Hybrid Cervical Total Disc Arthroplasty Combined with Anterior Cervical Discectomy and Fusion: An Analysis of Clinical Outcomes

SMISS 2021
E-Poster #141

The information presented unapproved FDA clearance indications for STALIF C and prodisc C devices and represents an off-label use.

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Conflict of Interests/Disclosures

Centinel Spine: Consulting, Royalty
RTI: Royalty
Paradigm Spine: Consulting, Stock
Orthofix: Royalty
St. Jude Medical: Consulting
Medtronic: Neuromodulation Consulting
Introduction

• Hybrid surgery (HS), combining adjacent anterior cervical discectomy and fusion (ACDF) and cervical disc arthroplasty (CDA), is a relatively recent treatment option for multilevel cervical degenerative disc disease (DDD).

• Although ACDF has been the standard of surgical care for single and multiple level cervical disc disease for many decades, over the past decade-plus, CDA has been shown to be a safe and highly effective alternative to ACDF.

• Some patients with multilevel disease are not good candidates for CDA at one or more levels, so HS may be more suitable in those patients.

• There are minimal patient-reported cervical HS outcome measures published to date, so the effect and reliability of HS are still unclear compared to ACDF or CDA alone.
Purpose of the study

Given the novelty of HS and the relative shortage of clinical data adequately evaluating the treatment option, this current study aims to assess the patient-reported outcome measures, patient satisfaction, complications and reoperation rates of cervical hybrid procedures for symptomatic cervical multilevel DDD in a single institution.

Prodisc C (Centinel Spine, LLC)  
STALIF C-Ti® (Centinel Spine, LLC)
Retrospective cohort study data was collected and analyzed from patients received HS for symptomatic cervical DDD between 06/2018 and 02/2020.

A total of 34 patients (13 male, 21 female) with mean age of 51.7±9.2 years (range 36–71), and follow-up 12-30 months are included in this report:

- 26 patients had 1-level CDA and 1-level ACDF (1+1);
- 3 patients had 2-level CDA+1-level fusion;
- 7 patients had 1-level CDA+2-level fusion; and
- 1 patient had 1-level TDA+3-level fusion.

Data was collected preoperatively and postoperatively at 3, 6, 12, and 18 months, then yearly thereafter.

Patient reported outcome measures included patient satisfaction, Visual Analog Score (VAS) for neck and arm pain, and Neck Disability Index (NDI).

Complication, reoperation, and readmission rates, as well as operation duration, length of stay (LOS), opioids use were also assessed.
Results

- The most common indication for surgery was multilevel cervical spondylotic radiculopathy (70.6%), followed by axial neck pain (20.6%), and cervical spondylotic radiculomyelopathy (8.8%).

- Improvement of pain and disability scores were clinically significant and these improvements were sustained throughout the follow-up period.

- There were no reoperations.

- All patients stayed in the hospital 23 hours or less.

- Average estimated blood loss was 7.3±3.4ml (range 5-15ml), and average operative time was 37.8±3.4 minutes (range 31-42 minutes).

- Average return to work/activities was 26±3 days.

- 3 patients had dysphonia at 6-week follow-up, in 1 patient dysphonia remained at 3-month follow-up.
Results - Case 1: 1+1

Preop MRI

Preop X-Ray Neutral

Preop X-Ray Flexion
Results - Case 1: 1+1

Postop Extension

Postop Neutral

Postop Flexion
Results - Case 2: 1+2

Preop MRI
Preop X-Ray Extension
Preop X-Ray Neutral
Preop X-Ray Flexion
Results - Case 2: 1+2

Postop AP

Postop Lateral

Postop Flexion
Results - Case 3: 1+1

Preop MRI
Preop X-Ray Extension
Preop X-Ray Neutral
Preop X-Ray Flexion
Results - Case 3: 1+1

Postop AP

Postop Lateral
Results - Case 4: 1+2

Preop MRI

Preop X-Ray Neutral

Preop X-Ray Flexion
Results - Case 4: 1+2

Postop AP

Postop Lateral

Postop Extension
Conclusions

- This study represents clinical experience of a single surgeon with the cohort of patients undergoing HS reported to date.
- Cervical HS for cervical DDD demonstrates favorable clinical outcomes at short- to midterm follow-up.
- Patients undergoing HS are not at increased risk of perioperative complications and may benefit from fewer postoperative complications and shorter LOS.