



## Editorial

# Can anterior cervical discectomy/fusion (ACDF) be safely performed in ambulatory surgical centers (ASC's)?

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## ABSTRACT

**Background:** Can anterior cervical discectomy/fusion (ACDF) be safely performed in ambulatory surgical centers (ASC's: i.e. discharges 4-7.5 hr. postoperatively) that meet the following stringent "exclusion criteria"; elevated Body Mass Index (BMI), major comorbidities, age > 65, American Society of Anesthesiology (ASA) scores > II, and largely multilevel ACDF.

**Materials:** Presently, most ACDF are still being performed in hospital-based outpatient surgical centers (HBSC: utilizing 23-hour stays), or as inpatients.

**Results:** Notably, unreliable disparate study designs involving very different patient populations resulted in nearly comparable, but implausible outcomes for 1-level vs. multilevel ACDF series performed in ASC. A summary of these outcome data included the following rates of; i.e. postoperative hospital transfers (0-6%), 30-day (up to 2.2%), and up to 90 day (2.2%) emergency department (ED) visits, readmissions, and reoperations.

**Conclusion:** Nevertheless, it is just common sense that "less should be less", that 1-level ACDF should involve less risk compared with multilevel ACDF procedures performed in ASC.

**Keywords:** Adverse events, Ambulatory surgi-center (ASC), Anterior cervical discectomy/fusion (ACDF), Efficacy, Hospital-based outpatient surgi-center (HBSC), Inpatient facility, Morbidity, Outcomes, Safety, Single vs multilevel

## INTRODUCTION

Can anterior cervical discectomy/fusions (ACDF) be safely performed in ambulatory surgical centers (ASC- discharges 4-7.5 hrs. postoperatively) adhering to "stringent exclusion criteria". As outlined in many studies, these exclusion criteria included; avoiding elevated BMI (i.e. obesity/morbid obesity, non-routine "morphology"), major comorbidities, age > 65, American Society of Anesthesiology (ASA) scores > II, and as raised by Gennari *et al.*, multilevel ACDF?<sup>[1,4-6]</sup> Presently, the majority of ACDF are still performed in hospital-based outpatient surgical centers (HBSC: utilizing 23-hour stays), or as inpatients.<sup>[1,4-6,8,9]</sup> Here, we analyzed outcomes of 1-level vs. multilevel ACDF performed in ASC, focusing on immediate postoperative hospital transfer rates, and up to 30 and 90 day postoperative emergency department (ED) visits, readmissions, and reoperations.<sup>[1,2,4-10]</sup> Again, our main question was whether ACDF could be safely performed in ASC. Furthermore, isn't it common sense that "less (surgery) should be less (morbidity)", that 1-level ACDF should involve "less risk" vs. multilevel procedures performed in ASC.<sup>[6]</sup>

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### **“Careful Patient Selection” for ACDF Surgery in ASC Using Multiple “Exclusion Criteria”**

#### ***Two Studies Emphasized Inclusion/Exclusion Criteria for 1-level ACDF to Be Performed in ASC***

Two studies emphasized careful patient selection utilizing multiple “inclusion” and “exclusion criteria” for performing 1-level ACDF in ASC [Tables 1, 2].<sup>[5,8]</sup> In France, Gennari *et al.* (2018) noted that 90% of cervical 1-level ACDF were being successfully performed in ASC [Table 1].<sup>[5]</sup> Notably, these patients were carefully selected utilizing “multiple inclusion criteria”; age < 65, only 1-level ACDF, ASA scores of < II, and patients were required to exhibit “standard morphology” (i.e. not including obesity/morbid obesity). Further, “exclusion criteria” included; age > 65, 3 + level ACDF, and ASA > II. Rossi *et al.* (2019) uniquely included 119 Medicare patients (i.e. all over 65 years of age) in ASA Grades I-III undergoing predominantly 1-level ACDF (103 patients).<sup>[8]</sup> They observed no immediate postoperative hospital transfers, a 2.4% 30-day incidence of postoperative adverse events, and a 1.7% frequency of 90-day readmissions (i.e. 2 patients with one requiring additional surgery for a deep infection) [Tables 1, 2].<sup>[8]</sup>

#### ***Three Studies Emphasized Inclusion/Exclusion Criteria for Multilevel ACDF to be Performed in ASC***

Three studies emphasized careful patient selection utilizing multiple “inclusion” and “exclusion criteria” for performing multilevel ACDF/mixed procedures in ASC [Tables 1, 2].<sup>[6,7,10]</sup> When Vaishnavi *et al.* (2019) compared outcomes for 2-level ACDF performed in ASC vs. in inpatient facilities, they emphasized major differences between the two populations; ASC patients had lower BMI (i.e. averaging 27.3 vs. > 30.4 for inpatients), and lower ASA Grades (i.e. I-II for ASC vs. > II for ASA for inpatients).<sup>[10]</sup> For McGirt *et al.* (2020) 2000 consecutive 1-3 level ACDF performed in ASC using 4 hr. PACU windows, they found that: “...surgeons can safely perform ACDFs in an ASC utilizing patient selection criteria and perioperative management protocols...”; they did note, however, higher morbidity rates for multilevel procedures [Table 1].<sup>[6]</sup> Similarly, Monk *et al.* (2023) found that 1-2 level ACDF performed in ASC vs. a propensity matched cohort of inpatients exhibited similar “improvement and outcomes”, largely attributed to patient selection.<sup>[7]</sup>

### **Medicolegal Suits Due to Ignoring Exclusion Criteria for ACDF Surgery Performed in ASC**

Experience with two medicolegal suits reviewed by this neurosurgeon highlight how critical it is to follow exclusion criteria when choosing to perform ACDF in ASC. In the first case, a morbidly obese alcoholic underwent a 1-level ACDF in an ASC; within 2 hours of discharge to home, he sustained a fatal cardiorespiratory arrest. A second patient,

over 65 years of age, underwent a multilevel ACDF in an ASC, and was discharged home within less than the requisite 4 hour postoperative observation window despite an excessive amount of Jackson-Pratt drainage. He too sustained a cardiac arrest at home, but remained vegetative for over 1 year before expiration. Notably, there must be many other “unreported” cases of ACDF being negligently performed in ASC (i.e. failure to follow “exclusion criteria”) resulting in irrevocable patient harm.

### **Nearly Comparable Morbidity Rates for 1-Level vs. Multilevel ACDF Performed in ASC: This Makes No Sense as “Less (Surgery) Should Be Less (Morbidity)”**

#### ***First, Documentation of Safe Performance of 1-Level and/or Multilevel ACDF in ASC***

Several studies documented the relative safety of performing 1-level vs. multilevel ACDF in ASC (same day discharges) [Tables 1, 2].<sup>[1,2,4,9,10]</sup> Garringer *et al.* (2010) concluded that the 645 1-level ACDF performed in ASC were safely performed; there were no deaths, 2 (0.3%) developed immediate postoperative epidural hematomas (i.e. within the 4 hour postoperative observation window), while 6% were readmitted within 48 postoperative hours.<sup>[4]</sup> Adamson *et al.* (2016) concluded that the 1000 1-2 level ACDF performed in ASC were also safely performed “without compromising surgical safety” vs. 484 performed as inpatients.<sup>[1]</sup> Arshi *et al.* (2018) just noted that patients undergoing 1-2 level ACDF in ASC had higher postoperative acute renal failure rates (i.e. likely reflecting suboptimal intraoperative blood pressure management by anesthesia).<sup>[2]</sup> Although Vaishnav *et al.* (2019) noted that patients selected for 1-2 level ACDF in ASC had lower BMI and lesser ASA Grades vs. the inpatients, they nevertheless concluded that both groups demonstrated comparable short and long-term outcomes [Tables 1, 2].<sup>[10]</sup> Safee *et al.* (2021) looked at 470 ACDF performed in ASC vs. outpatient hospital centers (i.e. 23 hours stays) vs. inpatient procedures [Tables 1, 2].<sup>[9]</sup> Although the same day or overnight procedures were shorter, and involved less blood loss vs. inpatients, all 3 demonstrated comparable perioperative adverse events, and 30-day readmission rates [Tables 1, 2].<sup>[9]</sup>

### **Rates for Multilevel ACDF Compared with Single-Level ACDF Makes No Sense**

Despite differences in immediate postoperative hospital transfer rates for 1-level vs. multilevel ACDF performed in ASC (i.e. 0-6% for 1-level vs. 0-0.8% for multilevel procedures), our analysis of these studies showed nearly comparable 30-day (1.9-2.4%), and 90 day ED visits, readmissions, and reoperation rates (1.7-2.2%) [Tables 1, 2].<sup>[1,4-7,9,10]</sup> Reasons for these differences/disparities likely included; small sample sizes (i.e. for some studies), the inclusion of fewer centers (i.e. some

**Table 1:** Summary of 10 studies.

Author [Ref] Journal Year	Surgical Procedures	Data	Data	Results	Outcomes
<b>Garringer<sup>[4]</sup> J Spinal Disord Tech 2010</b>	645 ACDF 1-Level ASC-Disc Stenosis AE 48 hrs Postop	<b>2 (0.3%) Acute EDH 4 hrs PACU All Deficits Resolved</b>	0 Deaths <b>6% Readmit</b> 80% of These Pain/Nausea	Conclude Safe ACDF ASC with 4 hr. PACU	Would lower readmit 1/3 avoid iliac autograft
<b>Baird<sup>[3]</sup> Global Spine J 2014</b>	Ambulatory Spine Surgery Electronic Survey Members ISASS	84.2% Surgeons Performed ASC Surgery <b>49.1% Surgeons Invested in ASC</b>	ASC Investors Perform >Complex OR in ASC Private Practice <b>&gt;ASC OR (94.3%)</b>	Non-Academic Surgeons>Invest + > Likely Do >Complex (Trend) OR in ASC	<b>Concluded: Hospital “where a patient may have better access to emergency care”</b>
<b>Adamson<sup>[1]</sup> J Neurosurg Spine 2016</b>	<b>1000 ACDF in ASC Vs. 484 Inpatient</b> 2006-2013 ASC <Cost ACDF Frequent OR <b>ACDF</b> 629 1-Level 365 2-Level	<b>Mean Age 49.5</b> 484 (48.4%) Males <b>Observation Postop ASC PACU 4 Hours “appropriate diagnosed-managed in 4-hour ASC PACU window”</b>	<b>Low 8 (0.8%) ACDF In ASC Transfer to Hospital Postop</b> 3-Pain, 1 Clot 2-Chest pain 1 CSF Leak, 1 New Neuro Deficit/ Reop 0 Deaths	<b>2.2% 30 Day Readmit</b> Similar 90-Day Surgical Morbidity for 1 and 2 Level ACDF	Similar ASC vs. Inpatient ACDF Results <b>Concluded ACDF Safely Done in ASC “without compromising surgical safety”</b>
<b>Gennari<sup>[5]</sup> Orthop Traumatol Surg Res 2018</b>	Outpatient ACDF in ASC France 90% <b>Success 27/30 Criteria ASC &lt;65, 1-Level ASA &lt;2 Standard Morphology (i.e. Obesity, Morbid Obesity)</b>	<b>AVOID ASC</b> Older Age>65 3+Level ASA >2 <b>ASC Wound Clot Rate 0.2%</b> Diagnosed Early-Drained Before DC <b>8-30% AE Most Dysphagia</b>	<b>2014</b> 16 M, 14 F <i>Mean age 47.2</i> Cervical Rad 1-Level 19 at 56 11 at C67 Mean OR Time 38 min	<b>Mean Postop PACU 7 h 30 min</b> Time in Facility 10 hrs 10 min	<b>1 F (3%) Transferred to Hospital New deficit REOP 2 (7%) Hospitalized Day 1- Dysphagia Resolved Must Monitor at Least 6 Hrs &lt;Risks Clot</b>
<b>Arshi<sup>[2]</sup> Spine J 2018</b>	ASC 1-2 Level ACDF >>Risk Revisions+AE PearlDiver Humana Insurance Records 2011-2016 ASC 1215 pts (Avg Age 65) vs. Inpatients 10,964 Avg. Age 69	1 yr. Postop Medical/Surgery AE Rate ASC ACDF Increased in 2016 ACDF in ASC <b>“Higher Likelihood Posterior Revision Surgery 6 mos. and 1 yr</b>	<b>ASC ACDF &gt;&gt;Likelihood Anterior Revision ACDF in 1 yr. postop</b> Postop Medical AE Only Acute ARF Higher ASC	Conclusion <b>ASC ACDF &gt;Risk Periop Surgical AE- &gt;&gt;Revision Anterior and Posterior Fusions&gt;Risk</b> Postop ARF	<b>Candidates for ASC- “should be counseled and carefully selected to reduce these risks”</b>
<b>Vaishnav<sup>[10]</sup> Clin Spine Surg 2019</b>	2-Level ACDF ASC (25) vs. Inpatient (58) Safety <b>83 Patients</b> Mean Age 51.7.6 ASC 53.2 Inpatient	<b>BMI &lt;&lt;ASC 27.3 kg/m vs. &gt;&gt;30.4 BMI Inpatient</b> ASC <<ASA Grade (I-II) Same EBL, Same AE (Most Urinary Retention)	<b>One Inpatient Reintubation</b> 0% Readmit from ASC <b>Both Similar Outcomes 6 wk-6 mos.</b>	<b>Conclude Safe to Do 2-Level ACDF in ASC vs. Inpatient No Increased Morbidity/AE</b>	<b>“Specifically BMI and ASA class should be taken into consideration” “Importantly the setting of the surgery does not impact early patient reported outcomes”</b>

(Contd...)

**Table 1: (Continued).**

Author [Ref] Journal Year	Surgical Procedures	Data	Data	Results	Outcomes
<b>Rossi<sup>[8]</sup> J Neurosurg Spine 2019</b>	ASC 119 ACDF Medicare>65 yo 90 Day Eval Morbidity	97 (81.5%) Medicare <b>103 (86.6%) One Level ACDF 15 (12.6%) 2-level ACDF</b> 1 (0.8%) 3 Level ACDF <b>None Reop in 4 hr. postop PACU</b>	1-3 Level ACDF 1 ASC from 2015-2018 ASA I-III	Postop PACU At Least 4 hrs Evaluated: Neck Swelling Neuro Status Swallowing Eat Solid Food Urination	<b>0% Hospital Transfers</b> 2.4% 30 day AE: Resolved 90 days <b>90 days Readmit: 1.7% (2) 1 (0.8%) Reop Deep Infection 0% Mortality</b>
<b>McGirt<sup>[6]</sup> Neurosurgery 2020</b>	ACDF in ASC 2000 Consecutive Cases 1-3 Level ACDF 2006-2018 One ASC <b>Observed 4 Postop hrs PACU</b>	Data-Comorbidities, Surgical Data, 30 and 90 Day Postop Morbidity <b>10 (0.5%) Transfer to Inpatient Within 4 Hrs of PACU Observation</b>	<b>Reasons for Transfer 10:</b> 2 Clots 2 Pain 1 CSF Leak 5 Medical AE <b>30-Day Reop 6 Pts 1.9% 30 Day Readmit Conclude Surgical AE Low &lt;1%</b>	Can be Diagnosed in 4 hr. PACU Observation Safe to Perform ACDF in ASC	“surgeons can safely performed ACDFs in an ASC utilizing patient selection criteria and perioperative management protocols.”
<b>Safae<sup>[9]</sup> World Neurosurg 2021 (Pg. 940)</b>	ACDF Same Day ASC vs. Outpatient vs. Inpatient Academic University Facilities All 3 Locals Safe/ Effective	2015-18 ACDF Outpatient Surgery 470 pts Mean age 56 255 F 54.3%	<b>Same Results all 3 Regarding Age, Gender, # Levels Fused No Differences Same day DC, Overnight Observation vs. Inpatient Admit Age, Gender, # levels Fused</b>	Same Day or Overnight: Shorter OR, Less EBL Periop AE 30 Day Readmit Fusion at 12 mos. vs. Inpatient	<b>Costs (Direct/Total) Lowest Same Day Cases vs. Medium Overnight vs. Highest Inpatient</b>
<b>Monk<sup>[7]</sup> Spine 2023</b>	ACDF in ASC vs. Inpatient 1 yr. Cost E 6504 pts QOD 1-2-Level ACDF ASC (520 pts) Inpatient (5984 pts) <b>Propensity match 374/Cohort (total of 748-Data Used</b>	<b>Similar AE and Improvement in Outcomes for Both Groups QALY</b> ASC Cost ACDF Significantly Lower 1 yr. (Medicare \$5879) Private Insurance (\$12,873)	Unacceptably poor cost utility for inpatients (Medicare/Private) Insured-Incremental cost Medicare \$3674 vs. Private Ins. \$8046)	<b>Inpatient ACDF “... significant increase in total costs vs. ASC without a safety, outcome or QALY benefit</b>	<b>“ASC. dominant option ... for first time 1-2 level ACDF in select patients compared to the inpatient hospital setting”</b>

COE: Center of excellence, Prof: Professional, FG: Federal government, Ins: Insurers. ASC: Ambulatory surgery center, Orthop: Orthopedics, SS: Spine surgery, ISASS: International society for the advancement of spine surgery, OR: Operations, HO: Hospital outpatient, DC: Discharges, SASD: Florida state-ambulatory surgery database, HCUP: Healthcare cost and utilization project, CPT: Current procedural terminology, ICD: International classification of diseases, Sig: Significant, pts: Patients, AE: Adverse event, F/O: Follow-Up, ASA: American society of anesthesiologists classification, Rad: Radiculopathy, HOPD: Hospital outpatient departments, ACDF: Anterior cervical discectomy/Fusion, OP: Operations, Readmit: Readmission, Periop: Perioperative, SSI: Surgical Site Infections, ARF: Acute Renal Failure, Neuro: Neurological, RLN: Recurrent laryngeal nerve palsy, ASD: Adjacent segment disease, EDH: Epidural hematomas, PACU: Post anesthesia care unit, Avg: Average, EBL: Estimated blood loss

single center studies), and their use of less stringent criteria for readmissions [Tables 1, 2].<sup>[2,4,5,6,7]</sup> For example, Garringer *et al.* (2010) reported a 6% readmission rate within 48 postoperative

hours for 645 patients undergoing 1-level ACDF; 80% were for pain/nausea alone (i.e. example of less stringent criteria).<sup>[4]</sup> Gennari *et al.* sample included just 30 patients operated on at



**Table 2:** Summary of data from 10 studies.

Variable	References	Variables
<b>Observation Times Cited in PACU</b>	[1,4,6,8]	4 Hours
	[5]	7.5 hrs (#5: 1-Level ACDF)
<b>EDH Postoperatively</b>	[5]	0.3% (#5: 1-Level ACDF)
<b>Transfers ASC to Hospital</b>	[8,10]	0% (# 8: 1-Level ACDF), 0% (#10: 2-Level ACDF)
	[6]	0.5% (#6: 1-3 Level ACDF)
	[1]	0.8% (#1: 1-2-Level ACDF)
	[5]	3% (#5: 1-Level ACDF)
	[4]	6% (#4: 1-level ACDF-Included 48 Postop Hours)
<b>30 Day Readmission</b>	[1]	2.2% (#1: 1-2 level ACDF)
	[8]	2.4% (#8: 1-Level ACDF)
	[6]	1.9% (#6: 1-3 Level ACDF)
<b>90 Day Readmission</b>	[1]	2.2% (#1: 1-2 Level ACDF)
	[8]	1.7% (# 8: 1-Level ACDF)
<b>1-Level ACDF Series</b>	[4]	645 Patients (#4: 1-Level ACDF)
	[5]	30 Patients (#5: 1-Level ACDF)
	[1]	629 Patients (#1: 1-2 Level ACDF)
	[8]	103 Patients (#8: 1-3 Level ACDF)
<b>2 Level ACDF</b>	[1]	365 Patients (#1: 1-2 Level ACDF)
	[8]	15 Patients (#8: 1-3 Level ACDF)
<b>3-Level ACDF</b>	[8]	1 Patient (#8: 1-3 Level ACDF)
<b>Series with Multilevel ACDF</b>		
<b>1-2 Level ACDF Series</b>	[2]	1215 ASC vs. 10,964 Inpatient
	[7]	374 ASC vs. 374 Inpatient Matched Controls
<b>2 Level ACDF</b>	[10]	83 Patients: 25 ASC vs. 58 Inpatient
<b>1-3 Level ACDF</b>	[6]	2000

SSI: Surgical site infection, CSF: Cerebrospinal fluid, RLN: Recurrent laryngeal nerve injury, PACU: Post anesthesia care unit, EDH: Epidural hematoma, ASC: Ambulatory surgical care unit, ACDF: Anterior cervical discectomy/fusion, Postop: Postoperative

just one facility; 1 (3%) patient required hospital transfer for a new postoperative neurological deficit, while 2 (7%) required rehospitalization on postoperative day 1 for dysphagia (i.e. small sample size in one institution).<sup>[5]</sup> Rossi *et al.* (2019) studied just 119 Medicare patients (i.e. undergoing 1-level ACDF (103 patients) vs. 2-level ACDF (15 patients)) who required no immediate postoperative hospital transfers, while 2.4% needed 30-day ED visits for adverse events, and 1.7% required 90-day readmissions (i.e. including 1 reoperation for a surgical site infection-small number series).<sup>[8]</sup> Alternatively, several multilevel ACDF studies showed just 0-0.8% immediate postoperative readmission rates; these were substantially larger series and involved multiple centers (i.e. Arshi *et al.* 1215 1-2 ACDF in ASC, McGirt *et al.* 2000 1-2 level ACDF in ASC, Monk *et al.* 520 1-2 level ACDF in ASC).<sup>[2,6,7]</sup>

### Difficulty Comparing Variable Study Designs Involving Different Patient Populations

We had difficulty comparing results of 1-level vs. multilevel ACDF performed in ASC due to marked variability in study designs resulting in operations being performed on fundamentally different patient populations.

#### Results of 1-level ACDF Performed in ASC

Two studies looked specifically at the results of 1-level ACDF performed in ASC [Tables 1, 2].<sup>[4,5]</sup> In Garringer *et al.* (2010), of 645 1-level ACDF performed in ASC, they found 6% of patients required postoperative hospitalization within 48 postoperative hrs.; 2 (0.3%) patients required surgery for epidural hematomas picked up within the 4 hour postoperative anesthesia care unit (PACU) stays [Tables 1,2].<sup>[4]</sup> For Gennari *et al.* (2018) 30 patients undergoing 1-level ACDF in an ASC, 1 (3%) patient developed a new postoperative neurological deficit discovered within the 7.5 hr. PACU observation window, and required immediate hospitalization/reoperation, while 2 (7%) other patients were hospitalized on post-discharge day 1 for dysphagia [Table 1].<sup>[5]</sup>

#### Results for 1 to 2-level ACDF Performed in ASC

Several series looked at results for patients undergoing 1-2 level ACDF in ASC [Tables 1, 2].<sup>[1,2,8]</sup> Using a 4 hr. ASC PACU observation window, Adamson *et al.* (2016) evaluated 1000 patients undergoing 1-2 level ACDF in an ASC; 8 (0.8%) adverse events required immediate hospital transfers (i.e. 3 for pain, 1 hematoma, 2 for chest pain, 1 with a cerebrospinal fluid leak, and 1 new neurological deficit/reoperation).<sup>[1]</sup> Nevertheless, the 30-day (2.2%) and 90-day (2.2%) readmission rates were nearly comparable to those for 484 patients undergoing inpatient procedures.<sup>[1]</sup> Arshi *et al.* (2018), utilizing PearlDiver Records, studied reoperation rates for 1-2 level ACDF performed in ASC (1215 patients) vs. in inpatient settings (10,964 patients); those undergoing ASC surgery were more likely to warrant secondary posterior revisions within 6 to 12 postoperative months,

or repeat ACDF within the first postoperative year [Tables 1, 2].<sup>[2]</sup> Evaluating 1-2 level ACDF performed in ASC involving 119 Medicare patients (i.e. 103 1-level/15 2-level, including patients in ASA Grades I-III) using 4 hrs. PACU stays, Rossi *et al.* (2019) found none required immediate postoperative hospital transfers, but the 30-day postoperative morbidity was 2.4%, while the 90-day postoperative readmission rate was 1.7%, similar to the numbers cited above in Adamson's Series [Tables 1, 2].<sup>[1,8]</sup>

### Results for 2-level ACDF Performed in ASC vs. Inpatient

Vaishnav *et al.* (2019) compared outcomes for 2-level ACDF performed in ASC vs. as inpatients; despite significant differences including lower BMI and lower ASA scores for ASC patients, they found similar outcomes at 6 postoperative weeks and 6 postoperative months [Tables 1, 2].<sup>[10]</sup>

### Results of 1 to 3-level ACDF Performed in ASC

When McGirt *et al.* (2020) performed 2000 consecutive 1-3 level ACDF in an ASC utilizing a 4 h. PACU observation window, 10 (0.5%) patients required immediate postoperative hospital transfers for; 2 hematomas, 2 with pain alone, 1 CSF leak, and 5 medical adverse events [Tables 1, 2].<sup>[6]</sup> Further, the 30-day readmission rate was 1.9% (i.e. 6 patients required reoperations).

### Concern About More Complex Spine Surgery Being Performed in ASC

Baird *et al.* (2014) observed that 84.2% of spine surgeons now work in ASC, with 49.1% being invested in these facilities [Tables 1, 2].<sup>[3]</sup> They additionally found a "trend" for invested spine surgeons to perform increasingly complicated operations in these facilities. Further, they were concerned that at least some of these ASC procedures should still be done in hospitals; "...where a patient may have better access to emergency care."

### CONCLUSION

Different study designs showed nearly comparable outcomes for patients undergoing 1-level vs. multilevel ACDF performed in ASC. Nevertheless, common sense should dictate that "less (surgery) should be less (morbidity)",

meaning 1-level ACDF should involve less surgical risk vs. multilevel procedures performed in ASC.<sup>[6]</sup>

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