

Atlantoaxial fusion complications

Atlantoaxial fusion is challenging because of the complex anatomy in the region and the need for a high degree of accuracy to avoid **complications**. Preoperative 3D-computed tomography (CT) scans can help reduce the risk of complications in the **vertebral artery**, **spinal cord**, and **nerve roots**. However, the patient may be susceptible to injury if the patient's anatomy does not match the preoperative CT scans. The intraoperative 3D image-based navigation systems have reduced complications in instrument-assisted techniques due to greater accuracy. This study aimed to compare the radiologic outcomes of C1-2 fusion surgery between intraoperative CT image-guided operation and fluoroscopy-guided operation.

They retrospectively reviewed the radiologic images of 34 patients who underwent C1-2 fusion spine surgery from January 2009 to November 2018 at our hospital. We assessed 17 cases of degenerative cervical disease and trauma in a study population of 18 males and 16 females. The mean age was 54.8 years. A total of 139 screws were used and the surgical procedures included 68 screws in the C1 lateral mass, 58 screws in C2 pedicle, nine screws in C2 lamina and C2 pars screws, four lateral mass screws in sub-axial level. Of the 34 patients, 19 patients underwent screw insertion using intraoperative mobile CT. Other patients underwent an atlantoaxial fusion with a standard fluoroscopy-guided device.

A total of 139 screws were correctly positioned. We analyzed the positions of 135 screws except for the four screws that performed the lateral mass screws in C3 vertebra. Minor screw penetration was observed in seven cases (5.2%), and major pedicle screw penetration was observed in three cases (2.2%). In one case, the malposition of a C2 pedicle screw was confirmed, which was subsequently corrected. There were no complications regarding vertebral artery injury or the onset of new neurologic deficits. The screw malposition rate was lower (5.3%) in patients who underwent intraoperative CT-based navigation than that for fluoroscopy-guided cases (10.2%). And we confirmed that the operation time can be significantly reduced by surgery using intraoperative O-arm device.

Spinal navigation using intraoperative cone-beam CT scans is reliable for posterior fixation in unstable C1-2 pathologies and can be reduced the operative time ¹⁾.

¹⁾

Lee JS, Son DW, Lee SH, Ki SS, Lee SW, Song GS. Comparative Analysis of Surgical Outcomes of C1-2 Fusion Spine Surgery between Intraoperative Computed Tomography Image Based Navigation-Guided Operation and Fluoroscopy-Guided Operation. J Korean Neurosurg Soc. 2020 Mar;63(2):237-247. doi: 10.3340/jkns.2019.0172. Epub 2020 Feb 27. PubMed PMID: 32120457.

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