

Total intracranial shunt migration

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Ventriculoperitoneal (VP) shunt is a common procedure performed for treating hydrocephalus. Recently, endoscopy has been used in selected cases.^[1-9] Proximal migration of VP shunt is a rare complication. Complete migration of VP shunt into the ventricle is very rare with very few cases reported in literature.^[1-10] We report a case of complete intracranial migration of a VP shunt which was endoscopically retrieved and replaced by a new one.

A 2-year-old child suffering from tubercular meningitis with hydrocephalus underwent a VP shunt via right parieto-occipital burr hole. He had received complete antitubercular treatment for the same. He presented 12 months later to our emergency department with signs of shunt malfunction. He was having headache, vomiting, and lethargy for 2 days. On examination, the child was afebrile and very drowsy, but following commands, with papilledema in both the eyes. A large pseudomeningocele at the burr hole site was present. No part of the shunt tube or chamber was felt in subcutaneous tissue. X-ray of the skull showed entire shunt in the cranium [Figure 1]. At surgery, previous burr hole of 1.5 cm × 1.5 cm was noted with no shunt tube visible. A burr hole was placed about 1 cm cranially from the previous one. A rigid endoscope (Gaab) was inserted into the ventricle. The entire shunt could be seen coiled within the right lateral ventricle [Figure 2a]. It was carefully held with forceps and retrieved from the ventricle taking care to free flimsy adhesions [Figures 2b and c]. New V P shunt was placed with the



Figure 1: Lateral X-ray of skull showing entire shunt tube inside the cranium

chamber firmly anchored to the pericranium. The child improved clinically and was discharged after 5 days.

Cerebrospinal fluid shunting is a common operation performed by neurosurgeons for hydrocephalus. It is a deceptively simple operation with a wide range of complications. Shunt tube proximal migration ranges from 0.1% to 0.4% of all shunt procedures.^[1-8] It varies from migration of ventricular end into ventricle or migration into subgaleal space and others. However, complete intracranial migration of the entire shunt system into ventricle is very rare.^[1-10] There are many factors that are proposed responsible for the migration of the shunt. Excessive neck movements producing a windlass effect coupled with a large potential subgaleal space created for chamber positioning or dilated ventricles with negative suctioning pressure or a positive intraabdominal pressure have been thought to be responsible for the migration.^[6,8-10] Others are either patient-related factors such as younger age, thin cortical mantle, malnutrition, or surgical technicality

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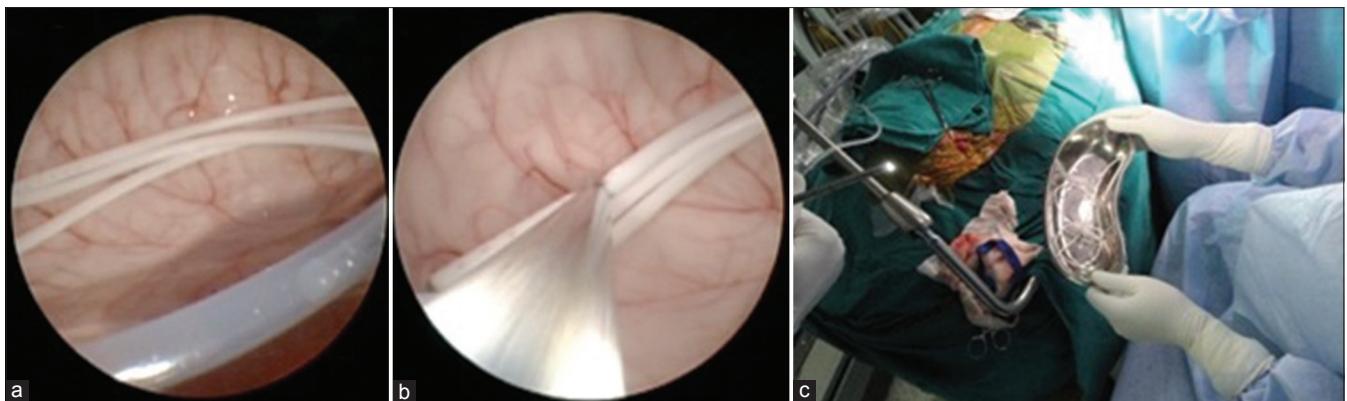


Figure 2: (a) Shunt tube along with chamber in the right ventricle after insertion of the endoscope; (b) endoscopic retrieval of the shunt tube with forceps; (c) retrieval of the shunt tube outside the burr hole

of creating a large burr hole, wide dural opening, and not anchoring of chamber to pericranium.^[1-10] Short distance between ventricular and abdominal end seen in young patients and severe hydrocephalus as in our case have been responsible for the migration of shunt inside the ventricle.^[4] Furthermore, peritoneal scarring with local cyst formation, non-absorption of cerebrospinal fluid, and constant positive abdominal pressure causing migration of the tube along the fibrous tract of the tunnel may be responsible in our case of post-tubercular meningitis patient. Chhabra shunt which has cylindrical chamber as in our case has been implicated in few of the reported cases.^[1-10] Parieto-occipital burr hole with a relatively straight course of shunt tunneling may be responsible for migration of the shunt in our case.^[4,9] Endoscope was inserted into the ventricle and the entire shunt in continuity was visualized inside the ventricle [Figures 2a-c]. It was carefully held with forceps and retrieved from the ventricle taking care to free flimsy adhesions and a new shunt was placed. In the previous case reports, either the shunt was removed by a small craniotomy or was left *in situ*.^[1-10] This is the first case of its kind where an entire migrated shunt has been removed with a help of an endoscope, thus voiding craniotomy-related morbidity, to the best of authors' knowledge. Endoscope also offers an advantage of safe removal of the tube and prevention of inadvertent pulling which may cause bleeding from the choroid plexus. Optimum subgaleal space creation for chamber, anchoring the chamber to pericranium, an adequate burr hole size, and small dural opening are some of the few measures to prevent shunt migration.

There are very few cases of complete intraventricular

migration of VP shunt. This is the first of its kind reported in literature where an entire shunt has been retrieved endoscopically to the authors' best knowledge. Optimum creation of subgaleal space for chamber, smaller burr hole and dural opening, and proper anchorage of the chamber to pericranium are some of the few measures that the authors propose to reduce this complication.

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