

Case Report

Two-year follow-up results of C2/3 Prestige-LP cervical disc replacement: first report

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Abstract: A 49-year-old female patient presented multilevel cervical disc herniation with persisting neurological signs since 16 months ago. Mild spondylotic changes in segments C2/3 and C5/6 were detected on plain films. Magnetic resonance imaging (MRI) confirmed multilevel cervical disc herniation (C2/3, C3/4, C4/5, C5/6), compromising the neural foramen at the left C3 and C6 nerve roots seriously. A double-level cervical disc replacement C2/3 and C5/6 was performed to relieve her pain. The surgery was carried out on a classic right approach after induction of general anesthesia. In this case, a 5*14 mm Prestige-LP was implanted in C2-3 and a 5*16 mm Prestige-LP was implanted in C5-6. Postoperative complications such as hoarseness, dysphagia, cerebrospinal fluid leakage and malposition of the prosthesis were not found. The patient's clinical symptoms were totally relieved 6 months after surgery. The 24 months postoperative X-ray showed the good position of the implant, a satisfying cervical range of motion and cervical lordosis. The preliminary clinical and radiographic results of C2/3 Prestige-LP cervical disc replacement are good. In our opinion a good exposure is half of the success of CDR C2/3 and transnasal intubation anesthesia is recommended to achieve a larger exposed space. In most cases mandibulectomy is not needed. With a minor follow-up of 24 months, the clinical and radiographic results of this case are good and larger studies with longer follow-up duration are warranted to explore the safety and effectiveness of CDR C2/3.

Keywords: ACDF, cervical disc replacement, cervical spine, CDR, C2/3

Introduction

Anterior cervical discectomy and fusion (ACDF) is well regarded as the surgical gold standard for the treatment of cervical disc degenerative disease for several decades [1, 2]. ACDF offers the possibility to maintain segmental lordosis and preserve anatomical disc space height. However, previous biomechanical studies have reported higher intradiscal pressure, as well as increased segmental motion, in levels adjacent to a cervical fusion [3]. Cervical disc replacement (CDR) aims not only to allow the same neural decompression as traditional anterior surgery, but also to preserve motion at the treated level and decrease the incidence of adjacent segment disease. Many spinal surgeons are familiar with the anterior approach to the upper cervical spine (occiput to C3) and experienced at performing discectomy and fusion with or without instrument in this region; however, how to perform cervical disc replace-

ment C2/3 has been little reported. Considering the little knowledge of CDR C2/3, we present this special technique case report to share our experience and to explore the safety and effectiveness of CDR C2/3 with a minor follow-up of 24 months.

Case description

This case describes a 49-year-old female patient presenting multilevel cervical disc herniation with persisting neurological signs since 16 months ago. The neck, shoulders and left arm pain has worsened in the last month despite a 6-month intensive conservative treatment. Currently she has some neck pain, shoulders pain and left side arm pain in the C3 and C6 roots distribution area. She does not have a neurologic deficit or walking disturbances. Mild spondylotic changes in segments C2/3 and C5/6 were detected on plain films. Dynamic flexion and extension X-rays showed the seg-

C2/3 Prestige-LP cervical disc replacement

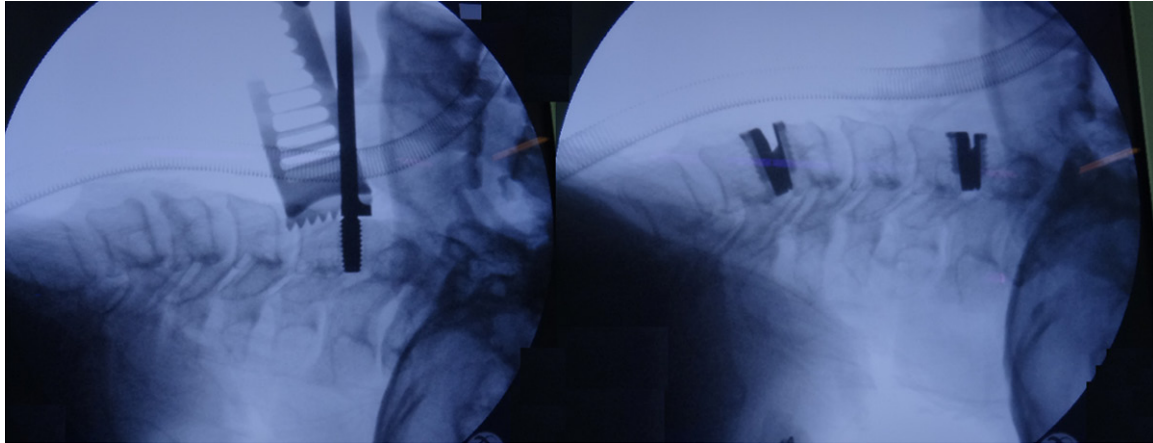


Figure 1. Intraoperative fluoroscopy.

mental movement well preserved. Magnetic resonance imaging (MRI) confirmed multilevel cervical disc herniation (C2/3, C3/4, C4/5, C5/6), compromising the neural foramen at the left C3 and C6 seriously.

The surgery was carried out on a classic right approach by a very experienced surgeon after induction of general anesthesia. The patient was carefully positioned supine on a radiolucent operating table with her head and neck in slightly lordotic cervical spine position (no rotation). A small towel roll was placed under the neck to assist with appropriate positioning of the neck and shoulders and to keep a physiologic lordosis without creating a hyperlordosis. The head is placed on a folded towel to keep it from rolling during the procedure. Gentle traction was given to the upper limbs and strapped by the side of body. Somatosensory evoked potential monitoring of cord function is suggested during the procedure. Fluoroscopy and metal markers were used to locate the correct incision point. A right-sided transverse skin incision in the submandibular region with a vertical extension as long as required providing adequate exposure is made. Carry the dissection through the platysma muscle with the enveloping superficial fascia of the neck and mobilize flaps from this area. Mobilize the anterior border of the sternocleidomastoid muscle by longitudinally dividing the superficial layer of the deep cervical fascia. Identify the digastric and stylohyoid muscles, and tag and divide the tendon of the former. Retracting the trachea and esophagus to the left side opens the approach to the prevertebral fascia and the spine. Carotid

artery is covered by soft tissue. The disc level is confirmed with the help of fluoroscopy (**Figure 1**). The insertions of the longus colli muscle are divided from the cervical bodies with bipolar and scissors. C2-3 discectomy was done and long shaft Caspar screws for interbody retraction were inserted into the middle of the adjacent vertebral bodies. Posterior longitudinal ligament along with anterior, posterior and lateral osteophytes were resected with rongeurs. Meticulous hemostasis was used throughout this procedure to diminish the blood loss and minimize the risk of heterotopic ossification. After adequate decompression of C2-3, the affected level of C5-6 was also accomplished neurologic decompression using the same method listed above. The subchondral endplates are preserved for the prevention of implant subsidence. After the endplate preparation completed, the disc space was distracted and a trial implant of appropriate size was inserted under image control. The distance between the implant and the anterior and posterior rim of vertebral bodies should be at least 1-2 mm. The prosthesis was then mounted over the application instrument and inserted into intervertebral space with the help of fluoroscopy. Oversizing of the implant can be identified by the presence of distracted facet joints posteriorly. In this case, a 5*14 mm Prestige-LP was chosen for C2-3 and a 5*16 mm Prestige-LP was chosen for C5-6. Final imaging of the device implantation is performed before wound closure. Hemostasis is rechecked, and a drainage was inserted. The skin was sutured subcutaneously.

C2/3 Prestige-LP cervical disc replacement

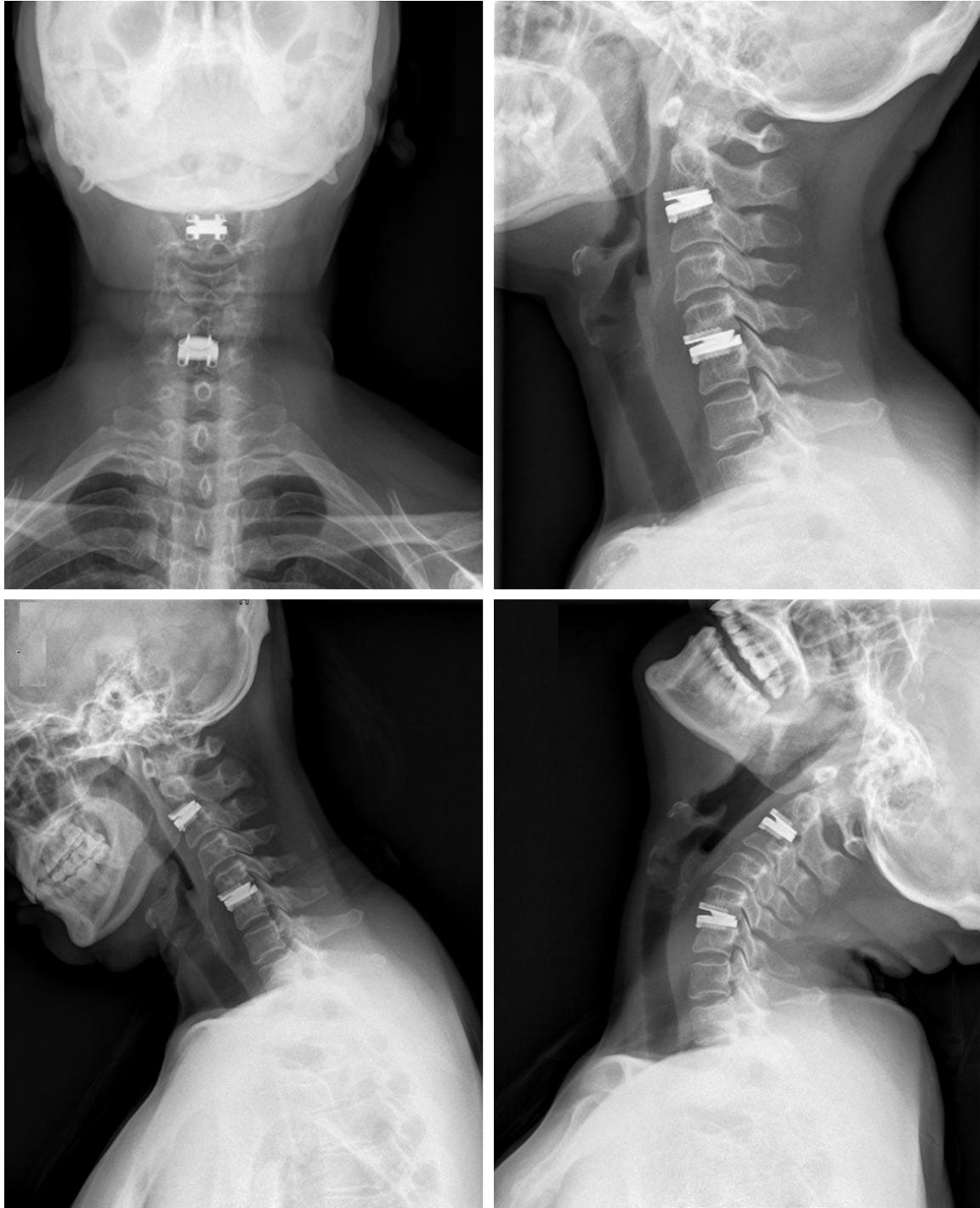


Figure 2. One week postoperative anteroposterior, lateral and functional X-rays.

The patient spent the first night in a recovery room, because of potential cervical wound bleeding. The patient was mobilised the next day and discharged home on the third day. She was obeyed to begin cervical function exercise 3 days after surgery and orthosis was not used.

One week after surgery she was obeyed to take anteroposterior, lateral and functional X-rays (**Figure 2**). Postoperative complications such as hoarseness, dysphagia, cerebrospinal fluid leakage and malposition of the prosthesis were not found. The patient's clinical symptoms were

C2/3 Prestige-LP cervical disc replacement



Figure 3. 24 months postoperative anteroposterior, lateral and functional X-rays.

totally relieved 6 months after surgery. The patient was followed at 1, 3, 6, 12, 24 months after surgery. The 24 months postoperative

X-ray (**Figure 3**) shows the good position of the implant, a satisfying cervical range of motion and cervical lordosis. The preliminary clinical

and radiographic results of C2/3 Prestige-LP cervical disc replacement are good.

Discussion

Overall results of cervical disc replacement are very good [4, 5]. A recent meta-analysis based on prospective randomized controlled trials reported that cervical disc replacement presented favorable functional outcomes, fewer adverse events, and fewer secondary surgical procedures and the efficacy and safety of CDR are superior to those of ACDF [6]. The main advantages of cervical disc replacement are as follows: preservation of motion, potential possibility of reducing adjacent segment disease, less work stoppage and lower incidence of postoperative dysphagia [7]. Although heterotopic ossification (HO) was reported to be unrelated to the clinical improvement, a previous meta-analysis has reported the pooled prevalence of HO was 44.6% 12 months after CDR and 58.2% 24 months after CDR [8]. Many spinal surgeons may be familiar with the anterior approach to the upper cervical spine (occiput to C3) and experienced at performing discectomy and fusion with or without instrument in this region; however, how to perform CDR C2/3 has been little reported. The preliminary clinical and radiographic results of C2/3 Prestige-LP cervical disc replacement are good. In our opinion a good exposure is half of the success of CDR C2/3 and transnasal intubation anesthesia is recommended to achieve a larger exposed space. In most cases mandibulectomy is not needed. With a minor follow-up of 24 months, the clinical and radiographic results of this case are good and larger studies with longer follow-up duration are warranted to explore the safety and effectiveness of CDR C2/3.

Disclosure of conflict of interest

None.

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