Stand-Alone Cages versus Cage and Plate Constructs for One- and Two-Level Anterior Cervical Discectomy and Fusion: A Prospective Randomized Controlled Trial

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INTRODUCTION

• Although anterior cervical discectomy and fusion (ACDF) with interbody spacer and separate plate/screw construct (PLATE) may be associated with:
  • Higher incidence of postoperative dysphagia
  • Increased operative time
  • Malpositioned hardware
  • Higher costs
  • Adjacent segment impingement.

• To address these concerns, others have opted to utilize an interbody cage with integrated screws and no plate (CAGE) with good results.
PURPOSE AND STUDY DESIGN

- **Purpose:** This study's purpose was to compare the perioperative and radiographic outcomes at 1 year between stand-alone and anterior plated 1 and 2 level ACDF.

- **Study Design:** Prospective randomized controlled trial
 Patients with 1-2 level degenerative disease were randomized in a 1:1 ratio into one of two treatment arms consisting of either PLATE or stand-alone CAGE reconstruction.

**Inclusion criteria:** diagnosis of radiculopathy, myelopathy, myeloradiculopathy, herniated nucleus pulposus, degenerative disc disease, spondylosis, osteophytic complexes, or foraminal stenosis at one or two contiguous levels of the cervical spine between C3 and C7.

**Exclusion criteria:** patients under the age of 18, and patients receiving treatment for indications of trauma, tumor, or infection.

Patients were followed for a minimum of 1 year following surgical intervention.
METHODS

Patient Reported Outcomes (PROs):

- Neck Disability Index (NDI)
- Visual Analog Scale (VAS) Neck and Arm
- Veterans RAND 12-Item Health Survey (VR-12)
  - All PROs were collected preoperatively, and at 6 weeks, 6 months, and 1 year postoperatively

Radiographic Outcomes

- Functional intervertebral level height of operative and adjacent segments
- Subsidence (absolute value)
- Cervical Lordosis
- C2-C7 Sagittal Vertical Axis (SVA)
- T1 Slope
- Fusion Segment Lordosis (FSL)
- Successful fusion as assessed via the criteria defined by Bridwell et al.
RESULTS

• Of the 46 randomized patients, 40 adhered to follow-up:
  • 1-Level ACDF
    • 10 patients with PLATE
    • 10 with CAGE,
  • 2-Level ACDF
    • 10 with PLATE
    • 10 with CAGE.
RESULTS – 1-LEVEL ACDF

- There were no postoperative differences in PROs except for worse swallow function on SWAL-QOL with PLATE at 6 weeks ($p = .050$) and 6 months ($p = .042$).
- Arthrodesis was observed in 90% of PLATE and 100% of CAGE patients ($p = .305$).
- Pseudarthrosis requiring revision was observed in one PLATE patient.
- Radiographic evaluation was similar across groups.
CAGE patients reported worse scores on NDI at 6-weeks (p = .037) and 6-months (p = .017), as well as on VAS Neck (p = .010).

Swallow function was worse with PLATE on SWAL-QOL at 6 weeks postoperatively (p = .038).

Arthrodesis was observed in 90% of PLATE and 80% of CAGE patients (p = .531).

Radiographic evaluation was similar across groups.
DISCUSSION

There was a significantly greater incidence of transient (but not long-term) postoperative dysphagia in both the single-level and two-level PLATE cohorts when compared to the CAGE configuration.

However, early postoperative pain and disability outcomes were worse for two-level CAGE in certain patient-reported metrics.
CONCLUSION

• These findings suggest that although anterior instrumentation may be associated with a higher likelihood of dysphagia, it may also be associated with higher short-term stability and improved patient-reported outcomes for two-level fusion until arthrodesis has been established.

• Surgeons should weight the advantages and disadvantages of both constructs at their own discretion, taking patient preferences into consideration during preoperative counseling.
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THANK YOU!