Bacteriological profile of Chronic Dacryocystitis in a tertiary hospital in Nepal

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ABSTRACT

Introduction: Chronic dacryocystitis is a common cause of epiphora resulting from nasolacrimal duct obstruction. We planned to study bacteriological profile of chronic dacryocystitis in a tertiary hospital in Kathmandu, Nepal.

Methods: This is a prospective study conducted patients with CDC who underwent external dacryocystorhinostomy in Shree Birendra Hospital from September 2018 to September 2019. A structured proforma was used to record all necessary information of all patients.

Results: A total of 90 eyes were included, 56 females and 34 males. The commonest organism isolated from conjunctiva was Staphylococcus Epidermidis whereas Staphylococcus Aureus and Staphylococcus Epidermidis were the commonest isolates from the lacrimal sac. All organism isolated from conjunctiva showed highest percentage of sensitivity to ceftriaxone and least sensitivity to ampicillin whereas Staphylococcus aureus and Staphylococcus Epidermidis from lacrimal sac specimen showed highest sensitivity to ceftriaxone and least sensitivity was seen with gentamycin. External dacryocystorhinostomy with silicon tube resulted into a success rate of 90%.

Conclusions: The knowledge of common organism causing chronic dacryocystitis helps in selecting antimicrobial prophylaxis in lacrimal drainage surgery. Furthermore, it also helps in determining the role of commensal flora in pathogenesis of CDC. Ceftriaxone is the most sensitive drug for the microbials of chronic dacryocystitis. External dacryocystorhinostomy is cheaper, technically easier surgical procedure with good success rate.

Key words: bacteriology; dacryocystorhinostomy; dacryocystitis; epiphora; nasolacrimal duct

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INTRODUCTION

Dacryocystitis represents an acute or chronic inflammation of the lacrimal sac,[1] which usually occurs due to obstruction of the nasolacrimal duct leading to stagnation of tears.[2] The obstruction may be an idiopathic inflammatory stenosis (Primary acquired nasolacrimal duct obstruction)[3] or may be secondary to trauma, infection, inflammation, neoplasm, or mechanical obstruction (Secondary acquired lacrimal drainage obstruction).[4]

It has its typical signs and symptoms. Its progression is sometimes slow and there are chances to reoccur. Acute dacryocystitis is also associated with sequele such as a recurrent conjunctivitis, draining fistula, abscesses, orbital cellulitis and even the endophthalmitis when untreated.[5] Clinicopathologic study suggests that compression of the lumen of nasolacrimal duct by inflammatory infiltrates and edema precedes development of chronic dacryocystitis (CDC). Acquired nasolacrimal duct stenosis in middle aged or old women is due to gradual facial bone thickening that narrows the canal that passes the nasolacrimal duct.[6]

It occurs in all age groups, the mean age group between 60 - 70 years.[7,8] Dacryocystorhinostomy (DCR) is the surgery of choice for the treatment of epiphora secondary to NLDO. Surgery creates an anastomosis between lacrimal sac and the ipsilateral nasal cavity by creating an osteotomy of appropriate size and the removal of the floor of lacrimal fossa[9] with 90% success rate of External DCR.[10]

METHODS

This is a prospective interventional study done in Shree Birendra Hospital, Chhauni, Kathmandu, Nepal. A total of 90 patients were involved. All patients diagnosed with CDC from 30 to 55 years who were willing for external DCR were included. CDC patients less than 30 years or more than 55 years; those not willing for surgery; patients with nasal pathology and malignancy and those with uncontrolled hypertension and diabetes mellitus were excluded from the study. All cases were ensured free from antibiotics at least one week prior to sample collection and were operated between September 2018 to September 2019. Convenience sampling method was used for sample collection from conjunctiva and the lacrimal sac. Ethical clearance was obtained from institutional review board of Nepalese Army Institute of Medical Science (NAIHS). Written, informed consent was taken in all cases. Thorough preoperative examination was done including anterior, posterior segment examination and the lacrimal drainage system. Probing and syringing were done to locate the site of obstruction. Routine blood investigations and ENT consultation was done to rule out contraindications for surgery. We studied the demographic variables, bacterial profile from conjunctiva and lacrimal sac along with complications and patency of the lacrimal drainage system. A standard surgical technique of external DCR was used in all patients by two experienced surgeons under local anesthesia. Conjuctival swab was taken from the inferior fornix retracting the lower lid just to avoid lid margin. Nasal mucosa was anesthetized and vasoconstricted by using nasal pack saturated with 1 ml of oxymetazoline with local anesthetic mixture. An incision approximately 1 cm in length was made over the anterior lacrimal crest, starting 2 mm above the medial canthal tendon. Orbicularis muscle fibers were separated by blunt dissection, periosteum overlying the anterior lacrimal crest were exposed and lamina papyracea was broken. The osteotomy size 15 mm by 15 mm in size was centered over the lacrimal sac fossa using the kerrison punch. The lacrimal sac was tented by bowmans probe after punctum dilatation. The sac was opened in a horizontal fashion to form anterior and posterior flap. One sample from the conjunctiva and lacrimal sac were taken to microbiology laboratory in Shree Birendra Hospital for culture in blood agar, chocolate agar, Mac Conkey agar and Thioglycolate broth and the second sample was used for gram staining. Organisms growth was identified using standard biochemical reactions and antibiotic sensitivity test by Kirby Bauer disc diffusion method as per CLSI guidelines. Nasal mucosa was incised horizontally to make anterior and posterior flap. Posterior flaps of the sac and nasal mucosa were removed. Silicon nasolacrimal tube was intubated in the lacrimal system and knots were made. The posterior nasal and lacrimal sac were anastomosed. Orbicularis muscle and skin was closed in separate layer. Syringing was performed to flush and to be sure of the patency. Nasal packing was done after surgery.

Complete bed rest in propped up position was advised for 24 hours. Postoperative management included both topical and oral antibiotics. The skin sutures were removed in a week. The silicon tube was removed after three months. Syringing was done in subsequent follow up in 1st week, 6th week and 12th week.

Disappearance of epiphora and lacrimal patency up to three months after surgery were taken as a parameter to define surgical success. For statistical analysis SPSS version 20.0 software was used.

RESULTS

A total of 90 patients underwent external DCR. Among them 56 (62.2%) were females whereas 34 (37.8%) were males. The commonest age group was between 36 to 40 years. The left eye 48 (53%) were involved more common than the right 32 (35.6%). Bilateral involvement was seen in 10 (11.1%). The disease was more noted in farmers 56 (62.2%), home makers 20 (22.2%) and job holders 14 (15.6%). Seven different species of bacteria were isolated from conjunctiva of 76 swabs (84.4%) and the commonest organism isolated was staphylococcus epidermidis 34 (37.4%) followed by Staphylococcus Aureus 14 (15.6%), Haemophillius Influenzae eight (8.9%), Escheria coli six (6.7%), Pseudomonas six (6.7%), Klebsiella four (4.4%) and Streptococcous Pneumonia four (4.4%).

Similarly, from the lacrimal sac four different species from 80 swabs (88.9%) were isolated. Staphylococcus Aureus and Staphylococcus Epidermidis both accounted for 32 (35.6%) and Streptococcous pneumonia and Pseudomonas each accounted eight (8.9%). No two organisms were isolated from a single swab. Organisms isolated from the conjunctiva and the lacrimal sac are given in Table 1. All organisms isolated from conjunctiva showed highest percentage of sensitivity to ceftriaxone and least sensitivity to ampicillin whereas Staphylococcus aureus and Staphylococcus epidermidis from lacrimal sac specimen showed highest sensitivity to ceftriaxone and least sensitivity was seen with gentamycin. (Fig 1, 2)

Minor complications noted intraoperatively were mucosal tear in 25 (27.8%) and bleeding in 16 (17.8%). Post-operative bleeding was seen in 10 (11.1%) and hypertrophic scar was seen in six (6.7%). Syringing after three months showed patency in 81 (90%) and non-patent in nine (10%).

DISCUSSION

CDC is the commonest cause of epiphora.[4] The normal flora of the eye acts as an opportunistic pathogen causing inflammation of the lacrimal sac due to obstruction of the nasolacrimal duct. CDC is more common in female population.[11-13]

Table 1. Organisms isolated from conjunctiva and lacrimal sac

Organism isolated	No of organisms isolated from conjunctiva (%)	No of organisms isolated from lacrimal sac(%)
Staphylococcus aureus	14 (15.6%)	32 (35.6%)
Staphylococcus Epidermidis	34 (37.8%)	32 (35.6%)
Haemophillius influenzae	8 (8.9%)	0
Escheria coli	6 (6.7%)	0
Pseudomonas	6 (6.7%)	8 (8.9%)
Klebsiella	4 (4.4%)	0
Streptococcous pneumonae	4 (4.4%)	8 (8.9%)
No organisms	14 (15.6%)	10 (11.11%)
Total no of organisms isolated	76 (84.4%)	80 (88.9%)

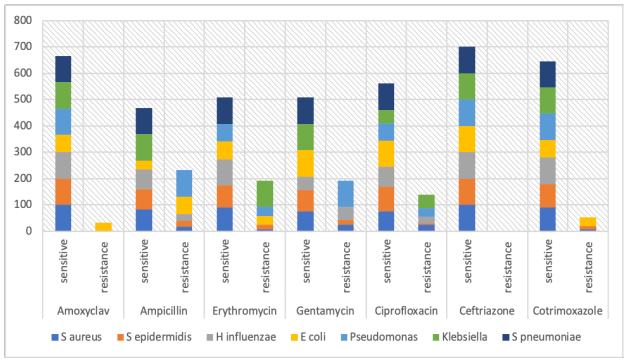

Figure 1. Bar diagram showing the antibiotic sensitivity pattern for the organisms isolated from the conjunctiva.

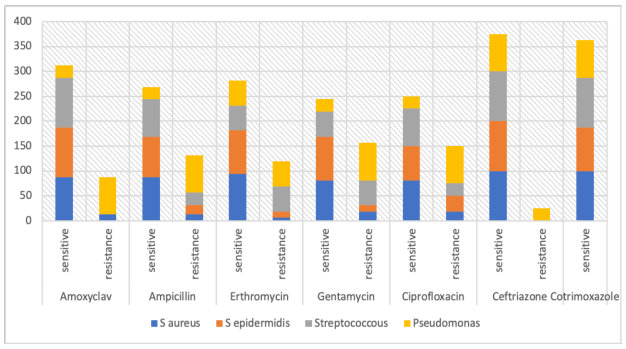

Figure 2. Bar diagram showing the antibiotic sensitivity pattern for the organisms isolated from the lacrimal sac.

This tendency was also seen in this study. The disease is more predominant in lower socio-economic group and in patients with poor personal hygiene as the

source of infection is mainly due to infection from the conjunctiva, nasal cavity or paranasal sinus or deviated nasal septum.[16] We too found the incidence more in patients with poor hygiene. In our study, 48 (53.3%) had left side involvement, 32 (35.6%) had right side involvement and 10 (11.1%) had both sides involvement. Unilateral involvement especially the left side is more common because of the narrow bony canal and acute angulation between the nasolacrimal duct and the lacrimal fossa on the left side.[14-17]

Different studies have demonstrated growth of gram positive bacteria more common than those of gram negative.[18,19] Staphylococcus aureus was the commonest islolate from the lacrimal sac seen in the study by Mandal et al[20] and Saniju et al.[21] A study by Prakash[11] et al. showed Staphylococcus Aureus (Gram positive isolate) and Pseudomonas (Gram negative isolate) as a common isolate. Our study also showed similarities to some extent as Staphylococcus Epidermidis and Staphylococcus Aureus were the commonest isolates from the conjunctiva and the lacrimal sac.

The organisms isolated from the conjunctiva and the lacrimal sac were compared and were found to be identical to some extent probably due to nasal mucosa is contiguous with the lacrimal apparatus and the conjunctiva.[22] Bharati et al.[15] showed variation in bacterial isolates and the antibiotic susceptibility. Briscoe et al.[23] reported a higher incidence of gram-negative organisms, mainly Pseudomonas with high resistance to the common antibiotics. Sharma et al[24] also reported gram positive organisms predominated over the gram negative where Staphylococcus aureus as the most common isolates. The gram positive bacteria outnumbered gram negative bacteria where vancomycin, amikacin, third generation cephalosporins and amoxyclav were the most sensitive antibiotics in another study.[22] In our study, organisms isolated from conjunctiva and lacrimal sac showed highest sensitivity to ceftriaxone whereas least sensitivity was seen with ampicillin and gentamycin. A cross sectional study[14] showed coagulase negative Staphylococcus aureus were the most common bacteria and all gram positive isolates were 100% sensitive to chloramphenicol and were least sensitive to tobramycin, but gram negative isolates were equally sensitive to chloramphenicol and nalidixic acid.

External DCR is the common surgical procedure done for most cases of naolacrimal duct obstruction which is described by Toti in 1904.[25] It has wide surgical view and does not require special skill. Various modifications have been practiced along with silicon stents augmentation to enhance the success rate of the surgery. The success rate of external DCR with siliastic tube was 94.1% in study done by Duwal et al.[26] Our study also showed result similar to those done in various parts of the world with success rate of 90% and no major intra operative and post-operative complications were noted.

Although, silicon stents have been used to augment external DCR but its placement is still controversial. The placement of the tube is felt as an economical burden by some authors. The success rate study conducted by Sainju et al[27] was 90% with intubation and 87% for DCR without intubation. Likewise, the success rate of the surgery without tube by Badhu et al[13] and Sharma et al[24] was 88.6% and 90.5% respectively. Silicon tube prevents the closure of the common cannalicular opening which is the commonest cause of failure. In another study[12] success rate at six months after surgery was 95% for DCR with intubation and 90% for DCR without intubation.

CONCLUSIONS

Knowledge about common microbials responsible for chronic dacryosystitis is important which helps in deciding the appropriate antibiotic coverage for ocular surgery. The commonest organism isolated from conjunctiva was Staphylococcus epidermidis whereas Staphylococcus aureus and Staphylococcus epidermidis were the commonest isolates from the lacrimal sac. Ceftriaxone is the most sensitive drug for the microbials of chronic dacryocystitis.

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