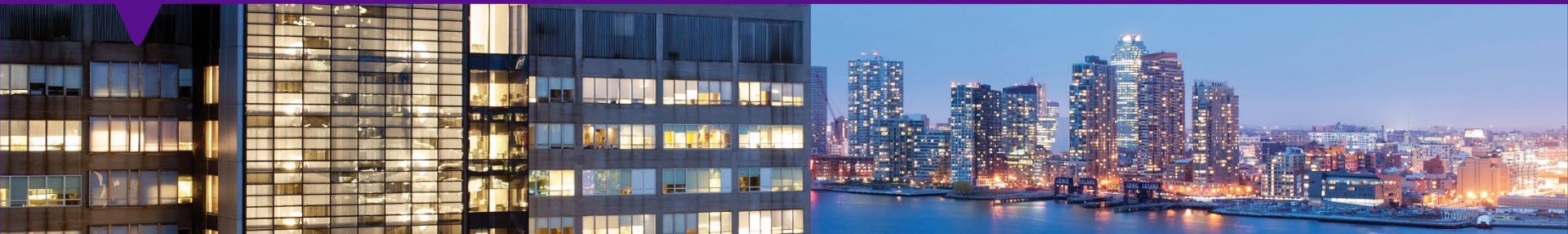


AN EVALUATION OF PREOPERATIVE PATIENT WEIGHT AND BODY MASS INDEX DURING SINGLE POSITION MINIMALLY INVASIVE SPINE SURGERY

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Introduction

- The single position minimally invasive (MIS) approach allows access to the anterior and posterior columns with the ability to mitigate complications associated with open procedures while achieving circumferential fusion.

OBJECTIVE:

To determine if patient weight and BMI will correlate with the occurrence of intraoperative events during MIS spine surgery

Methods

Inclusion Criteria:

Retrospective review of a single-center database of adults undergoing **single position minimally-invasive spine surgery**, with available surgical positioning and weight/BMI data

Procedure included:

prone lateral single position (a lateral interbody fusion and posterior instrumentation while the patient remains lying in the prone position)
lateral single position (a lateral interbody fusion and posterior instrumentation while the patient remains lying in the lateral position)

Methods

Statistical Analysis

- Outcome measures: Weight (kg), BMI (kg/m²), Aborted procedures (failing to proceed after positioning), estimated blood loss (EBL), operative time (OpTime)
- Patients stratified into 2 groups based on operative positioning:
 - Lateral decubitus [Lat]
 - Prone Lateral [PL].
- Uni- and multivariable analysis was performed
 - controlled for age, surgical invasiveness, and comorbidities.
- Mean weight and BMI values compared in patients with and without aborted procedures
 - thresholds determined that correlated with increased EBL and OpTime.

Results

- 144 met inclusion criteria
 - Mean age: 56.2 years old
 - 55.7% Male
 - 82 Lateral, 62 Prone Lateral
- Surgical data:
 - Average of 3.41 levels fused
 - 37% had osteotomy

| Demographics | |
|------------------|---------------------|
| Age (years) | 56.2 ± 12.9 years |
| Male (%) | 55.7 % |
| % Smokers | 20% |
| Surgical Details | |
| Levels Fused | 3.41 ± 3.86 |
| EBL (mL) | 693.8 ± 1761 mL |
| Operative Time | 325.5 ± 161 minutes |
| Osteotomy | 37% |
| Lateral | 13.6% |
| Prone | 7.2% |

Results

- Lateral patients
 - with a weight ≥ 130 kg (n=7) had significantly longer OpTime ($p<0.00$), longer LOS ($p= 0.003$), and more EBL ($p<0.0$).
 - No significant difference in mean BMI for Lat patients and without an aborted procedure.
 - Significant difference in mean weight for Lat patients with and without an aborted procedure (73.4 vs 89.8kg, $p=0.004$)
 - Multivariable analysis
 - weight (OR 1.03 [CI 1.01-1.06], $p=.020$) and BMI (OR 1.15 [CI 1.02-1.30], $p=.026$) were independent predictors for aborted procedure
 - one aborted case (weight > 120 kg), but no significant findings for EBL or OpTime.

| | Lat | PL |
|----------------|------------|-------------|
| Mean Age (yrs) | 64.8 | 62.2 |
| BMI | 29.1 | 29.4 |
| CCI | 2.9 | 3.5 |
| EBL | 192.5 | 193.5 |
| ASA Grade | 2.33 | 2.38 |
| Levels Fused | 1.86 | 2.47 |
| Decompressions | 61% | 73% |
| Osteotomies | 14% | 27% |
| Operative time | 193.5 | 178.6 |
| LOS | 2.73 | 2.85 |
| Lat | | |
| | w/ aborted | w/o aborted |
| Mean BMI | 28.8 | 29.6 |
| Mean Weight | 73.4 | 82.8 |
| PL | | |
| | w/ aborted | w/o aborted |
| Mean BMI | 29.3 | 29.3 |
| Mean Weight | 79.5 | 82.8 |

Discussion

- Cao et al. performed a meta-analysis demonstrating that obesity is associated with longer operative times, greater post-operative blood loss, higher risk of surgical site infections, and higher risk of nerve injuries in lumbar spine surgery.
- Particular attention must be paid to operative room set-up and positioning, as well as surgical limitations, for those with higher BMI and weight.
- MIS techniques, compared to conventional open procedures, may provide similar outcomes while decreasing incision length, blood loss, operative time, and length of stay
- This study found a **significantly higher incidence of aborted procedures in those with increase mean weight in patients in lateral decubitus position.**

Conclusion

- **Weight is associated with significantly increased chance of aborted procedure** in patients in lateral decubitus position during minimally invasive spine surgery.
- Patients in the lateral decubitus position who weighed 130 kg or more had on **average longer operative times, longer length of stay in hospital, and more estimated blood lost.**
- This study has the potential to help with risk stratification in the future when determining patients undergoing a single position procedure.