

## An unusual complication of a ventriculoperitoneal shunt: Endoscopic ultrasound-guided drainage of a giant cerebrospinal fluid pseudocyst

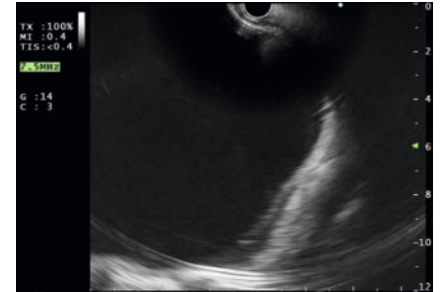
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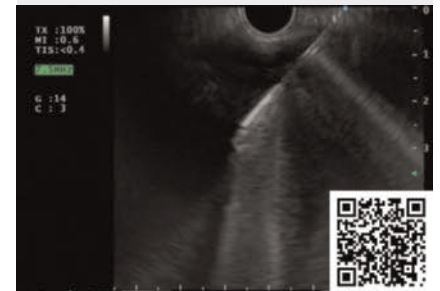
► **Fig. 1** Pre-procedure photograph with markings of bilateral shunts in the neck and scar marks of previous surgeries, with gross abdominal distension. The white bandaged area on the right chest is of the recent ventriculo-pleural shunt procedure.



► **Fig. 2** Computed tomography (CT) scan showing a large, encysted collection (16 × 25.6 × 41 cm) occupying the whole abdomen, displacing the bowel loops peripherally, with no free fluid and a left ventriculoperitoneal shunt entering the collection.



► **Fig. 3** Endoscopic ultrasound image of a large anechoic cystic collection with a left ventriculoperitoneal shunt entering it.



► **Video 1** Endoscopic ultrasound-guided drainage of a giant (41 cm) cerebrospinal fluid pseudocyst using a nasocystic drain, leading to complete resolution of a cystic collection.

A 24-year-old man presented with a gradually progressive abdominal distension over 6 months. He received bilateral ventriculoperitoneal shunts 4 years back for tubercular meningitis with multiple revisions since then. At presentation, he had a functioning right ventriculo-pleural shunt and a blocked left ventriculoperitoneal shunt with right double J stent. Examination revealed markings of bilateral shunts in the neck with gross abdominal distension (► **Fig. 1**). A contrast-enhanced computed tomography scan of the abdomen revealed a large, encysted collection (16 × 25.6 × 41 cm) displacing the bowel loops peripherally, no free fluid, and a left ventriculoperitoneal shunt entering the collection (► **Fig. 2**), also visualized on endoscopic ultrasound (EUS) (► **Fig. 3**). The neurosurgery team planned to remove the blocked ventriculoperitoneal shunt only after drainage of the collection to prevent further fluid accumulation. Exploring different treatment options in a multidisciplinary team

meeting, the patient opted for EUS-guided drainage.

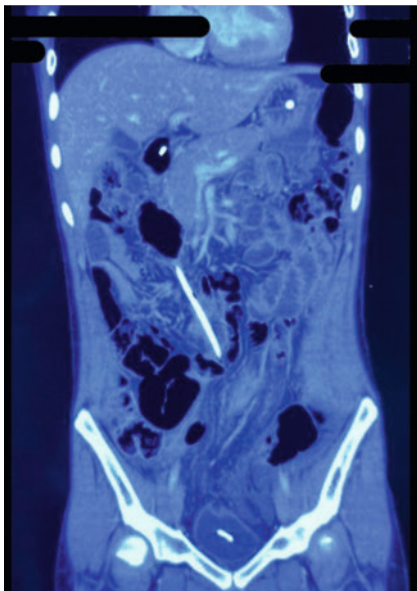
Under fluoroscopic and endoscopic guidance, standard steps of an EUS-guided cysto-enterostomy were followed (assessment using linear echoendoscope [GIF UCT180; Olympus, Tokyo, Japan], puncture with a 19-G needle [EZ Shot3 Plus; Olympus Medical], fluid aspiration, guidewire passed and coiled within the cavity, tract dilatation using an 8.5-Fr cystotome [CYSTO085U; G-Flex, Nivelles, Belgium]), and a 10-Fr nasocystic drain was passed deep down in the pelvis (► **Video 1**). Post-procedure, 11 liters of fluid was drained (cerebrospinal fluid [CSF]: lymphocytic, high protein, gene-expert negative, sterile, positive beta-2 transferrin) and distension decreased re-

markably. A post-procedure X-ray of the abdomen was done (► **Fig. 4**) along with CT, which revealed complete resolution (► **Fig. 5**); the left ventriculoperitoneal shunt was removed subsequently. Thereafter, the nasocystic drain was removed under endoscopic guidance and the patient discharged, with no recurrence 1 year post-procedure.

A ventriculoperitoneal shunt is fraught with intraabdominal complications (10–25%), among which abdominal CSF pseudocysts are extremely rare (0.3–6.8%), life-threatening, and occurring 3 weeks to 21 years post-procedure. Consensus is lacking regarding their management [1–4]. To address the issue of transmural



► **Fig. 4** Post-procedure X-ray of the abdomen showing a nasocystic drain, right ventriculo-pleural shunt, left ventriculo-peritoneal shunt, and right double J stent.



► **Fig. 5** Post-procedure CT of the abdomen showing complete resolution of the cerebrospinal fluid pseudocyst with the nasocystic drain lying in the pelvis.

contamination with EUS-drainage, we used two strategies: 1) dilatation of the tract with an 8.5-Fr cystotome with placement of a 10-Fr nasocystic drain to avoid over-dilatation; and 2) choosing a

nasocystic drain over a transmural pigtail stent to drain the fluid outside, negating the chances of retro-contamination from intestinal contents [5].

To the best of our knowledge, this is the first report of EUS-guided drainage of such a giant CSF pseudocyst and appears to be a safe and effective alternative.

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### Conflict of Interest

The authors declare that they have no conflict of interest.

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