Navigated Robotic-Guided Pedicle Screws Placed Successfully in Single-Position Lateral Lumbar Interbody Fusion

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Disclosures

• LAA, JRR, and CGL are employees of Globus Medical, Inc. with stock options

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Minimally invasive lateral interbody fusion has distinct advantages over traditional posterior approaches

• Percutaneous placement of pedicle screws from the lateral decubitus position may potentially increase safety and improve operative efficiency

• Precludes need for repositioning

• Studies investigating the safe placement of pedicle screws in lateral position needed
Materials and Methods

• Single-center contribution
• Retrospective, IRB-exempt
• Radiographic Outcomes
  • Screw placement evaluation
  • Screw malposition rate
  • Screw reposition rate
  • Return to operating room (OR) rate
SP-LLIF Single Position Lateral Lumbar Interbody Fusion (SP-LLIF)

- Lateral decubitus position
- Retroperitoneal approach
- Neuromonitoring
- No repositioning
Intraoperative Pedicle Screw Placement Planning

- Dynamic reference base + surveillance marker placed
- Introperative CT taken + registered w/ software
- Pedicle screw trajectory planning
Intraoperative Pedicle Screw Placement

- Surgeon-controlled foot pedal activated + positioned robot arm to planned pedicle trajectory
- Stab incisions
- Pedicle screws inserted under neuromonitoring using navigated instruments guided by robotic arm
Results

Baseline Characteristics
• 55 consecutive patients
• 49% female
• Avg Age: 67 yrs
• Avg BMI: 29.5 kg/m²
• 27% current/former smokers

Surgical Data
• 19/55 2-level cases
• 171 levels treated
  • 52/171 at L4
• 342 screws placed
• Mean EBL: 117.4cc
• Mean OR Time: 155.7 min.
• Mean LOS: 2.9 days
Results: Pedicle Screw Positioning

• 342 pedicle screws placed
• 4% (14/342) placed manually
  • Due to surgeon discretion

• 328 screws placed with the robot
• 2% (7/328) repositioned
  • Due to surgeon discretion

• No malpositions requiring return to OR

98% screw placement success rate for navigated robot-assisted pedicle screw placement
Postoperative anteroposterior (A) and lateral (B) fluoroscopic images of a one-level MIS SP-LLIF
Conclusions

This study demonstrates a high level (98%) of successful surgeon-assessed pedicle screw placement in minimally invasive navigated robot-assisted SP-LLIF