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Rare Instance of Scrotal Migration of Ventriculoperitoneal Shunt: A Case Report

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Abstract

Ventriculoperitoneal (VP) shunt is used for treating hydrocephalus but it also results in many complications, the most common being hernia and hydrocele. The distal end of the ventriculoperitoneal shunt is placed in the peritoneal cavity to drain the fluid from the ventricles. The catheter has a tendency to be displaced into the scrotum due to the patent processus vaginalis (PPV). It is treated surgically by repositioning the catheter. We present the case of a 5-year-old child who was presented to a pediatric emergency with inguino-scrotal swelling, which started 4 days ago. The child had a history of congenital hydrocephalus. It was treated with ventriculoperitoneal shunt at 1 month of age. Examination revealed distal end of the peritoneal catheter in the right inguinal region. Scrotal ultrasonography revealed a right-sided hydrocele. The child underwent surgery and the hernia was reduced.

Subject Areas

Pediatrics

Keywords

Hydrocephalus, Hydrocele, Scrotal Swelling, Ventriculoperitoneal Shunt

1. Introduction

The ventriculoperitoneal shunt is the standard way of treating hydrocephalus but can result in many complications such as subphrenic CSF loculation, perforation of the GI tract, formation of a CSF-enteric fistula, and intrathoracic migration of the tip of the shunt [1]. Shunt migration is a rare event that occurs in one person out of every 1000 who receive a shunt procedure [2]. The displacement is more common in pediatric patients than adults due to the patent pro-

cessus vaginalis [3]. The catheter can also pierce the scrotal skin and cause shunt infection [4]. Surgical repositioning of the catheter in the peritoneal cavity and hernia treatment followed by closure of the processus vaginalis is the standard treatment [5]. A 5-year-old male presented to the pediatric emergency with an inguinoscrotal swelling that persisted for 4 days. The child had a history of congenital hydrocephalus which was treated with ventriculoperitoneal shunt at 1 month of age. His examination showed the distal end of the peritoneal catheter in the right inguinal region. Ultrasonography revealed a right-sided hydrocele. The patient then underwent surgery, the drain was successfully reduced intra-abdominally, and the hernia was repaired. It is a rare instance of migration of ventriculoperitoneal shunt into the scrotum. Our research aims to contribute to the understanding of shunt-related complications and provide insights for managing similar cases in the future.

2. Case

A 5-year-old boy was admitted to the pediatric emergency department with a developing inguinoscrotal swelling that had persisted for 4 days (**Figure 1**). The patient had a prior history of congenital hydrocephalus, which was treated with a distal ventriculoperitoneal (DVP) shunt at the age of 1 month. The child was alert, hemodynamically stable, and afebrile on physical examination. The inguinoscrotal exam revealed an enlarged right scrotum, with the distal end of the peritoneal catheter found in the right inguinal region, extending towards the scrotum. Radiographic imaging (**Figure 2**) confirmed the shunt tip located within the enlarged right scrotum. Scrotal ultrasonography (**Figure 3**) revealed a moderately abundant right hydrocele, with finely echogenic contents, and the individualization of tubular echogenic material within it, consistent with the distal end of the DVP drain. The patient subsequently underwent surgery, with the drain successfully reduced intra-abdominally, and the hernia repair performed.

Figure 1. Preoperative image showing the right sided scrotal swelling.

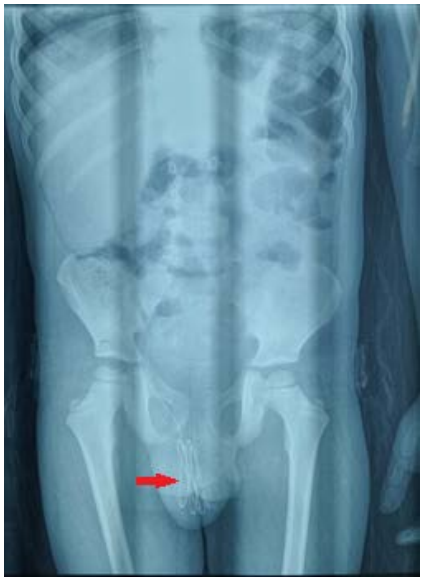

Figure 2. X-ray imaging showing the migrated distal end of ventriculoperitoneal shunt in scrotum.

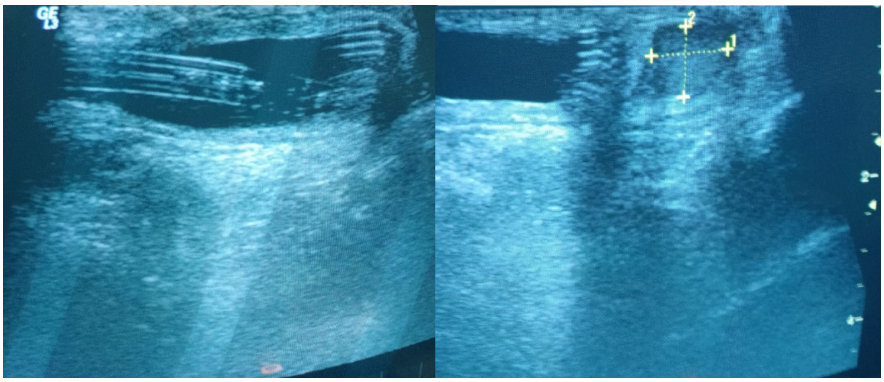

Figure 3. Ultrasound of scrotum demonstrating echogenic tubular structure and significant hydrocele.

3. Discussion

A ventriculoperitoneal (VP) shunt is a common way of treating hydrocephalus. However, it is also a potential cause of hydrocele. Other severe complications of the distal part of V-P shunt are a cerebrospinal fluid (CSF) pseudocyst of the lesser sac, subphrenic CSF loculation, perforation of the GI tract, formation of a CSF-enteric fistula, and intrathoracic migration of the tip of the shunt [1]. The distal end of the V-P catheter is placed in the peritoneal cavity. Migration of the VP tube's distal end into the scrotum is a relatively uncommon complication of VP shunts. The presented case reports an instance of this rare complication of VP shunt. Distal catheter migration into the scrotum has only rarely been reported in adult patients, while almost all reports of shunt migration into the scrotum have been in children [6] [7] [8]. According to some articles, the incidence of migration of the distal end of the VP shunt was 10% [9] while a study of

108 pediatric patients with VP shunts found a 3.7% incidence of scrotal migration [10].

The migration of VP shunt in infants and children up to 1 year is because of the patent processus vaginalis (PPV), which permits the VP shunt to migrate into the scrotum [3]. A variety of intra-abdominal pathologies may present with or be accompanied by scrotal signs in cases of patent processus vaginalis, which is an extension of the peritoneal cavity into the scrotum [11]. Obliteration can happen before birth in up to 80% of males and 60% of females, but it still persists at birth in both sexes [12]. By the age of eight weeks, 63% of males have a persistent processus vaginalis, which can obliterate at any time up until two years of age. Up to 40% of males with persistent process vaginalis continue to have it after this age, with about half of them remaining asymptomatic their entire lives [13].

In addition, the small size of the peritoneal cavity in infants and raised intra-abdominal pressure as a result of the VP shunt also play a role in the etiology of scrotal migration [14]. Hernia and hydrocele resulting from a VP shunt migration are managed by the reduction of hernia and repositioning of the catheter [5]. Obliteration of the processus vaginalis after repositioning of the catheter is also necessary to prevent recurrence and further complications [15]. Prior studies recommend that the surgery should be bilateral due to the involved risk of recurrence. The opposite side should be explored and treated accordingly [2]. The presented case is a rare instance of VP shunt migration into the scrotum leading to the development of an inguinoscrotal swelling in a 5-year-old boy who had a history of congenital hydrocephalus. Scrotal ultrasonography revealed a right-sided hydrocele. The patient then underwent surgery which is the standard approach [5], with the drain successfully reduced intra-abdominally and the hernia reduced and repaired.

4. Conclusion

In conclusion, our study presents a rare case of ventriculoperitoneal (VP) shunt migration into the scrotum in a pediatric patient with a history of congenital hydrocephalus. This complication emphasizes the need for careful monitoring and prompt management of patients undergoing ventriculoperitoneal shunt placement for hydrocephalus. Surgical repositioning of the catheter, along with hernia treatment and closure of the processus vaginalis, represents the standard approach for managing VP shunt migration into the scrotum.

Conflicts of Interest

The authors declare no conflicts of interest.

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