

Impact of intervertebral foramen area after cervical spinal correction surgery

Introduction

Laminoplasty enables sufficient decompression in multi-segmental cervical spondylotic myelopathy (CSM). However, CSM with kyphosis may lead to poor surgical outcomes by interfering with posterior shifting of the spinal cord. In such case, corrective fixation using cervical pedicle screw (CPS) is selected. In the other hand C5 nerve palsy is a troublesome complication in surgery for cervical myelopathy. However, the precise mechanism is still unclear. The purpose of study was to investigate the effect of correction surgery by CPS for intervertebral foramen.

Methods Forty-five patients who underwent correction surgery using CPS (25 male, 20 female, a mean of 73 years old) were enrolled in the present study. 87 fusion level (174 foramen) were evaluated foramina area (FA), head-caudal diameter and anteroposterior diameter in CT reconstruction image at pre-operation (pre-op) and final follow-up (FU). C2/7 angle and local angle were measured in XP. We statistically evaluated the change of FA and diameter between pre-op and FU. Correlations between local correction angle and FA, diameter were further evaluated.

Results Postoperative FA was 28.6mm^2 at pre-op and 30.7mm^2 at FU ($p, 0.004$). C2/7 were $-3.3/3.3$ degree and local angle were $-0.01/0.43$ degree (pre-op/ FU). Diameter of head/caudal and antero-posterior were 7.9 and 3.8mm^2 at pre-op, 8.3 and 3.8mm^2 at FU. The correlation between corrected local angle and FA was significantly negative correlation ($p, 0.03$). Furthermore, the anteroposterior diameter of the foramina after correction by CPS showed a significant negative correlation. The foramina decreased when the local angle was corrected by 10 degrees or more, and significantly narrowed (15%) in 15 degrees or more.

Discussion When we are going to plan cervical correction surgery for dropped head syndrome or cervical myelopathy with kyphosis, it is necessary to avoid corrective angle 10 degree at each level.