Three-column osteotomy

A “column” is roughly 1/3 of the width of the spine. Thus, the goal of three-column osteotomies is to break the spine in half without damaging the spinal cord. First, the back portion of the spine covering the spinal cord, known as the lamina, is removed.

Three-column osteotomies through posterior-only approach are safe and effective and offer good clinic-radiological and function outcome in post-tubercular kyphosis deformity correction [1].

For severe ASD patients with high grade pelvic incidence (PI), pelvic tilt (PT), and PI/lumbar lordosis (LL) mismatch and who have subjected to spine surgeries more than twice before, 3-COS might be more effective than standard surgical management (SSM) in improving the clinical outcomes. However, due to the higher reoperation rate of 3-COS, SSM may be more appropriate than SSM for correcting the not serious ASD patients [2].

Adult spine deformity (ASD) patients with three column osteotomies from March 2005 to December 2014 in our center were retrospectively reviewed. Pre- and postoperative standing postero-anterior and lateral radiographs of the entire spine were obtained. Scoliosis Research Society-22 questionnaire [SRS-22] and Oswestry Disability Index [ODI] were administered preoperatively, postoperatively (surveys within 2 months after surgery), and at final follow-up. Patients were assigned to one of two groups according to pre-operative coronal curve magnitude: (1) if coronal curve <10°, patients were assigned to kyphosis group (K group); (2) if coronal curve >40°, patients were assigned to kyphoscoliosis group (S group).

Results: 33 ASD patients were assigned to the kyphosis group (K group), of which 26 received PSO (pedicle subtraction osteotomy) and 7 VCR (vertebral column resection). 76 patients were assigned to kyphoscoliosis group (S group), of which 50 received PSO and 26 VCR. Patients in the K group were significantly older than in the S group (42.8 vs. 33.7 years, $p < .05$). Significantly longer OT (operation time) and more EBL (estimated blood loss) were observed in the S group as compared to K group (OT: 282 vs. 205 min, $p < .05$; EBL: 1827 vs. 1214ml, $p < .05$). No significant difference was noted for number of fusion levels between the groups (12.4 vs. 12.7, $p > .05$). Pre-operative radiographic parameters demonstrated no difference of GK (global kyphosis) and SVA (sagittal vertical axis) between the two groups (GK: 74.7° vs 76.2°, $p > .05$; SVA:53.2 vs. 55.7mm, $p > .05$). K group had larger KF than S group (26% vs. 15%, $p < .05$). Overall complication rate was higher in S group than in K group (30.3% vs. 18.2%, $p < .05$). No difference of neurological complication rates between the two groups (9.1% vs. 10.5%, $p > .05$).

Conclusions: Kyphoscoliosis group had less KF, GK correction and more OT, EBL and surgical complications when receiving three column osteotomies [3].

1)
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2)
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