

Case Report

# Delayed anterior cervical plate dislodgement with pharyngeal wall perforation and oral extrusion of cervical plate screw after 8 years: A very rare complication

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## Abstract

We report a patient with congenital anomaly of cervical spine, who presented with clinical features suggestive of cervical compressive spondylotic myelopathy. He underwent C3 median corpectomy, graft placement, and stabilization from C2 to C4 vertebral bodies. Postoperative period was uneventful and he improved in his symptoms. Eight years later, he presented with a difficulty in swallowing and occasional regurgitation of feeds of 2 months duration and oral extrusion of screw while having food. On oral examination, there was a defect in the posterior pharyngeal wall through which the upper end of plate with intact self-locking screw and socket of missed fixation screw was seen. This was confirmed on X-ray cervical spine. He underwent removal of the plate system and was fed through nasogastric tube and managed with appropriate antibiotics. This case is presented to report a very rare complication of anterior cervical plate fixation in the form of very late-onset dislodgement, migration of anterior cervical plate, and oral extrusion of screw through perforated posterior pharyngeal wall.

**Key words:** Cervical spine complication, delayed pharyngeal wall perforation, missing screw, oral extrusion of fixation screw, plate migration and dislodgement, screw pullout

## INTRODUCTION

In 1967, Bohler<sup>[1]</sup> for the first time reported the use of anterior cervical plate and screw fixation. Since then, there has been an immense increase in the number and the types of anterior cervical fusion with plating systems for various pathologies like trauma, cervical disc, cervical spondylotic compressive

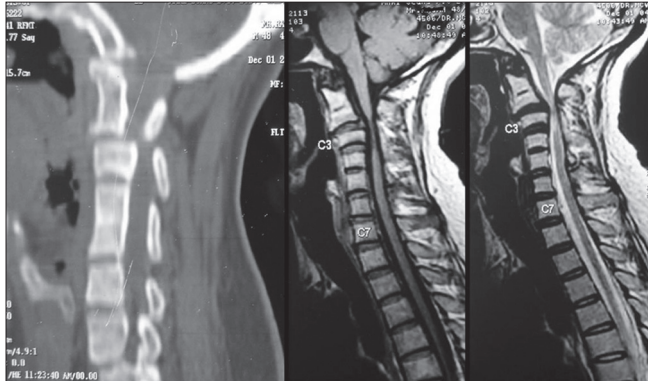
myelopathy, ossification of the posterior longitudinal ligament, and spinal infections.<sup>[2,3]</sup> In spite of the refinements in the plating system and designs, incidence of dislodgement of plate and screw pullout is still seen, but migration of plate and oral extrusion of screw during taking food is very rarely reported.

## CASE REPORT

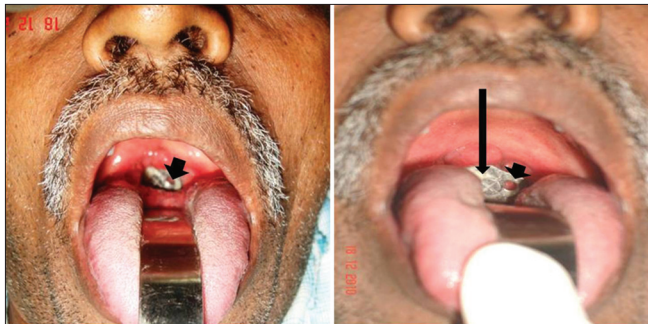
A 54-year-old gentleman with cervical compressive spondylotic myelopathy and multiple congenital anomalies of the cervical spine such as cranio-vertebral junction anomaly with occipit-C1 synostosis and C4-C5 fused vertebrae [Figure 1] underwent C3 median corpectomy, gardening, iliac crest graft placement, and stabilization using titanium plate and screws from C2 to C4 vertebral bodies [Figure 2]. Postoperatively, he had improvement

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in his symptomatology. He reviewed after 8 years with complaint that a screw had expelled through his mouth while having food. There was history of progressive difficulty in swallowing with occasional regurgitation of feeds of 2 months duration. He had no history of recent trauma or worsening of power in his limbs. He was conscious and his neurological examination was normal except for exaggerated deep tendon reflexes. On oral examination, there was a defect in the posterior pharyngeal wall, through which cervical plate along with a missed fixation screw and intact



**Figure 1: Preoperative CT scan and MRI scan of the cervical spine showing cranio-vertebral junction anomaly with C2-3 subluxation and block C4-C5 vertebra**



**Figure 3: Clinical photo of the patient on 8 years follow-up, showing perforation of the posterior pharyngeal wall. Cervical plate system and missing screw (arrow head) can be seen through the defect. Interlocking screw is seen intact (long arrow)**

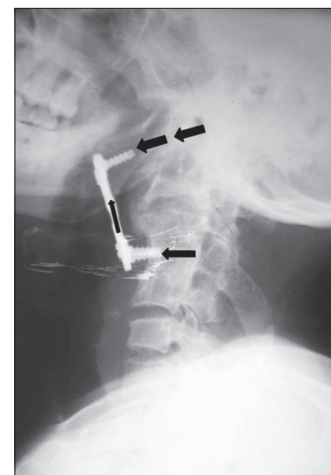


**Figure 5: Plate and screws which were removed. The self-locking screw at upper end is still intact with one missed fixation screw. The lower locking and fixation screws are unscrewed**

self-locking screw was seen [Figure 3]. X-ray cervical spine lateral view showed anterior dislodgement and migration of the plate with a missing screw socket [Figure 4]. Oral culture was taken, and he was started on intravenous antibiotics, betadine oral gargles, and was fed through a nasogastric tube. At resurgery, no abnormal movement was seen, but the plate and screw system was loose and had migrated, with no evidence of fracture of the plate system. The plate was removed in toto after removing the screws [Figure 5]. As the patient had no new neurological deterioration and no abnormal movement was seen intraoperatively, no further instrumentation was done. He was planned for posterior fusion in case he developed new neurological deficits or signs of instability. Postoperatively there was no injury to the peripheral nerves or cranial nerves. Since the posterior pharyngeal wall defect was small, it was expected to close over a period of time; hence, no attempt was made to close it. Postoperatively he was continued on nasogastric tube feeding and intravenous antibiotics for 2 weeks. Regular inspections were made at the posterior pharyngeal wall to rule out fistula formation. The posterior pharyngeal wall defect had closed by 3 weeks without any gaping/fistula formation. At



**Figure 2: Intraoperative X-ray cervical spine lateral view showing implant in situ**



**Figure 4: X-ray cervical spine lateral view showing anterior dislodgement (thick arrows) and migration of the cervical plate (thin arrow) with screw pullout. Second screw is seen missing**

11 months of follow-up, the patient is asymptomatic with normal lower cranial nerves' function and with no signs of instability or new neurological deficits.

## DISCUSSION

Anterior cervical plating has many benefits as an adjuvant to anterior cervical fusion techniques. It provides rigid fixation, resists graft settling and prevents development of segmental kyphosis, promotes higher fusion rates, and reduces the incidence of graft extrusion. Anterior approach for several cervical spinal pathologies like trauma, cervical disc, cervical spondylotic compressive myelopathy, ossification of the posterior longitudinal ligament, and spinal infections has gained widespread acceptance.<sup>[2,3]</sup> In the last two decades, there has been a rise in the use of stabilization methods for various spinal pathologies, using a variety of plate and screw constructs.<sup>[4]</sup> Implant failure after anterior cervical plating has been well documented.<sup>[5,6]</sup>

Though anterior cervical plating seems to be a straightforward procedure, it can be associated with complications like recurrent laryngeal nerve injury with hoarseness of voice, cerebrospinal fluid leakage, quadriplegia, worsening of the paresis, perforation of the soft tissue structures like the esophagus, screw pullout, and migration of plate and screws, and even death has been reported.<sup>[6-8]</sup> Very rarely aspiration pneumonia, carotid artery injury, abscess formation, mediastinitis, systemic sepsis, pleuritis, fistula formation, and gastrointestinal complications following oral extrusion of the screw or plate system have been documented.<sup>[8-11]</sup> All these complications can be attributed to the complex anatomy of the anterior cervical region, improper patient selection, and poor surgical techniques. Lowery *et al.*<sup>[5]</sup> reported failure rate of 35% in patients who underwent anterior cervical plating surgery, of which 7% cases underwent resurgery. Zeidmann and his colleagues estimated an overall complication rate of 5% with anterior cervical spinal fusion surgery.<sup>[11]</sup> Dislodgement of cervical plate with migration and oral extrusion of screw has been rarely reported in the literature. Such complications have been reported from as early as 1958, when Smith and Robinson<sup>[3]</sup> reported a case wherein the graft and the whole plate system device had extruded through the gastrointestinal tract.

Our patient was operated for cervical spondylotic myelopathy with C3 corpectomy and C2–4 stabilization. The technical difficulties in operating at this high level were attributed to retraction of the surrounding tissues, close proximity to vertebral artery, and difficulty in applying plate and screws.<sup>[12]</sup> In our patient, there were similar difficulties during the surgical procedure, and difficulty in doing proper gardening for placing the plate system due to the inadequate space at high cervical level could be one of the causes for plate system failure in our patient. These difficulties can be reduced by extending the standard anterior cervical exposure rostrally and by careful soft tissue dissection, along with mobilization of the superior thyroid artery and using table-mounted retractors.<sup>[13]</sup>

One of the complications of cervical plating system is screw

pullout. There are only two cases of oral extrusion of the screw following surgery. Geyer *et al.*<sup>[14]</sup> have reported oral extrusion after 5 years of surgery without any evidence of plate dislodgement, which was managed conservatively. Lee *et al.*<sup>[15]</sup> have reported an oral extrusion of cervical plate screw after 15 months following surgery, which was again managed conservatively.

Our patient presented after a period of 8 years with oral extrusion of screw, and on radiography, there was evidence of migration of the plate system and missing screw. Ours is the only case where following oral extrusion of the screw, surgical intervention like removal of the implant system was required, as there was associated plate anterior dislodgement. Screw pullouts were associated with esophageal or posterior perforation with asymptomatic passage of implants through the gastrointestinal tract.<sup>[16-18]</sup> Our patient also had posterior pharyngeal wall perforation, through which the screw had extruded out.

The main predisposing factor in the development of screw or plate extrusion is the initial suboptimal positioning of the plate and screws or length of these screws<sup>[19]</sup> or the size and position of the graft. Most of the implant extrusions that were documented in the literature were related to various aspects like malpositioning of screws,<sup>[18]</sup> inadequate purchase into the vertebral body,<sup>[20]</sup> excessive movement,<sup>[21]</sup> osteoporosis,<sup>[22]</sup> and surgical site infection.<sup>[16]</sup> Our patient had no signs of osteoporosis or infection. Single cortical purchase is considered adequate when locking screws were used, but double cortical purchase is recommended for conventional screws. In our patient, due to high cervical position, single cortical purchase was achieved and this was supplemented with locking screws. The upper fixation screw had pulled out in spite of the locking screw in position, which was seen on oral examination. The cause for this complication could be the inappropriate gardening and suboptimal placement of the screws or defective hardware, but the cause for fixation screw to pull out in spite of the intact locking screw has to be considered. In addition to the factors mentioned above, congenital anomalies of the cervical spine also predispose to the implant failure.<sup>[23]</sup> Our patient had C4–C5 fused vertebrae and occipit–C1 synostosis which might have exaggerated the process of implant migration, as the unique geometry and regional anatomy of the cervical spine with congenital abnormalities causes additional stress to the plate system.<sup>[20]</sup>

The causes for posterior wall perforation can be iatrogenic injury or over vigorous retraction causing delayed local vascular complications.<sup>[15]</sup> The chronic compression due to the protruding plate and screws over the posterior wall of the pharynx may lead to focal ischemia and necrosis and perforation, as seen in our patient.

Patients generally present with the complaint of difficulty in swallowing, pharyngeal pain and swelling, neck pain, loss of weight, dysphonia, subcutaneous emphysema, fever, or worsening of the neurological status,<sup>[10,18,24-26]</sup> as in our patient who presented with swallowing difficulty and regurgitation of

feeds, with no evidence of lower cranial nerve paresis.

The treatment of instrumental failure depends on the severity of the problem, the patient's general condition, and the presence of complications. Initial management includes elimination of oral feeds, nasogastric tube feeding to restore fluid and nutritional balance, betadine mouth gargles, and intravenous antibiotics, as per the culture sensitivity report. There are reports of conservative management in cases of the screw pullouts with no dislodged plate.<sup>[14]</sup> The indications for hardware removal were mainly persistent dysphagia or loosening of implants beyond 5 mm.<sup>[15]</sup> In our patient, the plate system has dislodged more than 5 mm and migrated with perforation of the posterior pharyngeal wall. Hence, our patient underwent resurgery and removal of the plate system. As the posterior pharyngeal wall defect was small and was expected to heal spontaneously, no repair was done. Surgical repair using sternocleidomastoid or pectoralis major flap repair<sup>[24,25,27,28]</sup> is indicated when the defect is large or when spontaneous healing fails. Postoperatively there can be chances of developing new neurological deficits due to hypoglossal nerve injury or damage to superior laryngeal nerve when re-operating at high cervical levels. Postoperatively antibiotics are given for 2 weeks and feeding should be through a nasogastric tube for 2 weeks, allowing sufficient time for the sutures to heal.

## CONCLUSION

We report a very rare case of late-onset (8 years) dislodgement, migration, and oral extrusion of fixation screws with intact locking screw, after anterior cervical spine plating. Associated congenital anomalies of cervical spine can exaggerate the chances of implant failure. In patients who present late with swallowing difficulty or regurgitation of feeds following anterior plating surgery, a clinical suspicion of screw pullout or plate dislodgement (though very rare) should be considered and evaluated for appropriate management.

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