Retrograde migration of a ventriculoperitoneal shunt followed by scrotal migration after correction in the same infant with triventricular hydrocephalus: a case report and review of the literature.

ABSTRAT

Hydrocephalus is a condition responsible for significant morbidity and mortality, and the most common surgical treatment is ventriculoperitoneal diversion with a drain, which can cause complications such as valve dysfunction, infection, peritoneal pseudocysts, and migration out of the peritoneal cavity. We report in this work a rare case of a newborn, delivered by caesarean section of a carrier of HIV infection, with congenital triventricular hydrocephalus, treated by ventriculoperitoneal shunt. The surgical course was marked by a retrograde migration followed by a migration into the left scrutom after repositioning the drain.

Ventriculoperitoneal shunt is a surgical treatment of hydrocephalus which appears technically simple, it requires a regular follow-up of the patient because of the complications which can occur, the examination of the drain path must be part of the monitoring factors.

INTRODUCTION

Hydrocephalus results from distortion of the normal cerebrospinal fluid (CSF) dynamics, leading to its accumulation and ventricular dilatation.(1)The global prevalence of hydrocephalus (HC) in the pediatric population has been estimated in several studies to be approximately in1 1000 births, with medium-to-low-income countries having a significantly higher incidence than high-income countries (2)

The main stay management of hydrocephalus is shunting with the goal of reducing intracranial pressures by diverting CSF to another compartment, most commonly into the peritoneal space. Other commonly used options include the pleural space and the right atrium(1) . Shunting and ventriculostomy are the two permanent treatment methods of CSF diversion

Ventriculoperitoneal shunting has been utilized for more than 5 decades, and despite major advancements in valve design and catheters, complications and malfunctions occur relatively often . Ventriculoperitoneal shunts(VPS) are prone to problems such as infection, migration, occlusion, and pseudocyst formation, leading to shunt failure and hydrocephalus(1)

The migration of the distal VPS catheter outside the peritoneal cavity is rare with most cases reported in pediatric patients and an overall incidence ranging from 1.5 to 10%.1,3 Distal shunt erosion into adjacent organs including the intestines, urinary bladder, scrotum, heart, and the abdominl wall is well(3)

The clinical case we present is that of a 12 day old newborn with congenital triventricular hydrocephalus, treated by ventriculoperitoneal shunt in whom the drain migrated backwards in a first stage, then migrated towards the left scrotum in a second stage after repositioning the drain.

Clinical case

Male baby N T, 12 days old, came to the clinic for macrocephaly, noted by the parents for 5 days. He is the first of 1 siblings born to a mother with HIV on ARV, with positive Toxo IgM serology, unwanted pregnancy, poorly monitored without any antenatal ultrasound, delivered by caesarean section with a birth weight of 4kg, head circumference (CP) 44cm, height 53cm.

On physical examination: He is cachectic and presents a macrocephaly with PC: 43cm, weight 3kg, the anterior fontanel is bulging with disjunction of the sutures and the enlarged fontanel, he presents a turgidity of the subcutaneous veins and a Papineau sign making a diagnosis of hydrocephalus evoked.

A transfontanellar ultrasound is performed showing a major tri-ventricular hydrocephalus, (fig 1), the treatment by peritoneal ventricular deviation is performed.

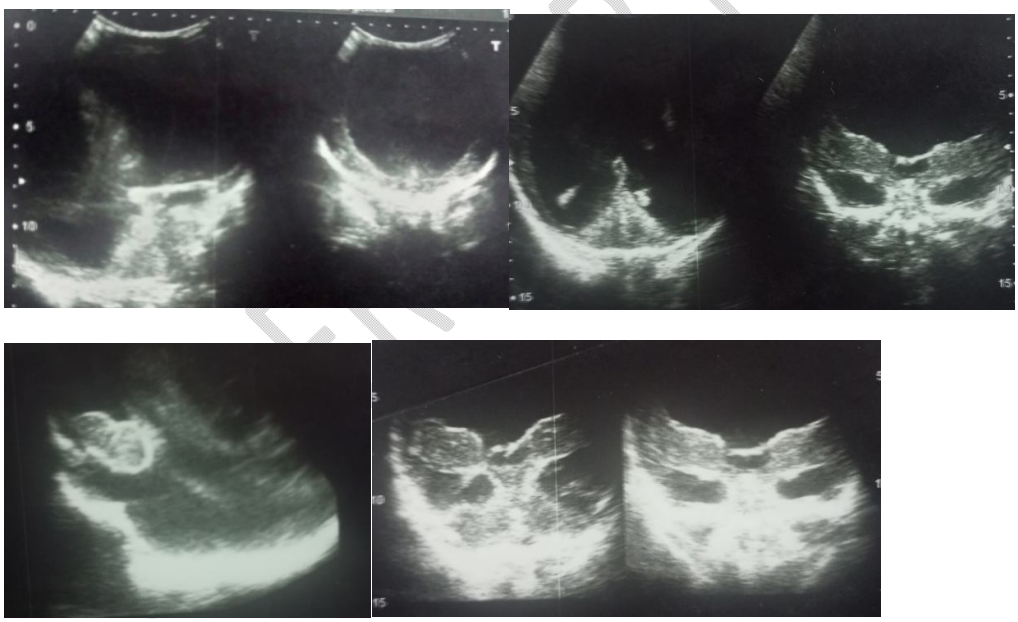

FIG 1 Transfrontanellar ultrasound

At the age of 4 weeks, he was seen in consultation with a poor general state of health, weight: 4kg PC: 47,5cm PB: 10cm PT: 31cm. The NFS shows a microcytic hypochromic anaemia, 12.3g/l, WBC 12500/mm, thrombocytopenia 79000/mm, GS: A positive, TP and TCK is normal and he is operated by DVP at 1 week3d

At 6 weeks 5 days, he returned to the appointment with a temperature of 37°C, a weight of 5.850 kg; PC; 48 cm; PB: cm13 Frontal discreetly bulging with swelling of the drain path in

the thoracic segment and difficulty palpating the drain in the distal abdominal segment of its path.

The craniocervical/thoracic radiograph shows a retrograde migration of the drain in its course and ITF showed a tri ventricular hydrocephalus with the intracranial drain (fig 2).

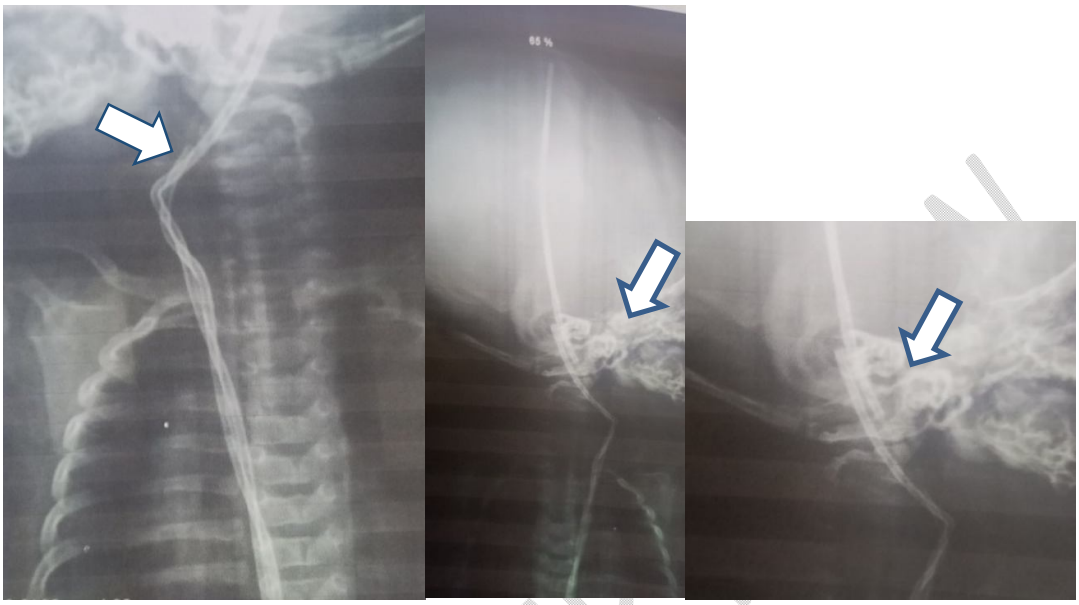

Fig2: Craniocervico thoracic showing retrograde drain migration

After a loss of sight, he was taken back for surgical repositioning of the drain at 4 months 3 weeks.

At 5 months of age he was seen in consultation with PC: 50cm; weight 7, 98kg, normo-tensioned fontanel axial erection, no particular problem on physical examination.

At 5 months 3 weeks, he returned for consultation with left testicular swelling. The physical examination shows a PC at 50.3cm, weight: 8kg, a tumour and translumination of the left testicle with perception on palpation of the scrotal filiform structure very suggestive of a drain,

A cervico thoraco abdomino pelvic X-ray is performed showing a migration of the left intrasrutal drain with hydrocele, (fig3) a third surgical intervention is scheduled for repositioning of the drain, closure of the vaginal canal, and cure of the hydrocele, patient is lost from sight with a left hydrocele and a testicular drain

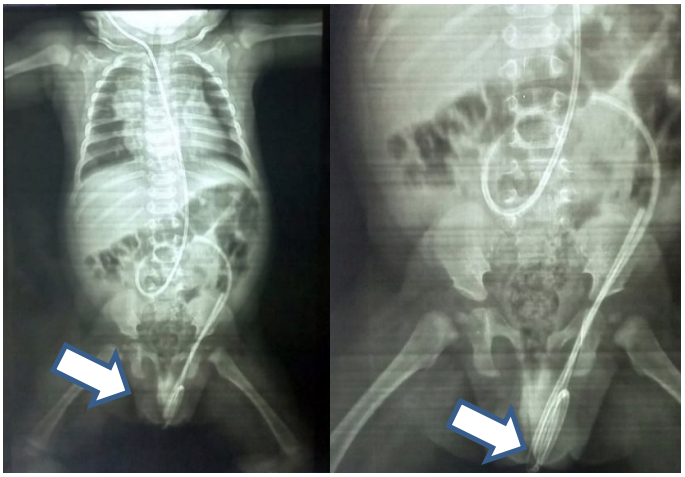

Fig3: Cervical, thero-pelvic and abdominal X-ray showing left scrotal migration of the drain

Discussion

The Migration retrograde and of the distal end of the ventriculo peritoneal shunt and migrtion of VPS into the scrotum through patent processus vaginalis (PPV) on the same patient is a rare complication. The incidence of this complication it s not dertermine in the littérature ; some articles reported the incidence of migration of distal end of VP shunt to be 10%(4).

CSF shunting is commonly prenoted with large number of complications, shunt migration being one of them. It could be classified based on: the compartment of migration (total intracranial, subgaleal, breast,thorax,abdominal wall,hollow viscus,genitourinary), the direction of migration (cranial,caudal), the component (5 ,6)

Our patient had a retrograde or cranial migration, repositioned, followed by a scrotal or caudal migration.

Some autors note some factors may be postulated to be responsible for the migration of the distal end of the VP shunt are:Intestinal peristalsis, Continuous water hammer effect of the pulsation of the CSF, Intermittent rise in the intra-abdominal pressure ,

Some factors are described in the literature: some Host factors such as younger age, thin cortical mantle, malnutrition, excessive neck movements producing a windlass effect coupled with a large potential subgaleal space or dilated ventricles with negative suctioning pressure or a positive intraabdominal pressure, patient's habit of rubbing the chamber area has been considered in many studies.(6) These factors found in our patient, who is a newborn malnourished, allow us to understand the retrograde migration. Surgical factors such as inadvertently large burr hole, wide durotomy, and inadequate anchorage to the pericranial tissues have been postulated. A large burr hole with a large dural rent may result in a subgaleal pocket with enough CSF acting like a sump sucking the ventricular catheter into the subgaleal pocket Chabra's shunt which has a cylindrical chamber has been implicated. Short

distance between the ventricular and abdominal end in young patients and rapid decompression of larger hydrocephalus are additional events.(6,8)

After repositioning the drain, it migrated into the left scrotum. Several hypotheses have been put forward in the literature to explain the srotal migration: the theory of physiopathology is related to increased intraabdominal pressure due to CSF in the peritoneal cavity(7) , Presence of a congenital hernial sac can be a predisposing factor for the migration of the VPS into the scrotum,Stiffness and length of catheter, age, and sex of the patient may also be culprit in the occurrence of this complications , Use of trocar for placing abdominal catheter is a blind procedure and also may be a causative factor(6,7);In a study on 108 pediatric cases with VPS the incidence of scrotal migration was found to be 3.7%(4) The processus vaginalis is an evagination of the peritoneal cavity through the inguinal canal, it forms during embryologic development in both sexes. In males, the testes migrate from the abdomen to the internal inguinal ligament during the 28 th week of gestation, and enter the scrotum by the 32 nd week of gestation. In females, the round ligament of the uterus passes through the inguinal ligament and terminates in labia majora. A PPV persists when it fails to close.Patent processus vaginalis is present in 90% of males at birth, 50% at 1 years, 40% in childhood years and 15 to 30% in adulthood.(4). This explanation is understandable in the case of our patient is the male and has Scrutal shunt migration and hydrocele at 5month 3 weeks probably because de processus vaginalis is an evagination not yet close .

CONCLUSION :

Retrograde migration and scrutum migration ventriculoperitoneal derivation shunt to the same patent is rare but benign complication after in hydrocephalus surgerical treatement by shunt. It is costly for poor families. It implies regular monitoring of patients after pentriculoperitoneal devivation. It is necessary to develop endoscopic surgery by ventriculoscopy to avoid complications related to foreign bodies, and especially in the case of drain migration; the neurosurgeon must examine regularly the patients operated with drains;

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