

Utilization Patterns, Outcomes & Complications of 300 Consecutive Robotic-Assisted Spinal Procedures and 1454 screws by a Single Surgeon

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Received Aug. 21, 2024; Accepted for publication Aug. 26, 2024; Published online Aug. 27, 2024
<https://doi.org/10.17161/kjmvoll7.22662>

Introduction. Literature related to robotic spine procedures report relatively high accuracy with low robot-abandonment, however, several are multi-center, multi-surgeon series with high variability or report on previous generation robot systems. The purpose of this study was to review all single-surgeon consecutive robot-assisted cases using a single robotic-platform and report utilization patterns, outcomes, and robot-related complications.

Methods. A review of all robotic spine surgeries performed by a single surgeon at an institution was performed. All cases utilized the same robotic-navigation system.

Results. Between August 2019 and July 2023, 300 consecutive robotic cases were identified. 53.3% were female with mean age 65.3yrs (range 20-92) and BMI 29.5 (19-47). Spinal pathologies included: Degenerative (88.7%), Deformity (16.3%), Trauma (10.0%), Neoplastic (5.7%), and Spondylodiskitis (1.7%). Cases were performed Open (10.3%), Minimally Invasive (MIS; 85.3%) and Hybrid (Open and MIS; 4.3%). Imaging sources included: Pre-Operative CT-merge (84.9%) and Intra-Operative 3D scan (15.1%). Patient tracker placement was: Posterior Superior Iliac Spine (81.6%) and spinous process (18.4%). Spine regions and screws placed included (% cases; # screws): Cervical (0.3%; 2), Thoracic (13.7%; 137), Lumbar/Sacral (96.3%; 1,231), Pelvic (12.7%; 78). There were 1,448 total screws placed. Mean total robot time was 38.75min (range 13-97; n = 228 cases). Six screws (0.4%) in six cases were malpositioned and removed intraoperatively. There was 0% robot abandonment, 0 returns to Operating Room and 0 neurologic deficits. Four patients (2%) had intraoperative durotomies and 22 (7%) had post-operative wound complications.

Conclusions. This report demonstrates that modern robotic platforms can be used across all spinal regions, using various imaging sources, with high accuracy and low complication rates.