CHRONIC OTITIS MEDIA

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THE initial purpose of this paper was to have been a simple consideration of the lessons learned from a number of visits to certain of my colleagues elsewhere, visits paid with the object of seeing their work and discussing ideas in relation to chronic otitis media.

At the behest of a member of the Journal Editorial Committee, this purpose has been modified, so that simple consideration has in part given way to mild provocation, the intention being to stimulate correspondence. Whilst the survey was never designed to be comprehensive, limited discussion of the pathological and operative aspects may well provide all the dissension desired. The study will be restricted almost exclusively to that class in which the lesion is truly chronic, the disease inaccessible or relatively so, and wherein minor measures have not been, or are unlikely to be, useful.

The results of major surgical treatment in this disease had long caused me serious concern, but it was only late in 1947 that the easing of the war-time burden permitted a search for new ideas and techniques. During the war years escape from the failures was not possible and consequently I was robbed of an excellence reached by the facile process of delegating post-operative care to others. Perhaps the standard attained was no worse than that of many other surgeons, but it seemed certain that some of my colleagues were producing a goodly proportion of operative results which might be contemplated without shame. A series of visits elsewhere was indicated in order to study methods and to discuss clinical and pathological concepts on which these were based.

Pathological Concepts

Numerous processes are probably at work in the maintenance of chronicity and I cannot presume fully to understand all or any of them; yet it may be of advantage to discuss some of the ideas emerging from an experience of nearly 200 cases coming to operation during the past sixteen months.

Some observers have claimed that the pathology seldom or never exceeds changes which are amenable to some form of drainage or "uncovering" operation, for example a simple attico-antrostomy procedure. It is true that we have all seen large numbers of cases in which spontaneous arrest of disease has been achieved by a natural process apparently in keeping with this principle, and we frequently enough observe the cessation of activity after surprisingly little minor interference. On the other hand

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Chronic Otitis Media

I have observed scores of good drainage operations and radical procedures in which even meticulous after-care has failed to control continued production of offensive discharge and granulations, or to prevent reproduction of cholesteatoma and perhaps further spread of the pathology. Mere offhand recollection brings to mind seven cases during the last year, three competent enough radicals performed elsewhere, and four of my own of which I would only claim that their surgical execution was not much below average standard. All these were at least good drainage operations, quite acceptable " uniform " cavities, and yet all seven developed involvement of the labyrinth from osteitis of the promontory, invasion of the oval window or erosion of the ampullo-dome, over a period of a few months to a dozen or more years following the original operation. Some of my Northern colleagues had the opportunity of viewing a most beautiful transmeatal attico-adital exposure quite dry for months but reproducing " sterile " cholesteatoma in two tiny patches. The simple uncovering of relatively early pathology does often work well enough, but I have come to believe that it is insufficient for the control of long-standing continuous chronic processes.

Spurred on by personal observation of the enthusiasm and dexterity of Tumarkin, and having studied many of his successes, I gave great attention to his procedures of transmeatal atticotomy, attico-antrostomy, and so on, both on the cadaver and in the living. There followed some very sweet triumphs as well as some anxieties consistent with my lesser skill, but I largely abandoned the operation because it proved (even where technically good enough) inadequate for the unfortunately large numbers of very chronic lesions which confronted me. On the other hand, the very careful work of Thorburn, who was studiously curetting out every scrap of doubtful lining tissue, every available small cell, and polishing the exposed bone—work which at one time I too lightly dismissed and which elsewhere I have unkindly called " rather radical ", again forced itself to mind because it seemed to provide a few clues to the solution of the problem. Contact with the work of these and other surgeons, together with the empirical experience of numerous failures, many not my own, suggested the need for some working hypothesis, limited for the time being strictly to old pathology and to cases in which drainage surgery had failed. Any such speculations must stand the test of observational confirmation in so far as consistent with the conditions imposed by the practice of surgery.

In otitis media of established chronicity, there might be two factors, among others, of considerable importance :—(*a*) reservoirs, single or multiple, when associated with other factors and (*b*) irreversible changes, inflammatory or degenerative, in the lining membrane and adjacent bone, often not amenable to drainage alone.

The prosecution of these ideas has led me to believe that outlying cells

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cannot be overlooked in chronic disease. The frequent coincidence of chronic otorrhœa with sclerotic mastoid bones by no means implies that the two must go together, since quite often chronic pathology, particularly in the attic segment, can be seen in the mixed type of bone, and not seldom in well-pneumatized clefts. Without suggesting that this factor is of outstanding significance, I have found that small residues may be a source of surgical disappointment in spite of superficially adequate adito-antral attention.

Of much greater moment, in my view, is the factor of irreversible changes. In a case not showing obvious accumulation of cholesteatoma, it is possible to take a biopsy from the lining tissue in the region of the adital inner wall, and to find that the superficial cells consist of desquamating keratinizing squames; beneath these there may be found a shallow irregular stratum granulosum, succeeded by dense ranks of squamous epithelial cells overlying granulation tissue. One may also observe microscopically that this granulation tissue is continuous with granulation tissue *inside* the superficial portion of the underlying bone—the kind of process suggested by clinical observation of certain labyrinthine erosions. If a lining membrane of this kind is left *in situ*, however well uncovered, it may continue to produce pus, granulations, or accumulations of cholesteatoma. I have been driven to conclude that tissue like this cannot be trusted, and if this means returning to the pathological concepts of our predecessors, or transferring my allegiance to the views of some contemporaries, then I am willing to make the change—not necessarily with finality.

For some years one of my friends has held that chronic otitis is a benign disease, a notion to which I can give only very reserved assent. Doubtless changes which are about to generate chronic pathology are at some stage and for some time benign, because they are so far early and reversible; but unfortunately there is good reason to believe that the condition is not always consequent on an advertised acute otitis, being as often or perhaps more often a thing of insidious development. In either case, once established, it may be too optimistic an assumption to label it as benign, in view of the known erosive character of the disease in its threat to hearing and balance, or to the intracranial structures—and I still see a sufficiently steady stream of otogenic intracranial tragedies to disturb my peace of mind. Granted that most cases will permit even leisurely observation, and perhaps a prolonged conservative therapeutic approach, I nevertheless believe that the pathology should be regarded as potentially erosive rather than benign.

Surgical Principles Arising from the Foregoing

Assuming that there is some substance in the pathological concepts already stated, and allowing that these are not comprehensive, what

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seems to be the logical consequence? I suggest that in old-standing lesions, if arrest of the disease is to be attained, the indications are that surgery should be excisive rather than merely the surgery of drainage. Given the presumption of such a pathology in part of, or the whole of the middle-ear cleft, operation should be meticulously " radical ", or excisive, in relation to those parts involved. The procedure, then, should include attention to outlying cells if present and affected, removal of diseased lining tissues, and curettage or polishing of underlying bone—the last in effect also excisive. And does not nature sometimes reject an ossicular remnant which remains active as much from nutritional impairment as from mere infection?

This word excisive is used not only in provocative manner, but also in a logical sense, because it defines fairly accurately the true meaning of the term radical as it relates to a pathology uninfluenced by simple exposure. The question of function, at least in respect of the transmission of sound, does not arise, since one may treat radically a diseased portion of the middle-ear cleft, and at the same time conserve an unaffected ossicular chain. On the other hand one cannot be functionally conservative towards a transmission mechanism which has ceased to transmit, as it may do from a very limited erosion of the tip of the incudal long process. Surely a radical change in ossicular function is far more often determined by existing pathology than by any radical clearance undertaken by the surgeon. Those who claim that the radical operation is never necessary should consider what object there may be in conservation and we might all benefit from some regard for the philosopher's love of definition. If the ossicular chain loses its continuity, the remnants can only be retained usefully if they serve to promote healing or at worst do not hinder healing, but it seems clear enough that they cannot be preserved in any functional sense.

This thesis, of course, assumes that the production of a dry ear is considered a legitimate ambition, always provided that the attainment thereof is not directly destructive of function.

Surgical Aspect

During the past sixteen months I have tried various surgical techniques standard and otherwise. In summarizing these in the classification given below, an endeavour has been made to cover all contingencies in the simplest fashion. In each case the *first term refers to the soft tissue work and the second term to the bony approach.*

1. Post-aural / transmastoid (Classical approach).
2. Post-aural / transmeatal (modified Tumarkin technique).
3. Permeatal / transmeatal (Tumarkin technique).
4. Endaural / transmastoid (the " modern " approach).
5. Endaural / transmeatal (modified Tumarkin).

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1. The post-aural transmastoid approach may be dismissed with the comment that it will commonly require also a meatal plastic procedure, in which event some may consider that the endaural technique should be employed from the start.

2. The post-aural transmeatal operation is simply the Tumarkin procedure with the addition of a skin incision, the meatus being crossed at the junction of cartilage and " membranous " wall. Thereafter, the meatal flap and bony atticotomy approach are as Tumarkin describes them.

3. I have invented the description " permeatal transmeatal " in order to put the operation neatly into its pigeon-hole, and it may be well that one who has closely studied this work should attempt a critical review, initiated in part at the suggestion of the inventor himself.

What are the essential features of this operation ? These may be summarized as follows :—

(*a*) The operation is extracartilaginous and requires no external incisions.

(*b*) A good skin flap is manufactured, still retaining its blood supply, and turned over into the mastoid segment so promoting healing and ensuring that one surface is covered by useful epithelium.

(*c*) The transmeatal technique ensures that the operator comes down on the important attic pathology early in the procedure, rather than late.

(*d*) By beginning with the prime site of the disease, the pathology can be followed as far as it goes without interference with tissues not involved.

(*e*) The technique ensures the minimal possible size of cavity and so the maximum speed of healing.

In addition to rapid healing in a large proportion of cases, Tumarkin claims certain advantages in conservation of function and suggests that the procedure is a minor operation as compared with others. At the risk of being accused of misinterpretation, he also considers that drainage rather than excision is one of the principles, and he is inclined to dismiss the importance of outlying cells.

Considering the above items one by one, it may be said that the strict technique is virtually alone in its absence of approach incisions. For those who, like myself, find most ears beyond their talent with only a split speculum for access, the addition of a post-aural incision is a trifling matter for both patient and surgeon. Provided that the technique is within the competence of the operator, and that after-access is good enough to a pathology which will subside with mere uncovering, there is no chronic ear operation which produces such rapid healing. On the other hand the permeatal procedure is too difficult in most cases for me, the access for " excisive " surgery where this is demanded is not adequate and I

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prefer a larger meatus for post-operative purposes than the average ear provides. I am less impressed nowadays with the great importance of keeping away from cartilage, if only because I have found the " open " interference with cartilage to be largely without terrors.

Admitting my indebtedness to Tumarkin in respect of the meatal flap which he uses, and in consequence also for various modifications of my own, this plastic measure can be combined with any other approach (with the possible exception of the pretragal transmeatal Popper technique). Of its value I have no doubt and its adoption can be strongly recommended.

The transmeatal *bony* route is of course essential to the operation but it may be employed as an adjunct either to the post-aural or the endaural soft-tissue technique. I have used it extensively in all of these approaches at first for the reasons given by Tumarkin, but latterly because, once mastered, it is usually much easier than fashioning a bridge from behind and then having to remove it. If a pure atticotomy, or attico-adital exposure, is intended, then one must work transmeatally, but if the antrum is also entered then there seems no essential difference between the transmeatal route and an entry effected *viâ* the region of Henle's spine. In the thesis I am arguing, the transmeatal bony route offers no advantage over the Henle approach, other than the convenience of the operator.

For the same reasons I suggest that, in cases other than those with the narrowest attic disease, the size of the operative cavity will in principle be the same by both routes if the pathology is followed only as far as it goes. It savours slightly of special pleading to compare the minimal excision of the Tumarkin operation with the maximal excision of the classical radical, because these are not necessarily the only alternatives. There may be a third, *viâ* Henle's spine, when the excision will usually be about equal, assuming the same pathological concepts.

The questions of conservatism and outlying cells have already been considered. On the former, I hold that principles other than those intrinsic to this discussion are involved; and as to the latter, I cannot feel that cells may be altogether dismissed.

Having gained the greatest possible advantage from my study of this permeatal operation, I have abandoned it almost wholly because too few cases fell safely within my competence, it seemed inadequate for very chronic disease, and it gave poorer after-access than I found comfortable. I have retained the meatal plastic in almost every case, and the transmeatal bony attack in the majority. On the latter point, I incline to recommend trial on the cadaver before operation on the living—the facial nerve from this side seems to have migrated.

4 and 5. The endaural transmastoid operation is in common use to-day and I would treat of it in conjunction with the transmeatal route. Experience with the transmeatal bony attack, in association both with the

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strict permeatal Tumarkin procedure and my own post-aural modification thereof, showed that entry *viâ* the attic had certain advantages—once I had learned to avoid the facial nerve. Having mastered the technique it seemed in my hands to provide an easier access in most cases, though a narrow deep meatus might occasionally drive me towards Henle's spine and a transmastoid attack. If the antrum is in any event to be opened, there is no fundamental difference between these two. For the past many months most of my cases have been approached by an endaural transmeatal technique, but now and again a particular anatomy has driven me to the alternative. However, all this refers to no more than the avenue employed and therefore it seems best to offer for criticism the details of my present methods separately.

Present Operative and Post-Operative Methods employed by the writer

Preparation. On this point, I would discuss only hæmostasis. Various injections have been tried, but more than a year ago I came down heavily on the side of high concentration in small quantity as against low concentration in greater quantity. I use a sterilized solution made up of 10 minims of liquor adrenalin in 110 minims of diluent (procaine is used for reasons of theatre convenience) ; about 40-60 minims is injected with a dental syringe—that is to say the amount of 1 in 1,000 adrenalin solution seldom exceeds 5 minims and is often less.

Soft Tissue Work

Endaural exposure is surely good enough for the great bulk of cases and it must seldom be that a post-aural incision is required on grounds of access only. My endaural incisions have varied a good deal, often in the search for nicer post-operative access, sometimes because of a particular tragal and conchal anatomy. The usual upper incision is now similar to Lempert's incision No. 1. The lower cut begins several millimetres *external* to the inner end of the first, is carried sharply backwards, and then downwards, no effort being made to avoid cartilage at the lower end. No skin is removed but considerable undercutting is carried out down to periosteum and the excision may even include some cartilage. All the skin of the roof and posterior wall, internal to the second incision, is now separated down to the attic. From this cuff, either now or later, a meatal (or tympano-meatal) flap is fashioned, consisting of the roof and posterior wall of the soft tissue canal, to be turned over eventually into the mastoid segment of the operative cavity.

Bony Approach

This has already been fairly well covered. Wherever possible the attic is entered *viâ* the meatus and then the work is carried backwards into the

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aditus and antrum. Alternatively the antrum is entered *viâ* the region of Henle's spine and subsequent work in the reverse direction.

Detail Work

Here I am assuming that the pathology is such as to indicate "excisive" surgery. Generally I try to hold to the principle of minimal removal and endeavour to leave as small a cavity as seems consistent with elimination of pathology. For some time now it has been my practice to elevate the diseased lining with a fine separator and where necessary to curette or polish the underlying bone. If a complete clearance of tympanic remnants (other than the stapes) is indicated, the same careful excision of lining is carried over the facial canal into the tympanum, and as far as possible the window regions are meticulously cleaned. I find it a useful ambition to preserve the chorda tympani and it may sometimes be left as the only structure crossing the tympanic space; but this is not to say that its preservation is of first importance or that it should be allowed to impair the proper conduct of the operation. Following a question by Brown-Kelly, last October, concerning the use of the microscope, I decided to use magnification in certain cases. This measure gives me no common advantage, but the instrument is usefully kept in the background in case of any unusual finding or difficulty, e.g. facial exposure, eroded stapes etc. Great care is taken to lower the facial ridge to its limit particularly at the inner end and I like to clear the anterior lip so as to give a good exposure of the oval and round windows. Thrombin is used to dry out the cavity and then a little powder (sulphonamide, urethane and boric) is insufflated. The meatal flap is turned over the facial ridge and kept in place with a bipped wick, other wicks being added as necessary. The operation is completed by a few sutures in the upper part of the first incision. The average case requires 70-90 minutes of operative time.

Post-Operative

Most patients are up and about in two or three days, sometimes earlier. Sutures are removed on the fifth day, and one week after operation the packs are removed, usually under brief pentothal anæsthesia. No further packing is employed. The cavities are seen about thrice in the ensuing week and then once or twice a week as necessary. Dry mopping is employed and the ambition is that every inspection should be carried out by the operator. I am now beginning to see some cases in which epithelialization is rapid, but of course many more in which it is not rapid and some in which there is no sign of it. Some may say, and do say, that this is all much ado about very little, and that the average results are good enough anyway. A method has been evolved of keeping results strictly in sight, and it is most surprising how easily one may be satisfied

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with a few good cases if this is not done. In mid-September, 1948, a large sheet was put on my R.V.I. dressing room wall. There are now (February, 1949) forty-five cases on the wall and almost every attendance is noted under such categories as :—dressings, granulations, moist, dry, epithelialized and so-on. It is an interesting document, there for all to see, and it offers an excellent aid to humility, though even some of the cases now regarded as disappointing would at one time have rather pleased me. Strict objectivity is perhaps unattainable, but a plan like this may go some way towards it.

Further Comments

This outline of a big subject must necessarily be sketchy and there are considerable fields that have not been touched—e.g. I have said nothing of the eustachian tube, of nasal suppuration, of facial weakness or worse, of the cleanliness necessary after the patient goes home, or of many another thing. Yet I may hope to have written enough to stimulate comment on a problem which must have caused distress to many an aural surgeon.

I have reviewed and criticized certain aspects of the work of some of my fellows and I trust not unkindly. Having so done, this would seem a fitting place to record my indebtedness to the kindness and hospitality, and especially to the patience of those who have borne with me and taught me so much ; and particularly would I mention Tumarkin, Thorburn, Otty, Spencer Harrison, Morton, Thomas (York), among others, because these are the people who have borne the brunt of my visits.

Finally it may be said that this is an incomplete study, now ending without moral or summary. It is left thus in the hope that the epilogue will be written by others.

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