Twenty-three patients who underwent C1 lateral mass screw (LMS)-C2 translaminar screw (TLS) and 29 who underwent C1 LMS-C2 pedicle screw (PS) fixation with ≥ 2 years of follow-up were retrospectively analyzed. Three-planar (sagittal, coronal, and axial) radiographic parameters were measured. Patient-reported outcomes (PROs) including the Neck Disability Index (NDI), Japanese Orthopaedic Association (JOA) score and the Short Form 36 Physical Component Summary (SF-36 PCS) were documented. Factors potentially associated with PROs were identified.

The radiographic parameters significantly changed postoperatively except the C1-2 midlines' intersection angle in the TLS group ($p = 0.073$) and posterior atlanto-dens interval in both groups ($p = 0.283$, $p = 0.271$, respectively). The difference in bilateral odontoid lateral mass interspaces at last follow-up was better corrected in the TLS group than in the PS group ($p = 0.010$). Postoperative PROs had significantly improved in both groups (all $p < 0.05$). Thereinto, NDI at last follow-up was significantly lower in the TLS group compared with PS group ($p = 0.013$). In addition, blood loss and operative time were obviously lesser in TLS group compared with PS group ($p = 0.010$, $p = 0.004$, respectively). Multivariable regression analysis revealed that a change in C1-2 Cobb angle was independently correlated to PROs improvement (NDI: $\beta = -0.435$, $p = 0.003$; JOA score: $\beta = 0.111$, $p = 0.033$; SF-36 PCS: $\beta = 1.013$, $p = 0.024$, respectively), also age ≤ 40 years was independently associated with NDI ($\beta = 5.40$, $p = 0.002$).

Three-planar AAI should be reconstructed by C1 LMS-C2 PS fixation, while sagittal or coronal AAI could be corrected by C1 LMS-C2 TLS fixation. PROs may improve after atlantoaxial reconstruction in patients with chronic AAI. The C1-2 Cobb angle is an independent predictor of PROs after correcting chronic AAI, as is age ≤ 40 years for postoperative NDI [1)].

2017

Hitti et al. reviewed the institutional experience with atlantoaxial instrumentation with and without navigation from 2007-2016. They limited the cases to those requiring C1-C2 stabilization in traumatic and degenerative cases, and not as part of more extensive surgical stabilizations. They identified (45) consecutive patients and compared intra-operative blood loss, need for transfusion, and time of procedure with and without the use of navigation.

There was a significant reduction in the amount of intra-operative blood loss in the navigated (n = 20) vs. non-navigated cases (n = 25). In addition, while the navigated cases were initially longer, currently there is no significant difference in the length of the cases.

Surgical navigation significantly reduced blood loss compared to non-navigated cases without increasing surgical time or risk of complication. Furthermore, navigation has the potential to reduce operative times due to a reduction in blood loss [2)].

Thirty-seven patients underwent this procedure. No neural or vascular damage related to this technique has been observed. The early clinical and radiologic follow-up data indicate solid fusion in all patients.

Fixation of the atlantoaxial complex using polyaxial-head screws and rods seems to be a reliable technique and should be considered an efficient alternative to the previously reported techniques [3)].

1)

Pan Z, Xi Y, Huang W, Kim KN, Yi S, Shin DA, Huang K, Chen Y, Huang Z, He D, Ha Y. Independent

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3) Harms J, Melcher RP. Posterior C1-C2 fusion with polyaxial screw and rod fixation. Spine (Phila Pa 1976). 2001 Nov 15;26(22):2467-71. PubMed PMID: 11707712.