

## THE PROBLEM OF CHRONIC FRONTO-ETHMOIDITIS.

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(Continued from p. 242.)

Fraser and Stewart [7] favour Coakley's modification of the Killian operation, which consists of opening the frontal sinus through its anterior wall, and entering the ethmoidal region through its lateral wall in the region of the inner canthus, leaving a bridge of bone between the upper and lower openings.

This operation has, however, been abandoned by the majority of rhinologists, not so much on account of the resultant disfigurement (particularly if necrosis of the "bridge" occurs), as because of the serious risk of spread of infection into the diploë of the cranial bones, with the production of diffuse osteomyelitis and intracranial complications, or pyæmia. There is, moreover, the possibility of some pathological mucous membrane being left behind in the "blind area" created by the bridge, which may give rise to subsequent trouble. It is, nevertheless, the operation of election when intracranial complications are already present.

The remaining external operation is the Howarth, which enables the most radical removal of the mucous membrane to be carried out, or more conservative measures to be adopted; it has the additional advantage of leaving no "blind area", and lastly, being carried out through the floor of the sinus, which consists of compact bone, there is distinctly less risk of ensuing diffuse osteomyelitis than when an entry is made through the anterior sinus wall.

*The Howarth Operation.*—This operation is being described in detail as the author has found the following technique satisfactory even under Indian conditions.

After careful preparation of the skin on four consecutive days, as a preliminary to operation on the fifth day, the anterior nares are swabbed out with 75 per cent spirit, and the nasal cavity of the affected side is packed with a long strip of gauze soaked in equal parts of 10 per cent cocaine and 1:1,000 adrenalin half an hour before operation.

It is essential that good radiograms be available in the theatre throughout operation. The operation is performed under intratracheal anæsthesia, chloroform-ether mixture being preferred; and the nasopharynx is well packed off.

Two radiating scratches are made to assist subsequent accurate closure. The skin is then drawn upwards, and a curved incision made from a point a little internal to the supraorbital notch to another point opposite or a little below the inner canthus.

Before proceeding further all hæmorrhage must be completely arrested ; particularly that coming from the angular vessels, which is apt to be most troublesome. It is best to ligate all bleeding points at once.

The periosteum is then divided in the line of the skin incision, and the orbital periosteum raised intact by working against the bone, carrying with it the attachment of the pulley of the superior oblique muscle. This periosteal raising is carried as far back as is considered necessary for the case in hand.

The raised periosteum, carrying with it the orbital contents, is then held out of the way by a flat retractor in the handling of which extreme gentleness is necessary.

With gouge and mallet the frontal sinus is then opened through its floor. Unless the mucosa is obviously healthy, the floor is then removed with bone forceps as far as the lateral limit of the cavity ; all loculi being carefully examined and any atypical extensions of the sinus opened up.

All pathological mucosa is removed, great care being taken not to nick the bone in so doing, while all mucous membrane which appears to be capable of recovery is carefully preserved.

The packing is now withdrawn from the nose. With bone forceps or gouge and mallet the fronto-nasal duct is next opened up and the medial bony wall of the orbit removed with bone forceps as far back as is judged expedient. The cells of the ethmoidal labyrinth are now freely accessible, and, as there will be found to be very little bleeding, can be exenterated with cutting forceps under direct vision ; the vertical plate of the middle turbinate being carefully preserved to safeguard the olfactory area.

When all pathological material has been removed, the cavity is swabbed out successively with peroxide, spirits and Bipp, and finally packed with a paraffined gauze strip brought out through the nares, this packing being removed on the morning after operation.

The orbital periosteum is then replaced and accurately fixed in position with a mattress suture.

Finally the skin wound is stitched, preferably with a subcuticular suture, the scar becoming almost invisible in a few months.

Difficulty may sometimes be experienced in keeping the fronto-nasal channel from closing too much during healing ; the avoidance of irrigation for two to three weeks after operation will help to prevent this. The after-treatment preferred by the author is the institution of four-hourly menthol inhalations after the removal of the packing, keeping the nose clear of secretion by swabbing it out, and daily spraying of the nasal cavity with  $\frac{1}{4}$  per cent phenol in paroleine.

The use of drainage tubes and silver nitrate is not recommended as a means of preventing overclosure. Should it occur, the use of a rasp with or without subsequent bouginage will produce the desired result in the majority of cases.

A refinement of the Howarth operation, to lessen the risk of overclosure,

is to Thiersch-graft the fronto-nasal channel. This is popular with some authorities.

It may be mentioned here that it is advisable to remove the antero-inferior part of the middle turbinate as a preliminary to the above operation in cases where this structure is noticed to be hypertrophied.

(e) *When the posterior ethmoidal cells are alone involved*, Howarth's operation with conservative treatment of the frontal sinus is the method of choice.

#### PERSISTENCE OF PAIN IN SPITE OF ESTABLISHED FREE DRAINAGE.

This may be due to at least two causes:—

- (1) Loculation with improper drainage of the loculus.
- (2) A hypersensitive condition of the inflamed mucous membrane in a patient whose deep trigeminal nuclei are also hypersensitive as the result of a mild toxemia arising from the sinus or some other septic focus.

#### PERSISTENCE OF DISCHARGE AFTER OPERATIVE TREATMENT.

Logan Turner and Goldsmith of Toronto [8] deprecate attaching too much weight to the presence of a little mucoid or mucopurulent secretion from the labyrinth or, especially, from the frontal sinus. They also point out that the presence of lymphocytes and polymorphonuclear leucocytes in washings from the frontal sinus merely indicates chronicity, and does not of itself demand further operative treatment.

A neurotic patient should be treated along common-sense lines; regulation of the manner of living, diet, habits and exercise being of more importance than local medication.

It may occasionally, however, be necessary to do something, and then it is advisable to select something simple and inexpensive.

Failure to cure fronto-ethmoidal suppuration may be due to:—

- (1) Insufficient removal of pathological frontal mucous membrane.
- (2) Incomplete treatment of an infected ethmoid; especially failure to clear out all the infected outlying ethmoidal cells about the floor of the frontal sinus and the roof of the orbit.
- (3) Failure to secure adequate permanent drainage into the nose, either the result of excessive post-operative closure, high septal deflection, large middle turbinate, or hypertrophied anterior lip of the infundibulum.
- (4) Failure to recognize and treat co-extant suppuration in a large crista galli cell or in the opposite frontal sinus.
- (5) Failure to secure arrest of all hæmorrhage at operation, and consequent inability to see properly and to open thoroughly every recess and cell into the main channel.
- (6) Excessive and injudicious lavage interfering with the healing process after a well-conducted operation.
- (7) The existence of syphilis, tubercular infection, malignant disease, foreign body, or sequestrum.

## TREATMENT.

A. In the absence of pain and œdema of the forehead or bulging of the lower wall, the effect of dry heat and irrigation with the frontal cannula should be tried.

B. If the frontal sinus is of very large size with many loculi, and persistence of discharge is the main complaint, the question of the wisdom of further operation should be seriously considered on account of the certainty of producing considerable scarring. Transnasal ionization should be given a trial.

C. If the symptoms and signs mentioned above are present, and X-rays reveal considerable ethmoidal disease alone, further ethmoidal removal is indicated by Mosher's or Sluder's method. But if the frontal sinus is also involved, if polypi recur high up in the nasal cavity, or if there be an orbital extension of the ethmoidal cells nothing short of radical operation will cure the condition.

It is anatomically impossible to remove all ethmoidal cells by the transnasal route: some authorities, however, recommend that this be adopted, and recommend that it be done in stages, allowing time for the subsidence of inflammatory œdema between each stage.

After an apparently thorough ethmoidal toilet, a full month's wait with occasional lavage allows results to be judged. If suppuration persists, there may still be cells which have been overlooked; but it is also necessary to eliminate inflammation in one of the larger paranasal sinuses as influencing the ethmoidal condition.

If further operative treatment is thought advisable, external operation is the best, and a Howarth should be performed. Its performance is not free from danger as there may be scarring and obliteration of landmarks. Even a moderately deflected septum should first be resected to give as much room as possible. It can be satisfactorily performed even if there be a fistula; but of course if there be any necrosis of a previous "bridge," bad scarring must be expected.

In combination with operative measures, irrigation with argyrol or neosilvol may help, but too strong silver salts should be avoided. Bismuth and oil may sometimes be of value in more recent cases, but there is a tendency for it to cake and remain indefinitely. Zinc ionization is likely to be most useful.

Repeated lavage during after-treatment is to be deprecated, there being a distinct risk of spreading the infection, while no benefit is derived from it. Hawking, mopping out, and gentle blowing of the nose, with forceps removal of crusts are better; final spraying with an oily antiseptic prevents drying and keeps everything sweet.

Radium may be of service, and a cautious trial is justifiable in the treatment of resistant cases with repeatedly recurrent polypi. A relatively large dose should be given with light screening for a short time. A

vigorous local reaction is produced, but after a few months the local condition may be much improved.

*Constitutional treatment.*—The constitutional disturbance varies considerably. Vaccines are of very little use. Anything improving the general health may help. Further operation is not to be embarked on lightly, but time must be allowed to elapse before the results are judged. Provided reasonable drainage exists, headaches, if present, are probably due to neurasthenia.

#### DETAILS OF CERTAIN CASES TREATED BY HOWARTH'S OPERATION.

(1) I. Kh., male, aged 49. Many years history of nasal polypi, nasal obstruction, headaches, fœtor of breath, pyorrhœa, etc. Intranasal examination showed the presence of multiple polypi in both nostrils, bathed in purulent secretion. Trans-illumination showed that both antra and frontal sinuses did not light up. X-ray showed both antra, frontal sinuses, and anterior and posterior ethmoidal cells on both sides to be opaque.

*Howarth operation* performed on the right side May 9, 1933. Multiple polypi were removed, thickened frontal mucosa was removed, and necrotic purulent ethmoidal cells exenterated. Healed by second intention, as a small sinus formed in the middle of the scar. This was curretted and stitched when immediate healing ensued. Patient's health improved.

*Howarth operation* on the left side August 14, 1933. Polypoidal mucosa of frontal sinus removed, after removal of many polypi. Purulent ethmoidal cells exenterated. Healed by first intention. Slight diplopia on looking down came on due to the development of a deep-seated granuloma; this was subsequently removed. Both antra to be treated at a later date. Nasal reaction soon subsided. Health continued to improve.

Subsequent progress: Troublesome eye symptoms gradually ensued for which the patient was eventually invalidated out of the Service, when touch with him was lost.

Up till February, 1934, six months after his second operation, his condition was as follows: Some relief of symptoms; polypi reforming in right nostril, which was again discharging a purulent secretion; left nostril clear; persistent diplopia.

(2) Major S., aged 46. History of gradual onset of frontal headaches and ethmoidal discomfort over a period of some years, with steadily progressing loss of self-confidence, insomnia, inability to concentrate, and melancholia. He looked very toxic on admission, was slow in responding to questions put to him, and gave other evidence of slow cerebration. Intranasal examination suggested chronic sinusitis. X-ray showed the right frontal and right ethmoidal region to be definitely opaque, and the left antrum doubtfully so.

*Howarth operation* performed on the right side, June 13, 1933. Purulent contents of right frontal sinus and paraorbital air cells evacuated. Pathological frontal mucosa removed. Right ethmoidal region exenterated. Healed by first intention. Nasal reaction soon subsided.

Tonics, graduated exercise, etc., produced definite improvement in his general health and mental condition. Proof-puncture showed his left antrum to be clear.

After three months' leave, including a sea voyage, he returned to his duty a changed individual. Up till a year since operation this improvement has been maintained.

(3) Mrs. W., aged 30. Many years history of frontal headaches, nasal obstruction, post-nasal catarrh, listlessness and inability to concentrate; and three weeks history of sore throats. Intranasal examination showed a congested left inferior turbinate with pus in the left middle meatus. Transillumination showed nothing. X-ray showed her left frontal sinus and ethmoidal region to be opaque, and her left antrum too.

*Howarth operation* performed on the left side, September 18, 1933. Purulent contents of left frontal sinus evacuated. Left ethmoidal cells exenterated. Healed by first intention. Nasal reaction soon subsided.

Following plague inoculation, there was a return of the frontal headache, but on the opposite side. Headlight baths, menthol and tinct. benzoini co. inhalations produced subsidence in five days. Her condition thereafter was found to be considerably improved up till five months after operation, when she returned to the United Kingdom; this progress was maintained.

(4) Private Mc., aged 21. History of frequent head colds, morning headaches, nasal obstruction, post-nasal catarrh, etc., of long duration. He looked very toxic on admission. Intranasal examination revealed the presence of polypi and pus in upper and middle meatus of both sides. Transillumination showed both antra and frontal sinuses to be opaque. X-ray showed right frontal, ethmoidal region and antrum to be relatively opaque, left frontal clear, left ethmoidal region and left antrum opaque.

*Howarth operation* performed on the right side, September 13, 1933. Right frontal sinus cleared out of pathological mucosa and purulent contents. Right ethmoidal cells exenterated. Antra and left ethmoidal region to be dealt with at a later date.

The patient took the anæsthetic badly; but there was no undue hæmorrhage or shock. He died from sudden heart failure two hours after operation ended. The air passages were found to be clear at autopsy, and all organs apparently normal.

(5) Mrs. L., aged 43. History of headaches, nasal obstruction and post-nasal catarrh of long duration. She was in a very "nervy" state, almost to the extent of a "borderline mental" case. Intranasal examination revealed the presence of congested turbinates and pus in both middle meati. X-ray showed right frontal sinus and ethmoidal region to be relatively opaque, left frontal sinus doubtfully so, and left ethmoidal region apparently normal.

*Howarth operation* performed on the right side, October 21, 1933. Polypoidal frontal mucosa and seropurulent contents cleared away. Necrotic ethmoidal cells with polypoidal mucosa and purulent contents exenterated. Healed by first intention. Nasal reaction soon subsided.

Owing to my transfer to the Northern Command it was impossible to carry out any treatment on the left side of this patient's nose.

Subsequent progress: In response to inquiry, it was learnt that up till nine months since operation there has been no further trouble on the operated side, but that the patient has experienced a certain amount of headache and pain on the unoperated side and has been under treatment for rheumatism. Her general health has otherwise been a good deal better.

(6) Private L., aged 20. History of nasal obstruction on both sides, frequent head colds, headaches, post-nasal catarrh, etc. Intranasal examination revealed a moderate degree of left-sided septal deflection, congested middle and inferior turbinates on the right side, and pus in the right middle meatus. X-ray showed relative radio opacity of the right fronto-ethmoidal region.

*Howarth operation* performed on the right side, February 23, 1934. Thickened mucosa and purulent contents of frontal sinus cleared out. The ethmoidal cells contained pus and multiple polypi, which were all cleared out. Healed by first intention. Nasal reaction soon subsided. A great deal of œdema developed in the region of the wound and in the adjacent eyelids. This responded to fomentations and bouginage of the fronto-nasal channel, but paresis of the internal rectus muscle was subsequently found to be present. This is gradually passing off. The intranasal condition is now satisfactory (six months since operation) and the symptoms have been relieved.

(7) Sepoy N. Kh., aged 27. History of fronto-vertical headaches, chronic head colds, nasal obstruction, and post-nasal catarrh. Intranasal examination revealed congested middle and inferior turbinates on the right side, multiple polypi and much pus in the right middle meatus. X-ray showed right-sided fronto-ethmoidal radio-opacity.

*Howarth operation* performed on the right side, March 7, 1934. Polypoid frontal mucosa removed, ethmoidal cells exenterated. Nasal reaction soon subsided. Healed by first intention.

Up to the present (five months since operation) symptoms have been relieved, and there has been no recurrence of polypi.

(8) Mrs. S., aged 33. History of severe bilateral headaches, mainly in frontal region, worse on moving the eyes (especially to the right). The patient also complained of more or less generalized headaches over both mastoid regions and the back of her head, so a neurotic element was suspected. Chronic head colds and post-nasal catarrh were also complained of. All the above were of long duration and tending to get worse. Intranasal examination revealed congested turbinates on both sides, much pus in the left middle meatus and to a lesser extent in the right one. Multiple polypi were present in the right middle meatus. X-ray showed radio-opaque frontal sinuses and ethmoidal regions on both sides. Both mastoids were also X-rayed, but found to be clear.

*Howarth operation* performed on the left side, June 8, 1934. Thickened frontal mucosa was removed. Purulent ethmoidal cells were exenterated. Healed by first intention.

*Howarth operation* performed on the right side, June 22, 1934. Polypi removed. Anterior ethmoidal cells were not extensively involved. The posterior ethmoidal cells had polypoidal mucosa and contained pus. The entire ethmoidal labyrinth was exenterated. An extension of the anterior ethmoidal cells below the orbit had purulent contents, and was accordingly also cleared away. The frontal mucosa was also polypoidal, and the contents of this sinus were purulent. It was well cleared out. Healing took place by first intention.

The patient is still complaining of occipital headaches, but it is hoped that they will improve with a course of bromides, valerian and suggestion; particularly as her general health has considerably improved.

(9) Lance-Corporal S., aged 23. History of frontal headaches, chronic head colds, nasal obstruction, especially on the left side, and a feeling of tightness in the ethmoidal region. Intranasal examination revealed congested turbinates on the left side, and a great deal of pus in the left middle meatus. X-ray showed both anterior and posterior cell groups as well as the frontal sinus to be relatively radio-opaque.

*Howarth operation* performed on the left side, June 13, 1934. Polypoid frontal mucosa was removed, as were also its purulent contents. The ethmoidal cells were exenterated. Healing took place by first intention. Some œdema of the left eyelids developed; it was, however, soon dispersed by fomentations. It is too early as yet to form any opinion as to subsequent progress.

(10) Private H., aged 26. History of epistaxis, inability to shake off repeated head colds, nasal obstruction, left sided frontal headaches relieved by bending down, when a free discharge of fluid occurs, and by blowing the nose, and post-nasal catarrh. Intranasal examination revealed congested inferior turbinates and pus in the left middle meatus. Pressure over the floor of the frontal sinus on the left side gave rise to discomfort. X-ray showed relative radio-opacity confined to the posterior ethmoidal cells.

*Howarth operation* performed on the left side, June 22, 1934. Mucosa of frontal sinus was only slightly thickened, while its contents were serous, so it was disturbed as little as possible. Anterior ethmoidal cells appeared to be normal. The posterior ethmoidal cells had polypoid mucosa and purulent contents. The entire ethmoidal labyrinth was exenterated. Healing took place by first intention. Some three weeks after operation œdema of the left eyelids developed. Examination showed the fronto-nasal channel to be much obstructed by œdematous mucosa; this was cleared away and the antero-inferior part of the middle turbinate was removed; after which the œdema of the eyelids soon subsided. Up to the time of writing the nasal condition is satisfactory.

SUMMARY.

- (1) Empirical treatment is to be strongly deprecated.
- (2) Non-operative treatment of this somewhat intractable condition is apt to be disappointing both to the patient and to the rhinologist ; partly owing to the futility of many of the methods suggested and partly because of the strictly limited applicability of and merely transient benefit given by such methods as are worthy of trial.
- (3) Where the disease is quiescent the case is best left alone.
- (4) Where the patient is in good health and has only slight catarrhal symptoms, the case is best treated symptomatically.
- (5) The keynote to success in surgical treatment is accurate location of the diseased cells : for this good radiograms taken in standard positions are essential.
- (6) When the infection is limited to the frontal sinus or to the anterior ethmoidal cell group, transnasal surgery may be adequate.
- (7) When the infection is more widespread, the question becomes a more complex one.
- (8) Special indications for external approach are : (a) Associated frontal and ethmoidal infection, when both anterior and posterior ethmoidal cells are involved ; (b) fistula at the inner angle of the orbit communicating with the ethmoidal labyrinth ; (c) presence of orbital cellulitis or an intracranial complication ; (d) persistence of symptoms in spite of the establishment of efficient drainage ; (e) when economic reasons exist for not risking exacerbations, the latter being a constant possibility as the result of more or less sudden obstruction of the fronto-nasal duct and the possibility of "break-through" into the cranial cavity, constituting a serious menace to the patient's life ; (f) presence of a neoplasm in the sinus ; (g) when the subject of exacerbations is about to travel beyond reach of rhinological aid.
- (9) The chief desiderata for radical operations on the fronto-ethmoidal region are complete exposure of the whole interior of the sinus and free access to the infected ethmoidal cells.
- (10) In the Howarth operation we have a means of approach which fulfils all requirements, leaves the olfactory "danger area" intact, and enables the surgeon to be conservative or most radical according to indications. The results obtained are distinctly encouraging.
- (11) This operation can be performed with safety under Indian conditions provided adequate skin preparation is employed, and rigid asepsis practised both at operation and in the after-treatment.
- (12) Rhinologists are still divided into "internists" and "externists" ; but it must be borne in mind that repeated minor operations are unsatisfactory and ill-tolerated by the patient ; and, since it has been conclusively shown that the risk of intracranial pyogenic disease ensuing is greater when all the infected cavities are not dealt with at one sitting, there would appear to be a very strong case for external operation which enables radical treatment to be carried out under direct vision.

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