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Outcome of Endonasal Endoscopic Dacryocystorhinostomy Without Stent

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ABSTRACT

Background: Dacryocystorhinostomy is the surgical bypass of the lacrimal sac and duct for the treatment of epiphora. Endonasal endoscopic dacryocystorhinostomy has been popularized as a minimally invasive technique.

Objective: the study aims to highlight the endonasal endoscopic DCR without stenting and to evaluate the results of the surgical procedure.

Patients and Method: This was a prospective study of 18 patients referred from the ophthalmology department for dacryocystorhinostomy after having been diagnosed as distal obstruction of nasolacrimal duct or sac. Data were collected through full history from the patients and clinical examination. Endoscopic dacryocystorhinostomy was performed without stent between January 2019 and January 2020 in Al Imamain Al Kadhimain Medical City and Al Qimma private hospital.

Results: The mean age was 34.83 years , range (12-53) years , 15 females(83.33%) and 3 males (16.67%) , 10 right eyes(55.56%) and 8 left eyes(44.44%) . All patients presented with epiphora, 17 of them (94.44%) presented with medial canthal discharge and 14 of them(77.78%) had medial canthal swelling with a mean duration of symptoms of 8.72 (5.5-14) months. Four patients were sent for a CT scan. Five patients(27.78%) had a septoplasty, two patients(11.11%) had conchoplasty to improve surgical access. The mean duration of surgery was 39.99 minutes, no intraoperative complications, one patient(5.55%) developed granuloma at the rhinostoma after 4 weeks and two patients(11.11%) developed synechia between the neo-ostium and middle turbinate after 3-6 weeks and one patient(5.55%) had a recurrence after 12 weeks. The success rate was 94.44%.

Conclusions: The endoscopic endonasal DCR is a successful surgery with low serious complications for treatment of distal nasolacrimal drainage obstruction if adequate sac exposure and good marsupialization are performed.

Keys words: DCR, endoscopic, epiphora

Dacryocystorhinostomy, (DCR), is the surgical bypass of the lacrimal sac and duct for the treatment of epiphora, a condition in which tears accumulate to the point that they drain down the face (1)

External dacryocystorhinostomy

External and endoscopic dacryocystorhinostomy have the same goal, to create a bypass of the blocked nasolacrimal duct by creating a fistula that allows the internal common punctum to communicate directly into the nasal cavity through the lateral nasal wall. The use of external DCR is favored by many ophthalmologists, who view it as the most effective procedure for correcting a nasolacrimal duct obstruction. The external approach involves a skin incision, drilling or rongeuring the bone of the anterior lacrimal crest and lacrimal sac fossa, opening the lacrimal sac and nasal mucosa, and suturing anterior and/or posterior flaps to create a mucosal fistula into the nose. The reported success rate of this surgery ranges from 80 to 95 %, with the major risks being wound complications (scar, infection, ectropion, or disruption of the medial canthal ligament) and nose bleeds.

In recent work, there was no significant difference between primary endonasal DCR and primary external DCR in terms of full success, partial success, and anatomic patency. Mean operative time was found to be

significantly shorter in endonasal DCR than in external DCR. The occurrence of postoperative bleeding was not significantly different between the two procedures. Postoperative cutaneous scarring was unique to the external DCR procedure. (2)

Primary endoscopic dacryocystorhinostomy

Endoscopic DCR is a minimally invasive procedure with improved endoscopic instrumentation. It has significant advantages over external DCR. It avoids a skin incision and scar, especially important in younger individuals or patients with a history of keloid formation. Dissection is limited to the inner wall of the lacrimal fossa, leaving intact the medial canthal anatomy and lacrimal pump function and avoiding a surgical site that goes from the skin to the nasal cavity. Postoperative pain is minimal, if at all present, and most patients can resume their normal activities a few days after surgery. The surgery requires less tissue dissection, often resulting in less intraoperative bleeding and a shorter surgical time than external techniques. Endonasal DCR can also be performed early to manage definitively acute dacryocystitis with abscess formation, minimizing the need to decompress the sac from the skin side.

There are also limitations. An anterior diverticulum arising from the lacrimal sac may not be effectively managed via the endonasal approach. Patients with a history of midfacial trauma may have altered anatomy involving the bones surrounding the lacrimal sac, making endonasal DCR hazardous with a less predictable outcome. A lacrimal sac neoplasm is best treated with an external DCR. Finally, there is a steep learning curve with using the nasal endoscope that may hamper early success if proper training has not been obtained (3).

Indications

The most frequent indication for endonasal DCR is chronic epiphora caused by acquired dacryostenosis. Other indications include acute or chronic dacryocystitis with or without the presence of a dacryolith and Benign lacrimal sac mass. Also, Patients with NLD obstruction and a previous history of sinus surgery, or failed external DCR are good candidates for endoscopic DCR

Contraindications

- The patient is on anticoagulation medications and is unable to stop perioperatively.
- Tumor of the lacrimal sac.
- The obstructions in the upper (pre-social) part of the nasolacrimal system such as punctual and canalicular stenosis. (3)

Complications

Complications demonstrated in endoscopic DCR are similar to those reported in endoscopic sinus surgery including epistaxis, occurring in 2% of patients. Other possible complications are orbital fat exposure. However. fat exposure should be an uncommon complication as it can only occur when the dissection is taken posterior to the uncinate. Which is an easily identifiable posterior landmark. Postoperative complications of endoscopic DCR are most frequently periorbital hematoma followed by synechiae(4).

Revisions

Revision DCR is unchanged from the primary technique. However, attention must be paid to the sac available for marsupialization. Prior surgeons may have inadequately opened the existing sac leading to the symptomatic failure, where the ample remaining mucosa makes the revision quite simple. Outcomes in this circumstance are expected to be similar to primary DCR. If however; the available sac is highly scarred or small, outcomes will be compromised.

Free mucosal grafts circumferentially covering damaged mucosa around the common internal punctum have been described to encourage primary wound healing. these can be placed as a free graft strung along the silicone tubes into the nose after surgery and placed under the gel foam, which will hold it in place. Overall outcomes of revision endoscopic DCR tend to still be quite good regardless of sac configuration with 89% success rates reported (4)

Outcomes

The last few years have seen a large quantity of data concerning powered endoscopic dacryocystorhinostomy and its high success rates which equals and occasionally exceeds that of external DCR. The long-term outcomes have also been reported to be excellent. These could be attributed to better anatomical understanding, better diagnostic workups, high-quality instruments and imaging systems, and a better understanding of postoperative ostium evaluation and management(4).

PATIENTS AND METHOD

A prospective study of patients who underwent endoscopic dacryocystorhinostomy without stenting at Al-Imamain Al-Kadhimain Medical City and AL-Qimma private hospital by different surgeons from January 2019 to January 2020. Data were collected includes the patient's age, sex, presenting symptoms, duration, clinical examination, endoscopic findings, operative experience, additional procedures, complications and follow-up results.

Patients were usually referred from the ophthalmology department when they were clinically diagnosed to have a distal nasolacrimal system obstruction. In our center, the decision to do DCR is made on the clinical ground, epiphora associated with repeated attacks of dacryocystitis. All patients were evaluated in the ENT department, Al-Imamain Al-Kadhimain Medical City, as well as in the private clinic by clinical examination focusing on anterior rhinoscopy aided by endoscopic nasal examination.

Explanation of the procedure and its possible complications for the patients and informed consent were taken from them. Full investigations for all patients including laboratory investigations, chest X-ray and echo study in selected cases to check the fitness for surgery. CT scan of nose and paranasal sinuses was done in case there was poor access to osteomeatal complex by endoscopy with a suspicion of concha bullosa and to exclude other pathologies.

Inclusion criteria :

Patients with chronic dacryocystitis who were diagnosed to have a distal nasolacrimal obstruction

Exclusion criteria :

□□□Patients with other nasal pathologies like chronic rhinosinusitis and nasal polyposis who needed additional surgery.

□□Patients unfit for general anaesthesia and surgery.

□□Patients who previously DCR was done for them.□Patients with a poor follow up after the surgery

PROCEDURE

□□Under general anaesthesia with endotracheal intubation, the patient's position was achieved by Reverse Trendlenberg position with the head tilted to the Surgeon, sterilization and preparation of Hopkin-rods rigid nasendoscopy (0), (4mm) connected to a video monitor by a video camera.

□□Hemostasis achieved by topical application of diluted adrenalin 1:1000 and Xylometazline 0.1 % on cotton pieces mobbed intranasaly at the site of surgery and asking for hypotensive anaesthesia. . Patients who were diagnosed to have septal deviation or concha bullosa that interfered with our procedure underwent preceding septoplasty or conchoplasty or both of them according to condition.

□□The procedure began with the creation of a mucoperiosteal flap. No 15 blade was used for incision, The superior margin of the flap is 5 mm posterior to the insertion of the middle turbinate and 10 mm above the axilla. The inferior limit of the flap is 10 mm anterior to the uncinate and just at the superior margin of the inferior turbinate.

□□□□Freer elevator was used to elevate the flap over the frontal process of the maxilla and pushed back over the middle turbinate.

□□The frontal process of the maxilla covering the anterior portion of the lacrimal sac was removed with a forward-biting rongeur (4-mm Hajek-Koeffler punch), also chiselling was done in some cases, the removal of the bone as much as possible to allow maximum exposure of the lacrimal sac then, the round knife was used to remove the lacrimal bone from the
posterior portion of the lacrimal sac. . Full exposure of lacrimal sac was checked by finger pressure over medial canthus.

□□Dilatation and probing of the lower lacrimal canaliculus were done with Bowman probe. The

easiness and smoothness of passage of the probe through the canaliculus down to the lacrimal sac was tested. Confirming that the probe was in the sac and not stuck in the common canaliculus by watching intranasal pinpoint medial tenting of the sac. After that, a sickle knife was used to open the sac vertically from top to bottom.

□□A ball probe was placed through the medial sac wall incision to ensure the adequacy of bone removal.

□□The posterior flap was released at its superior and inferior margins with a scissor, and the anterior flap was released with a lacrimal spear

sickle knife laid open without tension. The lateral nasal wall flap elevated at the beginning of the

case was trimmed to accommodate the opened lacrimal sac. The square segment was removed from the anterior portion of the flap to accommodate the size of the opened sac.

The decision for not stenting was made, when there is a smooth and easy passage of the probe through the lacrimal canaliculus into the sac, while dilating or probing and, when the sac opening and marsupialization is sufficient.

Small pieces of gel foam were put to support the flap and keep the marsupialization

pack was inserted lightly into the nose for 24 hours.

Follow up

Patients were admitted to the ward over the night, Injectable antibiotic (ceftriaxone vial)1g single dose was received and analgesia (paracetamol vial) 1g twice, the pack was removed next morning and patients were discharged home on an oral antibiotic(cefixime) for 5 days, paracetamol tab

Norfloxacin eye drops for 7-10 days, nasal wash(normal saline) and local steroid (betamethasone) nasal drops or sprays for 3 weeks. The steroid nasal drops aimed to reduce the likelihood of granulation tissue formation.

Patients were seen after one week for cleaning the nasal cavity from blood clots, crusts and remnants of gel foam, second look was after 2 weeks also for cleaning and endoscopic debridement, and to check the patency of neo-ostium by saline irrigation.

The follow up continued monthly for the next 3 months, the release of adhesions and management of the granulation tissue at the rhinostoma was done by cauterization under local anaesthesia

RESULTS

Age

Eighteen patients were operated on, the mean age was 34.83± 9.78 years, the minimum age was 12 years and the maximum was 53years. The distribution of age group revealed that two patient(11.11%) aged 0-20 years , four patients (22.22%) aged 21-30 years , seven patients (38.89%) aged 30-40 years and five patients (27.78%) aged > 40 years.

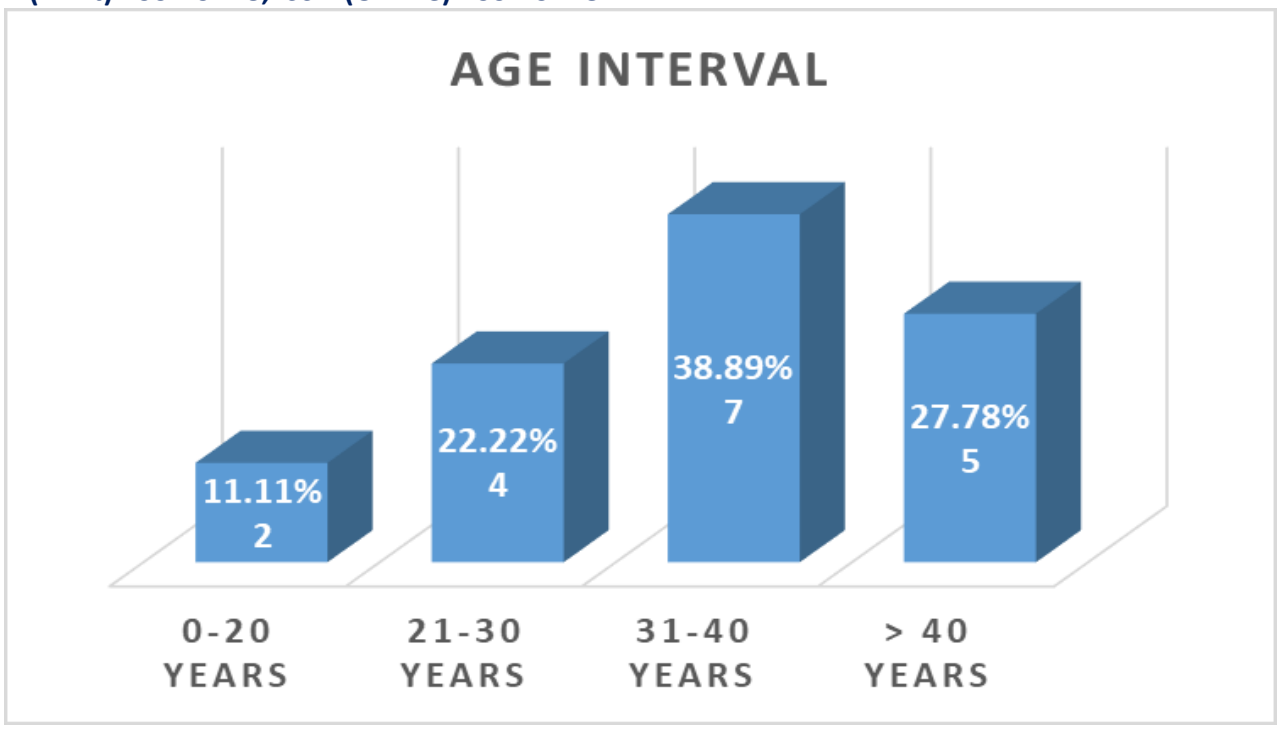

Figure 3.1 Distribution of the patients according to age

Gender

Fifteen (83.33%) of patients were females and three (16.67%) of patients were males.

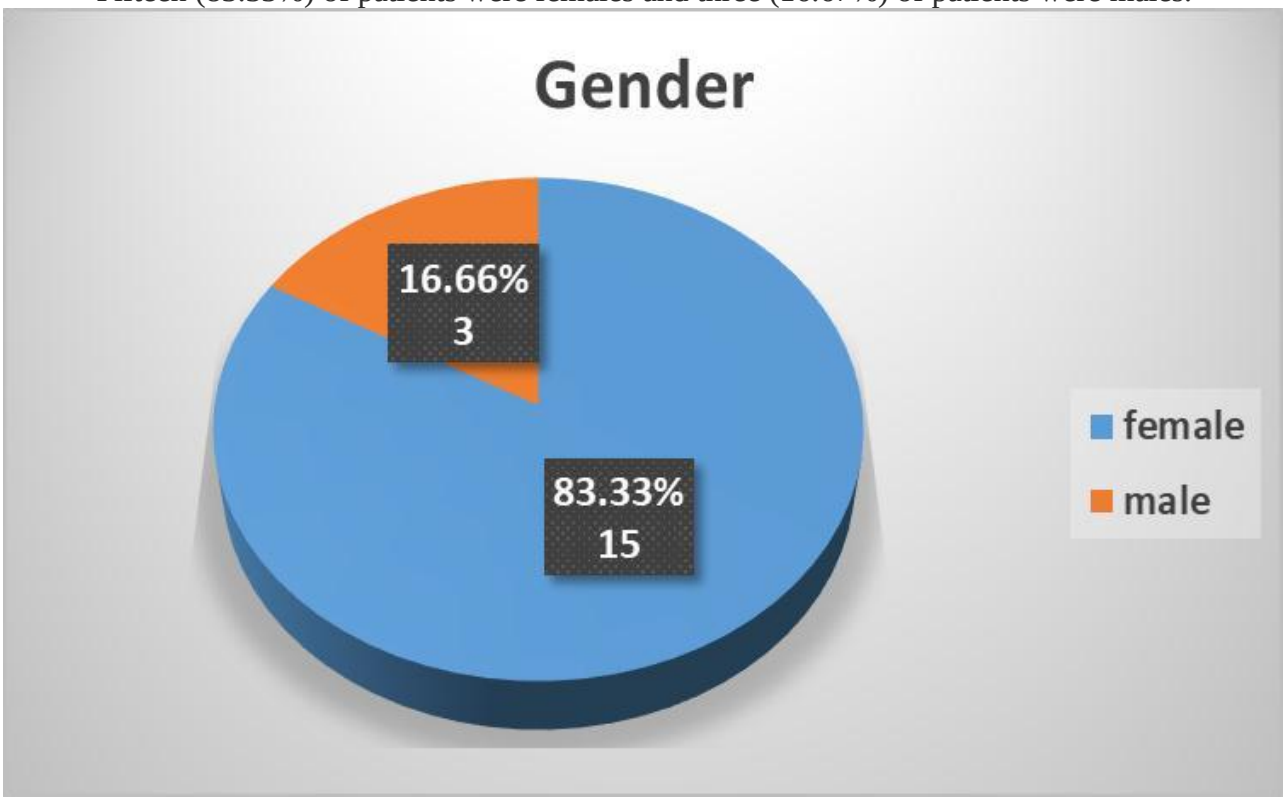

Figure 3.2 Distribution of the patients according to gender

Side

Ten cases (55.56%) were right side and eight of them(44.44%) were left side.

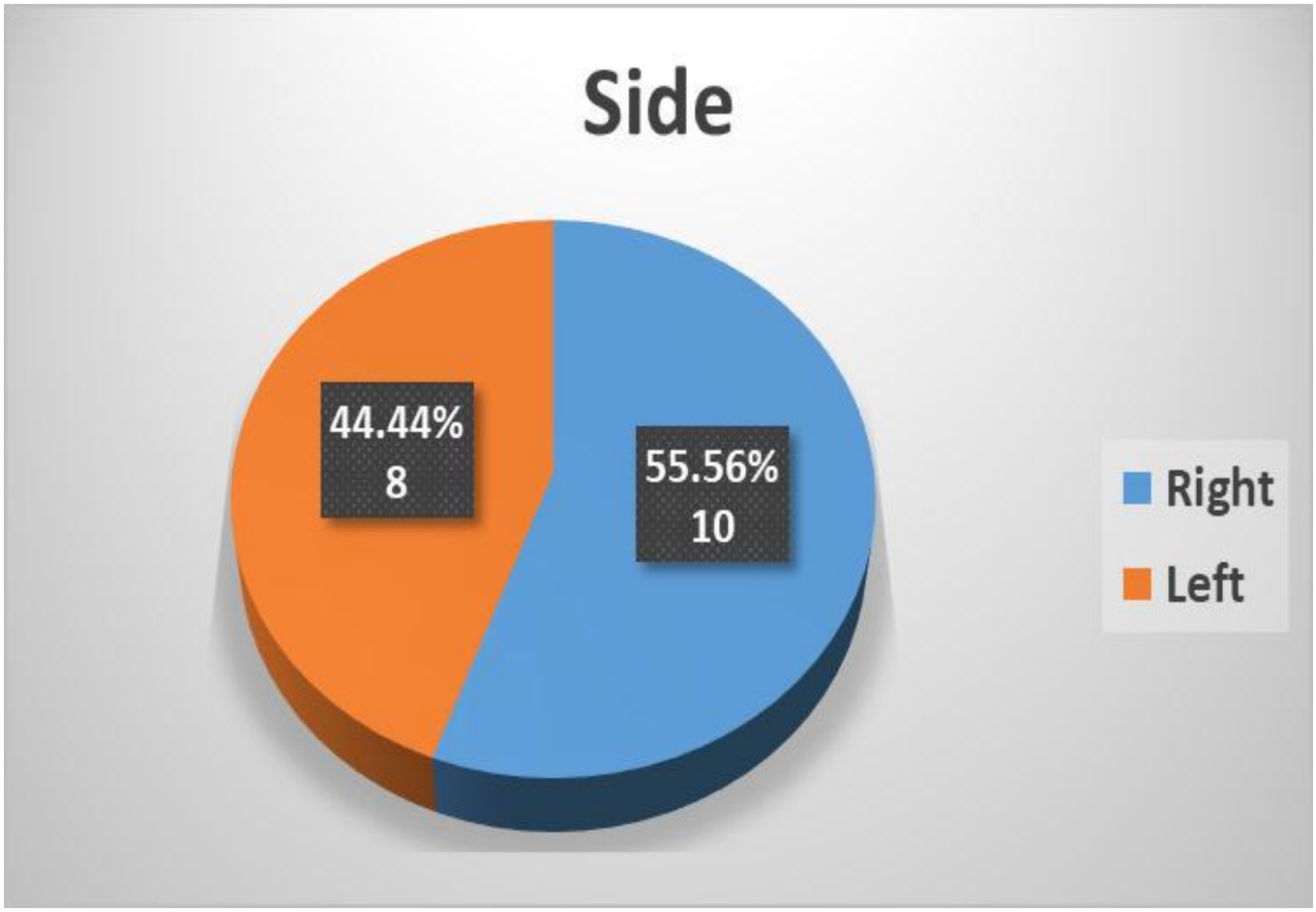

Figure 3.3 Distribution of the patients according to the affected side

Presenting symptoms

All patients presented with epiphora, seventeen(94.44%) of them were presented with medial canthal discharge.

Medial canthal swelling was identified in fourteen patients (77.78%). The mean duration of symptoms was 8.72 months, ranging from 5..5 to 14 months.

Nasal symptoms and trauma

Nasal obstruction has complained from 8 patients (44.44%), rhinorrhea was in 2 patients (11.11%), one patient(1.56%) had a history of face trauma(nasal bone fracture) and non of the patients had previous surgery.

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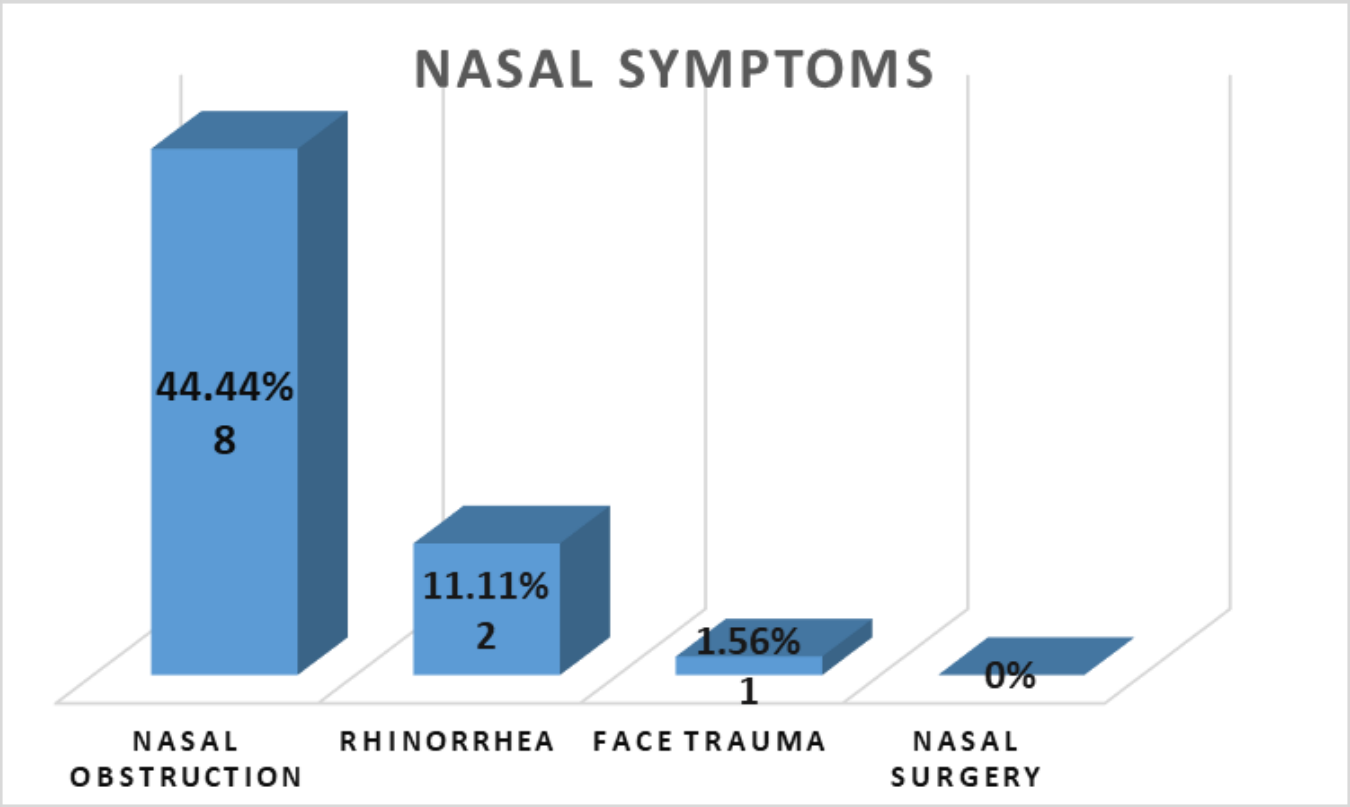

Figure 3.4 Percentages of nasal symptoms and previous trauma

Associated surgery

Five patients (27.78%) required septoplasty and two of them (11.11%) required conchoplasty to facilitate the endoscopic surgery. One patient(5.55%) underwent to release of adhesion between the lateral nasal wall and septum.

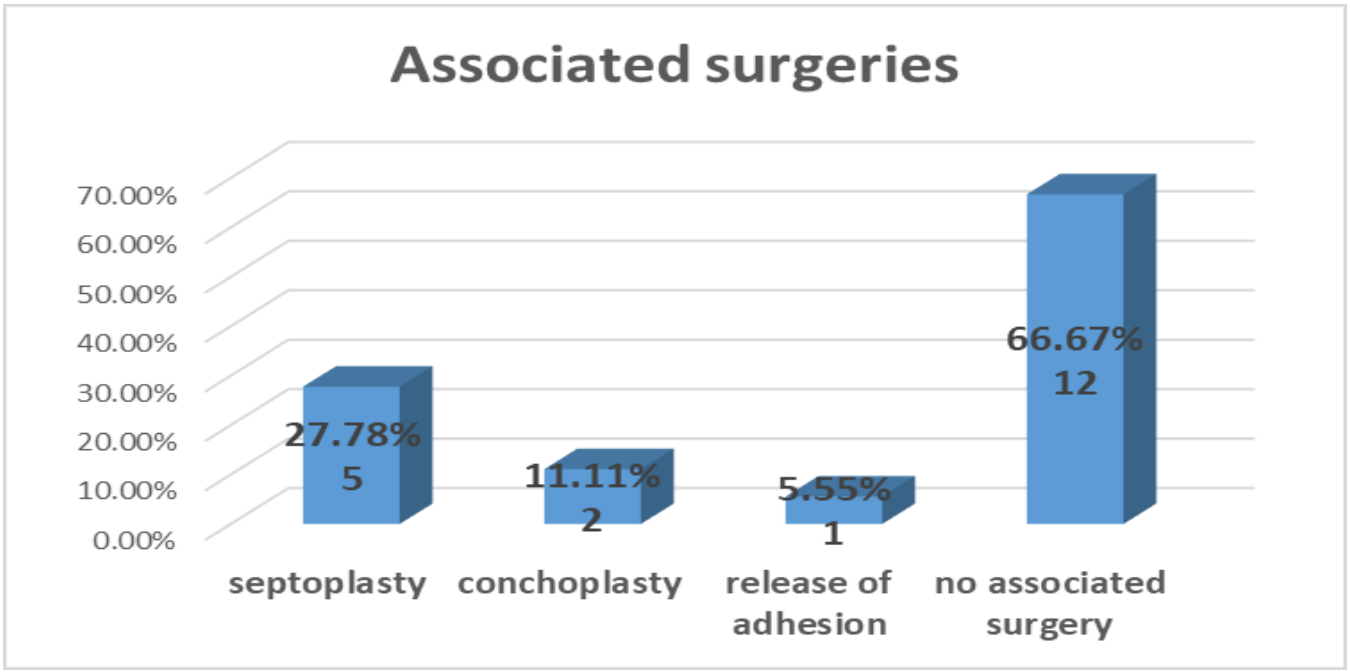

Figure 3.5 Proportion of patients according to associated nasal surgery

Duration of surgery

The duration for the operative procedure ranged between 20-60 minutes with a mean of 39.99 ±8.32 minutes.

Complications

Intraoperative complications like orbital fat exposure, orbital hematoma and haemorrhage were not encountered. Regarding the postoperative complications, two patients developed synechia between the rhinostoma and middle turbinate after 3-6 weeks of the follow-up, one patient developed granuloma after 4 weeks and one patient had a recurrence of obstruction 12 weeks later

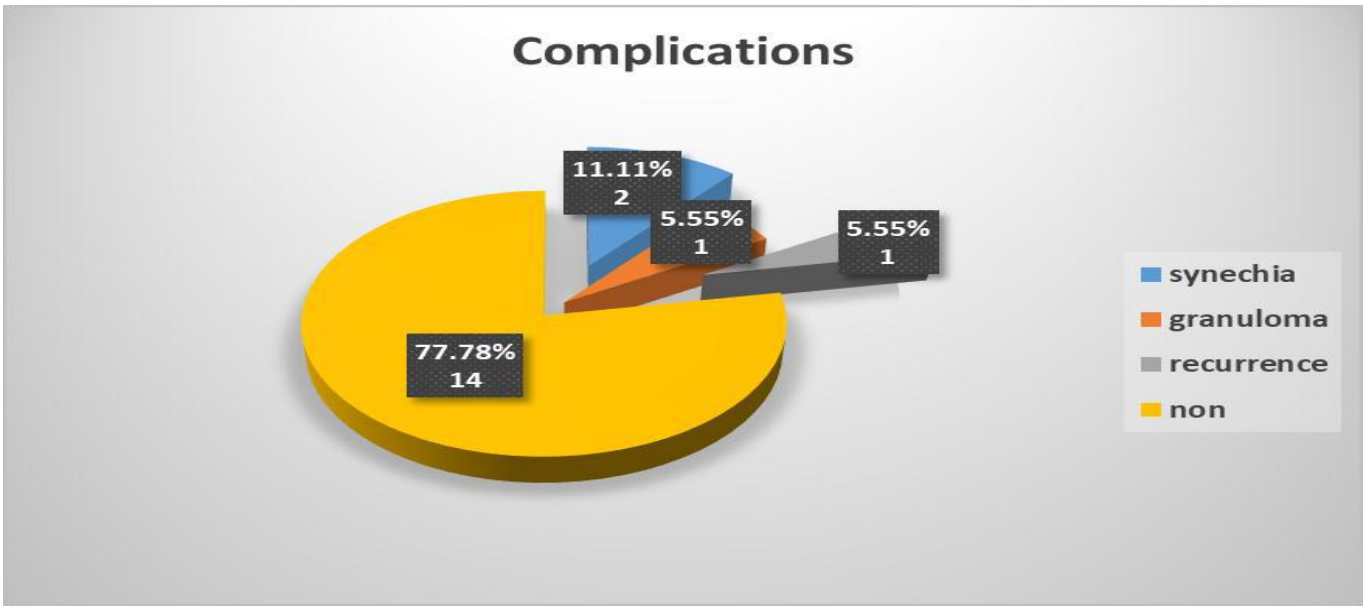

Figure 3.6 Percentages of postoperative complications

Success

During the follow-up period, the patients were assessed subjectively by satisfying resolution of symptoms and objectively by assessment of the neo-ostium with nasendoscopy, and nasolacrimal system irrigation

Figure 3.7 Percentage of success after surgery

DISCUSSION

Age

In our study the mean age was 34.83± 9.78 years and the age ranged from 12 years to 53 years, a maximum frequency was seen in the 4th and 5th decades of life mostly related to ageing, a similar range is reported in a study conducted by Mohit Goel et al(5), age ranged from 15 to 60 years and highest incidence rates were the third, fourth and fifth decades. Also compatible with Basil M. N. Saeed et al (6) that found the mean age was 31 years and the range from 23 to 64 years.

In S Harvinder et al(7); the mean age was 45.54 years and the range from 18 -74 years.

Shiv Kumar Raghuwanshi et al (8) mean age 54.3 years, range 6–65 years

Sex

The current study included 18 patients, 15 of them were females(83.33%) and 3 were males(16.67%) so it correlated with studies (5-7) that have demonstrated the marked predilection for females. This might reflect that nasolacrimal obstruction is more likely to occur among females explained by the narrower lumen of the bony nasolacrimal canal. It is also possible that endocrine factors may be playing a role in the aetiology (5)

Side

The most common operated side was right in our study 10 (55.56%) while the left side was 8 (44.44%), this goes with :

Basil M. N. Saeed et al (6), right side 20 (57.14%) and left side 15 (42.86%)

Shiu Ting Mak et al (9) Left eye: right eye ratio was 1:1.3

But different from S Harvinder et al(7) in which 13 are left side, 7 are right and 2 are bilateral.

Presenting symptoms

All patients in our study presented with epiphora and the majority of them (94.4%) had medial canthal discharge. A high percentage of them (77.7%) presented with medial canthal swelling, these presentations are commonly reported in Jae Wook Yang et al (10) and Basil M. N. Saeed et al (11).

Associated surgeries

During the procedure, septoplasty was done in 5(27.7 %) of patients and conchoplasty for pneumatised middle turbinate in 2(11.11%) patients to facilitate the surgery and to relieve the symptoms of nasal obstruction in complaining patients that support the advantage of endoscopic intranasal approach for DCR. In Basil M. N. Saeed et al (6) (37.14%) of patients had septal surgery and 27.2% of patients in S Harvinder et al(7). In Sukhada Mishra et al (12): (27.3%) required septoplasty for correction of deviated nasal septum and 11 patients (13.1%) required conchoplasty while in Sajad Al-Helo et al(13) one case underwent septoplasty out of 32 patients.

Duration of surgery

The average time consumed for the operative procedure in our study was 39.99 ± 8.23 minutes ranged between 22 and 59 min. In the majority of cases, 77.78% of the time was within 20-45min. Our time was close to B PITTORE et al (14), The mean duration of the procedure was 40 minutes and higher than the time consumed in Shiv Kumar Raghuwanshi et al (8) in which the mean operative time was 30 minutes (range 11 minutes to 45 minutes). The difference in operative time may be related to surgeon experience and facilities of the surgical center.

Complications

Regarding the complications, no major intraoperative complications like orbital hematoma, orbital fat prolapse, cerebrospinal fluid leak, primary or secondary haemorrhage were documented in our study. Synechiae between the middle turbinate and the rhinostoma was identified in 2 patients in different periods, one patient developed it after 3 weeks and the second after 6 weeks of follow up period. This synechia was due to granulation tissue and it was released to prevent any adhesion and subsequent complications. One patient developed granuloma at the site of rhinostoma after 4 weeks of not interfering with the stoma. One case had a recurrence of obstruction after 12 weeks. This case had revision surgery after 4 months using lacrimal stent

In many studies (6-8-9) the incidence of complications was low with some cases with synechiae and granulations tissue without clinical significance, major complications also were not documented.

While in S Harvinder et al(7) Two patients of twenty-two had complications, one orbital fat exposure and the other secondary haemorrhage.

Success

The success rate in our study was about 94.44%, 17 cases out of 18 had a good outcome, subjective improvement of symptoms and objective detection of ostium patency was observed. A failure was reported only in one patient because of distal stenosis that developed gradually after 3 months, this was due to inadequate exposure of the sac and other factors like an infection. The size of the lacrimal ostium created during endoscopic DCR with wide exposure of the sac is paramount to the success of this surgery. Another key factor is the need

for mucosal preservation. The nasal mucosa is preserved so that it can be fashioned to the lacrimal flaps created to achieve mucosal apposition of the marsupialized sac and the nasal mucosa. The success rate also exceeded 90% in SONKHYA N et al (15) and other studies (6-7-14),.

CONCLUSION AND RECOMMENDATION

Conclusion

□□The endonasal endoscopic DCR is a successful procedure with low serious complications to relieve a distal lacrimal drainage system obstruction in short term follow up period.

□□A good operative procedure of adequate sac exposure and good marsupialization is needed for success and avoidance of complications

Recommendation

□□Encouraging and developing the experiences of surgeons in this operation will increase the success rates.

□□EEDCR without stent should be considered as a first surgical choice for the nasolacrimal duct obstruction leaving the stent for revision cases or failure of surgery.

□□Further studies with a larger sample size and longer follow up period are suggested

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نتائج عملية مفاغرة كيس الدمع من الأنف ناضوريا بدون أستخدام دعامة

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الخلاصة/
خلفية الدراسة:مفاغرة كيس الدمع هي عملية لتصنيع قناة مجرى الدمع وتستخدم لعلاج سيلان الدمع الناتج عن انسداد القناة الدمعية.
وتعتبر مفاغرة كيس الدمع من الأنف ناضوريا وبدون استخدام دعامة وتقييم نتائج الطريقة الجراحية المرضى والطرائق:دراسة استطلاعية لثمانية عشر مريضا تمت احالتهم من وحدة العيون لاجراء مفاغرة كيس الدمع بعد ان تم تشخيصهم من طبيب العيون على انها انسداد بعيد في القناة الانفية الدمعية او الكيس الانفي الدمعي.تم جمع المعلومات اللازمة بعد ذلك تم اجراء عملية مفاغرة كيس الدمع للمرضى وبدون استخدام دعامة في مستشفى مدينة الأمامين الكاظمين الطبية ومستشفى القمة الأهلي في الفترة من كانون الثاني 2019 الى كانون الثاني 2020 وتمت متابعة المرضى لمدة ثلاثة أشهر بعد العملية
النتائج:كان معدل عمر المرضى 34.83 سنة وتراوح من 12 الى 53 سنــة كان الأناث 15 والذكـــــور 3 كانت 10 عمليات للعين اليمنى و 8 لليسرى. جميع المرضى كانوا يعانون من سيلان الدمع. 17 منهم يعانون من تفريغ موقعي وسطحي و14 منهم يعانون من انتفاخ موقعي وسطي وكان متوسط مدة الاعراض 8.72 شهر.ارسل 4 مرضي لاجراء فحص المفراس الحلزوني للانف والجيوب الأنفية.أجري تعديل الحاجز الأنفي اثناء العملية ل5 مرضى،وتم اجراء تقليم جانبي للرف الأنفي الوسطي لأثنين منهم كان متوسط وقت العملية و39.9 دقيقة.
ظهور ورم حبيبي في مريض واحد بعدة أسابيع والتصاق بين الرف الأنفي الوسطي وفتحة المفاغرة في مريضين بعد 3-6 أسابيع من العملية فشلت العملية في مريض واحد فقط. نسبة النجــاح كانت 94.44%.
الاستنتاجات:عملية مفاغرة كيس الدمع من الانف ناضوريا جراحة ناجحة لعلاج انسداد قناة الدمع البعيد مع وجود نسب ضئيلة من المضاعفات العملية تحتاج الى عمل جراحي يتضمن تحرير عظمي واسع للجانب الخارجي من التجويف الأنفي ومتابعة ناضورية جيدة بعد العملية
كلمات استدلالية: مفاغرة كيس الدمع،ناضوريا،سيلان الدمع