

# MIGRATION OF AN ENTIRE ONE-PIECE VENTRICULOPERITONEAL SHUNT INTO THE VENTRICLE

Mehmet Fikret Ergünger, M.D.,

Department of Neurosurgery, Cumhuriyet University Medical Faculty, Sivas

**Turkish Neurosurgery 1 : 47 - 48, 1989**

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## **SUMMARY :**

*The author reports a case of upward migration of an entire one-piece shunt into the ventricle. The probable mechanisms are discussed. Suggestions are made for how to avoid the occurrence of such a rare complication.*

## **KEY WORDS :**

*Computerized Tomography, Hydrocephalus, Ventriculoatrial (VA) Shunt, Ventriculoperitoneal (VP) Shunt*

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Many serious and even life-threatening complications still occur with distressing frequency in the surgical treatment of hydrocephalus in spite of contemporary procedures (3-5,8-10,12). Although downward migration is rather common and related to either breakage or disconnection of tubes (1,6,7,14-17), only five cases of upward migration were found in the literature (2,11,13,18,19). In this article another case of upward migration is presented.

## **CASE REPORT**

A six-month-old girl was operated on June 18, 1988 for progressive hydrocephalus. A VP one-piece straight shunt catheter was inserted. It was fastened distally to the surrounding soft abdominal tissue by a single silk suture. The cranial portion was also attached to the weak pericranial tissue, again, by a single silk suture. She was sent home on the seventh postoperative day.

The patient was readmitted on July 19 1988 because of a large subgaleal effusion at the operation site. CT scan confirmed migration of the entire peritoneal tube into both ventricles partly within the right and partly within the left (Fig. 1). The parents did not permit a second operation for revision and discharged her from the hospital.

One month later, the patient was readmitted once more because of acute hydrocephalus. She was obtunded and a varying degree of intermittent decorticate posturing was noticed. An exploratory craniotomy was performed immediately. The peritoneal tip of the shunt was found in the right ventricle and the rest in the left. Using the same shunt device, it was implanted again in the appropriate position, this time being fastened securely using plastic anchoring wings. On the third day postoperatively, jaundice appeared, became severe on the seventh day

the patient was dead on the tenth day from hepatic failure.

## **DISCUSSION**

The incidence of disconnection or migration in cerebrospinal diversionary shunt systems including both VA and VP is 25 % in 10-to 12 year survivors (10). However a search of the literature disclosed only five cases of upward migration of the distal tubing of a VP shunt (2,11,13,18,19). In one patient, the distal tubing entered the thorax (2), in the second the peritoneal catheter was found underneath the scalp one month following insertion of the shunt (13) and in the other three, the ventricular cavity was the location (11,18,19). In all cases, either the tubing had been left free in the subcutaneous tunnel or the cranial portion was fastened only weakly to the surrounding tissue by a single silk suture. Also none had any additional reservoir or single system that would prevent rostral migration by creating extra resistance. Straight tubing was used in all cases.

Following insertion of the shunt, as control of the head in the neonatal period begins to improve, the infant is able to raise his head to look around when in the prone position. This function may improve so that the infant hyperextends his head in this position and even raises his chest from the surface. As the motor functions continue to improve the child may begin to propel himself in the prone position by squirming and then by dragging and crawling. All these vigorous motions could reinforce the "windlass effect" described by Scott and associates (18) as forceful flexion-extension motions of the infant's head.

During propelling, squirming, dragging and crawling in the prone position, a weakly fastened abdominal single silk suture may be untied. All these may cause or facilitate upward movement.

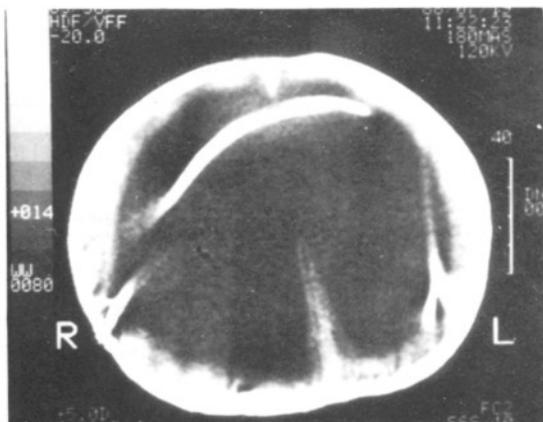


Fig. 1 – Computerized tomography of the brain one month after the first operation. Whole catheter is within the ventricle.

Also abdominal distention and or respiratory movement of the thoracic cage may be responsible for the upward migration. Abdominal distention may force the peritoneal tubing to come out through the abdominal insertion point and continuous respiratory action of the thoracic wall may account partly for the upward migration.

Finally continuous drainage of ventricular fluid might result in ventricular collapse that could generate a negative pressure that helps to drag up the distal tubing.

There are two suggestions to prevent this complication: The first is, if the scalp is thick enough, to prepare a separate subgaleal tunnel to harbour the extradural and subgaleal cranial portion. The second is to use, if available, plastic anchoring wings which are external and non-constricting tubing clamps. These clamps must be sutured to soft tissues at at least, two points, abdominally and cranially, in the course of the tubing. I think that although a foreign material, these small wings do not add any additional potential risk.

**Correspondence:** M. Fikret Ergünger, M.D., Department of Neurosurgery, Cumhuriyet University Medical Faculty, Sivas  
Phone : 477-10130/373

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