

2017

From November 2008 to January 2012, clinical and radiological data of 7 patients presenting with rheumatoid arthritis (RA) and associated irreducible bulbo-medullary compression treated with endoscopic endonasal odontoidectomy (EEO) were retrospectively analyzed. In all patients decompression was achieved by EEO with anterior C1 arch preservation. In the last two patients, after EEO, we used the spared anterior C1 arch for reconstruction of anterior column of CVJ by positioning, under pure endoscopic guidance, autologous bone and two tricortical screws between the anterior arch of C1 and the residual odontoid. All patients were examined clinically with Ranawat classification and radiographically with CT scan, MRI and dynamic x-ray immediately after surgery and during follow-up.

Adequate bulbo-medullary decompression with anterior C1 arch preservation was obtained in all cases. At follow up (average 66,2 months; range 91-54 months) all patients experienced an improvement at least of one Ranawat classification level and presented no clinical and/or radiological signs of instability. **CONCLUSIONS:**

EEO with anterior C1 arch sparing provides satisfying long term results for irreducible ventral CVJ lesions in RA. The preservation of anterior C1 arch and, when possible, the reconstruction of anterior CVJ can prevent the need for posterior fusion ¹⁾.

2014

Twelve consecutive cases of craniovertebral junction instability with or without basilar invagination were diagnosed at the National Institute of Neurology and Neurosurgery in Mexico City, Mexico, between January 2009 and January 2013. The EEA was used for 5 cases in which the odontoid process was above the nasopalatine line, and was compared with 7 cases in which the odontoid process was beneath the nasopalatine line; these were treated using the transoral microscopic approach (TMA). Odontoidectomy was performed after occipital-cervical or cervical posterior augmentation with lateral mass and translaminar screws. One case was previously fused (Oc-C4 fusion). The senior author performed all surgeries. American Spinal Injury Association scores were documented before surgical treatment and after at least 6 months of follow-up.

Neurological improvement after odontoidectomy was similar for both groups. From the transoral group, 2 patients had postoperative dysphonia, 1 patient presented with dysphagia, and 1 patient had intraoperative CSF leakage. The endoscopic procedure required longer surgical time, less time to extubation and oral feeding, a shorter hospital stay, and no complications in this series.

Endoscopic endonasal odontoidectomy is a feasible, safe, and well-tolerated procedure. In this small series there was no difference in the outcome between the EEA and the TMA; however, fewer complications were documented with the endonasal technique ²⁾.

The charts of 9 patients who underwent endonasal endoscopic surgery to the odontoid between January 2005 and August 2013 were reviewed. The clinical presentation, radiographic findings, surgical management, complications, and outcome, particularly with respect to time to extubation and feeding, were analyzed. Radiographic measurements of the distance between the back of the odontoid and the front of the cervicomedullary junction (CMJ) were calculated, as well as the location

of any residual bone fragments.

There were 7 adult and 2 pediatric patients in this series. The mean age of the adults was 54.8 years; the pediatric patients were 7 and 14 years. There were 5 females and 4 males. The mean follow-up was 42.9 months. Symptoms were resolved or improved in all but 1 patient, who had concurrent polyneuropathy. The distance between the odontoid and CMJ increased by 2.34 ± 0.43 mm ($p = 0.03$). A small, clinically insignificant fragment remained after surgery, always on the left side, in 57% of patients. Mean times to extubation and oral feeding were on postoperative Days 0.3 and 1, respectively. There was one posterior cervical [wound infection](#); there were 2 cases of epistaxis requiring repacking of the nose and no instances of breathing or swallowing complications or velopharyngeal insufficiency.

This series of 9 cases of endonasal endoscopic odontoidectomy highlights the advantages of the approach in permitting early extubation and early feeding and minimizing complications compared with transoral surgery. Special attention must be given to bone on the left side of the odontoid if the surgeon is standing on the right side ³⁾.

2013

From September 2009 to April 2010, three consecutive patients with basilar invagination, of which the etiology was congenital osseous malformations, underwent endoscopic transnasal odontoidectomy. All patients presented with myelopathy. The last two cases also received occipitocervical fixation and bone fusion during the same surgical episode to ensure stability.

All the patients were extubated after recovery from anesthesia and allowed oral food intake the next day. Cerebrospinal fluid rhinorrhea was found in the second case and cured by continuous lumbar drainage of cerebrospinal fluid. No infection was noted. The average follow-up time was more than 24 months. Remarkable neurological recovery was observed postoperative in all patients.

The endoscopic transnasal odontoidectomy is a feasible approach for anterior decompression of pathology at the cervicomedullary junction. The advantages over the standard transoral odontoidectomy include elimination of risk of tongue swelling and teeth damaging, improvement of visualization, alleviation of prolonged intubation, reduction of need for enteral tube feeding and less risk of affecting phonation. The minimally invasive access and faster recovery associated with this technique make it a valid alternative for decompression of the ventral side of the cervicomedullary junction ⁴⁾.

From July 2007 to June 2010, 5 patients (3 males and 2 females, age range, 25-41 yr) with irreducible cervicomedullary junction compression were subjected to endoscopic transoral odontoidectomy without occipitocervical posterior fixation and bone fusion.

A purely endoscopic transoral odontoidectomy for decompression of the cervicomedullary junction without the occipitocervical fusion was achieved successfully in 5 patients. None of the patients underwent tracheotomy and postoperative gastrostomy tube placement. The patients were started on liquids on the third postoperative day and advanced to a regular diet on the fourth postoperative day. There was no postoperative velopharyngeal insufficiency, cerebrospinal fluid leakage, regional infection, or meningitis. The patients were discharged in 10 to 12 days after the surgery. There were

no evidence of instability at the craniovertebral junction at 12 to 47 months of follow-up and remarkable improvement in neurological function was observed in each patient.

The endoscopic transoral approach may be a more direct route to C1 and the odontoid than the endoscopic endonasal approach. This approach allows complete resection odontoid to decompress the cervicomedullary junction without increasing the risk of complications such as wound infection, meningitis, and velopharyngeal insufficiency. Usually, the occipitocervical posterior fusion and tracheotomy is less necessary in this approach ⁵⁾.

2008

From September 2004 to April 2007, three consecutive patients with [basilar invagination](#) and instability in the [craniovertebral junction](#) were enrolled. The causes for the invagination and instability included [rheumatoid arthritis](#) in two patients and trauma in one patient, and all patients presented with myelopathy and quadriparesis before intervention.

All three patients underwent an endoscopic transnasal transclival approach for anterior decompression and resection of the displaced odontoid process and pannus to decompress the underlying medulla. Subsequently, they received occipitocervical fixation by lateral mass screws and bone fusion to ensure stability. Remarkable neurological recovery was observed after surgery in all patients, and no adverse effects were noted.

Compared with the standard transoral approach, the transnasal transclival endoscopic approach for decompressing basilar invagination is a feasible and effective alternative that avoids common disadvantages like prolonged intubation, excessive tongue retraction, and the need for palatal incision ⁶⁾.

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