Cerebrospinal fluid leakage from the umbilicus: Case report and literature review

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A B S T R A C T

INTRODUCTION: Shunt catheters within the peritoneal cavity have migrated through and perforated almost all the intra-abdominal hollow viscera. An umbilical cerebrospinal fluid fistula following a ventriculoperitoneal shunt is an extremely rare complication.

CASE PRESENTATION: We report a 8-month-old infant who presented with leak of clear fluid from the umbilicus, seven months after a ventriculoperitoneal shunt operation. We could not see distal tip of the shunt on examination. After the operation, the patient’s follow-up was uneventful.

DISCUSSION: The direct effect of CSF and VP shunt, such as chronic irritation, silicon allergy, foreign body reaction, may cause sterile inflammation on the abdominal structures and this inflammation may soften tissue and cause CFS leakage and VP shunt extrusion.

CONCLUSION: If the distal tip detected on umbilical region, these patients should be examined frequently for umbilical shunt pathologies, especially infants.

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1. Introduction

Ventriculoperitoneal (VP) shunt is one of the most common surgical procedures performed for the management of congenital hydrocephalus [1]. Numerous abdominal complications have been reported in the literature. An umbilical cerebrospinal fluid (CSF) fistula following a VP shunt is an extremely rare complication. We present the case of an infant with a CSF leakage from the umbilicus and discuss the various pathophysiological causes behind such a complication.

2. Case presentation

A 8-month-old infant with VP shunt for congenital hydrocephalus presented to the Department of Neurosurgery as a case of umbilical clear fluid leaking for 2 days (Fig. 1). VP shunt was inserted when she was 1-month-old. Clinically, she was alert and the neurological examination was unremarkable. Blood laboratory studies showed no abnormalities. The clear umbilical fluid discharge was positive for beta-transferrin confirming cerebral spinal fluid and direct microscopy showed no microorganism. The abdominal radiography and computed tomography confirmed that distal VP shunt tip was protruded to left inferior-lateral part of the umbilicus (Figs. 2 and 3).

The patient was operated for distal VP shunt tip displacement, the distal tip was re-located into the subdiaphragmatic area of the abdominal cavity (Fig. 4). There was no complication after the operation. The patient’s follow-up was uneventful for 5 months.

3. Discussion

Complications of VP shunt are well described [2]. The first case reports of spontaneous extrusion of the abdominal end of the VP catheter though the umbilicus, suggested an area of anatomical weakness or possibility of a patent vitello-intestinal duct [2]. There are only four reports of umbilical CSF fistula following VP shunt in the English literature [2–5]. The mechanical pressure of VP shunt and/or the distal tip irritation to anterior abdominal wall structures may be a probably have been a causative factor resulting in adhesion of the shunt tube to the urachal remnant/persistent omphalomesentric tract, later on resulting in a fistula and CSF leak from the umbilicus.

However, the changing dynamics of intra-abdominal causes such as the VP shunt may create defects in the umbilicus. When cases with the umbilical complication of VP shunt were investigated, some authors emphasized infection [1,6], some were argued anatomical and congenital defects [7,8]. We think that the direct effect of CSF and VP shunt, such as chronic irritation, silicon
allergy, foreign body reaction, may cause sterile inflammation on
the abdominal structures and this inflammation may soften tissue
and cause CFS leakage and VP shunt extrusion.

Our case was 8-month-old, VP shunt was inserted when she
was 1-month-old. This duration may be enough for tissue soften-
ing of the abdominal wall structures and CSF fistula formation. In
literature, there are a lot of abdominal VP shunt migration reports
(intestinal perforation, extrusion from anus, vagina, abdominal

wall, umbilicus etc). In this respect, our hypothesis may prove these
complications.

4. Conclusion

Hydrocephalus may accompany to many congenital umbilical
defects. For this reason, patients with hydrocephalus should be
examined for the umbilical defects and the peritoneal tip of VP
shunt should be positioned appropriately far away from umbili-
cus for its chronic mechanical irritation. If the distal tip detected
on umbilical region, these patients, especially infants, should be
examined frequently for umbilical shunt pathologies.
Conflict of interest

The authors of this manuscript declare no conflict of interest regarding any commercial label or pharmaceutical industry.

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Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Author contribution

ID: drafted and designed the manuscript and participated in surgery; MDU, HOA and NU: drafted and reviewed the literature for previous cases; SCY: coordinated surgery and grammatical review; SK and NU: data collection, NU: data interpretation, ID: participated in surgery and reviewed the manuscript; NU and SCY: performed the final review. All authors read and approved the final manuscript.

Guarantor

Necati Ucler is the guarantor who accept full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish.

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