

Introduction

-Efficient operating room time use is important

-In this study we sought to determine what factors increase anesthetized, non-operative time

-We utilized a database of over 5,000 consecutive neurosurgical spine cases at our institution.

Methods

-Surgical records were searched retrospectively

-All spine surgeries performed between January 2010 and July 2012.

-Anesthetized, non-operative time was calculated from the anesthesia record

-Compared to both patient and procedure characteristics to determine any significant relationships

Results

-There were 5515 surgical cases.

-Mean age of 60.5, mean BMI of 29.7 and 3226 (58%) were male.

-There were 1176 (21%) fusion cases, and level of pathology was predominantly lumbar (4010 cases, 73%).

-Fusion cases had a significantly longer total anesthetized, non-operative time when compared to non-fusion cases (Fusion – 98 minutes vs. Non-fusion – 76 minutes, mean difference – 22 minutes, $p < 0.0001$).

Table 1

Demographics	Combined
Mean BMI	29.7
Age	60.5 years
ASA Grade	I – 256, II – 3237, III – 2004, IV – 18
Gender	M – 3226, F – 2289
Level of pathology	Cervical – 1385, Thoracic – 120, Lumbar 4010
Approach	Anterior – 354, Posterior – 5130, Combined - 31

ASA American Society of Anesthesiologists, BMI Body Mass Index

Table 1: Patient demographics

Demographic Factors

Non-Fusion Cases

-Significant factors affecting anesthetized, non-operative time in non-fusion cases include age greater than 65 (mean difference – 5 minutes, $p < 0.0001$), ASA grade, and BMI (< 25 – 72 +/- 1.2 minutes vs. 25-29 – 74 +/- 0.6 minutes vs. 30-39 – 79 +/- 0.6 minutes vs. 40+ – 87 +/- 1.8 minutes, $p < 0.0001$). -Age, ASA grade and BMI all maintained significance on multivariate analysis.

Fusion Cases

-Similarly, for fusion operations, age > 65 was significantly associated with increased non-operative time (mean difference – 6 minutes, $p < 0.01$), increasing ASA (mean difference 9 minutes, $p < 0.0001$) and increasing BMI. Age, ASA grade and BMI all maintained significance on multivariate analysis.

Table 3

Non-Fusion					
BMI	< 25	25-29.9	30-39.9	40+	
-Non-operative time (minutes)	72 +/- 1.2	74 +/- 0.6	79 +/- 0.6	87 +/- 1.8	$P < 0.0001$
Age	< 65	65+			
-Non-operative time (minutes)	74 +/- 0.6	79 +/- 0.6			$P < 0.0001$
ASA Grade	I	II	III	IV	
-Non-operative time (minutes)	68 +/- 1.8	74 +/- 0.6	81 +/- 0.6	114 +/- 9	$P < 0.0001$
Level of Pathology	Cervical	Thoracic	Lumbar		
-Non-operative time (minutes)	92 +/- 1.2	100 +/- 3	72 +/- 1.2		$P < 0.0001$
Approach	Anterior	Posterior	Combined		
-Non-operative time (minutes)	113 +/- 10	76 +/- 0.6	218 +/- 31		$P < 0.0001$

ASA American Society of Anesthesiologists, BMI Body Mass Index

[†]Increase in minutes is based on comparison to the first measurement, so BMI of 40+ is compared to BMI < 25

Table 3: Factors affecting anesthetized, non-operative time in non-fusion spine cases

Non-fusion cases

Table 4

Fusion					
BMI	< 25	25-29.9	30-39.9	40+	
-Non-operative time (minutes)	96 +/- 1.8	98 +/- 1.8	99 +/- 1.8	113 +/- 4.2	$P < 0.01$
Age	< 65	65+			
-Non-operative time (minutes)	96 +/- 1.2	102 +/- 1.2			$P < 0.01$
ASA Grade	I-III	III-IV			
-Non-operative time (minutes)	95 +/- 1.2	104 +/- 1.8			$P < 0.0001$
Level of Pathology	Cervical	Thoracic	Lumbar		
-Non-operative time (minutes)	100 +/- 1.2	124 +/- 7.2	95 +/- 1.2		$P < 0.0001$
Approach	Anterior	Posterior	Combined		
-Non-operative time (minutes)	92 +/- 1.8	101 +/- 1.2	123 +/- 6		$P < 0.0001$

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[†]Increase in minutes is based on comparison to the first measurement, so BMI of 40+ is compared to BMI < 25

Table 4: Factors affecting anesthetized, non-operative time in spine fusion cases

Fusion cases

Key Findings

-Fusion procedures added 22 minutes of non-operative time on average when compared to non-fusion cases

-Small increases in non-operative time noted with increasing age, increasing BMI and increasing ASA grade for both fusion and non-fusion procedures

-Patient characteristics are likely additive such that an obese 70 year old patient with respiratory problems undergoing a fusion will have a significantly longer non-operative time when compared to healthier patients undergoing decompression procedures alone

Conclusions

Patient and surgical factors, such as age, ASA grade, BMI, level of pathology and surgical approach have noticeable effects on anesthetized, non-operative times in spine surgery.

Learning Objectives

By the conclusion of this session, participants should be able to

- 1) Identify patient specific factors that increase anesthetized, non-operative time in spine surgery
- 2) Identify procedure specific factors that increase this time
- 3) Identify areas for improvement and increased efficiency within the OR patient flow