ENTROPION IN HONG KONG*

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TRACHOMA persists as a major scourge in the causation of blindness in the Far East. Of its many complications and sequelae, entropion is undoubtedly the commonest. Apart from the cataract operation, which restores sight, an entropion operation is perhaps the most gratifying in the field of ophthalmology.

The following is a report on 1,252 cases of entropion seen in the Ophthalmic Department, Kowloon Hospital, and the Violet Peel Eye Centre, Hong Kong, from December 1, 1955, to October 25, 1956, and from September 1, 1954, to December 31, 1955, respectively. Utilizing the great number of cases encountered, an attempt has been made to compile some statistics which may prove of interest.

Incidence

Among the total number of 2,639 minor operations performed in the two hospitals, 543 at the Violet Peel Eye Centre (Fig. 1A) and 709 at the Kowloon Hospital (Fig. 1B), 1,252 (Fig. 1C) were necessitated by entropion. This includes a small number of epiblepharons and spastic entropions which are reported together because the corrective procedures are similar.

Locality.—It is interesting to mention that trachoma is most endemic in Yuen Long, a rural town which is infested with flies.

Sex.—Of the 1,252 cases of varying degrees of entropion operated upon, 967 cases (77·2 per cent.) were female and 285 cases (22·8 per cent. were male), a ratio of 3·4 to 1 (Fig. 1).

Age.—Fig. 1 (opposite), also shows the frequency in successive decades of life. Entropion was seen most often in the fifth decade, and the following points may be noted:

(1) There is practically no trachomatous entropion in the first decade of life. The patients shown in this column were cases of epiblepharon.

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FIG. 1 (A).—Entropion cases in Violet Peel Hospital, September 1, 1954, to December, 31, 1955.
(B).—Entropion cases in Kowloon Hospital, December 1, 1955, to October 25, 1956.
(C).—Total entropion cases reviewed.

(2) The 28 cases of spastic entropion which were included occurred chiefly in females over 50 years of age.

(3) The curve shows a steady rise starting at age 21, reaches its peak at 41 to 50, and declines slowly after age 60.

The high incidence of entropion in the oldest age group suggests that entropion will persist unless corrected surgically.

There were three patients aged 10 with trichomatous entropion, two boys and one girl. Another girl aged 7, had some trichiasis associated with

trachoma. At the other end of the scale were two women aged 82, one of whom had bilateral cataracts also.

The fact that trichomatous entropion is so rare below the age of 10 years suggests the condition develops very slowly.

In the first decade, there were fifteen female patients and fifteen males, nearly all with epiblepharon. As age advanced, there was a steady increase of females over males, 3:1 in the second decade, 4:1 in the third, 6:1 in the fifth, and 9:1 in the sixth decade and above. The last two age groups included 28 cases of spastic entropion.

Pathology

There are two main processes at work in trachoma; inflammation and cicatrization. The first process of inflammation, or infiltration, is seen in a primary epithelial lesion of the conjunctiva and cornea, with papillary hypertrophy and secondary infection of the subepithelial tissues, resulting in follicular hypertrophy. Infection or infiltration of the upper tarsus occurs chiefly near its lower margin along the line where the blood vessels of the marginal arcade perforate the tarsus from in front to reach the conjunctiva. The tarsal glands are invariably affected. Strangulation by dense infiltration of round cells and mast cells and later by fibroblasts from adventitia of blood vessels results in atrophy and degeneration of the acini. Cicatrization of the conjunctiva and the tarsal plate results in entropion.

The development of an entropion depends on distortion of tarsus and contraction of the conjunctiva. The tarsus may contract vertically, resulting in lagophthalmos or coloboma of the lids as well as entropion, or sideways, causing a bowl- or boat-like bulge. The contraction of the conjunctiva acts like a bowstring on the softened tarsus. When both are in the process of cicatrization, much deformation occurs, especially at the region of the sulcus subtarsalis, and this also causes the disappearance of the fornices.

As an entropion forms the posterior border of the lid margin flattens or disappears. Normally, the posterior border should be sharp, so that the intermarginal strip and the conjunctival surface are at right angles. In early entropion, the posterior border becomes rounded by infiltration or flattened by cicatrization, and the base of the eyelashes is not supported but comes into contact with the globe. At first, this disappearance or flattening occurs only in one portion of the lid margin. Trichiasis may be seen directly above the area where the posterior border is "rounded-off"; this type of trichiasis differs from that caused by congenital malposition of the root of the lashes, because in the latter the posterior border is normal.

In time the whole posterior border becomes "rounded-off" and the whole lid margin turns in. This is followed by the disappearance or obliteration of the fornices, irritation and spasm of the orbicularis, lagophthalmos, and finally total atrophy of the tarsal plate if the entropion is left untreated.

Eversion of the upper eyelid can then be effected by resting one thumb on the upper lid and pulling it gently towards the eyebrow.

Grading of Entropion

For convenience in selecting the particular operation indicated in each case, the following classification has been worked out.

- Grade I. Intorsion of part of the eyelashes without hypertrophy of the tarsal plate.
- Grade II. Intorsion of the whole of the eyelashes without hypertrophy of the tarsal plate.
- Grade III. As Grade II but with hypertrophy of the tarsal plate.
- Grade IV. As Grade III but with general contraction of the conjunctival sac with or without spasm of the orbicularis or lagophthalmos. At this stage, the tarsal plate may have become entirely atrophied.

The four grades are shown in Fig. 2 (overleaf). Grades II and III differ in that in the former the process of infiltration has destroyed the acini before "strangulation" takes place, while in the latter the rapidly invading infiltration and cicatrization blocked the ducts before the acini have been destroyed, so that retention cysts occur. This, combined with degenerated epithelial down-growths, gives the appearance of bleb-like excrescences on the conjunctiva, which burst on pressure. In Grade IV, the conjunctival fornices are greatly reduced in size.

Operation

Division of Intermarginal Strip.—In view of the vast number of cases which require surgical correction, it is necessary and practical to use a method which is simple, time-saving, and yet effective. The following is easy to perform, produces hardly any bleeding (requires only one piece of gauze for dabbing), and can be performed single-handed without assistance. Furthermore, it creates an artificial upper palpebral furrow which serves a cosmetic purpose, especially in some Chinese females who do not have one. However, there is one requirement: the intermarginal strip must be discernible.

(1) After local anaesthesia with 1 ml. 2 per cent. Novocain with adrenaline, the lid is everted with the fingers and three to five double-armed sutures (black silk or cotton), are inserted from the upper border of the tarsus on the conjunctival surface, to appear in the skin surface about 2 mm. from the lid margin (Fig. 3A, overleaf).

(2) The sutures are held together and a spatula is inserted, thus keeping the eyelid everted (Fig. 3B, overleaf).

(3) An incision is made along the grey line about 2 to 3 mm. deep, through either half or the whole of the extent of the eyelid, depending on the location of the trichiasis (Fig. 3B).

(4) The sutures are tied on a thicker thread placed parallel to the lid margin, and the operation is completed (Fig. 3C, overleaf).

NORMAL EYELID

GRADE I

GRADE II

GRADE III

GRADE IV

FIG. 2.—Diagrams of normal eyelid and four grades of entropion.

As the exits of the sutures are nearer to the lid margin than their entrances, tying them causes the incised wound to gape and remain open. When the stitches are removed on the eleventh day, this gap is filled with well-epithelialized granulation tissue. The intermarginal strip is found to be broader than before and the irritating eyelashes are again "supported" away from the globe. The operation can be completed within five minutes.

FIG. 3.—Stages in operation for division of intermarginal strip.

Follow-up

The follow-up of these patients is deplorably neglected. Most of them live in the suburbs or distant islands, and once relieved do not care to come again unless for operation on the other eye. An attempt was made to retrieve them (through the mail by the Lady Almoner) but owing to the extremely poor response the effort was abandoned. Another reason for the paucity of follow-up is that cases are discarded if the records are incomplete or if the patients are seen within one month.

Results

(1) *Modified Green Method*.—124 cases of different grades were followed for periods varying from 2 to 22 months. Of these, 104 cases were successful, including 22 cases followed for more than a year, and forty cases for upwards of 6 months. The period of observation of the twenty unsuccessful cases varied from 2 to 13 months: seven developed granulation tissue at the incised wound on the conjunctival surface, which had the appearance of a ruptured chalazion (none of these recurred after being snipped off by scissors), five resulted in a disfigured tarsus which had to be corrected by tarsectomy, seven had residual trichiasis, at either the external or the internal canthus, and one was overcorrected.

(2) *Hotz Operation*.—97 cases of different grades were followed up for from 2 to 17 months. Seventy-eight cases were successful, of which seven were observed for over a year and eight for upwards of 6 months. The remaining nineteen cases were not successful; fourteen had residual trichiasis, most of them at the external canthus, one gave a lobulated appearance of the lid margin, three cases developed hypertrophic tarsitis, and one was overcorrected.

(3) *Division of Intermarginal Strip*.—44 cases were followed up for from 1 to 9 months. Among them, 38 cases were successful, of which seven were followed for over 6 months. In this group of successful cases, four had been operated on by the "partial" method (i.e. the incisions were made directly "beneath" the area of trichiasis, not extending along the whole length of the lid). Of the six unsuccessful cases (in which the follow-up ranged from 1 to 4 months), four had residual trichiasis (which suggested that a more "radical" operation was necessary), one showed a tendency to re-invert, and in one (after a "partial" operation) the stitches somehow sloughed off at first dressing on the fourth day.

(4) *Modified Hotz Operation (Anterior Tarsectomy)*.—One case was followed for 3½ months and another for one month, both of them being successful; a third case, however, has a tendency to re-invert.

(5) *Skin and Muscle Operation*.—Six cases of simple spastic entropion followed for from 1 to 3 months were successful, and one was over-corrected. Six cases of spastic entropion complicated by trachomatous cicatrization were all unsuccessful, because this operation does not tackle the tarsus and conjunctiva which were both diseased.

(6) *Stallard's Operation*.—Five cases were followed up from 1½ to 4 months. Four were successful, and one was found to have a tendency to re-invert when seen during the fourth month.

(7) *Machek-Blaskovicz' Operation*.—This method takes more time and is not often used. One case (Grade II) was found to be successful after 2½ months, but when the patient came again after 6 months the lashes were found to be re-inverted, and were later corrected by a modified Green operation. A second case (Grade IV) was found to be unsuccessful during the second month.

(8) *Excision of Follicles*.—This may be necessary if the lid persistently inverts in spite of previous operations. One case followed for 2 months was found to be successful, but in another the lashes had grown again after 6½ months, and had apparently not been completely excised.

(9) *Spencer-Watson's Operation* (for canthal trichiasis).—Two cases, followed at 3 and 5½ months respectively, were observed to be successful.

(10) *Cuenod-Nataf's Method*.—Two cases followed up for 1½ months were successful, but another was found to be unsuccessful during the third month.

(11) *Wheeler's Tarsectomy*.—Three cases observed at the fourth, sixth, and ninth month were found to be successful.

(12) *Duwerger's Operation*.—Four cases were found to be successful after from 1½ to 5 months, and another case observed after 3 months proved to be unsatisfactory.

The cases in which these various operations were performed are summarized in the Table.

TABLE
ENTROPION OPERATIONS

Method	Number	Percentage
Modified Green (upper lids)	426	30.5
Hotz	313	22.4
Division of Intermarginal Strip (total and partial)	168	12.0
Electrolysis	163	11.7
Modified Green (lower lids)	125	8.9
Wheeler's Tarsectomy	21	1.5
Stallard	34	2.4
Miscellaneous (Spencer-Watson, Machek-Blaskovicz, Du-verger, Wheeler, Excision of Hair Follicles)	95	6.8
Unclassified	52	3.8
Total	1,397	100.0

Conclusions

Three approaches are possible in the correction of entropion:

- (1) *From the Skin*, the conjunctival part not being touched (e.g. Hotz, Stallard, Machek-Blaskovicz).
- (2) *From the Conjunctival Surface* both the conjunctival and tarsal plate being tackled (e.g. Modified Green, Wheeler's tarsectomy).
- (3) *At the Lid Margin* in early or residual cases (e.g. division of intermarginal strip, electrolysis).

Besides those listed above, combined methods, e.g. Cuenod-Nataf's, may also be used.

In comparing the approach from the skin and conjunctiva, we find that the latter is simpler, has less bleeding, saves time, and gives better results at the canthal region. On the other hand, disfigurement or granulation tissue formation is not uncommon. Hence this method is preferably used in cases with extensive cicatrization and inverted eyelashes, or in cases with shortage of skin which have a tendency to develop lagophthalmos. This method is extremely useful in the correction of epiblepharon and entropion of the lower lid.

The skin approach has the advantage that it will not lead to a disfigured lid and it is the method of choice if the conjunctival sac is secondarily infected. It is also easier to perform if the tarsus is thick and hypertrophic, because here it is possible to excise a wedge-shaped piece from the tarsus. As compared with the conjunctival approach, this method causes more bleeding, takes more time, and occasionally gives unsatisfactory results in the canthal region (some extra sutures laid at the canthi may prevent this).

The operation at the lid margin is the simplest of all. It takes less than five minutes, no assistance is necessary, there is hardly any bleeding, and no disfigurement, and a cosmetic result is also achieved.

The following operations are suggested for the various grades of entropion:

- Grade I. Division of Intermarginal Strip (partial)
 - Electrolysis or Electrocautery
 - Spencer-Watson (if trichiasis is situated at canthal regions)
 - Excision of Follicles
- Grade II. Division of Intermarginal Strip (total)
 - Stallard
 - Hotz-Anagnostakis
 - Modified Green
- Grade III. Stallard
 - Hotz-Anagnostakis
 - Modified Green
 - Division of Intermarginal Strip
- Grade IV. Modified Green
 - Stallard
 - Hotz-Anagnostakis
 - Excision of Follicles

Summary

(1) 1,252 cases of entropion are reported and analysed. A system of grading is suggested and a simple operation is described.

(2) Entropion occurs predominantly in the female sex, the ratio being 3.4:1. The high peak of incidence occurs in the age group 41 to 50 years.

(3) The importance of the disappearance of the sharp posterior border of the lid margin in early cases of entropion is emphasized. The division of intermarginal strip operation is aimed at broadening the intermarginal strip and thus supporting the eyelashes away from the globe.

(4) Because follow-up is so incomplete it is not possible to make a definite assessment of success or failure. In correcting entropion, the approach at the lid margin is to be attempted first, reserving the more radical operations to be done later if necessary. The skin-and-muscle operation is useless in cases of spastic entropion complicated with trachomatous cicatrization.

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