Percutaneous Screw Placement in the Lumbar Spine With a Novel Guidance Technique.

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Introduction

Several guidance techniques have been employed in an effort to increase accuracy and reduce surgical time during percutaneous placement of pedicle screws (1, 2, 3, 4, 5). Aim of this study is to present a new technique for percutaneous placement of lumbar pedicle screws that reduces surgical time and radiation exposure for patients and operating room personnel .

Methods

After receiving institutional approval, the authors reviewed the data for 11 patients who underwent percutaneous placement of pedicle screws using their modified technique. In an effort to validate this technique, they collected the data for 11 other patients (control group) who were operated on with the Jamshidi needle (Becton, Dickenson and Company, Franklin Lakes, NJ, USA) technique (6,7). The two operative groups were matched for age and body mass index (BMI).

Data reviewed included indication for surgery; the patient's sex, age, and BMI; intraoperative blood loss; intraoperative complications (including screw misplacement that resulted in repositioning of the screw); duration of the surgical procedure; radiation exposure; and postoperative complications immediately after surgery and at the time intervals of 30 and 90 days after the procedure.

The patients were 7 males and 4 women with a median age of 58.78 years old and a median BMI of 35.25 kgr/m2 for the novel technique group and 6 men plus 5 women with a median age of 57.89 years and a median BMI of 36.12 Kgr/m2 for the control group of patients. Integrated computer guided navigation system was used in all cases (Figures 1A-1D). A hand held drill with a navigated drill guide was used in order to create the path for the guidewires insertion through the pedicles to the vertebral bodies (Figures 2A-2D). The length of the inserted drill could be adjusted and controlled from the surgeon through specific markers on the hand drill (Figure 2E). Intraoperative confirmation with anterior-posterior (AP) fluoroscopy was obtained through out the procedure. After the removal of the hand held drill, the placement of the screws took place through the guidewires to the pedicles (Figures 3A-3E). A final intraoperative CT was performed after the screw placement in order to ensure their optimal position.

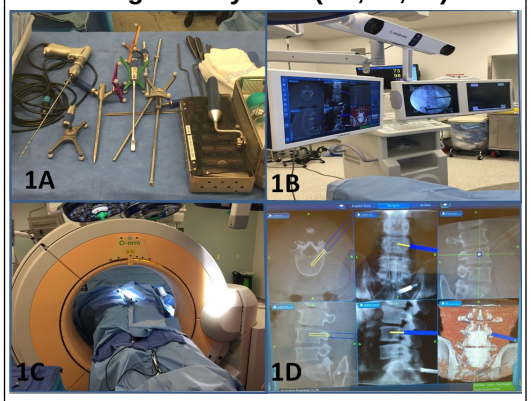
Conclusions

This novel technique for percutaneous placement of lumbar pedicle screws is characterized by minimal blood loss, less exposure to radiation, and decreased operation time in comparison to the widely used method.

Limitations

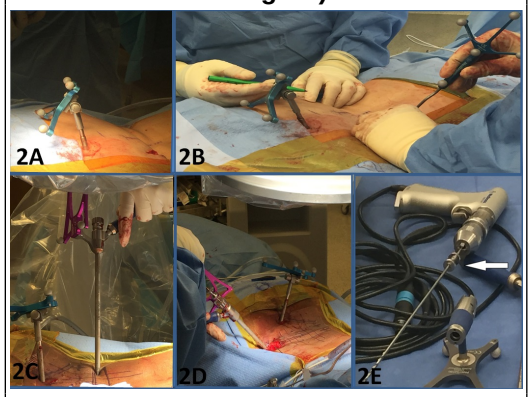
Drawbacks for this study are the retrospective design and small number of patients.

Use of navigated instruments (1A) through the integrated computer guided navigation system (1B,1C,1D).



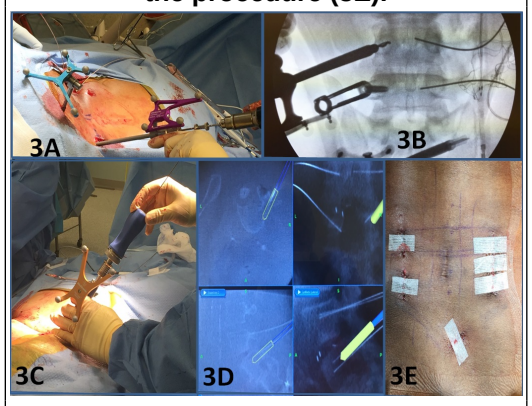
Figures 1A-1B-1C-1D

Percutaneous implantation of a reference dynamic navigational frame (2A). The pedicles are cannulated with the drill through the navigated drill guide (2B, 2C, 2D). The drill length is preset with a drill stop (white arrow in 2E figure)



Figures 2A-2B-2C-2D-2E

After the cannulation (3A), the guidewires are inserted through the drill guide to the pedicles and vertebrae (3B, 3C); pedicle screws are implanted under navigational control (3D). Minimal incisional length is noted at the end of the procedure (3E).



Figures 3A-3B-3C-3D-3E

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