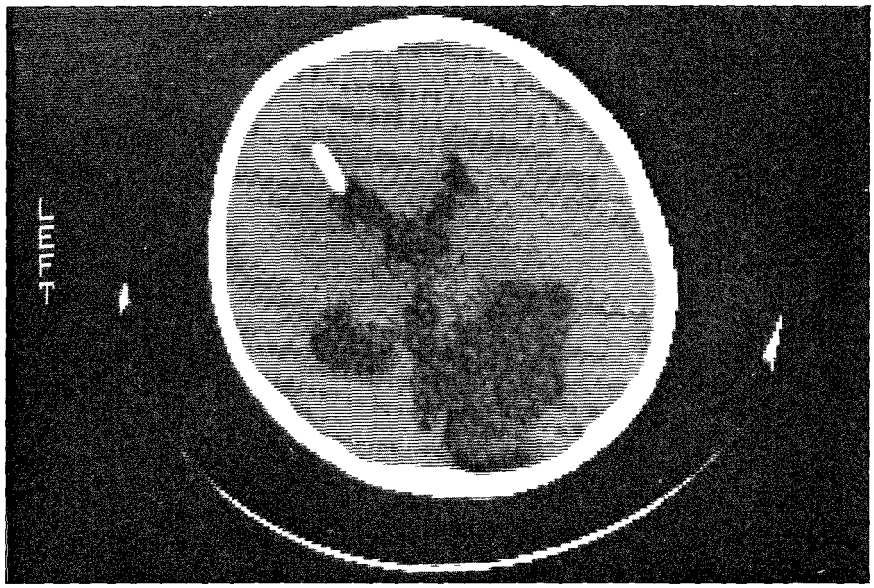

Fig. 1 CT scan showing a large right parieto-occipital porencephalic cyst with hydrocephalus. The tip of the ventricular catheter was in the brain parenchyma of the frontal lobe.

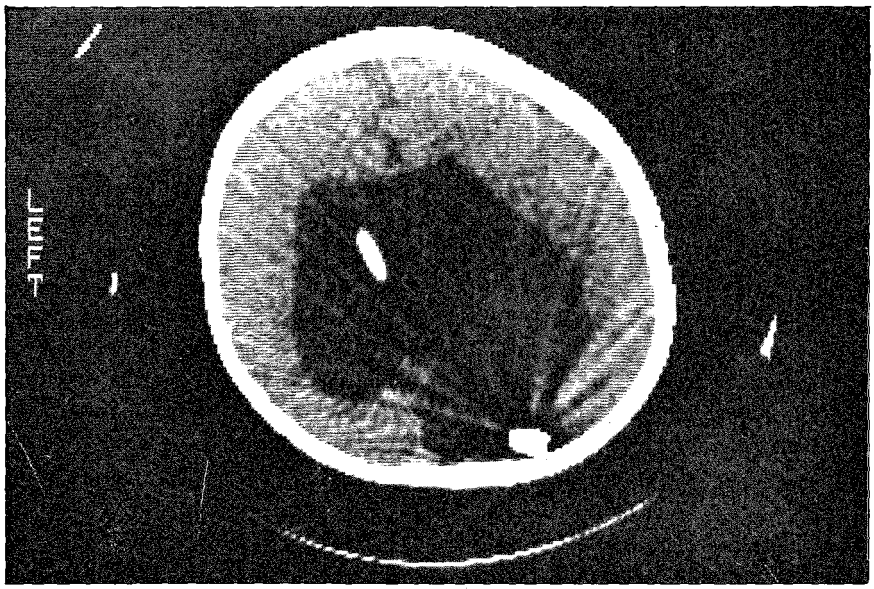

Fig. 2 CT scan showing the metallic component corresponding to the Hakim's valve just within the porencephalic cyst.

OPERATION:

When the old posterior parietal incision was opened, there was no valve or connector found on withdrawing the distal end upwards. The burr hole was reopened and traction of the upper end of the silastic tubing brought the Hakim's Valve into direct vision, out of the porencephalic cyst (Fig. 4). This

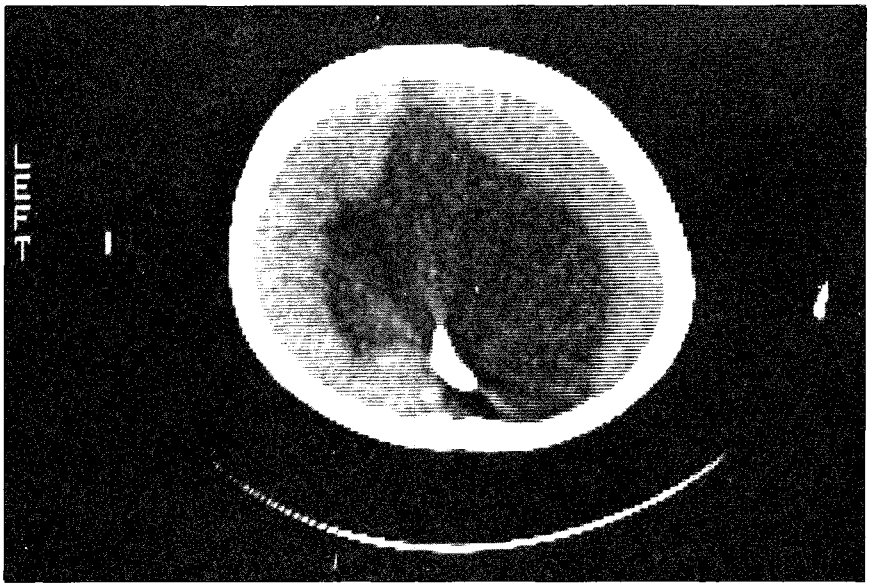

Fig. 3 CT scan showing another metallic component in the porencephalic cyst consistent with the right angled connector.

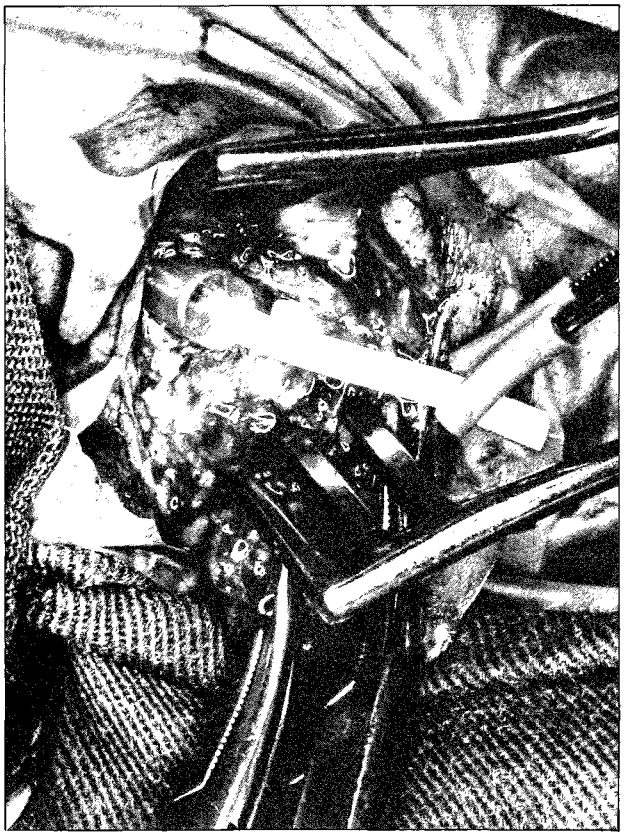

Fig. 4 Operative photograph showing the Hakim's valve emerging from within the porencephalic cyst on traction of the cut distal catheter.

was followed by the stainless steel right-angle connector and the ventricular catheter. The shunt was tested and reinserted after shortening of the ventricular catheter and repositioning the distal drainage catheter in the peritoneal cavity. Postoperatively, the left hemiparesis resolved. The child became alert and active and epilepsy was under good control with sodium valproate on follow-up six months later.

DISCUSSION:

Migration of CSF-shunts is not uncommon but usually takes the form of peritoneal tubing migrating into the abdomen when the shunts become disconnected. In other cases, the distal drainage catheters may protrude into the anal and vaginal orifices, outwards through the skin incisions or distally into the right atrium[5,6,7].

Proximal upward migration of the shunt is extremely uncommon. Migration of peritoneal tubing into the thorax and a craniotomy skin flap had been reported[8,9]. Rarely, however the entire shunt system may migrate into the ventricles[10,11,12,13]. To-date, in all cases of proximal migration reported, the shunt system consisted of straight tubing without interposing valves or flushing devices. It was suggested that the presence of such valves or flushing device might have prevented these proximal migration[13]. The fact that the presence of a reservoir or valve might not be able to prevent such intracranial migration was further confirmed by the reported case of migration of the Pudenz reservoir and ventricular catheter into the cavity of a subdural haematoma[14].

The underlying cause of upward migration in each case was probably due to lack of or improper anchorage of the CSF-shunt valve or connector on to the pericranium using non-absorbable suture material. The thin cortex, with porencephalic cyst in our patient facilitated this migration. In addition, repetitive flexion-extension movements of the child neck acting as a windlass, further increased the risk of such migration.[15] The suggestion by some authors that the dura opening in the burr-hole might have been too big was not confirmed during the operation. In fact, the dura had to be reopened before the valve could be retrieved. There was no distal obstruction or abdominal cyst formation as noted in the previous reported cases[10]. Proper anchoring of the system by suturing the connector firmly on to the pericranium with non-absorbable suture material should have prevented the proximal migration. The increase in the frequency of fits in this child was probably due to the invasion of the ventricular catheter into the brain parenchyma in the left frontal lobe or increased pressure in the porencephalic cyst.

This case confirms the possibility of proximal intracranial migration of the distal components of the shunt system even though a proximal valve is present. The importance of securing the shunt system properly on to the pericranium cannot be over emphasized[16].

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