Etiology of lacrimal sac infections

Furkaan Majied Hamied
F. I.B. M; Ophth, I.C.O). Department of Surgery, college of Medicin, Al-Qdisiah University, Iraq.

الخلاصة: التهاب الكيس الدمعي مشكلة شائعة تعرض العين والمحجر الى خطورة التلوث وما يتبعها من التهاب محجر العين، الملتحمة او حتى القرنية لذلك فأنها مشكلة تهدد النظر.

المرضى و طرق البحث:

في مستشفى الديوانيه التعليمي في العيادة الخارجية لطب وجراحة العيون بعد التشخيص السريري لالتهاب الكيس الدمعي. تم اخذ اثنين و ستين عينة من محتويات الاكياس الدمعية الملتهبة لغرض اجراء الفحص البايولوجي عليها.منذ حزيران 2010 و حتى حزيران 2013.

النتائج والاستنتاجات:

78% من المرض كانت نتائجهم ايجابية والباقي سلبية. لم تشخص اي حالة التهاب بالفطريات (*Staphylococcus Species*) اكثرالاصابات كانت بـ الكلورامفنكول افضل مضاد حيوي لالتهاب الكيس الدمعي. وهو مضاد متوفر وغير مكلف.

Abstract:

Background:

The lacrimal sac infection common problem exposing the eyeball and the orbit into the risk of contaminations and the subsequent; orbital cellulitis, conjunctivitis, and even keratitis so it is an indirect sight threatening disorder and should be studied promptly.

Patient and methods

At Al-Diwaniya Teaching hospital, at the outpatient clinic of ophthalmology; after clinical diagnosis of dacryocystitis, a sixty tow samples of lacrimal sac contents were studied microbiologically (12 bilateral and 38 unilateral) .From June 2010 to June 2013.

Results and conclusions:

78%(39) of cases were with positive results, while the remainder were negative. No fungal infection recommended. The most common pathogen is the *Staph* species, and the most effective antibiotic is the Chloramphenicol, which is available and non coasty drug could be used as a first line therapy.

Introduction:

Infection of the lacrimal sac is usually 2ndary to nasolacrimal duct obstruction, it may be acute or chronic.

In normal physiology tears secreted by the lacrimal gland 10 ml/24 hours, with blinking the palpebral aperture closes laterally then medially, the tears move from the marginal tear strip toward the medial lacrimal lake. Then by capillarity to the canaliculos, common canaliculus,then the lacrimal sac. Tears flow to the inferior meatus of the nose by gravity, lacrimal pump, and changes through the nose due to respiration. Valves within the lacrimal drainage system permit only one way flow of the tears.[1][2]

The embryonic anlage of the lacrimal excretory system begin as a cord in the area of the medial canthus and grows both laterally and downward.

Cavitation of these epithelial cords starts at the 50-mm stage, or 4 months of gestation, creating a lumen through the system. This lumen finally breaks through it's latest stage in the nasolacrimal duct to form a continuous opening just before birth.

The lower end of the lacrimal duct is the last to canalize, and in more than half of infants the last portion of this nasolacrimal stem may not completely finalize its patency at birth.

2-4% of patient with incomplete canalization are symptomatic. [1][3

Congenital anomalies of the lacrimal drainage system include;

Dacryostenosis**,** absence of valves, lacrimal sac diverticuli (either autosomal dominant or association of thalaseamia), punctual atrasia, canalicular atrasia.[4]

Differential Diagnosis of Dacryocystitis include; non infections amniotocele in aneonate, acute dcryocystic retention in adult, lacrimal sac neoplasms, congenital midline meningoencephalocele, dermoid

cysts, ethmoidal and frontoethmoidal mucoceles, skin cysts, inclusion cysts , and chronic unilateral conjunctivitis.[3][4]

Regarding the normal flora of the eye; the predominant organisms of the conjunctiva are diphtheroids *Corynebacterium* species, *S. epidermidis* and non heamolytic streptococci.

Neisseriae and gram-negative bacilli resembling *Haemophilus*, *Moraxella* species are also frequently present.

In the neonatal periods the most predominant bacteria are *Staph.* species *E.coli* and *Sterptococcus* , but in children the predominant bacteria are *Hemolytic stretococcus*, *Pneumococcus* and *Haemophilus*, and in adult more than 50 years the *Diphtherial* type increase and mixed type of normal microbial flora and decrease numbers of sterile conjunctive.

Sometimes the conjunctiva remain sterile, but most people have normal microbial flora.

No differences of the normal flora between sexes, and right and left eyes.[5]

Patients and methods:

At Al-Diwaniyah Teaching hospital, at the outpatient clinic of ophthalmology; after clinical diagnosis of dacryocystitis, from fifty patients sixty tow samples of lacrimal sac contents were studied (12 bilateral and 38 unilateral) .From June 2010 to June 2013.

Clinical diagnosis done by history taking, gross examination of the orbit, ocular indices , and slit lamp biomicroscopy. Immunocompromised patients (diabetic,on immunosupression therapy, pregnant women, and any type of anemias) were excluded. Patients on topical or systemic antibiotis, also excluded, the patient should be antibiotic free at least for three days also any patient on long term ocular therapy is excluded.

Sample of the lacrimal content was taken by swapping the Bowmans lacrimal probe prior to process of syringing and ,or probing. The the sample studied at the laboratory unit by culture and sensitivity test.

Chiseqare test was used to test the statistical significance between cases and different risk factors. P value of <0.05 was considered significant

Results

Regarding the epidemiological features of the included 50 patient's; 15 (30%) males, and 35 (70%) females ,the age of patients ranged between 6 months to 72 years, 37 (74%) are of urban area while 13 (26%) of rural area, one of the included cases was Down syndrome, and one with old mid facial injury.

In this study 38 (76%) patients, presented with unilateral involvement, while 12 (24%) had bilateral involvement . Three of unilateral involvement were with history of dacryocystorhinostomy of the other eye.

Regarding the course of the disease, 5 (10%) patients had acute disease, 27 (54%) chronic, and 18 (36%) recurrent .

The laboratory assessment detect bacterial in 39(78%) of cases while a 11 (22%) were with a no growth results

The relationship of the age group and laboratory results explained in table(No. 1).

LAB results Age	+ ve	- ve	Total
<1 yr.	6	2	8
1-20 yr.	17	3	20
21-40yr.	8	2	10
>41 yr.	8	4	12
Total	39	11	50

X^2=2.07
DF=3
P=0.50

Females number was 35 (70%) of cases, 28 (80%) of them were with positive results while males were 15 (30%) in number 11 (73.3%) of the were with positive results.

Of 39 (78%), the infectious microorganisms include most commonly *Staph* species 18 (46.1%); [*Staph aureus* 10 (25.7%) and *Staph epidermidis*, 8 (20.5%)] , *Corynebacterium diphiheriae* 7 (17.9%), table(2) *Streptococcus pneumonia* 7 (17.9%), *Pseudomonous aeruginosa* 4 (10.3%), and *Proteous* 2 (5.1%), while no fungal infection can be detected. Figure (2),

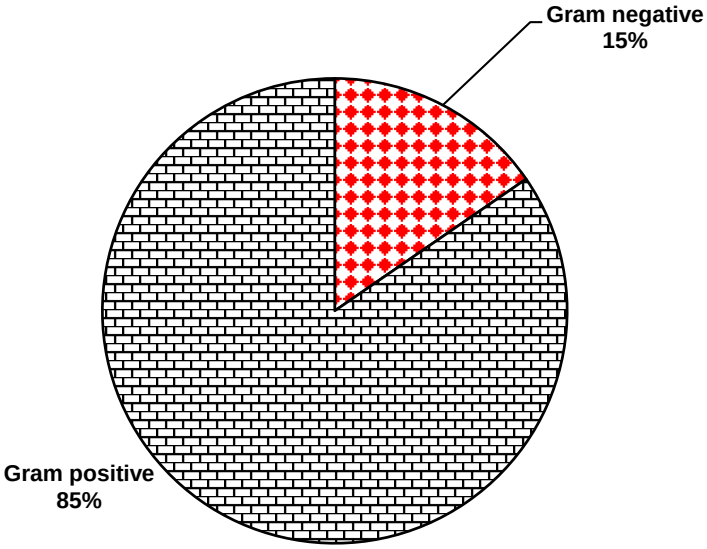

Table (2): Microorganisms species detected by culture method in 39 patients sample.

R	Causative	No.	%
1	***Staph. aureus***	10	(25.7)
2	Staph. epidermidis	8	(20.5)
3	Corynebactrium diphtheriae	8	(20.5)
4	Streptococcus	7	(17.9)
5	Pseudomonous aeruginosa	2	(5.1)
6	Proteous	2	(5.1)
7	**Total**	**39**	**(78)**

Regarding the course of the disease, the most common microorganism in acute disease is *Staphylococcus aureus* 3 (60%) of culture results, *Corynebactrium diphtheriae* 6 (22.2%) in chronic, and 5 (27.7%) for each of *Staphylococcus epidermidis* and *Streptococcus pneumonia* isolated in cases of recurrent disease.

The sensitivity pattern of the *Staphylococcus aureus* showed that, the most effective drug was chloramphincol 9 (90%), followed by norfloxacine 8 (80%), cefotaxime 8 (80%), and 2 (20%) for each of the gentamycine, ampicilline, tetracycline and erythromycine, as shown in table (3).

Staphylococcus epidermidis was mostly sensitive to norfloxacine 7 (87.5%) followed by cefotaxime 5 (62%), chloramphincol 3 (37.5%), gentamycine 3 (37.5%), ampicillin 1 (12.5%), tetracycline 1 (12.5%), and 1 (12.5) for erythromycine.

Chloramphincol was the most effective drug against *Corynebactrium diphtheriae* 6 (75%), followed by norftoxacin 4 (50%), ampicillin 3 (37.5%) and tetracycline 1 (12.5%), while resistant to erythromycine.

Streptococcus pneumoniae was mostly sensitive to norfolaxacine 6 (75%) followed by chloramphincol 3 (37.5%),

cefotaxime 2 (25%), ampicillin 2 (25%) and least sensitivity to erythromycine 1 (12.5%).

Pseudomonous aurogenosa was mostly susptable to chloramphenicol 3 (75%), norfloxacine 50% , cefotaxime 2 (50%).

All growths of ***Proteous*** **we**re susptable to cefotaxime**,** followed by chloramphenicol 1 (50%) and norfloxacine 1 (50%).

Table (3): Antibiotic sensitivity of microorganisms(M.O.) species isolated from 39 patients with dacryocystitis.

Sensitive M.O. / Antibiotics	*Staph. aureus*		*Staph. epidermidis*		*Corynibactrim diphth*		*Streptococcus pnemonea*		*Pseudomonou aurogenosa*		*Proteous*	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Chloramphincal	9	(90)	3	(37.5)	6	(75)	3	(37.5)	3	(75)	1	(50)
Gentamycine	2	(20)	3	(37.5)	2	(25)	-	-	-	-	-	-
Norfloxacine	8	(80)	7	(87.5)	4	(50)	6	(75)	2	(56)	1	(50)
Cefotaxime	8	(80)	5	(62)	2	(25)	2	(25)	2	(50)	2	(100)
Ampicillin	2	(20)	1	(12.5)	3	(37.5)	2	(25)	-	-	-	-
Tetracycline	2	(20)	1	(12.5)	1	(12.5)	-	-	-	-	-	-
Erythromycine	2	(20)	1	(12.5)	-	-	1	(12.5)	1	(12.5)	-	-
Total	**10**		**8**		**8**		**8**		**4**		**2**	

Discussion

Stagnation of the tear and microorganisms mostly in prescence of distal nasolocrimal duct obstruction or stenosis lead to dacyocysistis,and subsequent exposure of the eye to the microorganisms and its toxins, the treatment of dacryocysitis is with surgery which cannot be done before irradication of infection to prevent postoperative cellulitis and dissemination of infection. Another importance of prompt treatment is inability to do any intraocular surgery in presence of infection (may predispose to endopthalmitis). [4][6].

In this study 50 patients involved most of them were females 35 (70%) while males where 15(30)% which is comparable to the sex distribution of a study done by (Xuguang Sun….*et al*.) which was (85.7%). (14.3%) consequently, and to that study done by Bulent yazici (80%, 20%), while (71.5%, 28.5%) in a study done by Ebram…. *et al*. [7][8][9]

Xuguang found that (80%) of patients have unilateral disease an (20%) of them with bilateral disease. In this study it was 38(76%) and 12(24%) consequently while three of patients with unilateral disease had history of dacryocystorhinostomy to the fellow eye.

The course of the disease in included cases was acute in 5(10%), chronic 27(54%), and recurrent in 18(36%) while no congenital dacryocystitis present which is defined by Grant G. as infected amiotocele at birth. [6]

Laboratory test show that (78%) patients sample were positive by using Grams stain and culture methods. These results are compatible to that reported by Xuguang Sun,….. et al which is (85%) and to that of Kuchar (72.6%). [10] While it is far away from that founded by Coden… *et al*. and DeAngelis….. et al which was in consequence (52.5% and 44.7%). [11][12]

No growth result which was (22%) patients sample could be referred to, *Chlamydia*, Richittsial, viral or non infections inflammation.

A total of 39 isolate were cultured of which was 33(84.6%) were gram positive bacteria and 6(15.4%) gram negative bacteria.

Which is compatible to that reported by DeAngelis… et al (2001) who found

(78.5% gram positive and 215% gram negative bacteria). Other studies; Coden *et al.* (1993) , Briscoe *et al*. (2005), and Sun (2005).[7][11][13]

Culture results were mostly with *Staphylococcus* species 18(36%) fallowed by *Corynibactrium Diphthriae* 8(16), *Streptococcus Pneumoniae* 7(14%), *Pseudomnous* 4(8%), *Proteous* 2(4%) and 11(22%) no growth. this order of incidence was supported by another studies.[7][11][12]. While Kuchar [10] found that the most common microorganism was *Streptococcus pnenmonia* followed by *Haemophilus influenzae*.

In Israel, Briscoe found that (61%) of culture results were Gram negative bacteria and the most common isolates were *Pseudomonous* (22%) which is against the literature review and all of the mentioned researches. [13]

Still the broad-spectrum antibiotic is the treatment of choice of dacryocysistitis (great variations of antibiotic sensitivity between studies which could be referred to the antibiotic abuse).

Conclusions and recommendations:

1.*Staphillococcu*s species most common microorganism infecting the lacrimal sac.

2.There is high resistance rate to antibiotics, to lower the resistant to antibiotics it is better to depend on culture and sensitivity test prior to starting therapy.

3.Each patient with epiphora should be assessed for lacrimal drainage disorder

4.promotion of health education to enhance parents to take epiphora of their children as a serious problem.

References

1.Yanoof & Duker. Ophthalmology,third edition,2009,page;1482-1483.

2. Jack Kaniski. Clinical ophthalmology, 6th edition, 2007, pages; 151.160

3.American Academy of ophthalmology. Basic and clinical Sciences course, Section 7, orbit Eyelids, and Lacrimal system, 2002-2003, United Statetes of America, p. 229.

4.Mc Cord C. Clinical Opthalomolog. The lacrimal drainage system. In Duane T(ed), vol 4, JB, Lippencott.

5.Brinser, J.H. Ocular bacteriology, In: K.F. Tabbara; and R.A. hyndink, infections of the eye, 1st ed. Little Brown and company, Boston; 1986: 115-50.

6. Grant G. Gilliand. Dacryocystitis, 2004. htt://www.emedicine. Sun X. Microbiological analysis of chronic dacryocystitis Am. Opthalmol, 2005; 25: 261-3.

7. Sun X. Microbiological analysis of chronic dacryocystitis Am. Opthalmol, 2005; 25: 261-3.

8. Bulent Yazici. Treatment of Nasolacrimal Duct obstruction in Adults with polyurethane stent, Am. J. opthalmol, 2001; 131; 37-45.

9.Ebran, J.M. The reconstruction of the lacrimal pathway in the common canaliculus surgery, J. Fr. Opthalmol, 2002. Sep; 25(7): 722-6.

10. Kuchar A. Lukas J. and Steinkogler F.J. Am. J. ophthalmology, Acta opthal Scand, 2000. 78: 694-8.

11. Coden D.j., et al. Clinical bacteriology of dacryocystitis in adults, opthal plastic Reconst Surg, 1993.; 9: 125-31.

12. De Angelis, D. et al. The role of bactriologic infection in the etiology of nasolacrimal duct obstruction. Iww.com.opthalmology. 2002

13. Birsco D. Changing bacterial isolates and antibiotic sensitivities of purulent dacryocystitis. Orbit, 2005. 24: 29-3