Single Level Radiculopathy
ACDF: “It’s Proven, It Works”

Stuart Hershman, MD
CSRS Instructional Course
Toronto, CA
11/30/16
Disclosures

- Consulting – DePuy Synthes Spine
ACDF or CDR?

Comparison of artificial cervical arthroplasty versus anterior cervical discectomy and fusion for treatment of symptomatic cervical disc disease: a meta-analysis of randomized controlled trials
ACDF or CDR?

A Meta-Analysis Comparing the Results of Cervical Disc Arthroplasty with Anterior Cervical Discectomy and Fusion (ACDF) for the Treatment of Symptomatic Cervical Disc Disease

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Investigation performed at the Department of Orthopaedic Surgery, West China Hospital of Sichuan University, Chengdu, Sichuan, People's Republic of China

• 27 studies included
  – 12 level 1 evidence; remaining 15 level 2
• Operative time – significantly longer (22 min) with CDR
• Blood loss – significantly greater with CDR
ACDF or CDR?

27 studies included
- 12 level 1 evidence; remaining 15 level 2

Operative time – significantly longer (22 min) with CDR*

Blood loss – significantly greater with CDR*
- *Not clinically meaningful...
ACDF or CDR?

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• No difference:
  – NDI scores
  – Adverse events
ACDF or CDR?

• CDR:
  – Better neurologic recovery
  – Fewer secondary procedures
  – Better VAS pain scores
  – Better ROM at the surgical level

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Let’s do CDR on everyone!!!
Who isn’t a candidate for CDR???

Table 1
Summary of contraindications to cervical TDR

- ≥3 vertebral levels requiring treatment
- Cervical instability (translation >3 mm and/or >11° rotational difference to that or either adjacent level)
- Known allergy to implant materials (titanium, polyethylene, cobalt, chromium, and molybdenum)
- Cervical fusion adjacent to the level to be treated
- Posttraumatic vertebral body deficiency/deformity
- Facet joint degeneration
- Neck or arm pain of unknown etiology
- Axial neck pain as the solitary presenting symptom
- Severe spondylosis (bridging osteophytes, disc height loss >50%, and absence of motion <2°)
- Osteoporosis/osteopenia
- Prior surgery at the level to be treated
- Active malignancy; any patient with history of invasive malignancy, unless treated and asymptomatic for at least 5 years
- Systemic disease (AIDS, HIV, Hepatitis B or C, and Insulin-dependent diabetes)
- Other metabolic bone disease (ie, Paget’s and osteomalacia)
- Morbid obesity (BMI>40 or weight>100 lb over ideal body weight)
- Pregnant or trying to become pregnant in next 3 years
- Active local/systemic infection
- Presently on medications that can interfere with bone/soft tissue healing (ie, steroids)
- Autoimmune spondyloarthropathies (rheumatoid arthritis)

TDR = total disc replacement.

Who isn’t a candidate for CDR???

• Probably most people...
ACDF or CDR?

• *Different patient populations!!!*
ACDF vs CDR patients


<table>
<thead>
<tr>
<th>TABLE: Selection Criteria for Anterior Cervical Surgery</th>
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<tbody>
<tr>
<td>Patient Selection</td>
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<tr>
<td>Consider Arthroplasty</td>
</tr>
<tr>
<td>Single-level disease</td>
</tr>
<tr>
<td>Primarily anterior or disk-related pathology</td>
</tr>
<tr>
<td>Preserved segmental motion</td>
</tr>
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<td>Preserved disk space height</td>
</tr>
<tr>
<td>No significant facet arthropathy</td>
</tr>
<tr>
<td>Normal sagittal alignment</td>
</tr>
<tr>
<td>Significant kyphosis</td>
</tr>
<tr>
<td>Segmental instability</td>
</tr>
<tr>
<td>Tumor, trauma, infection</td>
</tr>
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<td>Previous decompressive laminectomies</td>
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Utilization Trends of Cervical Artificial Disc Replacement After FDA Approval Compared With Anterior Cervical Fusion

Adoption of New Technology

Young Lu, BA, Steven J. McAnany, MD, Andrew C. Hecht, MD, Samuel K. Cho, MD, and Sheeraz A. Qureshi, MD, MBA
ACDF vs CDR patients

ACDF vs CDR patients


### TABLE 2. Comorbidities and Diagnoses (ACDF vs. CDA 2008–2010)

<table>
<thead>
<tr>
<th>Comorbidities (%)</th>
<th>ACDF, % (n = 416,674)</th>
<th>CDA, % (n = 8820)</th>
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ACDF vs CDR patients

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ACDF indicates anterior cervical discectomy and fusion. CDA, cervical disc arthroplasty.

Cervical HNP

• Cervical radiculopathy
  – The disc is responsible in 22% of cases, while 68% of cases arise from a combination of discogenic and spondylotic causes (Radhakrishnan K, et al. *J Neurology*. 1994)
Who is a candidate for CDR?

- 167 pts who underwent anterior cervical surgery over 2 years
- 43% (n= 72) fit the inclusion criteria for CDR
  - 47 pts were excluded due to number of 3+ levels
  - 72/120 = 60%
  - 40% were not candidates for CDR!!!
Who is a candidate for CDR?

- MRI is unreliable to assess facet arthrosis
- 594 facets
  - Using CT, only 43.1% of the facets were categorized as normal
- 63.7% moderate/substantial intermethod agreement
Who is a candidate for CDR?

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Must get CT scans on any patient you’re considering!!
Metallic debris (and polymeric debris where applicable) was consistently found
  – Inflammatory cells frequently present

Long term effects???
We’re the ones studying it, and we want it to work!!

Patients also want it to work!!

- Compared to physicians, consumers prefer new technology significantly more often (39.7% vs 13.8%; p<0.001)
CDR is a great procedure, however...

- Healthier patient population
  - Younger, healthier, more active, no arthrosis
- Particulate debris
  - We don’t know what long term effect this will have
- Reseacher bias (no studies are blinded)
  - As clinicians, we want this to work
- Patients experience a “buzz word/new technology” phenomenon (ie lasers, robots, stem cells, etc.)
  - Only recently do clinicians have hard proof that CDR works
Thank You