

Spine

Retropharyngeal cerebrospinal fluid collection as a cause of postoperative dysphagia after anterior cervical discectomy

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Abstract

Background: Transient dysphagia after anterior cervical discectomy is not uncommon. It is usually related to esophageal edema secondary to retraction, mechanical adhesions of the esophagus to the anterior spine, and stretch injuries to nerves involved in the swallowing mechanism. Structurally induced dysphagia, secondary to laceration of the neck viscera or to the presence of retropharyngeal masses, is by far less frequent, and it does not usually improve over time.

Case Description: The authors present the case of a 36-year-old woman who complained of severe dysphagia both for solids and liquids after C4 through C5 anterior discectomy and fusion, complicated by a millimetric dural tear of the anterior thecal sac. Postoperative neuroimaging revealed retropharyngeal fluid collection, extending in front of the vertebral bodies of C3, C4, and C5, exerting a mass effect on the posterior wall of the pharynx. Taking into account both the MRI aspect of the collection and the dramatic improvement of symptoms after lumbar punctures, we conducted a diagnosis of CSF collection in continuity with the subarachnoid space. The dysphagia and the CSF collection resolved with conservative therapy (bed rest and 3 lumbar punctures).

Conclusion: To the best of our knowledge, such a complication has never been described before in the literature. It should be included in the differential diagnosis of patients with postoperative dysphagia lasting more than 48 hours.

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Keywords:

Cervical spine; Operative complication; Dural tear; Cerebrospinal fluid collection

1. Introduction

Anterior cervical discectomy and fusion are one of the most frequently performed cervical spine surgical procedures. Complications are almost rare, even if some authors report an overall complication rate as high as 25% [9], mostly related to incorporation of the bone graft or of the implanted prosthesis. Intraoperative problems, such as recurrent nerve injury, pharyngeal and esophageal laceration, dural laceration, spinal cord contusion, and nerve root damage are by far less frequent [2,5,9]. Other

complications such as bilateral vocal cord paralysis, angioedema, thoracic duct injury, CSF fistula, retroesophageal abscess, and hemothorax have been anecdotally reported [1-4,7,9,10,18]. By contrast, transient and self-limiting dysphagia and hoarseness, usually secondary to retraction and edema and/or mechanical adhesions of the esophagus to the anterior spine, are not uncommon [1]. We report the case of a 36-year-old woman who presented, in the early postoperative period, severe dysphagia for both solids and liquids. Postoperative neuroimaging revealed a retropharyngeal fluid collection, interpreted as a CSF collection in continuity with subarachnoid space. The dysphagia and the CSF collection resolved with bed rest and a cycle of 3 lumbar punctures. To the best of our knowledge, such a complication has not been described before in the literature.

Abbreviations: CSF, cerebrospinal fluid; CT, computer tomography; MRI, magnetic resonance imaging.

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2. Case report

A 36-year-old obese woman presented at the Department of Neurological Science of the San Sebastiano City Hospital of Caserta, Italy, with a 1-year history of progressively worsening cervical radicular pain irradiated to the right shoulder. Deep tendon reflexes were brisk and symmetrical, whereas the rest of the physical examination results including swallowing were normal. Preoperative imaging work-up included a cervical spine MRI study, as well as a cervical computerized tomography, both revealing a C4-5 disk extrusion with impingement of the thecal sac at the corresponding level. The patient underwent an anterior cervical discectomy via a right approach. There were no major difficulties with intubation or ventilation. Under magnification, the protruded disk was totally resected with the use of curettes and rongeurs. After the posterior longitudinal ligament was opened, the epidural space was explored with angled curettes. During these maneuvers, CSF was seen leaking through a millimetric dural tear. A fibrin glue (Baxter Healthcare Corp, Glendale, CA) layer was applied on the exposed dura, and a Cornerstone-SR PEEK cage (Medtronic Sofamor Danek, Memphis, Tenn) was impacted into the disk space for fusion. At the end of the procedure, there was no evidence of CSF leak or vascular and/or visceral lacerations.

The patient received intravenously administered fluids for 24 hours; thereafter, she began to complain of difficulty with swallowing liquids and anterior neck and upper sternal pain. The next days, she had progression of her dysphagia with painful swallowing (odynophagia), difficulty with saliva, food sticking in the throat, and several episodes of coughing during attempts of eating. On the fifth postoperative day, the dysphagia became very severe, with complete inability to ingest liquids and solids without the risk of food aspiration in the airways.

Dynamic x-ray evaluation of the upper gastrointestinal tract, after Gastrografin ingestion, showed no pharyngeal or esophageal lacerations, nor presence of fistulous tracts. A fiberoptic examination excluded any laryngeal abnormalities and also a supraglottic edema, but it revealed that the posterior wall of the pharynx, on the right side, was impressed by a soft retropharyngeal mass. A CT scan of the neck and mediastinum demonstrated the presence of a low-density, 2.5 × 1.5-cm, retropharyngeal mass, extending in front of the vertebral bodies of C3, C4, and C5 and exerting a mass effect on the posterior wall of the pharynx on the right side (Fig. 1). The mass did not enhance after administration of contrast medium. In the suspicion of a CSF collection in continuity with the subarachnoid space, a lumbar puncture, with a 20-gauge spinal needle, was performed, draining about 25 mL of CSF. Two hours later, the patient's symptoms dramatically improved: she became able to swallow water and other fluids. During the next days, the patient continued to slightly improve further. Cervical magnetic resonance (MR), obtained 2 days later, showed the clear reduction in size of the prevertebral mass, which showed the same CSF intensity in all the sequences, including T1 fat suppression and myelo-MR sequences (Fig. 2). The patient underwent 2 more lumbar punctures, with a complete remission of symptoms. She was discharged free of symptoms on the 15th postoperative day. At 3 months of follow-up imaging, the complete disappearance of the fluid collection was observed (Fig. 3).

3. Discussion

Postoperative dysphagia has been well documented in patients undergoing anterior cervical spine surgery. However, the reported incidence varies widely (11%–67%) in the published series [1,8,15,17]; minor transient dysphagia,

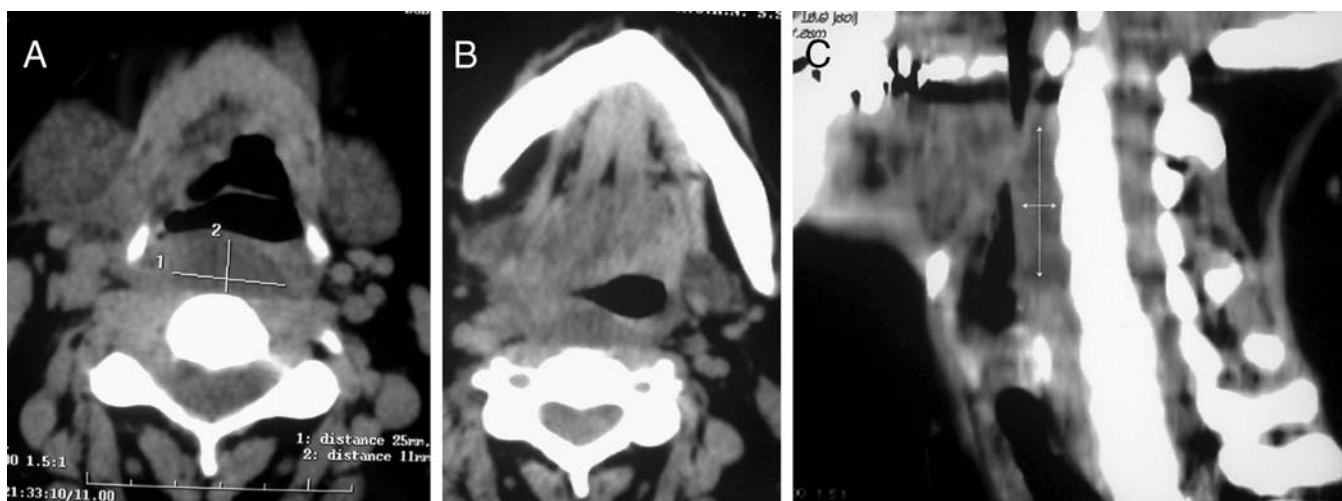


Fig. 1. Postoperative CT scan of the neck demonstrated a low-density retropharyngeal mass (A), exerting mass effect on the right side of the posterior wall of the pharynx (B) and extending in front of C3, C4, and C5 vertebral bodies. Sagittal reconstruction (C).

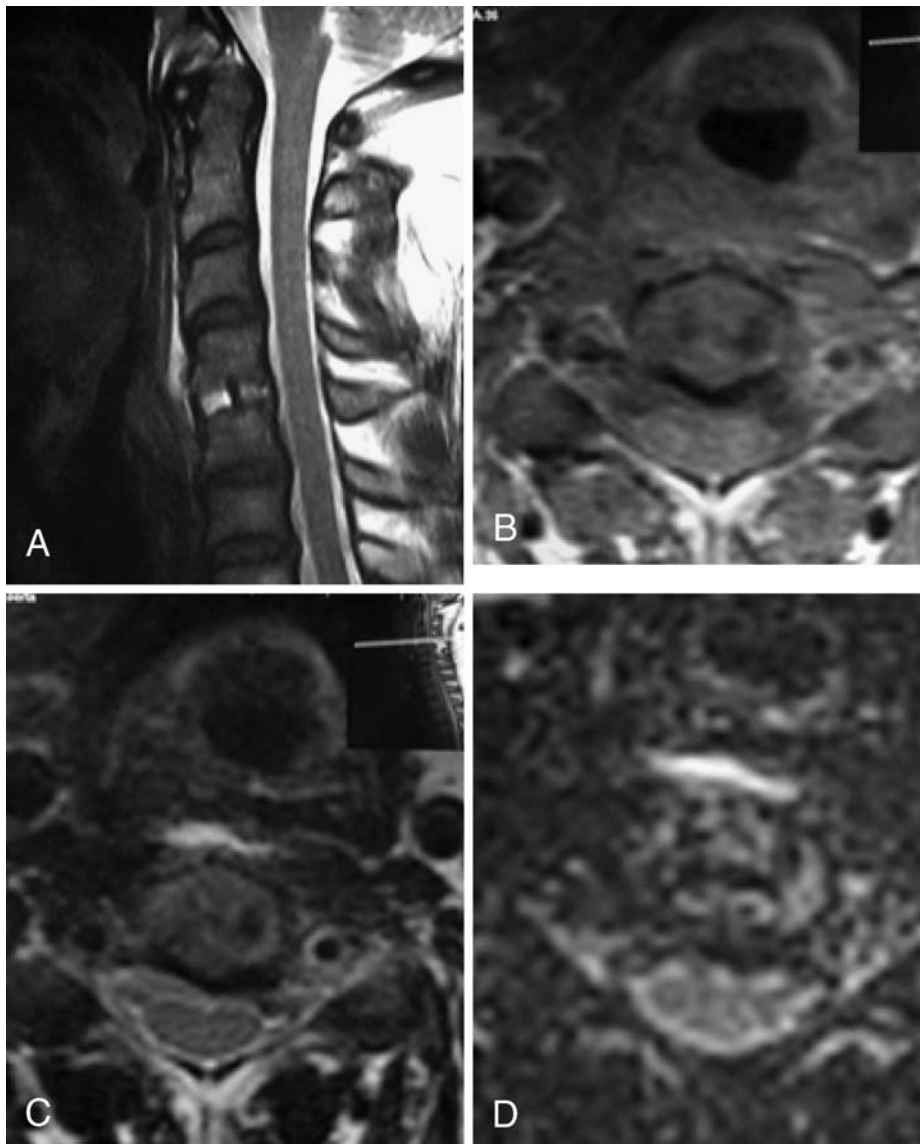


Fig. 2. Cervical MRI (mid-sagittal T2-weighted image in panel A, axial T1-weighted image in panel B, axial T2 in panel C, and myelo-MR in panel D) showing the reduction in size of the retropharyngeal collection after lumbar puncture. The collection showed the same CSF intensity in all the sequences.

beginning in and concluding by about 48 hours postoperatively, is common and does not necessarily indicate subsequent problems [17]. Dysphagia lasting more than 48 hours had been also found in patients with clear postsurgical complications. In these cases, the swallowing problems are related to impaired pharyngeal contraction near the surgical site, deficient laryngeal closure and laryngeal penetration, and postswallow aspiration; proposed mechanisms include esophageal edema secondary to retraction, mechanical adhesions of the esophagus to the anterior spine, and stretch injury to nerves involved in the swallowing mechanism (hypoglossal nerve, superior laryngeal nerve, and recurrent nerve) [1,8,15,17]. Postoperative dysphagia usually improves with time [1,8,15,17]. After anterior spine surgery, structurally induced dysphagia is less common and can be secondary to injury of the neck viscera (pharyngeal or esophageal perforations) or to the appearance

of prevertebral masses, such as retropharyngeal hematoma, retropharyngeal abscess, scarring, and protrusion of the surgical hardware [1,8,17,18]. In these cases, the mechanisms involved in the origin of the dysphagia not only are limited to the mechanical blockage of the pharynx/esophagus, but also include esophageal fixity at the level of the cricoid cartilage and inflammatory reaction of the periesophageal and peripharyngeal tissues [6].

To our knowledge, retropharyngeal CSF collection, as a cause of structurally induced dysphagia after anterior cervical spine approach, has never been reported.

Retropharyngeal CSF collections are very uncommon, with only 5 cases reported in literature [12–14,20]. All the reported cases were posttraumatic, secondary to atlanto-occipital dislocation and extending from C1 to C2 through C3. In all cases but 1 [13], hydrocephalus was associated. The CSF flow disorder can be considered an important

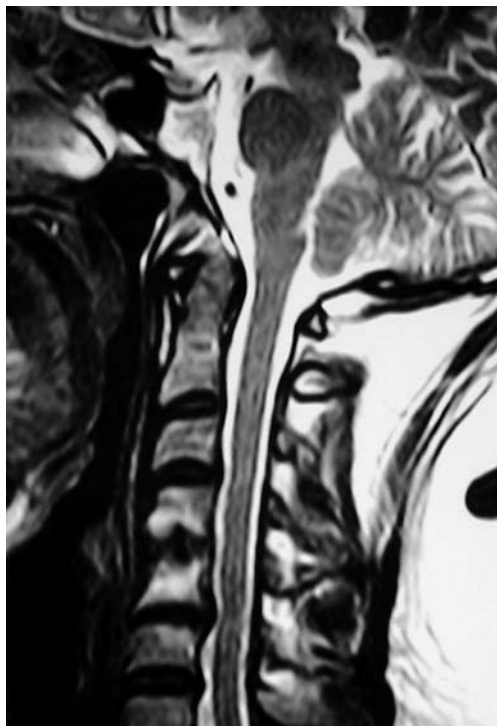


Fig. 3. Three months' follow-up of sagittal T2-weighted image MR images, showing the complete collapse of the collection.

factor in driving the fluid through the traumatic dural defect, which represents a path of least resistance, thus, explaining the progressive increase and the missed resolution of the collections in the reported cases, which required permanent CSF diversion procedures [12–14,20].

The CSF collection, when its volume increased, may exert compression and could cause dislocation of the pharyngolaryngeal structures determining respiratory and swallowing symptoms.

In our case, after surgery, the collection expanded in the surgical field, in front of the bodies of C3, C4, and C5, and the dysphagia progressively worsened in the first postoperative days. Lumbar punctures, dramatically improving the patient's symptoms, allowed us to confirm the diagnosis and to definitely treat the collection. It is possible to suppose that the effect of lumbar punctures would be prolonged in time because of the CSF leak in the peridural space and in the muscles through the dural hole opened by the spinal needle. Because of the benign course of the disease, invasive diagnostic procedures, such as contrast CT myelography and radionuclide myelography, were not scheduled.

The differential diagnosis of retropharyngeal CSF collection includes retropharyngeal hematoma and abscess.

Retropharyngeal hematoma can be difficult to diagnose by CT imaging, in which it is visualized as a midline hypoattenuating retropharyngeal mass, without peripheral enhancement [11]. By contrast, the diagnosis of hematoma can be easily made by MRI, when hyperintensity is seen on both T1- and T2-weighted sequences in the acute phase, and when hyperintensity in T1 and low signal in T2 are seen in

subacute phase (>24 hours) [11,19]. Often, concentric layers of low and high signal in T2-weighted images can be visualized because of the coexistence of blood products at different stages of degradation [11,19]. Cerebrospinal fluid collections have the same signal intensity of CSF in all the sequences that does not change over time.

Retropharyngeal abscesses, complicating anterior spine surgery, have been described both in the immediate postoperative period and in a delayed phase (months to years) [16,18]. Patients with retropharyngeal abscess usually present with neck swelling and tenderness associated with dysphagia, fever, and clear laboratory evidence of acute inflammation. Often, a pharyngocutaneous fistula, secondary to laceration of the esophagus or pharynx during surgery, is associated [16,18]. Neuroradiologic appearance of retropharyngeal abscess is quite non-specific but a marked enhancement after administration of contrast medium can be discovered both on CT scan and MRI [18]; signs of spondylitis or spondylodiscitis are usually associated.

In conclusion, retropharyngeal CSF collection, a rare complication of anterior spine surgery, should be included in the differential diagnosis of patients with postoperative dysphagia lasting more than 48 hours. Conservative management with bed rest and intermittent lumbar punctures may be enough to resolve the symptoms because of the absence of associated CSF flow disorders.

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Commentary

Spennato et al report a case of a 36-year-old woman who developed a retropharyngeal CSF collection after an anterior cervical discectomy and fusion. Intraoperatively, a small tear in the dura occurred, which was sealed with fibrin glue. Postoperatively, the patient developed dysphagia and neck pain. Imaging revealed the CSF collection, which was treated by lumbar puncture with resolution of the collection. Such a collection develops through a ball-valve effect. Cerebrospinal fluid pressure forces fluid out through the small opening, with the fluid not being able to reenter. By lowering the CSF pressure by lumbar puncture, the CSF is no longer forced out, the opening seals, and the collection of CSF resorbs.

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