Abstract

Purpose: C1/C2 fixation with Goel-Harms technique is of the methods to treat highly unstable fractures of atlantooccipital complex or a revision for unsuccessful dens screw. The use of intraoperative navigation allows us to perform C1/C2 fixation via minimally invasive lateral approach. We report a series of patients treated with minimally invasive lateral C1/C2 Goel-Harms fixation, reporting the surgical procedure and discussing the technique.

Methods: We prospectively enrolled 10 patients affected by unstable fracture of atlantooccipital complex or nonunion of the dens after fixation with dens screw. One patient underwent revision from prior MI-lateral occipitocervical fixation. All patients were preoperatively evaluated with CT scan and MRI scan if needed. Patients underwent minimally invasive lateral C1/C2 Goel-Harms fixation with the assist of intraoperative 3D imaging and navigation. All patients were functionally and radiologically evaluated pre- , at 6 weeks and at 1 year postoperatively.

Results: Minimally invasive lateral C1/C2 Goel-Harms fixation was successfully performed in all of the patients. 46 screws were placed. 43 (93,47%) were placed without any pedicle breach. In 3 (6,52%) screws we observed a minor pedicle breach. No major pedicle breach was observed. One patient postoperatively died due to concomitant trauma, one patient had postoperative dysphagia. COMI and ODI decreased from 6,19 and 57,25, respectively, to 3,69 and 26,84., respectively.

Conclusions: Described method of C1/C2 is a minimally invasive method that has a similar outcome to the open technique. It requires the experience in open techniques and the assist of intraoperative 3D imaging and navigation to be performed efficiently. Moreover, in our opinion it promotes easy hardware removal after healing of the fracture.

Keywords: Craniocervical junction; Occipitocervical junction instability; Occipitocervical fixation; Minimally invasive spine surgery; Spinal trauma