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CASE REPORT

Coiling and migration of peritoneal catheter into the breast: a very rare complication of ventriculoperitoneal shunt

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Abstract Upward migration of distal catheter of a ventriculoperitoneal shunt with coiling is very rare. Pseudocyst and galactorrhea are known breast-related complications. Here, we report a 13-year-old girl, known case of myelomeningocele and shunted hydrocephalus, who presented with right breast pseudocyst due to distal tube migration and coiling of the catheter. Plain radiography was not diagnostic because of severe levoscoliosis, but chest computed tomography scan was confirmatory of shunt coiling lateral to the breast. The possible mechanisms causing this uncommon complication are described.

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Introduction

Ventriculoperitoneal (VP) shunting is the standard and definite treatment of hydrocephalus which drains the excess cerebrospinal fluid (CSF) [2, 7]. Shunt failure is a frequent consequence after this procedure that ranges from 40% to 70% of cases [1]. The causes of shunt failure include infection, obstruction, kinking, fracture, and migration of the catheter [2, 3, 6, 7]. Proximal upward migration of the distal tube is a very rare event. Breast-related complications such as CSF pseudocyst and galactorrhea due to shunt fracture and leakage of CSF into the lactiferous tissue have been reported previously [3, 5, 6, 8]. Here, we report a 13-year-old girl with shunted hydrocephalus and history of myelomeningocele (MMC) who presented with right breast pseudocyst subsequent to distal catheter migration and coiling. The pathophysiology and treatment are discussed.

Case report

The patient is a 13-year old girl who presented with progressive enlargement of her right breast over the course of 1 year. She had a history of MMC repair at first day of life followed by VP shunt insertion at age of 3 days. She was subjected to three shunt revisions caused by proximal catheter problems and a new shunt procedure at the other side in ages of 3 and 5 months, and 12 years, respectively. She was found to have progressive scoliosis since age of five which was not treated due to some socioeconomical issues.

Her physical examination revealed a mentally normal with paraplegia and severe thoracolumbar levoscoliosis. The breasts were asymmetric with right side being about three times larger than the left one. There was not any

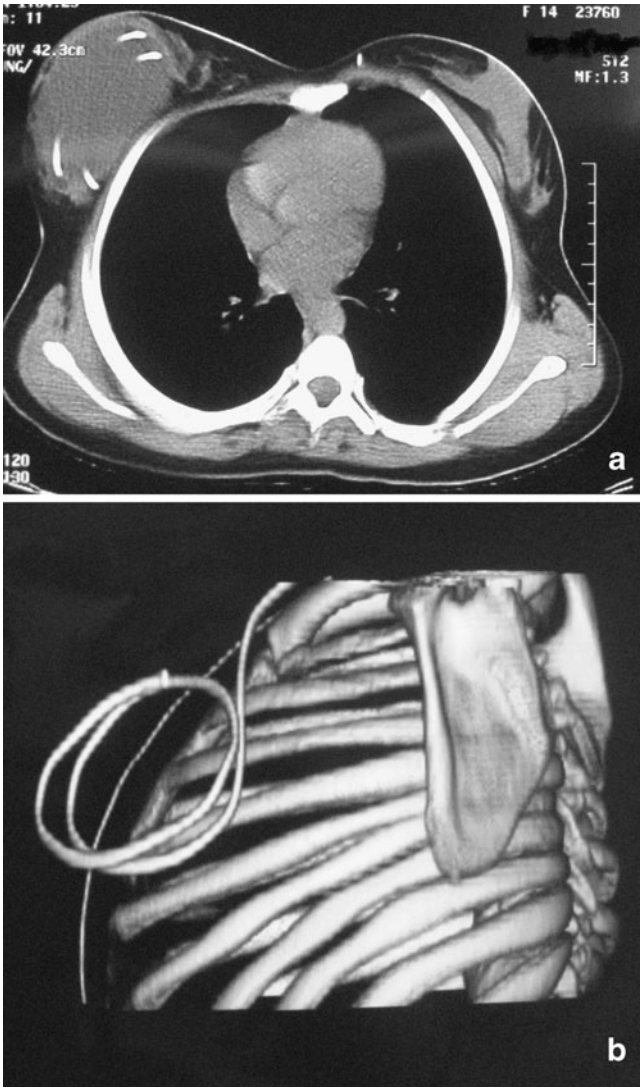

Fig. 1 **a** Chest CT scan in axial view shows breast asymmetry and the pseudocyst lateral of the breast containing loops of catheter. **b** Three-dimensional CT scan of chest confirms the distal tube migration and coiling

tenderness or redness inside or around the right breast. The tract of distal catheter was palpable at the lateral aspect of right breast but could not be detected distally. Left side shunt was working perfectly well, but the right-sided reservoir was incompressible.

Brain computed tomography (CT) scan was confirmatory of well-treated hydrocephalus. Plain radiography was done during last few months to check the tract of distal tube but was not of a good quality due to severe scoliosis and hence did not reveal the exact course of distal tube. New plain radiography performed during her latest admission was also unable to show the catheter and therefore chest CT scan was done. Chest CT scan with three-dimensional reconstruction confirmed the diagnosis of shunt migration to the chest inside the cyst and typical coiling of the catheter (Fig. 1).

Shunt removal was performed through a small incision at neck overlying the tract of catheter. The catheter was very fragile, with obvious calcification around the tube which was cut and ligated. The distal catheter was removed from the same incision and the cyst was drained through the gutter of peritoneal tract. The postoperative period was unremarkable and the breast asymmetry recovered completely in the next few weeks.

Discussion

Ventriculoperitoneal shunting is a straightforward procedure to manage hydrocephalus [7]. The rate of shunt failure in the first year of insertion is about 40% which increases to 50% and 70% after 2 and 5 years, respectively [1]. The most common complications of VP shunts are obstruction, infection, and mechanical failure such as fracture and kinking of the catheter, disconnection of proximal and distal components, malposition, and finally shunt migration [1, 2, 6, 7]. Migration of distal part of VP shunt to the heart, pulmonary artery, hollow viscera, peritoneal cavity, abdominal wall, oral cavity, vagina, and scrotum have been reported in the literature [2–7]. In spite of all known complications, VP shunting is still the most common and successful method for CSF diversion.

Distal tube migration may be the result of abdominal wall contractions that can expel the shunt catheter into the fibrous tract surrounding the catheter. Increased intraabdominal pressure due to obesity or cyst formation may be another responsible mechanism for shunt migration. Anchoring of shunt tube to a calcified point around the tube may work as "windlass" resulting in coiling of the catheter in the subcutaneous tissue. Furthermore, forceful rotation or flexion–extension movements of head and neck can facilitate upward migration of peritoneal catheter [2, 3, 6–8]. Since the curved form of catheter is similar to the pre-insertion shape of shunt in its package, retained memory of the shunt tube can be another responsible mechanism for shunt coiling [4].

In this case, the migration of peritoneal tube can be described by several mechanisms. Progressive scoliosis from toddler period and increased breast bulk in puberty associated with the inappropriate position of the catheter (which was passing in the lateral aspect of nipple inside the tissue of breast) helped the process of migration. Coiling could result from anchoring of tube due to severe calcification found around the distal catheter at cervical area and windlass phenomena in addition to retained memory hypothesis.

Conclusion

Shunt migration to the chest is a very rare event in hydrocephalic patients. It may be the result of abdominal

wall contractions, increased intraabdominal pressure, anchoring of shunt tube to a calcified point around the tube at cervical area, forceful rotation or flexion–extension movements of head and neck, and finally the retained memory of shunt tube. Progressive scoliosis and increased breast bulk during puberty can be associated with the inappropriate position of the catheter and they all may represent other explanations for the mechanism of this event. If plain radiography can not reveal the migration, chest CT scan would be the examination of choice.

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