

Computer Assisted Robotic Surgery in Octogenarians

a case controlled study

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Introduction: The proportion of population over the age of 80 undergoing spinal surgery is growing. The use of robotic computer assisted surgery in these patients is challenging, due to poor bone quality, and at times complex pathology and anatomy. We are present a consecutive series of octogenarian patients who underwent robotic computerized guided spine surgery.

Methods:

Prospective data in spine referral center was retrospectively collected and analyzed. All patients who were 80 years or older at the time of surgery were identified. These patients were matched to 120 patients under the age of 80 (a 3:1 ratio). Patients' age, sex and indication for surgery were documented. Time of procedure, accuracy execution, fluoroscopy time, and any instrumentation related complication were documented.

Results:

Between 2007 and 2013, 192 trajectories were executed in the octogenarian patients and 568 trajectories in the younger patients. The average age was 83.9 years vs 61.2 ($P<0.05$); BMI was 26.9 in the octogenarians vs 28.9 in the younger patients ; -12 patients were males in the octogenarian vs 50 in the younger patients. The upper instrumented in both groups vertebra was T5 and the lowest was S1. Percutaneous procedures were performed in 25 octogenarian patients and 73 in the younger group of patients. Average robotic usage time was 6 min and 40 seconds in octogenarians, compared to 5 min and 5 seconds in younger patients ($P<0.05$). Radiation exposure time was 16.3 seconds per screw in the octogenarian's vs 9.3 seconds in the younger patients ($P<0.05$). 182 (94.5%) executed trajectories were accurate vs 545 (95.9%) accuracy in patients under the age of 80 (NS). No robotic assistance or any hardware related complications occurred.

Discussion: Spine surgery in the octogenarians is challenging. The combination of osteoporotic bone and complex spinal pathologies, results in longer robotic procedures and in higher radiation exposure time, compared to younger patients. However, execution accuracy and safety is identical to younger group of patients, allowing to apply optimal instrumentation in these frail patients.