Review Article

Powered Endoscopic Dacryocystorhinostomy

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INTRODUCTION

Endoscopic endonasal dacryocystorhinostomy has gained a considerable popularity in the recent two decades with the advent of the rigid fiber optic endoscope. There are numerous advantages of endoscopic dacryocystorhinostomy (DCR) and include, no facial incision, no disruption of the medial canthal tendon, no disruption of the lacrimal pump, less traumatic, feasibility in acute dacryocystitis etc. Recent published meta-analysis have revealed comparable results with external DCR with lesser risks of infection and bleeding. Powered Endoscopic DCR as described by Wormald et al is a technique that allows creation of largest possible osteotomy and complete sac marsupialization and hence achieve high success rates comparable to that of external DCR. This article describes the set up needed, surgical techniques, advantages and outcomes of powered endoscopic DCR.

INSTRUMENTS AND SET UP

The author uses Image 1 HD viewing system with xenon light source and 0 and 30 degree, 2.7 (pediatric) or 4 mm (adult) telescopes (Karl Storz, Tutlingen, Germany) (Fig 1). Occasionally, self-irrigating telescopes (Fig 2) are used by the author in cases of lacrimal abscess, acute dacryocystitis or conditions which predispose to a little more bleeding than usual. The powered instrument consists of a console, hand piece with specifically designed diamond burrs of various sizes and angulations (Medtronic Xomed, Jacksonville, FL, USA) (Fig 3).

SURGICAL TECHNIQUE

Preparation and Anesthesia

Powered endoscopic DCR may be performed under either general anesthesia or local anesthesia. The author prefers general anesthesia. The middle turbinate, axilla and adjacent lateral wall are infiltrated with 2% xylocaine with 1:60,000 adrenaline (Fig 4) and followed by nasal packing with ribbon gauze or preferably neurosurgical patties (Fig 5). The patties are medicated with 0.05% (adults) or 0.025% (pediatric) xylometazoline. It is best to leave the patties for at least 8-10 minutes for good decongestion. With the patient in supine position, patients’ head should be slightly elevated and neck slightly extended so as to facilitate superior osteotomy.

Fashioning the nasal mucosa flaps

A number 15 blade or sickle knife or a radiofrequency device (Fig 6) is used to make the incision over the lateral nasal mucosa down to the peristeum in front of the maxillary line (Fig 7). The first horizontal incision of 12-15 mm length is made 10 mm above the axilla of the middle turbinate (Fig 8). The vertical incision begins from the anterior end of the horizontal incision and ends at of about two-thirds of the vertical height of the middle turbinate (Fig 9). A horizontal incision is then made at right-angle at the inferior end of the vertical incision until reaching the maxillary line, just short of uncinate process. A Freer peristeal elevator is then used to elevate the mucoperiosteal flap, baring the underlying bone (Fig 10) and is then tucked around the axilla of middle turbinate to keep it out of the operating field.

Osteotomy

Once exposure of the frontal process of maxilla and its junction with lacrimal bone is achieved, a small round knife is then used to remove the thin lacrimal bone from the sac before using a Hajek-Kopfler forward punch (Karl Storz, Tuttlingen, Germany) to remove the remaining bone covering nasolacrimal duct and frontal process of maxilla. Once the bone becomes thick superiorly and is not amenable to punch removal above the axilla of the middle turbinate, a curved 25° high speed diamond DCR burr (Medtronic Xomed, Jacksonville, FL, USA) is used to remove the rest of the bone to expose the sac completely. All bones over the lacrimal sac fundus and common canaliculus opening should be removed. Superoanteriorly, the osteotomy should extend till orbicularis oculi muscle is just exposed and superoposteriorly, the agger nasi air cells or operculum of the middle turbinate is entered to ensure full fundus exposure (Figs 11-13).
Fashioning lacrimal sac flaps

The author prefers filling the lacrimal sac with fluorescein stained viscoelastic since this not only dilates the lacrimal canaliculi and sac (Fig 14), but also protects the lateral wall of sac and internal common opening from inadvertent trauma. The Bowman probe is passed through the upper canaliculus and is held horizontally tenting the medial wall of the lacrimal sac (Fig 15).

A crescent or DCR spear knife is used to make a vertical incision along the entire length of the lacrimal sac from the fundus down to the nasolacrimal duct (Fig 15). An “I” or “Y” shaped-incision is then completed with upper and lower horizontal releasing cuts at the top and the bottom using a sickle or spear knife (Fig 16). The lacrimal sac is then completely marsupialized and both the anterior and posterior sac flaps are laid opened and flat like an open book on the lateral nasal wall (Fig 17).

Edge to Edge mucosal apposition

Once both the nasal mucosal and lacrimal sacs are fashioned, an edge to edge approximation is performed so as to achieve healing by primary intention. A ball probe is useful to spread open the lacrimal sac flaps. No bare bone should be left behind since that may incite granulation tissue. The anterior flap should be in contact with the anterior cut end of the nasal mucosa whereas the posterior flap should lie back flat in apposition with the agger nasi mucosa (Fig 18).

Hemostasis

A correctly done endoscopic DCR rarely would have hemostasis issues! When needed it can be achieved with Merocel nasal packing (Fig 19), cold saline irrigation, head-up position or judicious bipolar cautery of the bleeding mucosal edges. Small piece of surgicel (absorbable hemostat, oxidized cellulose polymer) gauze can be left at the end of the surgery to maintain hemostasis.

Adjunctive modalities

The use of silicone intubation and Mitomycin C (MMC) is controversial without concrete proof of benefit or harm. For their endoscopic DCR’s, the author prefers using intubation for 4 weeks and circumostial MMC as per protocols described in literature (Figs 20 and 21).6,7

Post-operative management

Postoperatively, broad-spectrum oral antibiotics, nasal decongestants, and steroid-antibiotic eye-drops are prescribed. Patients are instructed to perform nasal douching to remove crusts and improve mucosal healing. The follow up of the patient is at 4 weeks for stent removal and further follow up only if needed.

ADVANTAGES OF POWERED ENDOSCOPIC DCR

- Easy Osteotomy
- Easy Superior osteoplasty
- Minimal heat / No necrosis
- Minimizes bleeding
- Quicker surgery
- Low Surgeon Fatigue
Fig 3: The Medtronic console

Fig 4: Local infiltration

Fig 5: Topical decongestion

Fig 6: Endoscopic Radiofrequency incision blades

Fig 7: A decongested nasal cavity with surfacemarkings of the incision

Fig 8: Superior horizontal incision

Fig 9: Anterior vertical incision
Fig 10: Elevation of the mucoperiostium flap

Fig 11: Powered osteotomy

Fig 12: Superior powered osteotomy

Fig 13: Complete exposure of the sac

Fig 14: Tenting of sac with the probe

Fig 15: Crescent blade for sac marsupialization

Fig 16: H shaped sac incision

Fig 17: Completed sac marsupialization
OUTCOMES

The outcomes of powered endoscopic DCR both in short term and long term are comparable to external DCR, both for primary as well as revision cases. Ali MJ et al studied the outcomes in 283 powered endoscopic DCR’s performed over an 11 year period. At a mean follow up of 17.1 months, anatomical success was achieved in 96.9% of primary cases and 91.3% of the revision cases. The same group looked at long term outcomes of powered endoscopic DCR in primary and revision cases. At a mean follow up of 21.8 months (range: 12-103 months), anatomical success was achieved in 97.7% and functional success in 95.5% of the primary cases. In their series on revision DCR’s, the authors found that at a mean follow up of 26.4 months (range: 12-66 months), anatomical success and functional success were recorded as 91.3% and 86.9% respectively. When comparison was performed between the trainees and the consultants, it was noted that at a mean follow up of 14.2 months, the consultants achieved anatomical success rate of 98.1% and a functional success rates 95.6%. The patients operated by trainees had a mean follow up of 10.9 months with 95% achieving an anatomical success and 89% functional success. When compared there was no statistically significant difference between the two groups (p=0.3) reflecting a point that these skills could be transferred effectively to the trainees.

Ali MJ et al also studied the behaviours of the Powered endoscopic DCR ostia beyond 4 weeks up to 2 years by serial endoscopic monitoring and showed that the ostia remained stable and there was no statistically significant difference either in size or area of the ostia. This partly reflects on the techniques used by the authors, where a 360 degree mucosa-mucosa apposition promotes healing by primary intention and reduces the shrinkage of the ostia.

CONCLUSION

In conclusion, the outcomes of both the primary and revision powered endoscopic DCR are comparable with the best of external DCR. A good knowledge of intranasal anatomy, meticulous surgical techniques and lower threshold for performing adjunctive endonasal procedures where indicated could yield excellent results with powered endoscopic DCR that are maintained over a long period of time.
Case Report

Single Balloon Enteroscopy in the diagnosis of Jejunal Diverticulosis

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Abstract: Diverticuli of jejunum is a rare disease. It may masquerade as intestinal obstruction, perforation, malabsorption, diverticulitis, blind loop syndrome, volvulus, and intussusceptions. We report a rare case of multiple jejunal diverticuli presenting as intussusception and obstruction. We emphasize the importance of single balloon enteroscopy which led us to diagnosis of multiple jejunal diverticuli.

Key words: Jejunal diverticuli, Intussusception, Single balloon enteroscopy

Introduction

Jejunal diverticuli are rare with an incidence of less than 0.5% [1]. The prevalence increases with age, peaking at the sixth and seventh decades [2]. It is often asymptomatic with complications occurring in 10-30% of patients which include perforation, hemorrhage and intestinal obstruction [3,4]. We report a rare case of intussusception leading to upper intestinal obstruction diagnosed on CT. Single balloon enteroscopy confirmed the cause of intussusception being multiple jejunal diverticuli.

Case Report

A 55 year old man reported to the department of gastroenterology complaining of short duration of intense abdominal pain and vomiting. The patient had a drug-free medical history and was not receiving any drugs during presentation. He mentioned a three month-lasting remittent abdominal pain, fullness and often abdominal distension. Physical examination revealed a distended abdomen with increased bowel movements. Rectal examination was normal. Vital parameters were within normal limits. Abnormal laboratory findings included leukocytosis (12300/mm³) and hypokalemia (3.2mmol/l). A plain abdominal X-ray showed multiple air-fluid levels and dilated intestinal loops suggesting intestinal obstruction but no signs of hollow viscous perforation. Abdominal ultrasonography revealed dilated and hyperactive intestinal loops. Contrast enhanced computed tomography (CT) scan demonstrated multiple distended small bowel loops with jejunal intussusception (fig 1). Patient was started on supportive therapy with nil per oral, Ryle’s tube aspiration and intravenous fluid replacement. Gastroduodenoscopy was normal with fluid residue in stomach. Single Balloon Enteroscopy (Olympus, SIF Q 180) through oral route was done after 8 hours fasting to look for cause of intussusception. Jejunum was reached in 5 minutes which showed diverticulum at proximal jejunum and retrograde intussusceptions (fig 2). On inflation of balloon of the outer tube, intussuscepted bowel showed reverse peristalsis and diverticuli were fixed. Scope was passed through the intussuscepted bowel and on further advancement, multiple diverticuli were found in mid jejunum. Shortening of loops was not tried and procedure was abandoned and patient referred for surgery. Review of CECT during procedure did not show any diverticuli. Surgical resection was done which showed multiple jejunal diverticuli with a band between proximal and distal diverticuli. (fig 3)

Discussion

Diverticulum of the small bowel is a rare disease with variable clinical presentations and often incidentally discovered during radiological investigations. Jejunal diverticuli are rare with an incidence of less than 0.5% [1]. Jejunal diverticuli are often asymptomatic with complications occurring in 10-30% of patients which include perforation, hemorrhage and intestinal obstruction [3,4].

Intussusception is the telescoping of proximal portion of bowel into distal bowel. It is an infrequent cause of abdominal pain in adults. As opposed to that in children, most of the cases (about 90%) in adults have an identifiable cause while the rest are idiopathic. In a study of 58 cases of surgically proven adult intussusceptions, most patients were found to have presented with signs and symptoms suggestive of bowel obstruction [5].

Diagnostic workup in a patient with pain abdomen with features of upper intestinal obstruction starts with X-ray abdomen which showed multiple air fluid levels. On further
evaluation into the etiology, CECT abdomen was done which showed jejunal intussusception with dilated proximal bowel loops.

In surgically proven cases of adult intussusceptions, malignant causes have been described in 48% of enteric lesions[5]. Single balloon enteroscopy was attempted for reduction of intussusception which showed proximal jejunal diverticuli with retrograde intussusception and on further advancement multiple mid jejunal diverticuli were seen. As the intussusception was fixed, reduction was not attempted and procedure was abandoned and patient was subjected to surgery.

The recommended treatment for jejunal diverticulosis is intestinal resection[6]. Hence in this case, surgery was performed. Intraoperative surgical pictures showed proximal and mid jejunal diverticuli connected by a band probably formed due to perforated diverticuli. The jejunal loop was resected and end to end anastamosis done. Post operatively, patient had no further complications.

We conclude that in a middle aged patient presenting with upper intestinal obstruction, balloon enteroscopy plays an important diagnostic role.

Fig 1: CECT abdomen showing jejunal intussusception with distended proximal bowel loops.

Fig 2: Single Balloon enteroscopy showing jejunal intussusceptions with diverticulum (arrow).

References


