



Case Report

Scrotal migration of peritoneal end of ventriculoperitoneal shunt in an infant – A rare entity

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ABSTRACT

Ventriculoperitoneal shunt migration into the scrotum is a rare phenomenon that has been reported in nearly 35 patients in the literature till date. Genitalia-related complications of ventriculoperitoneal shunts in children like inguinoscrotal migration usually occur during 1st year of the shunt procedure due to factors like raised abdominal pressure and patency of process vaginalis. We report a case of scrotal migration of tip of ventriculoperitoneal shunt in a 2-month-old infant presenting to us with communicating hydrocephalus. In a patient with inguinoscrotal swelling and ventriculoperitoneal shunt, migration of shunt should be suspected. Prompt diagnosis and management of this condition is important due to various complications like shunt dysfunction and testicular lesions. Treatment of this condition is surgical closure of the patent processes vaginalis and shunt reposition.

Keywords: Ventriculo peritoneal shunt, Inguinoscrotal swelling, Shunt migration

INTRODUCTION

Ventriculo-peritoneal (VP) shunt is a commonly done procedure for the treatment of hydrocephalus in children. The procedure is associated with several complications related to the shunt system. Most of the complications are related to the migration of distal shunt catheter. We report a rare case of VP shunt migration into scrotum and its management.

CASE REPORT

A 2-month-old infant presented to our department with history of increasing head circumference since birth. On examination, the patient had bulging anterior fontanelle and enlarged head. Transfontanelle ultrasonography of brain and magnetic resonance imaging was done which showed communicating hydrocephalus. Patient underwent ventriculoperitoneal shunting. On 5th post-operative day, patient developed testicular swelling on the right side. Clinical examination revealed a soft, non-tender, and fluctuant swelling with positive transillumination test. X-ray abdomen showed distal tip migration of shunt in the right scrotum [Figure 1]. Ultrasonography was suggestive of right-sided hydrocele. The right-sided herniotomy was done with repositioning of shunt into the peritoneal cavity.

DISCUSSION

According to literature, the incidence of congenital hydrocephalus is about 0.2–0.5/1000 live births.^[1] Ramani in 1974 reported the first case of migration of shunt in scrotum.^[2] The usual timing of occurrence of shunt migration into right side of scrotum is within 6 months of performing ventriculoperitoneal shunt.^[3–5] The clinical manifestation is hernia or hydrocele due to patent processes vaginalis.^[6] The migration of shunt can occur into various organs in the body such as chest, abdomen, or urinary bladder.^[7] Literature search shows that malfunction of shunt with distal migration can happen hours, days, or years after VP shunt insertion.^[8] In children, ventriculoperitoneal shunt insertion can increase the pressure in the abdomen by the flow of cerebrospinal fluid causing the patency of the processes vaginalis.^[9] Around 60% of infants up to 3 months, 50% up to 1 year, and 40% of children up to 2–16 years have patency of processes vaginalis.^[10,11] Factors like small peritoneal cavity and alignment of inguinal canal in vertical direction in small children may be associated with the migration of shunt. The involvement of the scrotum more on the right (60%) side can be explained by the fact that the descent of the testis on the right testis occurs late during development. The shunt migration in scrotum can cause malfunction of shunt,

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incarceration of catheter and secondary hydrocele.^[12] In literature, the exact cause of migration of shunt in scrotum is not clear; hence, the reports of various case series and clinical presentations [Tables 1 and 2] may help in

defining the condition. With the information available and considering the fact the, surgical closure of the patent processus vaginalis with the reposition of shunt reposition seems appropriate.

Table 1: Reported cases of ventriculoperitoneal shunt scrotal migration.^[13-15]

| Author | Case | Age | Interval | Catheter fracture | Side | Presentation | Image | Treatment | Inguinal Hernia |
|--------------------------------|------|------------|-----------|-------------------|------|--------------|--------|------------|-----------------|
| Kwok <i>et al.</i> | 1 | 6 months | 1 week | Yes | B | S | XR | 2, 4, 6 | No |
| Zvi Ram <i>et al.</i> | 2 | 3 years | 2.5 years | No | R | S, H | XR | 1, 2, 4, 6 | No |
| Bristow <i>et al.</i> | 3 | 10 months | 24 h | No | R | S, F | XR | 1, 4, 6 | No |
| Ward <i>et al.</i> | 4 | 18 months | 7 months | No | R | S, H, F | XR | 2, 6 | No |
| Fuwa <i>et al.</i> | 5 | 1 year | 11 months | Yes | L | S, H | XR | 2, 5, 6 | No |
| Lee <i>et al.</i> | 6 | 65 years | 7 days | No | R | S | XR, US | 1, 4 | No |
| Ricci <i>et al.</i> | 7 | 10 years | 2 years | Yes | L | S, H | XR, CT | 2, 5, 6 | No |
| Mohammadi <i>et al.</i> | 8 | 7 months | 5 months | No | R | S | XR, US | 1, 6 | No |
| Calvario and Neto | 9 | 2 months | 1 month | No | R | S | XR | 3, 6 | No |
| Ozveren <i>et al.</i> | 10 | 4 days | 24 h | No | R | S | XR | 2, 6 | No |
| Kita <i>et al.</i> | 11 | 5 years | 4 months | No | L | S | XR | 6 | No |
| Karasmanoglu <i>et al.</i> | 12 | 14 months | - | - | R | H, F | US, CT | - | No |
| Elizabeth <i>et al.</i> | 13 | 14 months | 12 months | No | R | F | XR, US | 3, 6 | No |
| Ho <i>et al.</i> | 14 | 14 years | 12 months | Yes | L | S, F | XR, US | 2, 4, 6 | No |
| Henriques <i>et al.</i> | 15 | 5 months | 4 months | No | R | S | XR | 2, 6 | Yes |
| Walsh and Kombogiorgas | 16 | 11 months | 6 months | No | R | S | XR | - | No |
| Garvia <i>et al.</i> | 17 | 6 years | 5 years | No | R | H | XR | 6 | No |
| Agarwal <i>et al.</i> | 18 | 2 years | 7 months | No | R | S | XR | 2, 6 | No |
| Quintana-Schmidt <i>et al.</i> | 19 | - | 1,5 month | No | R | H | XR | 2, 6 | No |
| Ramani | 20 | 6 months | 5 months | No | R | S | XR | 2, 6 | No |
| Rehm <i>et al.</i> | 21 | 50 years | 4 years | No | - | S, H | XR | 1, 4, 5 | No |
| Panda <i>et al.</i> | 22 | 5 years | 3.5 years | No | L | S | XR | 2, 6 | No |
| Shahizon <i>et al.</i> | 23 | 14 years | 1 year | Yes | L | S, F | XR, US | 2, 4, 6 | No |
| Oktem <i>et al.</i> | 24 | 10 months | 6 months | No | R | S | XR | 3, 6 | No |
| | 25 | 2.5 months | 5 months | No | R | S | XR | 3, 6 | No |
| | 26 | 9 days | 4 months | No | R | S | XR | 3, 6 | No |
| | 27 | 2.5 months | 24 h | No | R | S | XR | 3, 6 | No |
| Ammar <i>et al.</i> | 28 | 10 months | 2 months | - | L | S, F | XR | 5 | No |
| Crofford and Balsam | 29 | 6 months | 5 months | No | R | S | XR | 3, 6 | No |
| | 30 | 3 months | 2 months | No | R | S | XR | 3, 6 | Yes |
| | 31 | 5 months | 1 month | No | R | S | XR | - | No |
| | 32 | 4 years | 2 months | No | L | H, F | XR | 6 | No |
| Shankar <i>et al.</i> | 33 | 1 year | 11 months | No | R | S | XR | 3, 6 | No |
| Ahmed <i>et al.</i> | 34 | 8 months | 1 month | No | L | S | XR | 6 | Yes |
| Taha <i>et al.</i> | 35 | 3 months | 3 weeks | No | L | S | XR | 2 | No |

B: Bilateral, R: Right, L: Left, Presentation: S: Testicular swelling, H: Hydrocephalus, F: Fever, Image: XR: Radiography, US: Ultrasound, CT: Computed tomography. Treatment: 1: Repositioning of the catheter by abdominal route, 2: Repositioning of the catheter by inguinal route, 3: Repositioning by unspecified route, 4: Decreased catheter length, 5: 2, 6: Closure of the Processus vaginalis

Table 2: Summary of above cases.

| Age (Range) | Time interval (Clinical presentation and surgery) | Clinical presentation | Side of migration | Investigation | Treatment |
|-------------------------------------|---|---|-------------------|---------------|---|
| 4 days–65 years (54%) within 1 year | 24 h–4 years (81%) within 1 year | Scrotal swelling (84%) Hydrocephalus (27%) | Right (70%) | X-ray (100%) | Hernia repair (78%) Reposition (20%) |



Figure 1: Abdominal x-ray of patient showing scrotal migration of shunt tip.

CONCLUSION

The migration of shunt into scrotum is quite rare. Treatment is repositioning the shunt and standard herniotomy. For better care and management of these patients, awareness regarding this condition is important.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

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