Acta Otorrinolaringol Esp. 2018;69(1):53–55

Acta Otorrinolaringológica Española

www.elsevier.es/otorrino

CASE STUDY

Cranio-cervical junction cerebrospinal fluid leak after microdebrider-assisted adenoidectomy – A rare case report

Fístula de líquido cefalorraquídeo en la unión cráneo-cervical tras adenoidectomía asistida por microdebridador – un caso raro

Karthikeyan Ramasamy*, Hemanth Vamanshankar, Sunil Kumar Saxena, Vignesh Karunakaran, Arun Alexander

Department of ENT, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry, India

Received 28 November 2016; accepted 12 January 2017
Available online 9 August 2017

Case report

A 24-year-old male patient was referred to our hospital following adenoidectomy using microdebrider, with a post nasal pack, in-view of severe intra and immediate post op nasal bleed which was not subsiding. The patient was immediately posted under general anaesthesia for endoscopic re-exploration. Blackish charred mucosa was present in the roof and posterior wall of the nasopharynx. Remnant adenoid tissue was present, which was debrided and bleeding was controlled. Merocel pack was kept in both the nostrils. The patient however complained of persistent severe occipital headache which was evaluated by taking a plain computed tomogram (CT) scan. This showed extensive pneumocephalus. On clinical examination patient had bilateral papilloedema with no signs of meningitis. Patient was put on conservative management with IV antibiotics. On the second post-operative day, following pack removal, patient had watery nasal discharge through the nasal cavity, and which presented as a postnasal drip. The watery discharge was confirmed to be CSF. Further evaluation with CT cisternography (Fig. 1) and MRI brain was done. CT cisternogram showed the site of CSF leak at the level of cranio-cervical junction with the loss of the anterior longitudinal ligament. On post-operative day 4, the patient was planned for a transnasal endoscopic repair of the CSF leak. Intraoperatively, the site of defect was found at the junction of cranio-cervical junction angle (Fig. 2). A defect of about 1×1 cm was seen, around which the previous cauterised mucosa was found with prevertebral muscle plain breech. CSF leak was confirmed by intraoperative Valsalva manoeuvre. Septal cartilage and abdominal fat were harvested. Defect was closed in 3 layers using septal cartilage, fat and Gelfoam with use of Tissel. Patient was put on lumbar drain for 5 days with intravenous antibiotics. Postoperative CT scan showed a resolved pneumocephaleus. Headache symptomatically improved over a period of one week. No leak was seen after pack removal. The patient is on regular follow up with no further complains.

Discussion

The cranio-cervical junction (CCJ) is the anatomical region where the base of the skull articulates with the upper cervical spine (C1 and 2). From anterior to posterior the layers encountered are nasopharyngeal mucosa,

* Corresponding author.
E-mail address: guyton2010@gmail.com (K. Ramasamy).

https://doi.org/10.1016/j.otorri.2017.01.006

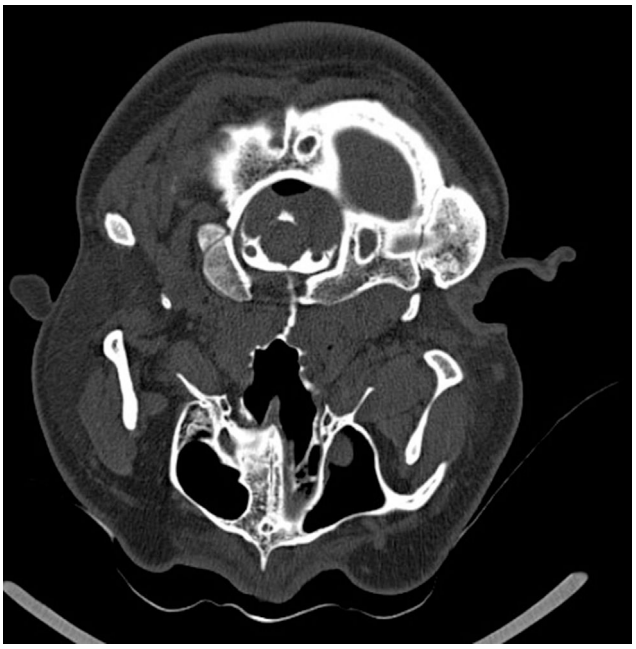

Figure 1 CT cisternogram (10 ml of non-ionic contrast media injected into sub arachnoid space though lumbar puncture) patient in prone position-showing the site of CSF leak at the level of cranio-cervical junction with the loss of the anterior longitudinal ligament.

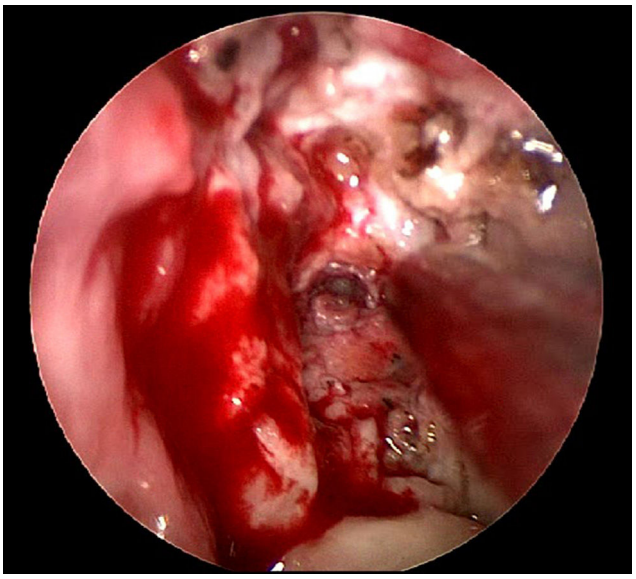

Figure 2 Intra operative picture showing cranio-cervical junction with the site of CSF leak.

pharyngobasilar fascia, longus capitis, and, more inferiorly, the longus coli muscles, atlanto-occipital membrane, anterior longitudinal ligament, atlanto-occipital ligaments, arch of the atlas, and odontoid peg. The spinal canal is located immediately behind the arch of the atlas. The peg is supported by the apical and alar ligaments which form a secure attachment to the occipital bone/clivus. Posterior to the odontoid, the cruciate ligaments (vertical and horizontal elements) provide strong support for the odontoid and prevent posterior displacement.[1]

Originally the concept of microdebrider was patented by Urban in 1969. In his patent application he called the equipment ''Vacuum rotatory dissector''. It was only from the year 1994 that Setliff and Parsons started using this equipment for nasal surgeries.[2]

Debrider has been in use for adenoidectomy surgery only in the recent years. Since it is an endoscopic minimally invasive surgery, it had become the standard of care for the treatment of adenoid hypertrophy. These blades are curved and hence can be introduced through the nasal cavities. The curvature of these blades mimics the curvature of the nasal cavity.

The use of a microdebrider in nasal surgeries has many advantages over conventional nasal surgery. It preserves the nasal mucosa and at the same time decreasing blood loss during surgery. It causes faster healing of the mucosa, with no obstruction or crusting during the post-surgery period as compared to conventional surgery. Also biopsy of the mucosa can be taken during surgery using in-line suction trap on the standard microdebrider.[3,4] However, its high cost, both in terms of initial expenditure as well as for disposable blades, tips and bits are the main drawbacks of using this instrument in nasal surgery.[5] Another problem is that during soft tissue removal there is marked diminution of tactile feedback, which in turn can cause damage especially in areas close to orbit and skull base.[6]

Complications of powered microdebrider have been described in literature. These include minor complications such as periorbital emphysema and ecchymosis, medial rectus injury, minor bleeding and purulent nasal discharge. Major complications include CSF leak and meningitis. These complications have been mainly attributed to the ability of the blades of the microdebrider to draw in materials such as medial rectus and orbital fat into the rotating blades with great efficiency and speed.[7]

However, complication has been described in literature during the use of microdebrider for adenoidectomy. Patients have only complained of mild neck pain, which has been managed with analgesics.[8] In our patient, excessive use of debrider for adenoid tissue removal, may have caused injury to the prevertebral muscles and anterior longitudinal ligament and other important structures in the cranio-cervical junction. This in turn may have lead to further complications like pneumocephaleus and CSF leak. Apart from the severe morbidity caused to the patient, there was also the need for a second surgery – CSF leak repair.

Hence the complication which we describe in our case is a very rare complication. Morena et al. had reported a similar case report in a 3 year old child with history of CSF leak, pneumocephalus post-adenoidectomy for which transoral endoscopic approach was used for repair. Repair was done by suturing in layers of the fistula tract, reinforced with basipharyngeal vascularised (based on ascending pharyngeal artery) and rotation flap of mucosa, and a free graft of muscle.[9]

Reconstruction of these defects using cartilage and fat had also never been reported in the cranio-cervical angle. Septal cartilage was chosen as the material for closure of the defect as it has some amount of elasticity which can fit to the size of the defect. Multiple layer of CSF leak repair with fat and gelfoam with tissel was done in order to achieve closure of the entire defect.

Hence the use of powered instruments like debrider in adenoidectomy surgeries, although very useful and more reliable for complete removal, has to be used with caution. The possible complications have to be kept in mind while performing this surgery.

Conclusion

Adenoidectomy is one of the most common surgeries performed in children today. The microdebrider is an important tool in performing adenoidectomy, and has now become an alternative method of adenoidectomy along with the nasal endoscope. Although a very useful tool for adenoidectomy, microdebrider assisted adenoidectomy has its own complications. These include injury to the soft palate, uvula, eustachian tube and persistent bleeding.

CSF rhinorrhoea and pneumocephaleus following debrider adenoidectomy is one of the rarest complication. This is the second case report of this kind reported. The defect happens at the cranio-cervical angle. Due to the complex anatomy of this region, assessment requires investigation with the CT cisternogram or MRI scan for detection of defect. Closure of defect can be done endoscopically with septal cartilage and fat in a multiple layer closure.

Funding

None.

Conflict of interest

None.

References

1. Wormald PJ. Endoscopic surgery of craniocervical junction. In: Endoscopic sinus surgery, editor. Anatomy, three dimensional reconstruction and surgical technique. 3rd edn New York: Thieme Medical Publisher Inc.; 2013. p. 272–3.
2. Gross CW, Becker DG. Powered instrumentation in endoscopic sinus surgery. Op Tech Otolaryngol – Head Neck Surg. 1996;7:236–41.
3. Dalke R, Burduk P, Mierzwinski J, Kazmierczak H. Rotation suction knife (shaver) as otolaryngology surgery. Otolaryngol Pol. 2006;60:37–40.
4. Ceylan K. Impact of microdebrider in surgical treatment of nasal polyposis in terms of health related quality of life and objective findings: a comparative randomized single blinded clinical study. KBB – Forum. 2007;6:60–5.
5. Bruggers S, Sindwani R. Evolving trends in powered endoscopic sinus surgery. Otolaryngol Clin North Am. 2009;42:789–98.
6. Bhatti MT, Gionnoni CM, Raynor E, Monshizadeh R, Levine LM. Ocular motility complications after endoscopic sinus surgery with powered cutting instruments. Otolaryngol Head Neck Surg. 2001;25:501–9.
7. Eviatar E, Pitaro K, Gavriel H, Krakovsky D. Complications following powered endoscopic sinus surgery: a 11 year study on 1190 patients in a single institute in Israel. IMAJ. 2014;16:338–40.
8. Somani SS, Naik CS, Bangad SV. Endoscopic adenoidectomy with microdebrider. Indian J Otolaryngol Head Neck Surg. Oct 2010;62:427–31.
9. Moreno-Luna R, Cárdenas Ruiz-Valdepeñas E, Tato JI, Rivero-Garvia M, Márquez-Rivas J, Mochón Martín A. Basiespinal cerebrospinal fluid leak as a complication after adenoidectomy: case report and literature review. World Neurosurg. 2016 Sep;93:484, e9-484 e12.