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Original Research Article

Lacrimal trephine vs punch in external dacryocystorhinostomy: The surgeon's choice

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ABSTRACT

Aim: A prospective comparative study to describe the surgical outcomes of external DCR using Kerrisons punch vs Lacrimal trephine.
Materials and Methods: A prospective comparative study involving 56 consecutive patients of age group 30-70 years over a period of 3 years who were randomly divided into two Groups. Group 1(n=28) underwent external conventional DCR using kerrisons punch as against group 2 (n=28) where trephine was used for osteotomy.
Result: Procedure success rate among Kerrisons group was 92.85% (26) vs 89.28% (25) in lacrimal Trephine group which is found to be comparable. Overall success rate was 91.07% (51). Need of general anaesthesia, more bleeding, longer operative time in group 1versus higher chance of nasal mucosal damage in group 2 was noticed. Patients were followed up for six months after surgery.
Conclusion: Kerrison punch showed almost comparable success rate to lacrimal trephine group but higher operating time for external DCR. Lacrimal trephine is relatively easier to perform, requiring shorter duration at skilled hands.

1. Introduction

For nasolacrimal duct obstruction and chronic dacryostenosis in the setting of patent canaliculi and a functional lacrimal pump, DCR surgery is the preferred choice. Two major approaches are utilized: external, via a transcutaneous incision and endonasal endoscopically guided.

Through the creation of a bony ostium, DCR procedure aims to create a bypass between the lacrimal sac and nasolacrimal duct which allows communication between the lacrimal sac and the nasal cavity. External dacryocystorhinostomy (DCR), as proposed by Ohm and by Dupuy-Dutemps and Bourguet in 1921; still remains the most successful operation. Despite ease and decreased morbidity of endonasal DCR, external DCR is procedure of choice as it is more successful.

The earliest operation that would resemble a modern external DCR was attempted by Woolhouse in England in the 18^{th} century. He advocated extirpating the sac, perforating the lacrimal bone and placing a drain made of gold, lead or silver. By the early 20th century others attempted to open the sac without removing most of it. Various stenting materials were used to maintain the patency of the ostium. These included leaving a thread, placing a gold cannula, placing a ball of catgut suture and placing gauze wicks which were periodically exchanged. Recreating a duct by placing a skin graft wrapped around a piece of wax had also been tried. Some authors reported success rates of 70–85% (Chandler, 1936) .

Toti[1] in 1904 published what is considered the first modern description of external DCR (Chandler, 1936; Carter and Nerad, 1996; Girgis, 1968; Pico, 1971).

External DCR is the standard treatment of nasolacrimal duct obstruction with success rates consistently above 90%. Alternative pathway of DCR by intranasal pathway was

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described by Caldwell in early as 1893.[2] It was modified by West in 1910.[3] Later on with the introduction of rigid nasal endoscopic approach.

The present study aims to compare the External DCR surgery by two sets of instruments (trephine vs drills) regarding the success rate, operative time, intra-operative and post-operative complications.

2. Materials and Methods

This is a prospective, comparative study involving 56 consecutive patients of PANDO in the age group 30-70 years over a period of 3 years who were randomly divided into two Groups. Group 1(n=28) underwent external conventional DCR using kerrisons punch as against group 2 (n=28) where trephine was used for osteotomy for primary acquired nasolacrimal duct obstruction.

All the cases of Acquired naso-lacrimal duct obstruction, Chronic dacryocystitis and patients in the age group of 4-60 years were included in the study.

Cases of canalicular / punctal obstruction and Secondary causes of nasolacrimal duct obstruction including infiltrative and neoplastic affection of lacrimal sac were excluded.

2.1. Surgical techniques

Surgical procedure of external dacryocystorhinostomy was performed under local anaesthesia using single point block. Ipsilateral nasal cavity was packed with gauze soaked in xylocaine jelly 2% and adrenaline 1 in 100000. J-shaped Curvilinear skin incision about 10-12 mm was given medial to the medial canthus (3-4 mm from medial canthus) above the medial canthal ligament avoiding the angular vein. Lacrimal crest was visualized and dis-insertion of medial palpebral ligament (MPL) was performed, periosteum elevated, the anterior lacrimal crest in the bone for lacrimal fossa were removed.

Osteotomy was created using two sets of instruments -

1. Kerrision punch/ rongeurs of different sizes (1.5mm, 2mm and 2.5mm) and
2. Lacrimal trephines (7.5 mm, 8mm. 8.5mm)

We compared the efficacy of the two sets of instruments for the surgical outcome of external DCR.

The surgical outcome was compared on following parameters (surgical time, intraoperative complications like haemorrhage, loss of nasal flap, laceration of nasal flap, lacrimal sac flap loss, orbital injury, and post-op epiphora.

Cases were followed for 6 months of post-operative period.

3. Result

This three years prospective comparative study comprised of 56 consecutive study who were randomnly divided into two groups. A total of 38 females and 18 males underwent conventional external dacryocystorhinostomy. The proportion of patients undergoing DCR with Kerrison's punch (group 1) and lacrimal trephine (group 2) has been shown below in the table.

Table 1:

	Instrument set used	
	Group 1 (kerrisons punch) n=28	**Group 2 (lacrimal trephine) n=28**
Mean Age (years)		
Gender	Female- 18 Male- 10	Female-20 Male- 8
Lateralisation	Right- 16 Left- 12	Right- 17 Left- 11

Table 2:

	Group 1	**Group 2**
Mean operative time	49.25 minutes	32.50 minutes
Success rate	92.85% (n=26)	89.28% (n=25)
Overall success rate- 91.07% (n=51)		
Chi square test- p=0.197 (not significant)		

Table 3: Complications encountered during intra-operative and post-operative period is tabulated below in the two groups

Intraoperative Complications		
	Group 1	**Group 2**
Excess intra-op bleeding	4	3
Lacrimal sac flap loss	1	1
Loss of nasal mucosa	-	2
Sub-cutaneous emphysema	1	-
Orbital injury	-	-
CSF Rhinorrhoea	-	-
Post-Operative Complications		
Reactionary hemorrhage	3	1
Wound infection	1	4

Complication encountered during our study were intraoperative (excess bleeding, lacrimal sac flap loss, loss of nasal mucosa) and post-operative (reactionary haemorrhage and wound infection).

4. Discussion

One of the crucial step during any DCR surgery is osteotomy and creation of bony window but larger bony stoma does not provide any added advantage, rather may complicate the procedure. Minimization of intra-operative tissue damage and postoperative scarring also account for successful surgery.[4,5] The creation of the bony window can be achieved by many technical variations including Chisel and hammer, kerrison and Citelli'bone punch,

Fig. 1: Kerrison's punch v/s lacrimal trephine

lacrimal trephine, and drills but comparison between the se instruments and surgical outcome is still nonconclusive.[6]

Our study showed almost comparable success rate among two groups (p= not significant) though the mean operative time was comparatively higher in the punch group with difficult surgical technique requiring more of learning curve compared to lacrimal trephine group, which is relatively easy to learn and perform at skilled hands with minimal to no complications intra-operatively.

Need of general anaesthesia, more bleeding, longer operative time in group 1versus higher chance of nasal mucosal damage in group 2 was noticed

In contrast, Study conducted by Kumar[7] et al in 2016 in Bihar showed that Kerrison punch group having marginally significant success rate compared to Lacrimal Trephine group but having more operating time.

5. Conclusion

Kerrison punch showed almost comparable success rate to lacrimal trephine group but higher operating time for external DCR. Lacrimal trephine is relatively easier to perform, requiring shorter duration at skilled hands.

6. Source of funding

None.

7. Conflict of interest

None.

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