Polyethylene intubation of the naso-lacrimal duct in chronic dacryocystitis

A review of forty cases with one year's follow-up

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Different medical and surgical methods of restoring the patency of the obstructed lacrimal passages have been tried since ancient times. Medical treatment has no value in chronic dacryocystitis but surgical techniques have evolved from the drastic procedures of cauterizing the diseased tissue to the more refined conservative procedure of dacryocystorhinostomy. This complicated and time-consuming operation has been further supplemented by intubation. A polyethylene tube is inserted permanently into the naso-lacrimal duct by exposing the lacrimal sac; the procedure is based on the method described by Summerskill (1952).

Material and methods

The study was carried out in the Ophthalmology Department of Rajendra Hospital, Patiala, in forty cases of chronic dacryocystitis who attended the hospital for treatment. Patients were selected who complained of epiphora, or who had regurgitation on pressure over the sac and on syringing with normal saline, indicating a block in the lower lacrimal passages. No patient with a negative regurgitation test was operated on by this technique.

Anaesthesia

Patients below the age of 12 years were operated on under general anaesthesia and the rest under local anaesthesia.

Technique

- (1) The site of the skin incision is marked with gentian violet solution.
- (2) The lacrimal sac is exposed through a straight skin incision about 1 cm. long along the lower part of the anterior lacrimal crest.
- (3) The soft tissue is separated below the intact medial palpebral ligament so as to expose the sac (Fig. 1).
- (4) A vertical incision 4–5 mm. long is made in the lateral wall of the sac (Fig. 2).
- (5) The naso-lacrimal duct is probed and dilated as much as possible without fracturing the bone (Figs 3 and 4).
- (6) A Polyethylene tube of appropriate size and calibre is placed in the naso-lacrimal duct so that its flange rests at the bottom of the sac and the bevelled end lies in the inferior meatus of the nose (Figs 5 and 6). Polyethylene tubes of different lengths (12, 15, 16, 17, and 18 mm.) and calibres (1, 2, and 3 mm.) are cut with one end bevelled while the other end is flanged about 4–5 mm. (This is done by warming the tube over a flame and quickly touching it against a smooth metallic surface.)

FIG. 1 *Soft tissue dissection with scissors* FIG. 2 *Lacrimal sac incision* FIG. 3 *Bowman's probe of smaller size in naso-lacrimal duct* FIG. 4 *Bowman's probe of larger size in naso-lacrimal duct*

(7) The sac and skin are closed separately by 6/0 silk stitches. (Fig. 7).

(8) The patency of the tube when in position is demonstrated by syringing with normal saline through the inferior punctum (Fig. 8).

Postoperative care

No special postoperative care is required. The skin stitches are removed on the 5th or 6th day after the operation and syringing is done to ensure the patency of the lacrimal passages.

All patients are followed up for 1 year, at 2-week intervals for the first 3 months, and then every month.

FIG. 5 *Direction of insertion of Polyethylene tube*

FIG. 6 *Insertion of Polyethylene tube*

FIG. 7 *Stitching of incision*

FIG. 8 *Syringing through Polyethylene tube to ensure patency of naso-lacrimal duct*

Results (Table I)

In the present series of forty cases the results after 1 year have been classified as follows:
(1) *Success* Cases which did not show epiphora and in which the regurgitation test was negative and fluid entered freely into the nose on syringing with normal saline.

Table I *Classification of results*

<i>Type of chronic dacryocystitis</i>	<i>No. of cases</i>	<i>Results</i>		
		<i>Complete success</i>	<i>Partial success</i>	<i>Failure</i>
Chronic catarrhal	28	23	2	3
Chronic suppurative	7	4	3	—
Mucocoele	5	3	1	1
Total	40	30	6	4 (10 per cent.)

(2) *Partial success* Cases which showed epiphora but in which fluid entered the nose on syringing.

(3) *Failure* Cases in which the lacrimal passages remained blocked and which still showed epiphora.

The tubes used were of three sizes, the calibre being 1, 2, or 3 mm. The results are classified in Table II according to the calibre of the tube.

Table II *Results related to calibre of tube used*

<i>Calibre (mm.)</i>	<i>No. of cases</i>	<i>Results</i>		
		<i>Complete success</i>	<i>Partial success</i>	<i>Failure</i>
1	6	3	1	2
2	30	23	5	2
3	4	4	—	—

Discussion

Plastic tubing has been used since 1944 to restore patency of the lacrimal passages with no evidence of tissue intolerance (Summerskill, 1952). The use of metallic tubes has been abandoned because of the risk of foreign body reaction varying from mild inflammation to necrosis. Most workers (Veirs, 1952; Vicencio, 1956; Loubère, 1961) have used Polyethylene tubes in cases of chronic dacryocystitis, but dilatation of the punctum and canaliculus and injudicious probing and manipulation have sometimes caused trouble (Irvine, 1961). A Polyethylene tube projecting from the punctum may cause chronic conjunctivitis (Vicencio, 1956) or the punctum may become blocked with granulation tissue (Henderson, 1953). The results of inserting Polyethylene tubing from the lower end of the duct have not been encouraging (Burns, 1968). Many surgeons have reported a high percentage of success by dacryocystorhinostomy, but this is a major time-consuming operation requiring highly efficient pre- and postoperative care.

The use of a wider tube by the technique described offers the following advantages:

- (i) Firm fitting in the naso-lacrimal duct;
- (ii) Less chance of blockage by blood or exudate;
- (iii) Less chance of a kink blocking the tube;
- (iv) Less chance of postoperative bleeding by pressure on the surrounding tissue;
- (v) Greater drainage capacity.

The few failures have been mostly due to such technical errors as wrong placement of the tube or using too narrow a tube.

Summary and conclusions

In forty cases of chronic dacryocystitis, a Polyethylene tube of appropriate calibre was inserted permanently into the naso-lacrimal duct so as to restore the drainage of the lacrimal passages. The duct was approached through an incision in the skin. After 1 year's follow-up, the lacrimal drainage was re-established in thirty patients, six were partially relieved, and only four were complete failures.

Polyethylene intubation of the naso-lacrimal duct by this technique gives good results when a wider moist tube is tightly and accurately inserted into the duct.

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