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ZERO-P IMPLANTS IN CERVICAL SPINE PROCEDURES-CASE REPORT

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Abstract

Supplementing anterior cervical disectomy and fusion (ACDF) with plates enhances stabilization, increases fusion and reduces failure rates. Zero-P implant for stand-alone anterior interbody fusion procedures of the cervical spine was recently developed to avoid complications associated with anterior cervical plates

Key words: ACDF, HDI, pressure, neck pain, paresthesis.

Introduction

For a long time, anterior cervical decompression and fusion (ACDF) has been regarded as the gold-standard surgery procedure in the treatment of single-level and multiple-level cervical disc diseases [1-3]. Intervertebral cages, without or with an additional anterior cervical plate, has been the most widely used intervertebral devices in recent decades [4].

Even the great advances of techniques and instruments, the fusion rates of ACDF has not achieved 100%. Fairen et al. reported the pseudo arthrosis rate can be as high as 15.2% in a prospective randomized controlled study [5]. A recent meta-analysis based on 17 prospective studies reported the overall pseudoarthrosis rate is 2.6% (95% CI: 1.3-3.9) [6].

ACDF with an anterior cervical plate can increase fusion rates, maintain or improve cervical sagittal alignment and stability, and reduce the risk of graft extrusion and subsidence, particularly in multi level surgery [7, 8].

However, anterior plating may also be associated with potential disadvantages and complications such as including increased dysphagia rates, tracheoesophageal lesions and plate malposition.

Owing to the complications and limitations associated with anterior plating, a new zero profile, standalone device (Zero-P, Synthes GmbH, Switzerland) for ACDF has been designed in an attempt to overcome the adverse effects associated with traditional cervical anterior plating.

A number of studies have reported the application of the Zero-P in single or two-level ACDF with excellent clinical and radiographic outcomes [9-11]

CASE REPORT

34 -year - female patient with severe pain in the neck and upper thoracic spine (8) with paresthesia of both arms. She had burning sensation in her arms.

The condition has been evolving despite conservative therapy consisting of analgesia, NSAIDs, muscle relaxants and physiotherapy. Using Numeric pain rating scale (NPRS) 5 in both hands, neck and upper thorax. With paresthesia in hands

During the examination Spurling sign was positive on both sides Lhermitte sign was positive in the upper extremity. Motor strength in her both arms was 4/5.

On the MRI of the cervical region (Fig1) prominent discus protrusion of level C5-C6. EMG with partial radicular lesion on cervical roots C4-C8, most severe C5-C7.

Operation was indicated. Anterior cervical approach with removing the disc between vertebral bones C5 and C6. After discectomy was completed, the fusion part was Cage was implanted between vertebral bones C5 and C6 in order to provide stability and strength to the area (Fig2).

Results

Day after procedure the patient was feeling good. Pain in neck was almost gone and didn't have paresthesia in her arms

On the checkup 1 week after operation treatment pain was moderate (3), motor strength in both arms was 5, NPRS was 3.

On the second checkup 2 weeks after operation pain on NPRS was 1,no parestesis.

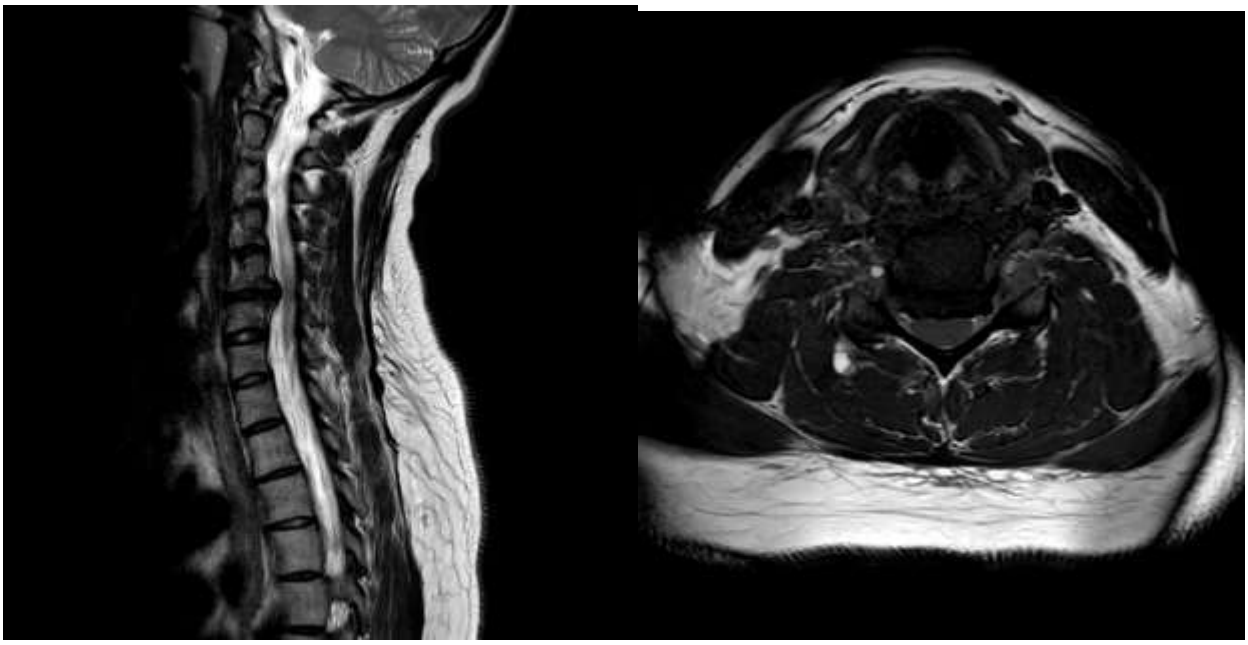

Fig 1.MRI before operation

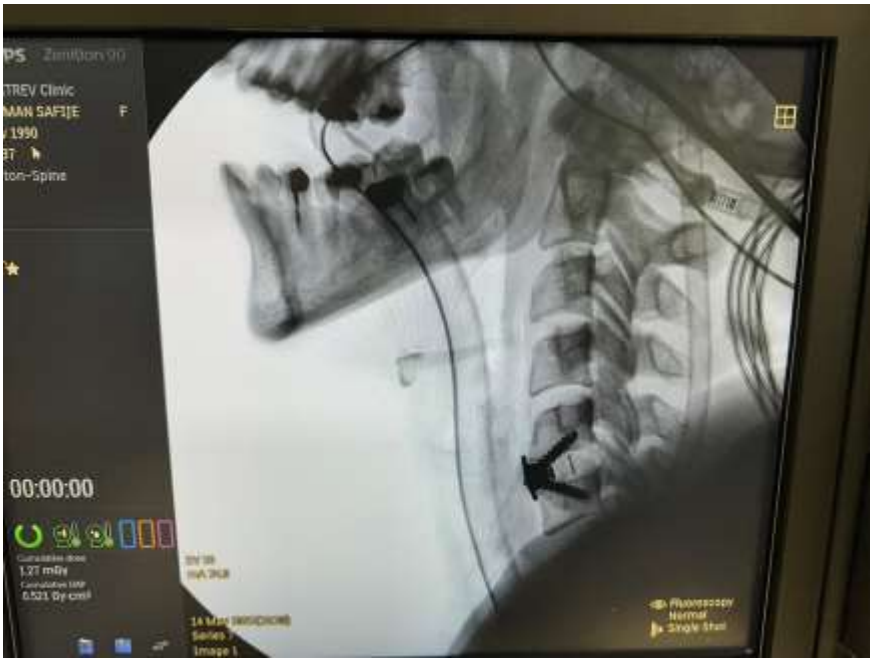

Fig.2. RTG during operation

The most commonly accepted method of evaluating muscle strength is the Medical Research Council Manual Muscle Testing scale.

This method involves testing key muscles from the upper and lower extremities against the examiner's resistance and grading the patient's strength on a 0 to 5 scale accordingly:

(2)

- 0 No muscle activation
- 1 Trace muscle activation, such as a twitch, without achieving full range of motion
- 2 Muscle activation with gravity eliminated, achieving full range of motion
- 3 Muscle activation against gravity, full range of motion
- 4 Muscle activation against some resistance, full range of motion
- 5 Muscle activation against examiner's full resistance, full range of motion

Discussion

The ideal cervical fusion substitute should result in fusion in all patients and offer maximal comfort. It would avoid pain and associated soft tissue morbidity, obviate the need for cervical orthosis, and not impair subsequent radiological investigations.

It would provide immediate stability in compression and resist axial displacement, minimize neck pain, and maintain spinal alignment and foraminal height. Cervical cages are generally characterized by being small, porous, hollow, cylindrical or nearly cubical implants that are thought to restore physiological disc height and allow bone growth through the implant with consequent bony fusion [2]. Cages were developed to prevent disc space collapse and decrease morbidity at the donor site which was reported to follow the use of autologous bone grafts [3].

Interbody fusion stops spur formation which prevents the buckling of the ligamentum flavum and consequently decreases postoperative pain [7].

Furthermore, cage constructs accomplish internal fixation while simultaneously supplying structural support for the organic, fusion-producing bone material in and around the device thus permitting cancellous bone which is incorporated more quickly than a cortical allograft to serve as the fusion substrate. Anterior cervical plating as a supplement to ACDF results in significantly higher incidence of fusion and decreased need for second surgery.

The addition of a plate is, however, not without side effects including dysphagia and implant-associated complications

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