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Cervical cages placed bilaterally in the facet joints from a posterior approach significantly increase foraminal area

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Abstract

Purpose

Foraminal stenosis is a common cause of cervical radiculopathy. Posterior cervical cages can indirectly increase foraminal area and decompress the nerve root. The aim of this study was to assess the influence of bilateral posterior cervical cages on the surface area and shape of the neural foramen.

Methods

Radiographic analysis was performed on 43 subjects enrolled in a prospective, multi-center study. CT scans were obtained at baseline and 6- and 12-months after cervical fusion using bilateral posterior cervical cages. The following measurements were performed on CT scan: foraminal area (A), theoretical area (TA), height (H), superior diagonal (DSI), inferior diagonal (DIS), and inferior diagonal without implant (DISI). Comparisons were performed using R-ANOVA with a significance of $\alpha < 0.05$.

Results

Foraminal area, height, TA and DISI were significantly greater following placement of the implant. The mean (SD) A increased from 4.01 (1.09) mm^2 before surgery to 4.24 (1.00) mm^2 at 6 months, and 4.18 (1.05) mm^2 at 12 months after surgery ($p < 0.0001$). Foraminal height (H) increased from mean (SD) 9.20 (1.08) mm at baseline to 9.65 (1.06) mm and 9.55 (1.14) mm at 6- and 12-months post-operatively, respectively ($p < 0.0001$). The mean DIS did not change significantly. There was a significant decrease in DSI: 6.18 (1.59) mm pre-operatively, 5.95 (1.47) mm and 5.73 (1.46) mm at 6- and 12-months ($p < 0.0001$).

Conclusions

Implantation of bilateral posterior cervical cages can increase foraminal area and may indirectly decompress the nerve roots. Correlation between increase in foraminal area and clinical outcomes needs further investigation.

Key Insights

- Surface area and shape of neural foramen were analyzed radiographically in 43 patients enrolled in the DTRAX Cervical Cage prospective, multi-center study; analysis at six months and one year compared to baseline
- Mean foraminal area increased from 4.01 mm^2 before surgery to 4.24 mm^2 at six months and 4.18 mm^2 at one year; increases of 5.73% and 4.24%, respectively
- Mean foraminal height increased from 9.20 mm before surgery to 9.65 mm at six months and 9.55 mm at one year; increases of 4.89% and 3.80%, respectively
- Analysis shows that DTRAX Cervical Cages can increase foraminal area and thereby indirectly decompress the nerve roots