higher forms, is to be found in each segment. Such organs exist in the embryos of all bony fishes, while they persist throughout life in some (for example, *Gobius Esow*). They present the form of a bulb of hair-cells, on the same plan as taste-bulbs. As the organs of special sense diverged from these of common type, it became advantageous that all these common ones should be supplied by a single diametameric nerve, the nerve of the lateral line. The nerve extends from before backwards, apparently by delamination from the epiblast. In cartilaginous fishes, the nerve and its sense-organs extend no farther backwards than the gill-bearing region, in which their relations to the character of the surrounding water are especially important. The only vestige of this series which remains in man is the remnant of the nerve of the lateral line, which persists as the auricular branch of the vagus.

The ear is commonly regarded as derived from a member of this series, but the eye and nose are always excluded. The first and second nerves are treated as parts of the brain, and excluded from the segmental scheme; either because they, and the part of the brain with which they are connected, are regarded as homologous with the cephalic ganglia of invertebrates (occurring in a region into which segmentation does not extend); or because of their hollow outgrowth from the neural tube; or, lastly, because the retina and olfactory bulb contain elements which elsewhere are rightly considered to be comprised within the brain and spinal cord. The first of these reasons has been already discussed. The second appears, to the lecturer, to be of no morphological importance, for the whole central nervous system was at first solid, and only subsequently became hollowed out and lined with cilia (as Mr. Sedgewick has suggested), for the safer location of its cells and for convenience of respiration. It is no wonder that this hollowing out is extended into the optic nerve, which contains probably more fibres than all the spinal sensory nerves put together.

With regard to the structure of the retina and olfactory bulb, there is, in the first place, an entire homology between the two; for, although the cylindrical form of the olfactory bulb does not favour stratification, and the arrangement of its elements varies considerably in different animals, their resemblance to the structures found in the retina is unmistakable. The interruptions in the course of the nerve-filaments, which course centrally from the epithelial cells, is probably the same in the two cases. First, they are connected with bipolar cells (the "inner nuclei" of the retina and cells of the glomerular layer of the bulb), secondly, in a process-plexus (the molecular layer of the retina and stratum gelatinosum of the bulb), and, thirdly, with multipolar cells. Further, the lecturer is of opinion that every sensory nerve of the body, on its way to the central plexus, passes through the same series of interruptions; the spinal sensory nerve being connected first with a (primitively) bipolar cell of the spinal ganglion, upon which it depends for its nutrition. Secondly, they are broken up in the gelatinous substance of Rolando, from which again filaments are reassociated as the processes of the multipolar cells of the cord. There is no greater difference in size between the cells of the spinal ganglia and the bipolar cells of the retina and bulb, than there is between the nerve-fibres which depend upon these cells for their nutrition in the two cases respectively.

It is not because of any differences in the character of the epithelial cells with which the nerves are in the several cases united, that morphologists have introduced such a broad distinction between the first two sense-organs and the rest. The columnar and fusiform cells of the olfactory epithelium, the rods and cones of the retina, the cells of Corti and the cells of Deiters in the ear, make up couples which remarkably resemble one another. It is because they claim for the first two nerves that they are parts of the brain, that they draw the line, and only commence the segmental arrangement behind them. Professor Milnes Marshall has proved that the olfactory nerve arises, like any other, from the neural crest, but still considers its sense-organ, the nose, to be not a segmental sense-organ but a gill-cleft. Van Wijhe recognises that the origin of the first nerve throws it into the segmental series; but, as the second nerve does not likewise arise in any animal from the neural ridge, he supposes that a displacement has occurred, and that the optic nerve is really the first, an inference opposed to all that is known of the history and development of the nerve. Beard recognises the necessity of making the nose a segmental sense-organ, but still excludes the eye. It appears to the lecturer that nose, eye, and ear, must "swim in the same boat;" and that, while it is in a sense true that the olfactory and optic nerves are parts of the brain, the modification of the system by which this comes about is, after all, remarkably slight. Indeed, it is the other sense-organs which have undergone modification, while the nose and eye perpetuate an older and more primitive arrangement. It has already been shown that in its first inception the nervous system was wholly peripheral.

Then a part of the plexus assumed a central position, the rest remaining in the vicinity of the sense-organs; of this latter portion all, except the bipolar cells of the spinal ganglia, has in the posterior segments drifted into the central system; while in the case of the first two segments, the older arrangement is still preserved.

ON THE SURGICAL TREATMENT OF FIBRO-MYOMA OF THE UTERUS.

Read before the Worcestershire and Herefordshire Branch.

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HAVING been requested to read a paper before this Branch, I propose to limit my remarks to the surgical treatment of fibro-myoma of the uterus. Of the frequency of uterine fibroids there can be little doubt; and, with increasing experience, the cases do not seem to diminish in number, but rather the reverse.

As we all know, very many, the majority, require no surgical treatment at all; they may remain stationary, without producing any symptoms, and no ill result follows; or they increase in size and bleed up to a certain stage, namely, about the menopause. After this period, they often subside with the functional retrogression of the sexual organs; and they may even disappear altogether. I shall not, however, refer further to this class, but to that very important one which demands surgical interference. Here a subdivision can be advantageously made: first, into those tumours which are treated from below, that is, *per vaginam*; and, secondly, those which can best, and perhaps only, be treated from above, that is, by abdominal section.

With the first subdivision of cases, the removal of a polypus by the *écraseur* is included, as this form of tumour is only an advanced stage of a submucous growth, having become pediculated by a process of squeezing exercised upon it by a contracting uterus. Submucous growths of large size will sometimes burst through their capsule, and be expelled in large masses *per vaginam*. A natural and complete cure is thus effected. I have seen probably half a dozen of such cases. In imitation of this process, art has been able to step in, and, by incising the capsule of the tumour, and perhaps the cervix uteri as well, has given an opportunity and an opening through which the uterus has been enabled to push out the offending mass. This can, in suitable cases, be aided by a process of enucleation. Some years ago, this form of treatment was ably advocated by Dr. Alfred Meadows, the first president of the new British Gynecological Society. There are, however, some very fatal objections to this course being adopted, except in a very small minority of cases, and those of exceptional suitability. The smallest objection is that such attempts are not always successful; not successful, I mean, in the sense of not attaining the object aimed at; the chief objection is the great fatality that attends the attempts at enucleation. Such is easily understood. Very frequently some form of dilatation of the cervix has to be made, and this, with the hæmorrhage or other fluid present, gives rise to a fetid state of the discharges. If we now make a fresh wound, that is, a perfectly raw surface, we at once open the door for the introduction and absorption of septic matters; in fact, we deliberately inoculate the patient with sepsis. This is bad enough, and dangerous enough; but if we further make, from time to time, during the progress of the treatment, attempts at enucleation, we make fresh raw surfaces each time, and so intensify the evils.

The treatment of these tumours by abdominal section has, within the last few years, attracted a very great deal of attention, and has been attended with very gratifying results. Two methods are open to the surgeon, each of which is good in suitable cases. I refer to, first, removal of the uterine appendages, and, secondly, to hysterectomy.

When I am asked, before an operation involving abdominal section, what I am going to do? I always say: "I do not know; I propose to make, in the first instance, merely an abdominal section;" and this will most probably result in one of three courses. 1. A simple exploratory operation, where, finding I cannot remove anything, I close the wound again, and the patient is none the worse. This becomes, with increasing experience, of course, less frequent. 2. Removal of the uterine appendages; when practicable, and appearing likely to answer the purpose. 3. Complete removal of the whole mass, or hysterectomy.

Removal of Uterine Appendages.—This operation should be practised whenever it can be done. It would be better to do it when the tumour is very small. The earlier the better; because, at this period in the history of the case, the operation is easier, the appendages being more easily reached; and its object is quite as much, if not more, the prevention of further growth, as the diminution in size of what is already there. At this time, it is an operation almost absolutely devoid of danger and difficulty, and leaves the patient with a very small scar, and perfectly able to enjoy life fully. When it is postponed until the tumour has become very large, difficulties arise. (a) The wound has often to be made of considerable size, even to the admitting the whole hand into the abdomen. This, though not adding materially to the danger, has a great influence on the after-comfort of the patient. (b) There is increased difficulty of removing the appendages; sometimes amounting to absolute impossibility, on account of their position behind or beneath a large tumour. It is, in this operation, quite essential for success that both ovaries and both tubes should be completely removed. I have myself found that to do it on one side is no good whatever. This experience occurred to me in a large tumour, where I was able to remove the right ovary and tube, but could not possibly get at the left side. The appendages were out of reach—in fact, deep down in the pelvis, beneath the tumour. The tumour continued to grow, and, some months afterwards, I performed hysterectomy, at which I found the left ovary and tube quite buried down in the pelvis. No trace of silk ligature or remnant of tube could be found on the right side. The rationale of the benefit to be derived from this operation is still a moot point. It would seem to depend on one or both of two causes: either (1) the diminution in the supply of blood, by the ligation of the broad ligament, and division of the spermatic artery; or (2) the suspension of the so-called ovarian influence, on which the functional activity of the uterus is dependent. Perhaps both factors have to do with the result attained, since it is necessary that both the tube and the ovary on each side should be completely removed.

The cases which are most likely to be benefited by this, which may be called the "minor" operation, are those myomata which give rise to hæmorrhage.

I have come to the conclusion that, as a general rule of practice, as soon as a myoma has been definitely diagnosed, and is increasing in size, or is causing hæmorrhage which is telling upon the health, removal of the appendages is a wise and justifiable proceeding to recommend.

Supravaginal Hysterectomy.—This is a much more serious undertaking. Of course it is very radical, and, when successful, there can be no doubt about the cure. I just now alluded to what I consider justifies the operation of removal of the appendages. I feel that very much more must be present before the surgeon could advise this much graver proceeding of hysterectomy. Subject to some modifications, I would say, if a patient under 40 or over 45 have a fibroid which is gradually though slowly (*a fortiori* quickly) increasing in size, giving rise to hæmorrhage, which tells on the health and strength, so that she is unable to do her duties in the world, causing pains which, as is sometimes the case, unfit her for her duties, or, by its increasing size, is beginning to exert injurious pressure on surrounding parts, as the rectum and bladder (the latter most frequently), that we are justified, in the presence of one or more of these disturbances to health, in recommending her to submit to an operation which will probably eventuate in the removal of the whole mass.

In reference to the operation, the first parts are similar in detail to ovariectomy. The incision has to be much longer, on account of the solid character of the tumour. A corkscrew, to pierce and drag out the tumour, is a great aid, and helps to minimise the length of the cut. As a rule, adhesions are not likely to be present, because there is not the same tendency to attacks of localised peritonitis, there being no abnormal fluid in close contiguity, as in many cystomata. I always pass a thick silk suture at the lower portion of the wound below the stump, and another immediately above the stump, so as to have these two sutures closely embracing the stump. It prevents the possibility of fluid running down the side of the stump, and effectually shuts off the peritoneal cavity. This is one of several details, the importance of attention to which I would accentuate, if success is to be attained. Another is the keeping of a sponge in the abdomen between the uterus and bladder; here fluid and blood may, during the operation, collect unobserved, and play hereafter an important part in an untoward result. Sponging out the cavity of the pelvis and abdomen, even though no fluid may appear to have collected, is important; and I now also frequently use a drainage-tube in addition. The arrangement of the stump with a clamp and pin is a matter that requires some little care and nicety, so that the wire-enclosed stump

may lie comfortably in the lower angle of the wound. It is very necessary to attend to the proper tightening of the wire. If it be not tight enough, hæmorrhage will ensue after a time from a gradual shrinking of the stump; this, if the surgeon be at hand, is easily controlled by a half or a complete turn of the screw. I recently lost a case on the seventh day from this cause. If the wire be too tight, it is apt to cause very rapid destruction of the distal end of the stump, with too early separation of the slough. When this occurs, the proximal end of the stump sags down into the pelvis; the more readily, if the abdominal wall be thick or the tension great. At the end of four days, at which period I have known the clamp to separate, the exudation and lymph round the stump, which shuts off the peritoneal cavity, must, of necessity, be slight, and capable of being easily broken down; when, if such should occur from the efforts of coughing, straining, etc., the whole abdominal cavity is laid open, with intestine protruding, and the putrid stump at the bottom. This dangerous state has occurred twice to me. One of the patients died in consequence; the other recovered. One advantage of this particular kind of clamp is that we can regulate the tightness of the wire, which is soft and pliable; and we also have so admirable a command over hæmorrhage, if it have not been screwed tight enough.

Of late, I have been in the habit of using the drainage-tube more frequently than I used to do, and much more, I know, than many operators. I do it for the sake of security. I am astonished at the very large amount of blood and serum which may be drawn off after the removal of fibroids. Of course, it is readily understood that, at first, after the sudden removal of a large solid mass, a considerable disturbance has arisen in the balance of the local circulation in the pelvis, and that a condition of stasis is relieved by osmosis. In a recent case, the amount of fluid was very considerable, and there were next day two or three fairly large blood-clots; although I am quite sure that, on closing the wound, I left nothing behind either of blood or serum. I am at present inclined to drain every case, even though the cavity is considered to have been sponged perfectly dry; and this, on account of the excessive sanguineous oozing noticed in so many instances. Perhaps one reason for this large quantity of bloody serum may be that the careful sponging has wiped off the endothelium from the serous surface of the visceral and parietal peritoneum. I have recently used drainage-tubes longer than those generally sold, and think that an advantage is gained by knowing that the tube is long enough to go down into the most dependent part of the pelvis, where fluid would be sure to collect. When I have lost a case after drainage, I have always felt that it was most probably because the tube was not quite efficient. I have had some made in Birmingham 8 inches long, and they appear to be long enough to reach through the deepest pelvis and thickest abdominal wall to the most dependent spot. I sometimes insert the tube through the upper portion of the wound, instead of near to the stump. This I do to prevent any interference with the early and sound healing of that portion of the wound which is near the stump; and also that the track of the tube and the hole left by the removed clamp may not be in danger of coalescing. The hole left behind, soon after the clamp has come away, is wide and deep, a sort of bottomless pit, dreadful to look into and contemplate. You see putridity at the bottom, and know that the sides consist of only a few granulations, which intervene between life and almost certain death. To prevent the sagging down into the pelvis too soon, I have several times passed the suture which is immediately above the stump through a small portion of the uterus itself, just below the wire. This detail also helps in shutting off the peritoneal cavity. I noticed recently that Dr. Bantock has been doing the same thing.

Although the results of hysterectomy have improved in the last few years, very much in the same way as ovariectomy improved after it was taken up and carried out in a scientific manner, yet it does not seem likely that it will ever stand on an equality in its results with ovariectomy. There are many circumstances connected with the nature of the case, and with the operation itself, that tend to cause a larger mortality. The best treatment of the pedicle or stump, now quite settled for ovariectomy, is still a matter for consideration in hysterectomy. For a few years, when the ovarian clamp was discarded, it was thought best to treat the uterine stump by ligature, and drop it in. Success did not follow this practice, as in the sister operation; and, of late, recourse has again been had to the clamp, or extraperitoneal plan. Theoretically, the intraperitoneal method appears the most scientific, and various devices have been adopted to ensure its success: namely, tying the stump in segments by a number of ligatures; sewing the peritoneal edges together over the stump, so as to form a cap or covering over the raw surface; this is aided again by taking out a wedge-shaped piece from the stump on the distal side of the ligature, by the application of the actual cautery, and also by tying

the vessels in the stump separately. Haemorrhage has proved a formidable danger in many instances, whether intra- or extra-peritoneal. The chief objections to the extra-peritoneal method are the greater liability to septic absorption, haemorrhage, the too early separation of the clamp; and the much greater delay in the healing of the wound and subsequent convalescence. This latter objection, though not so important as the former ones, is yet a factor in the consideration.

As regards the causes of death, putting aside such unforeseen accidents as tetanus, haemorrhage, too early separation of clamp, etc., I think nearly all the deaths will be found to be due to septicæmia in one of its many manifestations. The symptoms which are most prominent in individual cases vary exceedingly. In one patient, as Dr. Keith recently remarked, death seemed to commence immediately from the operation, and to go on uninterruptedly. I call to mind two cases as illustrating the inequality or irregularity of the symptoms.

CASE I.—Mrs. D. lived five days. The pulse and temperature were normal till a few hours before death. She had incessant vomiting and suspension of flatus from the time of operation. She was sure, almost to the last, that she was going on well "but for the sickness."

CASE II.—Miss H. had no vomiting, and flatus passed freely; but distension came on in forty-eight hours, with raised temperature and rapid pulse.

I think we shall, ere long, forego using the term "surgical fever," and apply to the condition long known under that head the name of septic fever, or some such word, having a precise pathological meaning. That there need be no pyrexia or fever after a surgical operation is often seen by all; I had an illustration of it last week. I removed a large myoma by hysterectomy, including the uterus, ovaries, and tubes. The patient has not had a symptom to cause the slightest anxiety, and her pulse and temperature have not once touched 100. Here was a case of sufficient magnitude to have caused considerable "surgical" fever; but as there was no septicæmia throughout, so there was no fever.

A CASE OF GASTRO-ENTEROSTOMY FOR CANCEROUS OBSTRUCTION OF THE PYLORUS.

By THOMAS H. MORSE, F.R.C.S. Eng.,

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THE following is an account of a case of the above nature which has fallen to my lot to operate upon. I desire to publish it, as I believe it to be the first case of the kind which has occurred in this country. In the BRITISH MEDICAL JOURNAL for February 13th, I have been much interested in reading the account of Mr. A. E. Barker's operation, which was performed at University College Hospital on January 5th, 1886. My own operation was performed on January 4th, 1886, and was very similar in many respects, though I regret to say it was not attended by the same brilliant result, but, on the contrary, by a fatal termination.

The patient was under the care of Dr. Doyle, of this city, owing to whose kindness I had the opportunity of seeing the case, and recording the facts as follows. Mrs. W., aged 65, had for the past six months suffered from vomiting after meals; at first, only after a hearty meal; during the last fortnight, the interval between each attack had been only from one to two hours. No blood had ever been mixed with the vomit. She had been an extremely strong and healthy woman, and had kept up and about her house as usual till December 22nd, 1885. Up to this time, she lost flesh slightly; but from then up to the date of operation, this loss of flesh was much more marked. The bowels acted regularly up to December 25th, but, after this date, there was no further passage of motion from them.

On January 2nd, 1886, her condition was as follows. She was in bed, though quite able to sit up and move herself about; was somewhat emaciated, but still retained her usual robust look in the face; the tongue was slightly coated with white fur. The pulse, which was always remarkably slow, was only 35 per minute, though a very good and fairly strong one. The abdomen was flaccid and empty; in the middle line, just above the umbilicus, was a hard tumour, of the size of an orange, painless to touch, and freely movable; its situation could be distinctly diagnosed when the stomach was full, for this organ could be seen contracting and relaxing alternately; its peristaltic movements could be followed up to the tumour, and could then be

seen to stop abruptly at its left border. The distended stomach and tumour could be moved together, and the peristalsis again watched in the altered position. On percussion, it became apparent that the whole stomach was dilated to about double its natural size; when the organ was empty, the tumour fell downwards, and lay on a level with and nearly touched, the anterior superior spine of the left ilium.

On January 4th, 1886, ether was given by Mr. Donald Day; Dr. Doyle assisted me. It was decided, contrary to my usual rule, not to use the steam carbolic spray, in consequence of her feeble condition, as I considered the prolonged exposure of any portion of the bowel to its influence would not be advisable.

An incision was made very obliquely from above downwards, and from left to right, about an inch above the umbilicus, between four and five inches long. The tumour was then seen to be involving the pyloric end of the stomach, limited abruptly by the origin of the duodenum; it was about the size of an orange, measuring horizontally two inches, and vertically two and a half inches. The peritoneum was smooth on the surface of the tumour, not infiltrated, and nowhere adherent to other structures; the lesser omentum was full of little nodules, of the size of No. 7 shot; the great omentum, all along the great curvature of the stomach, was also studded with small nodules of the same size.

Under these circumstances, I felt that the removal of the tumour would not extirpate the disease. I therefore commenced at once to establish a communication between the stomach and jejunum. I first had to decide as to the best method of approximating these two portions of intestine. This can be done by pushing the great omentum to one side, and drawing the jejunum forward to the stomach; in this way, the jejunum is made to encircle the transverse colon. The other way, and the one which I adopted, was as follows. I first separated, between twoligatures, the great omentum from the great curvature of the stomach, opposite the centre of the organ, for a distance of between two and three inches; the duodenum could then be seen crossing the spine, and ending in the jejunum; the third inch of the latter was taken up, and dragged forwards to the stomach through this opening in the great omentum. Dr. Doyle held it against the stomach whilst I attached it, before opening either viscus, just in front of the line of separation of the great omentum. This I did with fine silk, for a distance of an inch and a quarter, with seven sutures, which included only the serous and muscular coats.

A small incision was then made into the stomach, a third of an inch anterior to the line of sutures, large enough to admit a No. 14 India-rubber catheter, through which the contents of the stomach (which amounted to a pint and a half) were drawn off, and were thus prevented from entering the peritoneal cavity. The incision in the stomach was then enlarged to an inch in length, and a similar one made in the jejunum; this latter bowel was completely empty. The suturing of these posterior cut edges was then completed, according to Czerny's method, as described in Billroth's *Clinical Surgery*—that is, this second row of sutures included only the serous and muscular coats, and emerged on the cut edges of the two viscera; when these were tightened, the cut edges of the two mucous membranes easily came into apposition; indeed, the mucous membrane caused some little difficulty by its constant tendency to prolapse. At this stage of the operation, I endeavoured to thrust part of the contents of a tin of Brand's essence into the lower end of the jejunum; in this I only partially succeeded.

I then proceeded to unite the anterior cut edges of the two viscera. This was done by ten more of the form of suture described by Billroth as Gussenbauer's, which are the same in principle as Czerny's—that is, their object is to unite the cut edges, and also the serous surfaces of the two viscera, only, in this case, the two rows of sutures are combined to form one. Two or three more superficial sutures, at each end of the incision, completed the task, and the result was what appeared to be a water-tight joint. After sponging out of the peritoneal cavity the small quantity of blood that had found its way into it, the organs were replaced, and the wound united. A dressing of Gamgee's absorbent tissue was strapped over it, and a flannel-binder applied over all. The operation lasted an hour and thirty-five minutes. The patient rallied well from it, and in an hour seemed quite herself again. Six hours after the operation, she expressed herself as feeling rather thirsty, but otherwise comfortable. I gave her a teaspoonful of Brand's essence of meat; this she swallowed without its causing any pain. I ordered, also, ice to suck every half-hour. The skin was warm; the pulse 48 per minute. I gave also an enema of three ounces of beef-tee.

January 5th, 9 A.M.—During the night she suffered no pain, and slept well at intervals. Temperature 98.4°; pulse 48. I ordered her to take a tablespoonful of milk and a teaspoonful of Brand's essence