Case Report

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An unexpected cause of intractable dysphagia after 20 years following cervical spine instrumentation using bone cement alone: a case report

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Introduction and Importance: Postoperative dysphagia following anterior cervical discectomy fusion (ACDF) for cervical disc herniation is still poorly understood. Dysphagia after anterior spinal cervical approach is mild and transient. Here, the authors present a rare case suffering with severe progressive dysphagia for over 1 year after 20 years of ACDF due to expulsed bone cement abutting the esophagus which was successfully removed after reoperation.

Case Presentation: A 59-year-old homemaker female presented to us with a foreign body sensation in the throat *'globus pharyngeus'* and progressive difficulty in swallowing for 1 year. She was previously operated for C5-C6 cervical intervertebral disc prolapse via ACDF using bone cement at another center. On examination, power in the left upper limb was MRC grade 3, and the left-hand grip was 25% only. MRI of the cervical spine showed increased prevertebral soft tissue space and a notable rectangular-shaped black prevertebral shadow at the C5-C6 level, causing esophageal compression. The patient underwent an exploration of previous ACDF surgery. Intraoperative findings revealed an extruded piece of bone cement of size ~2×1.5×1 cm^3 at C_5-C_6 disc space level, compressing the esophagus. The yellowish extruded piece was removed and C_5-C_6 was reinforced with an anterior cervical plate with screws. The postoperative course was uneventful.

Clinical Discussion: The exact pathophysiology of dysphagia after ACF surgery remains unknown. In our case, there was an expulsion of the graft. The graft used was polymethyl methacrylate, commonly known as bone cement, which was placed 20 years back. Since polymethyl methacrylate is bioinert material, the graft may have expulsed from its site of placement and thus compressed the esophagus. Taking into consideration of the cost-effectiveness and maintenance of spinal mobility, few neurosurgeons believe that the application of bone cement in ACF surgery as a spacer is a safe and very cost-effective modality compared to modern expensive artificial disc.

Conclusion: Dysphagia after ACDF surgery is usually underrecognized. Although the serious complications after ACDF surgery are rare, dysphagia can cause prolonged morbidity to patients. Using bone cement alone for ACDF surgery may carry the risk of its anterior expulsion even after a long period of surgery.

Keywords: anterior cervical fusion, bone cement, cervical spine, dysphagia

Introduction

Anterior cervical discectomy and fusion (ACDF) remains the gold standard for the surgical treatment of patients with radiculopathy and/or myelopathy caused by cervical intervertebral disc herniation or spondylosis[1]. Postoperative dysphagia following ACDF is still poorly understood[2,3]. ACDF is indicated when there is fixed cervical kyphosis of more than 10°, compression arising from two or fewer disc segments and established anterior compression pathology[2,4].

HIGHLIGHTS

- Postoperative dysphagia following ACDF surgery is still poorly understood.
- A 59-year-old female presented progressive difficulty in swallowing for 1 year.
- MRI showed a notable rectangular-shaped black prevertebral shadow at the C_5-C_6 level.
- The patient underwent exploration of previous ACDF surgery.
- Intraoperatively extruded bone cement was seen, which was removed.

Dysphagia is a dysfunction of normal swallowing[5,6]. Acute dysphagia is usually seen after craniocerebral injuries, head and cervical spine surgeries, and vascular strokes. However, chronic dysphagia is seen in genetic syndromes like cerebral palsy and developmental disorders. Progressive dysphagia is commonly found in neurodegenerative diseases. Dysphagia can increase the burden and affect recovery of patients[7–9].

The anterior cervical approach is a technically safe method, with a direct access to the vertebral bodies and intervertebral discs[10,11]. However, it carries a number of risks and potential complications. Implant failure and graft migration, which usually occur anteriorly, may result in partial kyphosis, dysphagia,

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esophageal perforation, or pressure on the carotid artery leading to neurological symptoms[12,13]. Dysphagia after anterior spinal cervical approach is usually transient in most cases. It may be caused by prevertebral soft tissue swelling, hematoma, bleeding, or inflammation associated with hardware irritation or esophageal retraction[14,15]. Older patients (aged >60 years) and those with pre-existing dysphagia due to myelopathy are at high risk for postoperative dysphagia[8,16]. Here, we describe a rare cause of extremely delayed dysphagia following anterior cervical surgery using bone cement for cervical disc prolapse. This case has been reported in line with Surgical CAse Report (SCARE) 2023 criteria[17].

Presentation of case

A 59-year-old female, with a known comorbidity of hypertension under medication, presented to us with foreign body sensation in her throat and difficulty in swallowing for 1 year and pain during swallowing for the last 2 months. The difficulty in swallowing was associated with both solid and liquid food. She underwent anterior cervical discectomy and fusion for C_5-C_6 cervical intervertebral disc prolapse at another center 20 years back. She again underwent L_4-L_5 posterior lumbar interbody fusion for L_4-L_5 grade II spondylolisthesis 16 years back at the same center. Twelve years back, she underwent L_5-S_1 bilateral foraminotomy and posterior lumbar interbody fusion for L_5-S_1 grade II spondylolisthesis at our center.

On examination, the patient was conscious and cooperative. Examination of the oral cavity and posterior pharynx revealed no abnormalities. The tone and bulk of the muscles in bilateral upper limbs and lower limbs were normal. The power in the left upper limb was MRC grade 3, and the left-hand grip was 25%. The power in the remaining limbs were MRC grade 5. Sensation was intact over all limbs. Nasopharyngolaryngoscopy (NPL) and

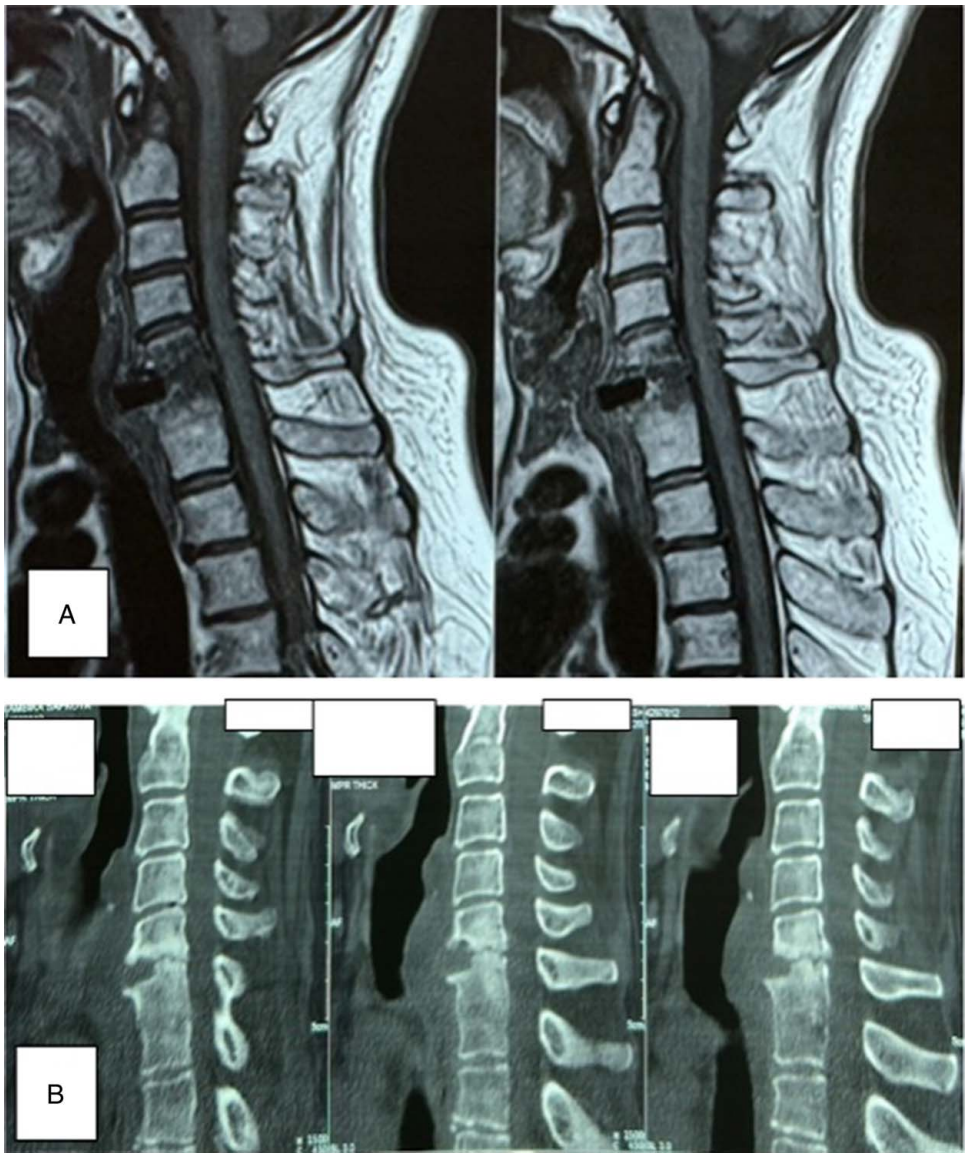

Figure 1. (A) T1 sagittal MRI cervical spine showing rectangular-shaped. black prevertebral shadow at C5-C6 level. (B) CT cervical.

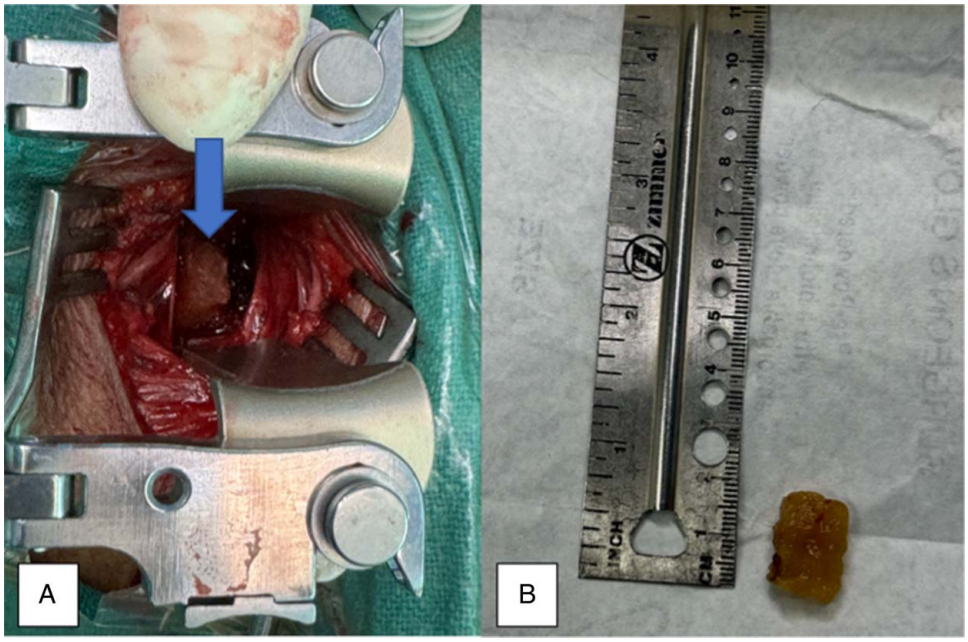

Figure 2. (A) Intraoperative picture showing the expulsed graft (blue arrow). (B) The expulsed polymethyl methacrylate bone cement.

upper gastrointestinal (GI) endoscopy showed normal findings. MRI cervical spine with neck showed prevertebral soft tissue signal intensity changes at C_5-C_6 level indenting the esophagus. CT cervical spine showed lytic erosion in the anterior aspect of the C5 and C6 vertebra with adjacent soft tissue components (Fig. 1). The patient underwent exploration of the previous ACDF surgery. Intraoperative findings revealed an extruded piece of bone cement of size ~2×1.5×1 cm^3 at the same level.

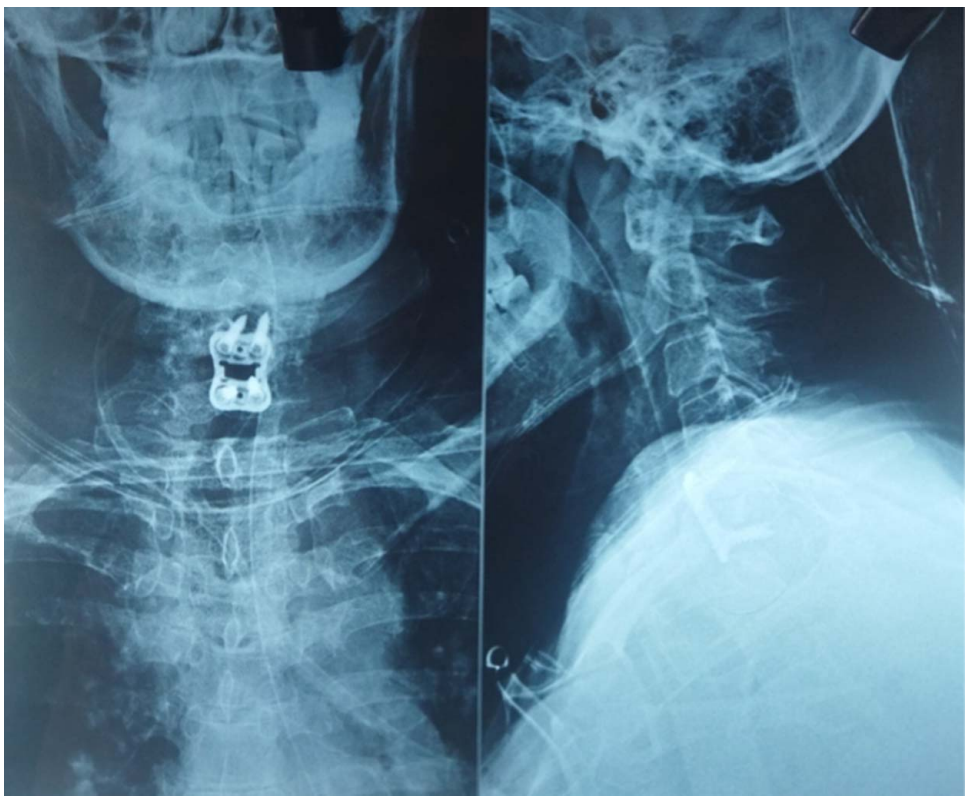

Figure 3. Postoperative anteroposterior and lateral cervical spine radiograph showing the anterior cervical plate with screw fixation at C5-C6 level.

The extruded piece was pushing the esophagus to the left. The extruded piece was removed (Fig. 2). The C_5-C_6 vertebral space was firm and was seen to be fused in the posterior part of the joint space, which was confirmed by intraoperative fluoroscopy. Thus, in-situ fixation in the form of C_5-C_6 anterior cervical plating was done (Fig. 3).

The postoperative course was uneventful. There was no foreign body sensation in the throat as experienced by the patient preoperatively. However, the power in the left upper limb and the left-hand grip remained unchanged. In the last follow up at 3-month postsurgery period, the swallowing difficulty has completely resolved.

Discussion

The mechanism of dysphagia after anterior cervical fusion (ACF) surgery is poorly understood[4,18,19]. The incidence of dysphagia following ACF ranges from 1.7 to 70%[16,20–24]. The occurrence of dysphagia after ACF surgery is thought to be transient and relatively minor[19,21]. The onset of postoperative dysphagia usually occurs during the first week after surgery in 75% of patients. However, in some patients, the onset can be delayed by occurring more than 1 month after surgery[25]. The incidence of postoperative dysphagia tends to decline over time with persistent dysphagia occurring in 8–35% of patients[16,19,20,26,27].

The exact pathophysiology of dysphagia after ACF surgery remains unknown. The potential causes include esophageal denervation, hematoma formation, and swelling of soft tissue[4,26]. The mechanism of dysphagia may include stretching or interruption of innervation of the digestive tract[16,25,28]. The other causes of dysphagia include surgical plate thickness, esophageal impingement, esophageal ischemia, scarring of the pharynx or esophagus, and graft-related problems[18,29,30]. In our case, there was an expulsion of the graft. The graft used was polymethyl methacrylate, commonly known as bone cement, which was placed 20 years back. Since polymethyl methacrylate is bioinert material[31], the graft may have expulsed from its site of placement and thus compressed the esophagus.

Taking into consideration of the cost-effectiveness and maintenance of spinal mobility, few neurosurgeons believe that the application of bone cement in ACF surgery as a spacer is a safe and very cost-effective modality compared to modern expensive artificial disc. However, it has not gained popularity due to the concern of complications. As in our case, where bone cement alone was used for ACDF without plating, it seems that the risk of its expulsion was there even after long time after surgery as it does not facilitate fusion. In the literature, there are numerous papers describing the use of polymethyl methacrylate in spine fixation and fusion to augment the strength of spinal implants[32,33]. Similarly, it has been used extensively for vertebroplasty and kyphoplasty[34–36] and have provided good strength. The combination of inert material and lack of anterior cervical plating, in our case, with years of wear and tear, might have caused the expulsion of bone cement. Alternatively, improvising by making cages with bone cement and packing with autologous bone graft intraoperatively maybe more cost-effective with less complications.

There are studies in the current literature that suggest the intraoperative and perioperative techniques that may decrease the incidence of postoperative dysphagia[37]. The intraoperative techniques include performing arthroplasty for one-level disease, using a low profile, small and smooth plate[37,38]. Similarly, decreasing endotracheal tube cuff pressure after neck retraction and changing the dissection plane for ACF surgery are other methods. Jeyamohan *et al.*[39] found that perioperative administration of dexamethasone significantly improved swallowing function and airway edema.

Conclusion

Dysphagia after ACDF surgery is underrecognized, especially in terms of its impact on a patient's quality of life. Although the serious complications after ACDF surgery are rare, dysphagia can cause prolonged morbidity. Using bone cement alone for ACDF surgery may carry the risk of its anterior expulsion even after a long period of surgery causing prolonged intractable dysphagia.

Ethical approval

Not applicable.

Consent

Written informed consent was obtained from the patient/legal guardian for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Not applicable.

Author contribution

S.B., B.T., P.R., and S.K.S.: prepared the original manuscript; S.B. and S.K.S.: reviewed and edited the manuscript; S.B., B.T., P.R., and S.K.S.: were in charge of the case.

Conflicts of interest disclosure

The authors declare no conflicts of interest.

Research registration unique identifying number (UIN)

Not applicable.

Guarantor

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Data availability statement

All data are available in manuscript itself.

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