throat. In the early stage, the pent-up fluids cause serious distension, but these become gradually absorbed; and then, unless the normal communication between the ear and the pharynx is re-established, the atmospheric pressure on the outer surface of the membrana tympani presses it inwards, and forces it against the fenestra ovalis. In this way, the organ undergoes permanent injury, and the drum, together with the contents of the tympanum, are damaged by structural changes. The membrane then appears to be deeply indented and concave, the margin looks thickened, the centre thin and transparent, and sometimes the short process of the malleus is visible through it.

Deafness and tinnitus are also intimately associated with diseases of the naso-pharynx. The tonsils are often enlarged, and their follicles filled with a yellowish fluid. Sometimes the mucous surfaces of the pharynx are swollen and covered with a thick muco-purulent secretion, which completely blocks the Eustachian orifices. In many chronic cases, the mechanical closure of the tubes is caused by out-growths of glandular tissue, which narrow the naso-pharynx, and obstruct the nasal passages.

Pressure on the outer surface of the drum is another source of tinnitus. It is frequently excited by the presence of a mass of impacted cerumen or the lodgment of a foreign body. In a case, recently under my care, immediate relief followed the removal of a large polypoid growth which projected from the external orifice. Under these circumstances, of course, efficient treatment is very easy of application.

Some aurists have ascribed the obstinate continuance of this unpleasant symptom to an altered condition of the intrinsic muscles of the tympanum. It is quite possible that, during a state of chronic inflammation, they may form adhesions with the surrounding structures, and so excite abnormal pressure during their contraction. On the other hand, they may lose their normal tonicity, or fall into a paralytic condition, through vascular and trophic changes. Now, any loss of contractile power must tend to aggravate any disturbance of the balance of pressure within the tympanum. The muscles of the ossicles are directly stimulated by sound, and, in the normal state of the organ, may regulate the tension of the membrana tympani, and the movements of the stapes in the foramen ovale; so it is at least probable that a loss of tone may be followed by an undue excitation of the auditory nerves.

I have now briefly considered tinnitus aurium in its relation to many common disorders of the conducting apparatus of the ear. In all cases of middle-ear disease in which it is present, it must be regarded as a symptom excited by abnormal pressure upon the internal auditory apparatus, and produced by mechanical causes within the tympanic cavity. But this disorder has sometimes a much deeper origin, and is essentially dependent upon disease of the nervous structures of the organ, and this, too, under many and very varying conditions.

During the course of brain or meningeal disease, the blood-supply to the internal ear may become deranged, and thus abnormal vibrations may be generated by a disturbance of the circulation within the cranium. The presence of persistent tinnitus, in association with general indications of atheromatous degeneration, must be regarded as a premonitory symptom of structural changes in the walls of the cerebral blood-vessels. Under such circumstances, the sounds appear especially depressing to the patient, exhibiting a wavy or beating character, and are often synchronous with the cardiac systole. Not long ago, a case of this sort occurred in my practice, and the patient, an officer in the army, died suddenly in a London street.

Tinnitus may result from hyperæsthesia or undue irritability of the auditory nerve. This condition is often induced by constant exposure to loud and harsh sounds. Many persons engaged in noisy trades experience for hours, after the cessation of their toil, a constant buzzing in the ears. Now, whenever this aural system constantly recurs, more or less deafness is sure to follow; and, if the exposure is continued, it will at length issue in the development of a very obstinate and persistent form of this affection.

In many cases of chronic aural disease, the branches of the auditory nerve which are distributed to the deep recesses of the labyrinth, appear to be the real seat of the disorder. Sometimes the fibrous membrane lining the bony cavities, and also the osseous structure itself, are found thickened and congested. The blood-vessels of the labyrinth are likewise dilated, and the membranes marked by the remnants of old capillary extravasations. Many forms of atrophy and degeneration of the nerves of the labyrinth are the result of arrested function, induced by disease of the conducting apparatus and tympanum. In these cases, from the long withdrawal of healthy stimulation, the ultimate fibres have lost their sensibility for sound, and a persistent tinnitus has been roused into existence dependent upon chronic changes

in the walls of the membranous labyrinth, which are capable of exciting the filaments of the auditory nerve, and creating disorderly discharges in the direction of the cerebral centres.

The most careful examination of the internal ear, in cases of obstinate aural disease, has sometimes failed to discover any very definite structural lesion; but, after all, opportunities for investigation in this direction are rare; at the same time, the complexity and delicacy of the auditory nervous network render the recognition of morbid changes a matter of considerable difficulty.

I have already remarked that very slight and varying conditions of the tympanic apparatus are often quite sufficient to modify the sensibility of the ear, and to kindle within it disturbing vibrations. Now, in some cases, these little variations are rendered acutely distressing through constitutional derangement, or by general disorder of the vascular system. Thus, tinnitus is sometimes present in anæmia and chlorosis, and is roused into activity and greatly intensified through the altered composition of the blood itself. At other times, it follows as the result of serious hæmorrhage, by which the blood-pressure is reduced and the vessels suddenly relaxed. It occurs in connection with venous hyperæmia, associated with cardiac obstruction and regurgitation. Occasionally it is a troublesome symptom during the course of some forms of chronic disease, in which the aural vascular system is disturbed by the high tension of the circulation. Many constitutional disorders are also observed to be important factors in the production of tinnitus, and this fact is frequently exhibited in patients who have long been the victims of gout, alcoholism, chronic dyspepsia, and general nervous depression.

It is evident, then, that tinnitus, of every character and intensity, must be regarded as the outcome of many disordered conditions of the ear, and that these conditions are aggravated by vascular and constitutional derangements. Sometimes it is an indication of temporary functional disturbance, at other times it points to structural change in some part of the organ. When considered apart from all its surroundings, it possesses very little diagnostic value. The important question to determine is the special form of aural disease of which it is a manifestation. Is it a symptom of middle-ear disease, or an affection of the nervous structures of the organ? We must not forget, however, that in practice the deep and superficial disorders are often intimately blended together, that changes in the sound-receiving apparatus are the secondary results of chronic middle-ear disease, and that it is sometimes a difficult problem to determine the exact seat and nature of the lesion which is the real source of the tinnitus. It is necessary, therefore, that we should in every case investigate the history and duration of the disorder, and carefully inquire into the constitutional condition of the patient. The conducting power of the ear must be tested with the watch and tuning-fork, and the external meatus and tympanic membrane inspected under good illumination. It is always, too, an important matter to examine the condition of the pharynx and nasal cavities, and then to prove the mobility of the drum, and the patency of the Eustachian tubes, by means of the air-douche and otoscope.

[To be continued.]

PROLAPSE OF THE UPPER INTO THE LOWER PART OF THE RECTUM WITHOUT EXTERNAL PROTRUSION.

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THE term prolapse of the rectum is often used somewhat loosely, many writers making it include hæmorrhoidal protrusion as well as the simple eversion of the gut. When the protrusion chiefly consists of dilated or hypertrophied vessels, it is rightly described as hæmorrhoidal, notwithstanding that a certain amount of normal mucous membrane may be drawn down at the same time.

The word prolapse should be restricted to cases in which the bowel, except for its liability to protrude, is healthy, or, at any rate in which any morbid condition affecting it is the result, rather than the cause, of the protrusion.

The amount of bowel that prolapses varies greatly, sometimes being little more than a fold of mucous membrane, while, occasionally, many inches involving all the coats of the bowel are turned inside out. In the former case the prolapse is described as partial, in the latter as complete. The closeness of the attachment of the rectum to the surrounding structures varies greatly in different individuals, a fact often noticeable upon examining the part with the finger. In some patients the bowel, when empty, has a smooth uniform surface, while

in others it is so relaxed as to be thrown into deep folds and reduplications. The mucous membrane is often so loosely connected with the muscular coat, as to slide considerably upon it, and it is a portion of mucous membrane thus sliding downwards, that forms the partial prolapse. In other instances, not merely does the mucous membrane slide upon the muscular coat, but the whole upper part of the bowel is liable upon straining to become invaginated into the lower portion, and, eventually protruding through the anus, forms a complete prolapse.

The cause of prolapse can in many cases be traced to abnormal and persistent straining, as may be seen from its frequent concurrence with phimosis, or stone in the bladder in children, and from chronic constipation and hypertrophied prostate in the adult; while occasionally the dragging of a polypus is the exciting cause. Often, however, none of these conditions appear to be present, and the prolapse can only be accounted for by a natural deficiency in the attachments of the gut. Sometimes a prolapse may be produced suddenly, during some violent straining effort; but, more commonly the process is a gradual one, and it can be observed how a partial prolapse, at first consisting of the sliding of the mucous coat alone, may gradually become complete by drawing after it the other coats of the bowel.

Many cases of complete prolapse, however, doubtless commence by an invagination of the middle into the lower part of the rectum. The upper portion of the gut is naturally more mobile and less firmly attached than the lower part, and this difference in mobility affords an explanation of the extensive prolapses occasionally met with, for these commence by an invagination of the upper into the lower part of the bowel, forming an intussusception, which, by the continuance of straining, is eventually protruded from the anus. It will be seen that in such a case there must have been a stage in which there was merely a slight invagination of the middle into the lower part, without any anal protrusion. It is probable that, in many instances, this first stage is never exceeded.

It is the object of this paper to call attention to this particular form of invagination. The condition is of not infrequent occurrence, and it is possible that it may exist without causing trouble; but, I am confident that it occasionally affords an explanation of rectal symptoms otherwise unaccountable.

The symptoms of prolapse when any considerable portion of the bowel is protruded are sufficiently prominent to admit of easy diagnosis, and the patient is generally aware of protrusion on straining. Occasionally, however, even with a considerable prolapse, the patient may be quite unconscious that any part of the bowel comes down, as in the case of a girl under my care at St. Bartholomew's Hospital, who had been passing blood and a certain amount of slime daily for more than two years. Whilst in the hospital, the bowels acted several times a day, about a teaspoonful of blood passing with each motion. She generally strained a good deal, but had never noticed any protrusion. She had but little pain in the bowels or about the anus. She was very weak and anæmic from the continual loss of blood. After a purge, and a soap and water injection, I examined the parts, which appeared normal with the exception of a weak sphincter. There was no sign of piles. By gently drawing on the parts, and telling the girl to strain, a small quantity of mucous membrane was everted, when by a sudden effort about three inches of the bowel shot out, forming a typical complete prolapse. At the top of some of the protruded rougie could be seen several shallow ulcers about an eighth of an inch in diameter. As the prolapsed part became congested, blood at once commenced to ooze from the margin of two or three of the ulcers, and in a few seconds accumulated in sufficient quantity to drip. The case was eventually cured by the use of the linear cautery. In this case, owing to the prolapse being complete, and becoming extruded at the time of examination, the diagnosis was fortunately easily made, and the girl cured, but had the protrusion not occurred at the time of examination, it would have been extremely difficult to make a diagnosis as to the cause of the trouble.

In cases in which the prolapse never protrudes at all from the anus, it is highly probable that the disorder may be altogether overlooked. The following case affords a good illustration of this fact.

A gentleman sent to me by my friend and colleague, Dr. Lauder Brunton, gave the following history. For two years he had a discharge from the rectum. This usually occurred in the morning on first going to stool, and it was occasionally repeated once or twice in the day. The discharge amounted to about a teaspoonful in quantity, and consisted of a muco-purulent material resembling the lightly-boiled white of an egg. He often had a sensation of the bowels being incompletely relieved, and he also complained of an occasional slight aching about the sacrum, but had suffered little or no actual pain.

He occasionally lost small quantities of blood. He was very anxious and nervous about himself, and had for long been treated without benefit, his disorder having been variously described as "catarrh of the bowel," "dysentery," and "liver complaint."

I made a very thorough examination of the bowel, on the probability of there being some ulceration, internal fistula, or possibly malignant disease, but failed to find any one of these conditions. On introducing the finger into the rectum, it became arrested by some loose folds of the gut, and some little manipulation was required to pass the finger into the bowel. On further examination, it was found that the middle part of the rectum was so relaxed, that a large fold of it became invaginated into the lower portion, and each time the patient strained, it was forced down so as to make a kind of intussusception. The invaginated part did not extend low enough to protrude through the anus. The mucous membrane at the summit of the prolapsed fold had a thickened velvety appearance, caused by the development of minute flattened villi on the surface. Having failed to find any other morbid condition, I came to the conclusion that the discharge and other symptoms arose from the intussuscepted mucous membrane becoming congested from pressure about its neck, and that, if this could be prevented, the case might be cured. The case was treated accordingly with the linear cautery with the most satisfactory results. I saw the patient a year later, when he stated that, since the operation, he had had scarcely any trouble, the irritability of the bowel having passed away, and the mucoid discharge having ceased.

It should be understood that when patients complain of mucoid discharge, and loss of blood, it not infrequently happens that the disease is the result of hæmorrhoids, ulceration, stricture, or cancer, each of which has its peculiar train of symptoms, the diagnosis of which can be confirmed only by examination. But it is when somewhat anomalous symptoms, such as described in the last case, occur, and when a careful examination fails to disclose any of the common diseases mentioned, that the probability of the symptoms being occasioned by a partial internal prolapse should be remembered.

Treatment.—It is possible that some benefit may arise from palliative treatment, and I have seen good results follow, especially when intussusception is slight, the use of water injections, as advocated by Brodie. The treatment consists of a daily injection of warm water, in order to obviate straining; and then, after the motion is passed, one to two ounces of quite cold water should be injected. The effect of the latter injection is to brace up the bowel by causing contraction of the muscular fibres. Benefit from this line of treatment must not be expected immediately, and the method should be persevered with for at least some months. In cases where the protrusion is considerable, causing trouble by creating an unnatural frequency and desire for a motion, with a troublesome mucoid discharge, if the cold water treatment and astringent injections have been tried without success, the case has a good chance of cure by the free use of the linear cautery. This treatment, so strongly advocated by Van Buren for external prolapse, is certainly an invaluable method of treating that disorder. It was from its success for external prolapse that I was led to try it as a means of remedying the invaginations now under consideration. The cautery produces inflammation resulting in the formation of a new fibrous tissue which, from its contractile tendency, firmly unites the mucous and the muscular coats along the track of the cautery iron. In this way the sliding of the mucous on the muscular coat is prevented, and the prolapse stopped in the initial stage. It is, of course, possible that the effect of the cautery may be more extensive, and that the inflammation may extend sufficiently to effect the union between the bowel and the cellular tissue surrounding it. The detail of the operation is as follows:—

The apparatus required consists of a large duck-bill speculum, two or three small sponges on holders, and a small blunt prong on a long handle for separating the mucous folds, a large spirit lamp, and a couple of cautery irons. The iron consists of a tapering metal rod four inches long set in a handle, the end of which is turned down at a right angle, expanding into a knob of metal about the size and shape of a small acorn. These irons can be heated over the spirit-lamp and used alternately. They will be found far more convenient and readily handled than Paquelin's cautery, which too rapidly cools.

The patient having been prepared with a purge on the previous day, and the bowels washed out an hour before the operation, is placed in the lithotomy position; the speculum is introduced, and four lines of cautery are drawn along the axis of the bowel, commencing as high as possible, and terminating at the anus. Of these lines one is drawn on the anterior, one on the posterior, and one on each side of the bowel, the speculum being shifted as required.

It is difficult to estimate the exact depth to which the cautery extends; it will be found sufficient if the iron be used at a black heat, and drawn slowly along the bowel. On completing the cautery, a pad of cotton-wool should be placed against the anus, and kept firmly in position by a perineal bandage. The after-treatment consists of keeping the bowels confined for some days, and for several weeks only allowing an action in the recumbent position. The patient should be specially cautioned against straining, and the motion should be kept soft by taking twenty to thirty drops of extract of cascara sagrada every evening. If care be taken to prevent the skin of the anus being touched by the cautery, there is very little after-pain.

If the case is not cured by a single application of the cautery, the procedure should be repeated.

THREE HUNDRED CONSECUTIVE CASES OF HÆMORRHOIDS CURED BY EXCISION.¹

By WALTER WHITEHEAD, F.R.C.S.E., F.R.S. EDIN.,
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DURING the first five years of my professional career, I employed the ligature in the few cases of severe hæmorrhoids that came under my treatment. I operated according to the most approved method of that time, cutting through the skin and mucous membrane, and applying the ligature to the artificially-produced pedicle. The number of cases operated upon did not, perhaps, exceed a dozen; nevertheless, they were sufficient to convince me that the ligature by no means produced a radical cure. One of my patients returned almost as bad as ever, and the reports I heard of another were anything but satisfactory. Although I have rarely made use of the ligature since, I have, during the last fifteen years, frequently operated a second time on patients whose piles had been previously ligatured. In some of these recurrent cases the operation had been performed by men of eminence in this department of surgery, leaving piles so extensive that it has been difficult to believe that they had ever been subjected to a previous operation. Amongst these, one was a case operated upon by Salmon thirty-six years ago.

After abandoning the ligature, I adopted the clamp and cautery, which to the novice appear to have such fascinating advantages. For eight years I treated all my cases in this manner, and I devoted a considerable amount of attention during this time to the construction of an instrument, which I eventually finished to my satisfaction, and called a Speculum Clamp. This instrument I now produce; and I merely mention it to show that for the time I had a strong prejudice in favour of this method of treatment. My experience of the clamp and cautery, which certainly exceeded fifty cases, resulted eventually in the conviction that it was decidedly inferior to the ligature. The immediate risks I found to be greater, and the failures by recurrence more numerous. Certainly it was more frequently followed by secondary hæmorrhage, and I am acquainted with cases where the bleeding, which is reported to have taken place, must have been little less alarming after the use of the clamp and cautery than that which occurred in those days when hæmorrhoids were unceremoniously excised, and no precautions whatever taken to arrest hæmorrhage. These cases were operated upon by surgeons of recognised repute in this special method of treating piles. I consider that a plan of treatment which fails to compass that special end for which it was designed, and in addition has other obvious disadvantages, besides the further objection of being somewhat difficult to understand and complex in execution, loses its position in surgery, and must give place to other operations which involve less risk, give better results, and do not require any special surgical training.

Being convinced of the disadvantages and the imperfections of the ligature, and the clamp and cautery, I abandoned both in 1876, and I have never used either of them since.

During the last nine years, with the exception of a few cases treated by thermo-puncture, and others by the injection of chemical agents, I have almost exclusively removed hæmorrhoids by excision, and unless I had very ample and sound grounds for advocating the advantages of this plan of treatment, I should have deferred saying anything until such time as much greater experience would have justified the course I am now taking. It has, however, so far exceeded all my expectations, that I have no hesitation in expressing my conviction that it surpasses in every respect every other operation designed for the same purpose. I have now operated upon more than three hundred patients without a death, a single instance of secondary hæmorrhage, or one

case where any complication, such as ulceration, abscess, stricture, or incontinence of feces has occurred. I may go further, and state that I have never had one moment's anxiety about any of the cases, and to the best of my knowledge every patient has been completely and permanently cured.

I am now, with all due diffidence and respect, going to make what may appear a very bold statement. I do not consider that any surgeon has a thorough conception of hæmorrhoids until he has performed the operation of excision. He may have dissected the cadaver any number of times with the special object of studying the structure of hæmorrhoids, but it is only on the living subject that dissection will reveal their true nature. It is these vivisections that have confirmed my belief in the inefficiency of the ligature and the clamp, and they have revealed also the cause of failure. In surgical literature we read of hæmorrhoids as distinct individual tumours, but the vivisections I have referred to demonstrate that the entire plexus of veins surrounding the immediate interior of the gut is invariably at fault. Without doubt the hæmorrhoidal condition is marked by special protuberances at certain points in the circumference of the gut, and these I find have a pretty uniform position, owing no doubt to the regular disposition of the fibrous septa.

But the essential fact remains that, though possibly concealed by these masses, there are minute venous radicles behind and between the main tumours. They are now as small as their larger neighbours once were, but let the latter be removed by clamp or ligature, and the apparently insignificant venules will dilate and take their place, the very removal, perhaps, affording room for growth, and whilst taking off external pressure leaving the tension within increased. It is on the removal of these rudimentary piles, that the permanence of the cure and the future welfare of the patient depend; and I contend that the operation of excision alone satisfactorily accomplishes this object.

The principles of the operation are exceedingly simple, and its performance requires no special apprenticeship. I have received numerous letters from provincial practitioners, who had only read the original description I gave in the *BRITISH MEDICAL JOURNAL* for February, 1882, expressing their entire satisfaction with the operation. As I have since slightly modified the operation I will first briefly describe it, and afterwards discuss in more detail some of the stages which, perhaps, require further explanation and some vindication at my hands, as the operation is opposed to some of the most cherished practices of modern surgery.

1. The patient, previously prepared for the operation and under the complete influence of an anæsthetic, is placed on a high narrow table in the lithotomy position, and maintained in this position either by a couple of assistants or by Clover's crutch.

2. The sphincters are thoroughly paralysed by digital stretching, so that they have no "grip," and permit the hæmorrhoids and any prolapse there may be to descend without the slightest impediment.

3. By the use of scissors and dissecting forceps, the mucous membrane is divided at its junction with the skin round the entire circumference of the bowel, every irregularity of the skin being carefully followed.

4. The external and the commencement of the internal sphincters are then exposed by a rapid dissection, and the mucous membrane and attached hæmorrhoids, thus separated from the submucous bed on which they rested, are pulled bodily down, any undivided points of resistance being snipped across, and the hæmorrhoids brought below the margin of the skin.

5. The mucous membrane above the hæmorrhoids is now divided transversely in successive stages, and the free margin of the severed membrane above is attached, as soon as divided, to the free margin of the skin below by a suitable number of sutures. The complete ring of pile-bearing mucous membrane is thus removed.

Bleeding vessels throughout the operation are twisted on division. This brief description comprises the several stages of the operation.

1. In the first place it will be observed that beyond the chloroformist the operation requires no skilled assistance. A single nurse is quite sufficient, and I have on more than one occasion dispensed with assistance altogether.

Contrary to general recommendation I prefer the lithotomy position, with the legs well flexed on the thighs and the thighs on the body. This raises the whole pelvis, and gives the surgeon a commanding view of the field of operations. I sit in front of my patient, with my work on a level with my shoulders.

2. I have a strong objection to the use of instruments in the dilatation of the sphincters. Not only are they apt to produce sloughing, which would jeopardise the success of the final step in the operation, but the danger of rupture and possible future incontinence is also

¹ Read in the Section of Surgery at the Annual Meeting of the British Medical Association at Brighton.