



Reliability of Posterior Spinal Instrumentation Guided with Neuronavigation.

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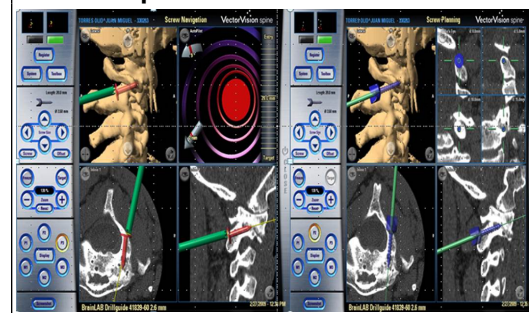
Introduction

Neuronavigation, one of the latest innovations in spine surgery, produces a 3-D, multiplanar and real-time vision of vertebral anatomy, obtaining the ideal trajectory for each screw, increasing accuracy, safety and effectiveness.

Learning Objectives

By the conclusion of this session, participants should be able to understand that navigation may help on prevent screws misplacement as well as reduces radiation exposure and reinterventions rate (Image 1).

Image 1. Navigation in posterior cervical spinal instrumentation.



Methods

We included patients operated from September-2008 to January-2014. Before surgery, a CT-scan is performed and clinical assessment by using VAS, Oswestry and JOA scales (lumbar, cervical). Surgery is assisted by navigation and guided by CT +/- Fluoroscopy, depending on the case. To check the screw's placement, a postoperative CT scan was performed and the implant position was classified according to Heary's Scale (Image 3).

Clinical outcomes were assessed with the same preoperative scale, as well as the satisfaction's degree and acceptance of the procedure.

Results

We involved 296 patients, 133 women and 163 men, 17 to 79 years. 92 patients with open surgery, MIS 113 and 91 percutaneously. 446 segments were treated and 1462 pedicle screws were placed. A complete clinical-radiological follow-up was performed in 266 patients, with a mean of 18.6 months. Placement accuracy was 99.11%. According to the Heary's scale, we observed 13 diverted screws: Grade-II: 4 (1 cervical, 1 thoracic and 2 lumbar), Grade-III: 6 (2 cervical, 2 thoracic, 2 lumbar), Grade-IV: 3 (1 cervical, 2 lumbar); but only 1 of them needed to be repositioned (image 3).

Image 2. Postoperative CT scan

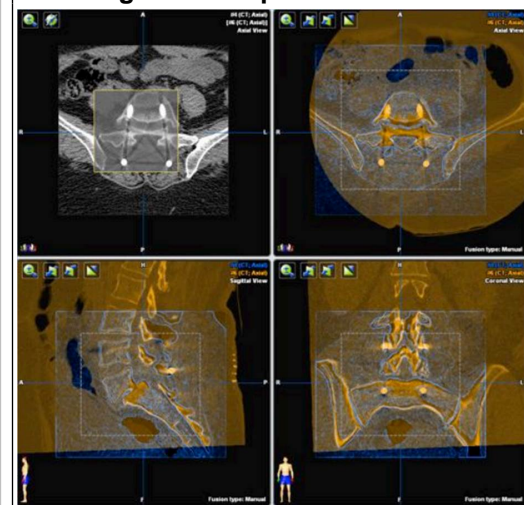



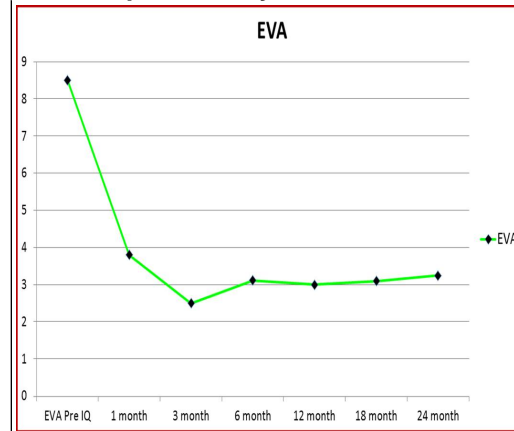
Image 3. Accuracy according to the Heary's Scale.

Total	Grade I	Grade II	Grade III	Grade IV	Grade V	Accuracy	Diverted S.
1462	1448	4 (1C,1T, 2L)	6 (2C,2T, 2L)	3 (1C, 2L)	0	99.11%	13



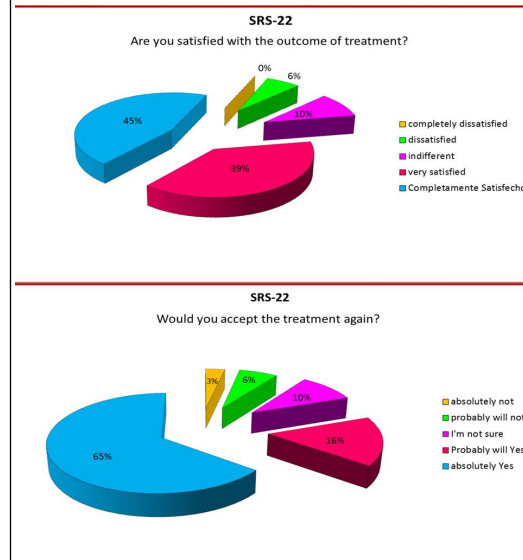
Clinical outcome was (preQx/postQx 1 month): EVA: 8.58/3.32 (Image 4), Oswestry: 69.0%/27.0%, JOA(L): 6.61/12.5, JOA(C) 8.1/12.6.

Image 4. Clinical Outcome of the patients by EVA scale.



These parameters remain unchanged at 3 months in 96.38% patients and at 6 months in 88.72%. 94% patients reported subjective satisfaction and would again undergo the procedure in 91% (Image 5).

Image 5. Scores in the SRS-22 Questionnaire



Conclusions

Navigation with Flouro2D-CT is a high precision technique that reduces complications rate as well as number of reinterventions, and allows high clinical efficacy. It's comparable and even superior in some respects to conventional surgery.

References

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2. Assaker, R., Cinquin, P., Cotton., Lejeune, J.P.: Image-guided endoscopic spine surgery:Part I. A feasibility study. Spine 2001; 26: 1705-1710.