

Endoscopic transnasal resection of the odontoid in a patient with severe brainstem compression

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Dear Editor,

Different approaches that allow access to the odontoid process have been described over the years. In case of persistent symptomatic space occupation only, resection of the odontoid is necessary to decompress the brainstem after posterior spinal decompression and fusion [1, 2]. The transoral (endoscopic or non-endoscopic) approach evolved to be the most commonly used. Complications associated with this approach are velopharyngeal incompetence, hypernasal speech, swallowing disturbances, and temporomandibular joint syndrome [6, 7]. The endoscopic transnasal approach for resection of the odontoid process has been introduced recently and experience is limited to few groups so far [4, 5].

We present a successfully treated case of a 64-year-old woman with a long history of primary chronic rheumatoid arthritis who underwent posterior atlantoaxial fusion more than 20 years ago. However, an increase of dysarthria,

increasing difficulty with swallowing including salivary retention in the mouth, decrease of motor power (grade 2/5 lower and 3/5 upper extremities), and progressive neck pain were observed and led to immobilization and dependency on a nasogastric tube for more than 3 months. The MRI and CT imaging disclosed a profound compression and dorsal dislocation of the brainstem (Fig. 1a, c) by the dislocated odontoid process. Cervical flexion/extension films confirmed a stable C1/C2 fusion. The patient underwent a complete endoscopic, neuronavigation-assisted (CT dataset, BrainLAB VectorVision2) transnasal resection of the odontoid.

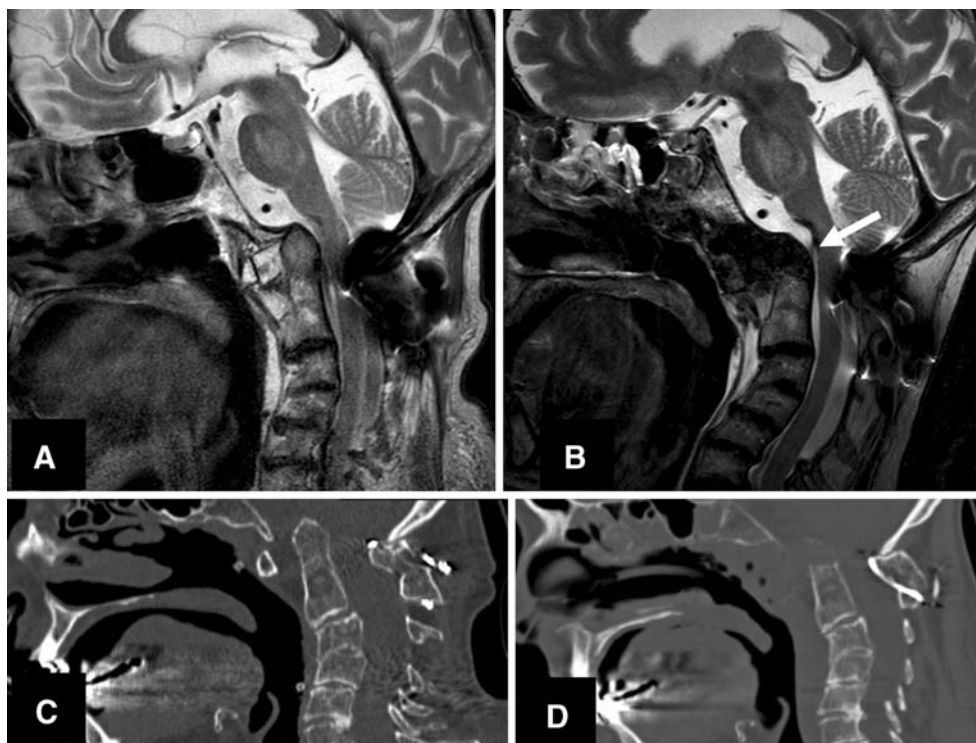
Surgery was performed purely endoscopically with a zero-degree endoscope in four-handed technique via two nostrils. First, an extended transnasal approach was created by resection of the vomer, anterior wall of the sphenoid sinus, and posterior end of the nasal septum. Thereafter, in a stepwise fashion, the caudal clivus, from median to lateral, the C1 anterior arch and dens were high-speed drilled. After resection of the pannus, pulsations of the dura become visible as a hallmark of the decompression of the brainstem. The surgical defect is covered with fibrin glue. A nasogastric tube is inserted under endoscopic view.

The patient was extubated the same day and transferred for rehabilitation on post-op day 10. Standing and attempts of walking were already possible during the first week postoperatively. The nasogastric tube was removed on the third postoperative week, the speech normalized, and salivary retention disappeared. Postoperative CT and MRI imaging show a sufficient resection of the odontoid (Fig. 1b, d) and cerebrospinal fluid at the site of former brainstem bulging.

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Fig. 1 **a** Preoperative MRI shows significant basilar impression from a dislocated odontoid. Posterior the metal artefacts of the C1/2-wiring can be recognized. **b** Postoperative MRI after transnasal odontoid resection: the former site of anterior brainstem compression is still visible (indicated by *arrow*). **c** CT showing dislocation of the odontoid which migrated cranially into the foramen magnum. **d** Postoperative CT: the caudal tip of the clivus, the anterior arch of C1, and the odontoid are drilled away



Although the transoral approach is the usually performed route for resection of the odontoid process, the transnasal approach performed by a purely neurosurgical team experienced in endoscopic surgery is a valid alternative. Only standard equipment is needed.

We assume that bacterial contamination and soft-tissue defect after transnasal approach should be minor compared to a classic transoral approach with pharyngeal incision and opening of the oral cavity [3]. Especially in patients with swallowing disturbances and salivary retention a less traumatic approach could result in a better postoperative outcome [5]. Tracheostomy to avoid postoperative airway problems in patients who undergo transoral operations should not be necessary for the transnasal approach [6].

Experience with the transnasal route is limited and surgery was carried out by few neurosurgeons or neurosurgeons in cooperation with otorhinolaryngologists to date. Further experience will be needed to evaluate the usefulness of the transnasal approach.

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