AMERICAN JOURNAL OF OPHTHALMOLOGY

Vol. 2

DECEMBER, 1919

No. 12

TREATMENT OF CHRONIC DACRYOCYSTITIS

W. L. BENEDICT, M.D., AND R. A. BARLOW, M. D.

ROCHESTER, MINN.

This paper prepared by cooperation of the Sections on Ophthalmology and on Otology, Laryngology and Rhinology of the Mayo Clinic includes a general discussion of the subject and the description of a preferred method of operation.

Inflammation of the lacrimal sac may be said to have become chronic when the function of the drainage apparatus cannot be restored by the use of medical or hygienic measures, and operative procedures have to be employed either to restore the function of the duct or to remove the sac and obliterate the duct. Malformation of the puncta, eversion of the lids, simple stenosis of the duct, or obstruction of the lacrimal meatus in the nose, may be responsible for epiphora at any age, without inflammation of the sac, while acute or chronic inflammation may arise without complete closure of either end of the drainage system.

Stenosis of the duct in infants seldom results in suppurative affection of the sac but may often cause collections of large amounts of secretion that distend the sac, producing a mucocele and often a permanent fistula through the skin. Such a mucocele may extend backward, involving a part of the ethmoid labyrinth, or even extend into the orbit. Obstruction in children may follow edema and secondary inflammation of the duct from syphilitic periostitis, without other obstruction. The lacrimal sac in such cases may become secondarily infected and produce a purulent secretion. The sac is quite troublesome and difficult to heal except by vigorous antiluetic treatment.

If we may draw a conclusion from the comparative occurrence of purulent discharge in cases of obstruction of the lacrimal system we may say that

chronic suppurative dacryocystitis in children is more often the result of disease of the structures about the lacrimal duct and sac than of congenital or acquired anatomic obstruction to the patency of the system.

The proportion of suppurative conditions of the sac in the adult is reversed. Obstruction to the flow of tears follows atresia of the puncta, eversion of the lids, or intranasal blocking. With the latter cause the closure of the canal is usually found in the duct at the point of least diameter, 10 mm. to 15 mm. below the upper end of the duct proper. Rarely we may find the entire duct occluded and contracted to a small fibrous cord. The secretion collecting in the sac regurgitates into the conjunctival culdesac, or it can be thus emptied by external pressure. Occasionally the obstruction may be in the canaliculi, and the collected secretion expressed through a stenosed duct or artificial opening into the nose. Both the upper and the lower openings may be closed, leaving a blind pouch which becomes an immense mucocele or which may rupture externally, producing a permanent fistula.

The treatment of chronic dacryocystitis is ultimately surgical. The procedure to be employed will depend on the nature and position of the obstruction, the extent of the involvement of contiguous structures, and the changes in the tissues produced by the disease or by previous treatment. The inflammation may be of low grade, producing

a mucopurulent discharge without redness, pain, or heat, showing only a moderate and varying swelling and loss of function. Atony of the muscles of the lid and the muscle of Horner may fail to empty the sac completely and a passive dilatation of the sac results. The contents may be expressed easily.

Collection of secretion purulent or nonpurulent will, if rapidly produced, set up signs of active inflammation which gives rise to acute exacerbations. Removal of obstruction to the intranasal portion of the duct and careful use of small probes will be sufficient in many instances to reestablish patency of the duct. Further attention, such as irrigations and local application of antiseptic and astringent lotions, may be employed until the lining of the duct is in a more nearly normal condition. If the inflammation has existed for a long time, if there have been frequent attacks of acute inflammation, or if a quiet dacryocystitis has been unsuccessfully treated by the use of large probes, such simple measures as would be given to the lower end of the sac with the use of small probes will not insure a permanent opening, and it will be necessary to employ more radical measures.

Primary disease of the sac, that is from foreign material having become lodged in the sac or duct, producing stenosis and permitting secondary infection, may become so extensive as to occlude the entire duct and set up a periostitis and disease of the contiguous accessory sinuses. This is seen frequently in cases of traumatism of the nose and orbit from a kick in the face by a horse, or other accident, in which the head has suffered a crushing injury. On attempting to sound such a duct the sounding instrument will encounter bare bone, loose pieces may be felt to move, and the instrument may be passed beyond the lacrimal fossa into the opened cells of the accessory sinuses, and even into the nasal cavity beneath the nasal mucosa. If the nasal mucosa is also broken the secretion may empty directly into the nose. That this does not always fol-

low is sufficient evidence that operative procedures intended to produce such and only such an opening are inadequate, whether the opening is made with a probe, a trephine, or a chisel.

Secondary disease of the sac may follow disease of the accessory sinuses. We have been slow to recognize the importance of this fact because of the difficulty of diagnosing disease of the anterior ethmoid cells. Little evidence of ethmoid disease may be found by inspection of the nasal chambers at the time of examination. The nose may appear negative, yet in such cases we frequently have demonstrated mucopurulent secretion with destruction of the lining of the cells, when we have made an external opening for extirpation of the sac. Inflammations of this nature are, of course, quiescent; they may exist for years without giving sufficient evidence of disorder to warrant exenteration. Drainage is established through or around the sac, and the mucopurulent secretion is expressed into the conjunctival culdesac. Most of the secretion comes from the changed mucosa of the sac itself, and removal of the sac may close the drainage and so cover the evidence of ethmoid disease. Occasionally, however, a permanent fistula may be established thru the skin, thru which the mucopurulent secretion of the diseased ethmoid cells escapes.

A suppurative ethmoid may, by its close relation to the lacrimal groove, set up an inflammatory process in the duct or sac which sooner or later may become purulent. The ethmoiditis may be of very low grade, and give no intranasal manifestation of its presence, but in time the presence of the pus may cause inflammatory reaction in the lacrimal duct which in turn may lead to stenosis, predisposing to a suppurative condition in the sac.

Pus may find its way into the lacrimal duct through the meatus, where there is a suppurative sinusitis with free drainage into the nose. Under such conditions the patient in blowing the nose forces the pus into the duct. Simple extirpation of the sac does not re-

move the evidence of chronic dacryocystitis in such cases. We admit the truth of the statement so frequently made, that if all the sac is removed the discharge will stop, but we are referring to the cases in which healing does not take place when the sac is totally destroyed or removed.

To dispose of the troublesome and dangerous secretion in chronic dacryocystitis is the high aim of treatment. If at the same time the function of the duct

an operation no more difficult to perform than that of extirpation of the sac.

As has been mentioned, function may be restored in some cases by removal of low nasal obstruction and the careful use of small probes. The use of large probes, however, should be avoided in all cases. If a canal or bony foramen needs to be enlarged, it should be done by an open method, using cutting bone instruments, and not blindly

Fig. 1. Showing method of applying cocain mud with adrenalin to sphenopalatine ganglion and anterior ethmoidal nerve, giving complete anesthesia.

can be restored a double aim will have been accomplished. To this end various operations have been devised, but insufficient consideration has been given the changes which must be made in the tissues involved, for after all either the offending part is removed completely, or the elements are so rearranged that nature will not be impeded in providing protection for healthy organs and other tissues. To remove or to destroy a sac is to admit inability to cope with the disease of the tissues involved. The function of a stenosed and diseased lacrimal sac can often be restored by

by forcefully probing, crushing and tearing tissues that cannot be seen, and are only indefinitely felt. To attempt the treatment of chronic dacryocystitis by use of large probes either to enlarge the duct or to make an artificial opening into the nasal chamber is unwarranted and unjustified by the results obtained. If false passages are made into the antrum or soft tissues of the cheek, troublesome complications may follow. The use of metal styles is happily on the decline but they are now encountered sufficiently often to warrant mentioning the dangers accom-

panying their use and to urge better surgical methods of securing the same result.

Destruction of the sac by actual or potential cautery accomplishes only one thing, it stops the secretion from the tissues destroyed. It does not allow inspection of the tissues surrounding the sac either from within or without. It does not aid in reconstruction. No attempt is made to restore function to the sac. It is as difficult to destroy the

cessory cells and pieces of loose or necrotic bone. If any opening is found it should be enlarged, and the cavity from which it leads explored and cleaned. If only one or two cells can be found to be involved, and the disease is not then giving rise to a purulent discharge the whole cavity may be irrigated with 1:2000 bichlorid of mercury solution, and the wound closed in the usual manner without drainage. If the bone is necrotic or if pus is present in the

Fig. 2. Mucous membrane flap removed, exposing bone ready to be chiseled. a. Bone removed, exposing nasal wall of lacrimal duct and sac.

sac by cautery with good cosmetic effect as it is to extirpate the sac, and the latter procedure has the added advantage of allowing inspection of the fossa and the bony duct, leaving nothing to be desired from the cosmetic standpoint.

Extirpation of the sac after the method of Meller gives most satisfactory results in most cases. After the sac has been removed a sound should be passed along the entire bony surface of the fossa and upper part of the duct in a search for openings into ac-

ethmoid cells the loose bone should be removed, the diseased cells broken down, and an opening made through the nasal mucosa. The external wound may then be closed and the ethmoid disease treated from within the nose.

Operations for the restoration of function of the sac and duct, as well as the cleaning out of any diseased ethmoid cells, are advocated from time to time and have more to be said in their favor than any other form of treatment of chronic dacryocystitis. We are convinced that it is not neces-

sary in the majority of cases to do a radical operation from the external surface. Plastic operations intended to restore function are unnecessary, be-

cells and take care of any other intranasal obstruction.

If a sound can be passed through the sac and into the upper part of the duct

Fig. 3. Probe inserted thru inferior punctum, extending it into the sac; and tenting it thru window opening into the nose.

sides being difficult to perform and involving a great deal of after treatment. When the sac and upper portion of the duct has not been destroyed, it may be tapped from the nasal side, by a procedure that at the same time will allow exposure of the anterior ethmoid

the sac should not be extirpated, but an attempt should be made to restore the function of the duct by intranasal dacryocystostomy. The operation should be done by one who is familiar with intranasal technic. If for any reason the operation should not accomplish the re-

sult desired the sac can always be removed later. West, Yankauer, Patterson and Fraser, and others report excellent results. They have restored function to the lacrimal drainage system in a large percentage of cases in which operation was done, which is vastly more than can be said for the extirpation or cautery method of treatment.

An operation which restores function of the sac and provides adequate drain-

by blocking the sphenopalatine ganglion and the anterior ethmoidal nerve by introducing a cotton applicator impregnated with cocain mud with adrenalin as the solvent, beneath the posterior end of the middle turbinate, and a second applicator passed between the septum and the middle turbinate to the cribriform plate as may be seen in Figure 1. These applicators are allowed to remain in position ten minutes, which ordinarily gives com-

Fig. 4. Sac wall tented thru window opening, grasped by forceps, and beginning incision. b Window opening into sac completed, draining freely into nose.

age of diseased ethmoid cells in the neighborhood of the duct, should any be present, should be easy to perform and unattended by complications that will require long after treatment. Such an operation may be described as follows:

OPERATION.

Two or three drops of 1 per cent cocain solution are instilled into the eye. This allows the probe to be introduced into the punctum with little or no discomfort.

The intranasal anesthesia is obtained

plete anesthesia of the nasal chamber. In case of high or anterior septal deflection a submucous resection of the septum should be done at this time.

A lacrimal probe is now introduced through the lower punctum (without slitting the canaliculus) into the sac and duct as far as it will go, and allowed to remain. This serves as a guide and landmark. The surgeon while working in the nose is thus constantly reminded of the direction of the duct.

The mucous membrane of the agger nasi is now elevated and resected

and a flap about 1 cm. in diameter is removed just in front of the attachment of the middle turbinate. The bone is next removed by means of a small chisel to make a window slightly smaller in diameter than that of the mucosal opening (Fig. 2). This exposes the inner wall of the lacrimal sac and the upper part of the duct (Fig. 2a). Any diseased ethmoid cells which are discharging their contents into the duct can be easily broken down at this time.

The lacrimal probe is now withdrawn slightly until the tip causes a tenting of the sac wall into the opening made through the bone (Fig. 3). With a small knife the sac is incised (Fig. 4), the flap is grasped with a fine forceps, and the incision continued in a circular path, completely removing this portion of the sac wall (Fig. 4b). The probe is

now removed, and the sac irrigated through the punctum.

This completes the operation and gives adequate drainage into the nose. Very often a quantity of pus escapes into the nose when the first incision is made into the sac wall. The after treatment is almost nil. No packing is necessary. The patient should be cautioned not to blow the nose vigorously, as the secretion from the nasal chamber may be blown through this new opening into the conjunctival sac. The reaction is very slight, healing is rapid, with little contraction of the mucous membrane. The patients experience no epiphora nor other discomfort after the operation. A lotion of zinc sulphat and adrenalin solution is used for the first week following operation, after which time no further treatment is needed.

REFERENCES

1. Paterson, J. V. and Fraser, J. S. Intranasal Dacryocystostomy: Intranasal Drainage of the Lacrimal Sac. *Brit. Jour. Ophthal.*, iii, 197-204, May, 1919.
2. West, J. M. Die Eröffnung des Tränensackes von der Nase aus in über 100 Fällen von Dakryostenose. *Berl. klin. Wchsch.*, 1, 926-927, May 19, 1913.
3. Yankauer, S. The Technic of Intranasal Operations upon the Lacrimal Apparatus. *Laryngoscope*, xxii, 1331-1346, Dec., 1912.

A SIX METER STEREOSCOPE

CAPTAIN HARVEY J. HOWARD, M.D., OPH.D.

PEKING, CHINA

The instrument here described was developed to meet the requirement for tests of binocular vision used at the Medical Research Laboratory of the Air Service Medical at Hazelhurst Field, Mineola, N. Y.

For the purpose of examining candidates for the flying service to learn their ability to judge distance, it was deemed necessary by the Eye Department of this laboratory to devise a test which could be used at a distance of six meters.

In a previous report (see p. 656) a description of an apparatus designed to make such a test was given. That apparatus was simple and crude, but at the same time gave very consistent results. The test was so planned that the only factor examined was the binocular parallax which is the most important personal factor in the judgment

of distance. The results obtained with the apparatus were in the form of threshold judgments of certain depth-differences. From these threshold findings, together with the measurements of interpupillary distances the minimal binocular parallactic angles (see Fig. 2 and Fig. 3, p. 661) of all the subjects examined were computed (Table 1, p. 663). In this previous report it was recommended that a normal binocular parallactic angle be considered not larger than 8 seconds, when employing a similar apparatus. Based upon the size of their respective angles, it was found possible to classify men