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Analysis of the optimum fixed angle in occipitocervical fusion

Objectives: To determine the optimum intraoperative angle of fixation for preventing postoperative dysphagia after occipitocervical (OC) or occipitocervicothoracic (OCT) fusion.

Materials and Methods: The authors analyzed 20 patients with craniocervical disorders who had undergone OC or OCT fusion. Lateral radiograph was obtained preoperatively, intraoperatively (after fusion), and postoperatively. The following angles were investigated: O-C2, C2-jaw (the angle between the anterior margin of the C2 vertebral body and the mandible), and dO-C2 (the difference between the preoperative and postoperative O-C2 angles). The relationship was investigated between the occipitovertical line (O-V line: a line running horizontally in the posterior direction from the lowest point of the occipital bone) and the center of the most distal vertebral body that could be confirmed at operation.

Results: In the group without dysphagia (n=18), the preoperative, intraoperative, and postoperative measurements of each angle were respectively as follows: O-C2: $11.6 \pm 12.5^\circ$, $21.3 \pm 8.7^\circ$, $20.3 \pm 8.7^\circ$, C2-jaw: $5.9 \pm 16.2^\circ$, $19.1 \pm 9.6^\circ$, $11.5 \pm 18.2^\circ$. The dO-C2 angle was 13.3 ± 11.2 , being 10° or more in all patients of this group. The intraoperative C2-jaw angle was $19.9 \pm 1.0^\circ$. There were no patients in whom the O-V line moved further backward during the operation compared with before surgery. In the group with dysphagia (n=2), the mean preoperative and postoperative angles were respectively as follows: dO-C2: -8° , -11° and intraoperative C2-jaw: -5° , -10° . The O-V line moved further backward during the operation compared with before surgery.

Discussion: There are some reports indicating that postoperative dysphagia can be avoided if the dO-C2 angle is -10° or more. We set the C2-jaw angle at 0° or more and performed OC or OCT fusion at a position where the O-V line was not moved further backward during the operation compared with before surgery. Dysphagia did not occur in the patients meeting this requirement. In the case of which the dO-C2 was within the recommended range, dysphagia occurred. These results suggest that OC or OCT fusion without shifting the cervical spine to the posterior direction compared with before surgery is important to prevent postoperative dysphagia.