Coronal balance

Coronal balance is a major factor impacting the surgical outcomes in adult spinal deformity (ASD). The Obeid-coronal malalignment classification (O-CM) has been proposed to improve the coronal alignment in adult spinal deformity surgery. The aim of the study of Baroncini et al. was to investigate whether a postoperative coronal malalignment (CM) < 20 mm and adherence to the O-CM classification could improve surgical outcomes and decrease the rate of mechanical failure in a cohort of ASD patients.

In this multicenter retrospective analysis of prospectively collected data on all ASD patients who underwent surgical management and had a preoperative CM > 20 mm and a 2-year follow-up. Patients were divided into two groups according to whether or not surgery had been performed in adherence to the guidelines of the O-CM classification and according to whether or not the residual CM was < 20 mm. The outcomes of interest were radiographic data, rate of mechanical complications, and Patient-Reported Outcome Measures.

At 2 years, adherence to the O-CM classification led to a lower rate of mechanical complications (40 vs. 60%). A coronal correction of the CM < 20 mm allowed for a significant improvement in SRS-22 and SF-36 scores and was associated with 3.5 times greater odds of achieving the minimal clinically important difference for the SRS-22.

Adherence to the O-CM classification could reduce the risk of mechanical complications 2 years after ASD surgery. Patients with a residual CM < 20 mm showed better functional outcomes and 3.5 times greater odds of achieving the MCID for the SRS-22 score ¹⁾.

Hwang et al. retrospectively reviewed the radiographic outcomes of pedicle screw-only constructs in all patients who had undergone SCI-related scoliosis correction at a single institution.

Medical records and radiographs from Shriner's Hospital for Children-Philadelphia for the period between November 2004 and February 2011 were retrospectively reviewed.

Thirty-seven patients, whose mean age at the index surgery was 14.91 ± 3.29 years, were identified. The cohort had a mean follow-up of 33.2 ± 22.8 months. The mean preoperative coronal Cobb angle was $65.5^{\circ} \pm 25.7^{\circ}$, which corrected to $20.3^{\circ} \pm 14.4^{\circ}$, translating into a 69% correction (p < 0.05). The preoperative coronal balance was 24.4 ± 22.6 mm, with a postoperative measurement of 21.6 ± 20.7 mm (p = 1.00). Preoperative pelvic obliquity was $12.7^{\circ} \pm 8.7^{\circ}$, which corrected to $4.1^{\circ} \pm 3.8^{\circ}$, translating into a 68% correction (p < 0.05). Preoperative shoulder balance, as measured by the clavicle angle, was $8.2^{\circ} \pm 8.4^{\circ}$, which corrected to $2.7^{\circ} \pm 3.1^{\circ}$ (67% correction, p < 0.05). Preoperatively, thoracic kyphosis measured $44.2^{\circ} \pm 23.7^{\circ}$ and was $33.8^{\circ} \pm 11.5^{\circ}$ postoperatively. Thoracolumbar kyphosis was $18.7^{\circ} \pm 12.1^{\circ}$ preoperatively, reduced to $8.1^{\circ} \pm 7.7^{\circ}$ postoperatively, and measured $26.8^{\circ} \pm 20.2^{\circ}$ at the last follow-up (p < 0.05). Preoperatively, lumbar lordosis was $35.3^{\circ} \pm 22.0^{\circ}$, which remained stable at $35.6^{\circ} \pm 15.0^{\circ}$ postoperatively.

Pedicle screw constructs appear to provide better correction of coronal parameters than historically reported and provide significant improvement of sagittal kyphosis as well. Although pedicle screws appear to provide good radiographic results, correlation with clinical outcomes is necessary to determine the true impact of pedicle screw constructs on SCI-related scoliosis correction²⁾.

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Baroncini A, Frechon P, Bourghli A, Smith JS, Larrieu D, Pellisé F, Pizones J, Kleinstueck F, Alanay A, Kieser D, Cawley DT, Boissiere L, Obeid I; European Spine Study Group (ESSG). Adherence to the Obeid coronal malalignment classification and a residual malalignment below 20 mm can improve surgical outcomes in adult spine deformity surgery. Eur Spine J. 2023 Jul 2. doi: 10.1007/s00586-023-07831-0. Epub ahead of print. PMID: 37393421.

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