Intraoperative CT and Stereotactic Guidance for Spinal Deformity

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Overview

- Deformity correction presents unique challenges in screw placement
- The use of surgical navigation facilitates instrumentation placement

Screw Placement in Deformity

- More Complex
  - Thoracic spine anatomy
  - Rotation component of deformity
  - Fusion mass
- Traditional Screw Placement
  - Lenke Technique (Anatomic)
  - Misplacement reported between 1-28%

Prior Experience

- Dr. Steuer's results with his first 50 cases using the O-arm
  - Average age of patient:
    63 years
  - Average number of levels fused:
    2.4
  - Average blood loss per case:
    295 cc

Prior Experience, cont.

- Excellent accuracy and intra-op CT to confirm
  - Prone vs. supine
  - Automatic registration
- No radiation exposure to surgeon and staff
- Helpful in minimally invasive techniques

Experience in Deformity

- Very helpful in placing pedicle screws through a fusion mass
- Reduces screw placement time with drilling vs. Lenke technique in the thoracic spine
- Reduces dissection associated with iliac screw placement

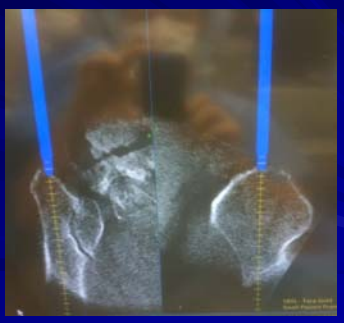
Initial Set Up

Close Up

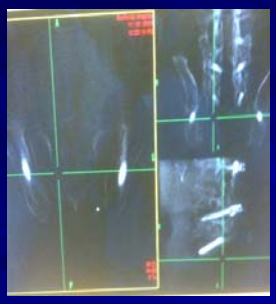
Moving Frame

Drilling Thoracic Pedicle

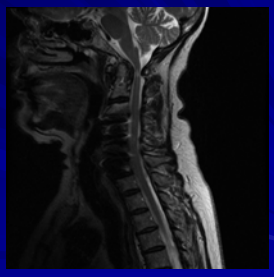
Drilling the Iliac



Example of Post Placement Imaging



Increased ADI and Cord Compression/Edema



Post-Op

Drawbacks

- The time related to draping and scanning. Usually less than 10 minutes
- Concern over contamination
- One cannot solely depend on the O-arm and surgical navigation
  - Software/Hardware failure
  - Problems with the frame, either movement or the LEDs
  - Rarely image quality, but if so usually associated with the upper thoracic spine

Conclusion

- Benefits of O-arm and surgical navigation in deformity
  - CT confirmation of screw placement
  - Assists in instrumentation placement through a fusion mass and in the rotational component of deformity
  - Less dissection of the ilium.