Introduction
Perioperative complication rates for adult spinal deformity (ASD) have been reported as high as 80%. Reported risk factors: age, co-morbidities, and blood loss. Risk scores exist in other surgical disciplines, however, is lacking for ASD. The goal is to identify major peri-operative complications and determine if patient profiles can be defined in ASD surgery.

Methods
Retrospective, consecutive, multi-center (n=8) review of major perioperative (<6wks post-op) complications in ASD patients (coronal/sagittal deformity). Major complications were identified and categorized as: pulmonary, neurological, cardiovascular, gastrointestinal, and infectious. Clinical chart reviews were conducted to obtain; ASA grade, comorbidities, preoperative labs, and intra/postoperative parameters. Incidence of complications and patient profiles described.

Results
72(18M, 54F) of 953 consecutive ASD patients were identified with a mean age of 54 (18-79) and total incidence of 99 major and 133 minor complications. Mean operative time was 491mn, mean EBL was 2440ml and mean transfusion was 3100ml RBC’s. 54% were revision cases (mean 1.9 previous surgeries) and 50% were staged procedures. 44% of patients were ASA grade III (mean ASA 2.33).

There was a mean co-morbidity rate of 2.5 per patient. Most common comorbidities: hypertension, depression/anxiety, coronary artery disease and hypothyroidism. The mean length of ICU stay: 3.4 days. Most common major complications: excessive (>4L) intraoperative bleeding (n=11), return to the OR for deep wound infections (n=11) and pulmonary embolus (n=10).

Conclusions
Improved understanding of risk profiles and procedure-related parameters is critical. Such information can assist in pre-operative risk-benefit decisions and preemptive approaches to reduce risk. This study reveals that patients affected by major complications in ASD surgery may not be 'typical' high risk patients. This study will form the basis for a prospective multi-center study and aid in the development of a risk scoring system for ASD.

References
Background
Adult Spinal Deformity (ASD) Complex Pathology...

Surgical Treatment: High Complication Rates (27-80%)
Risk vs. Benefit
Method / Inclusion Criteria

Multicenter (n=8), Retrospective, Consecutive Chart & Radiographic Review

Adult Spinal Deformity
- Cobb > 30 degrees
- Sagittal imbalance > 5cm
- Coronal imbalance > 5cm
- Kyphosis > 60deg
- Lordosis < 30deg
- TK Kyphosis > 20deg

Major Complication
- Per-op, before / after dc (<6w)
- Categorized
  - Pulmonary
  - Neurological
  - Cardiovascular
  - Gastrointestinal
  - Infectious
Results - Demographic

72 Patients (from 953 consecutive ASD Surgeries)

- 7.5% Incidence Major Complication
  - Total Incidence 99 Major and 133 Minor Complications
- Mean Age 54yrs (18-79) 18M, 54F

Mean Co-Morbidity Rate: 2.5 per patient

1. HTN
2. Depression/Anxiety
3. CAD
4. Hypothyroidism
Results - Complications

Most Common Major Complications:

1. Excessive (>4L) Intra-operative bleeding (15.3%, n=11)
2. Return to OR for deep wound infection (15.3%, n=11)
3. Pulmonary embolus (13.9%, n=10)
**Discussion**

**Inherent Risk of ASD surgery not avoidable**

- risk profiles critical to make risk-benefit decisions

- procedure/patient profiles associated with major complications:
  - High EBL, OR time, ASA grade, thyroid condition...
  - not necessarily old or obese

- ongoing prospective studies
  - refine risk profiles
  - develop risk scoring system for ASD
1. Baron EM, Albert TJ. Medical complications of surgical treatment of adult spinal deformity and how to avoid them. Spine 2006;31:S106-18

