After the severe colicky pain of the onset has passed away and local pain is felt in the right iliac fossa, some general tenderness of the belly may exist with rigidity. As a rule, the limited acutely tender spot in the right iliac fossa can be detected about the point indicated by McBurney, in a line from the anterior superior spine to the umbilicus, about 2 inches below the brim of the pelvis. This brings me to the question of the presence or absence of tumour. Some time ago, examining the records of a large number of cases occurring consecutively in the General Hospital, I found that in two-thirds a distinct tumour was recognised in the right iliac fossa, which on palpation and sometimes on percussion was felt and spoken of as a tumour here merely the rigid contraction of muscle over the appendix and adjacent parts acutely inflamed and tender. However that may be, undoubted tumour is very common, and is due to thickening and masting of the appendix to the gut and omentum round it, sometimes also to the parietal peritoneum, and to infiltration later into the fascia and muscles of the abdominal wall. In this way a most massive swelling may result. In addition to this matting and infiltration, later pus may be added, making the tumour larger and more definite. The presence of a tumour produced in either of the ways indicated is a common and valuable sign. Where, owing to tenderness and general muscular rigidity, no tumour can be felt, by relaxing the muscles with an anesthetic one can pretty certainly be detected, that indeed, in the worst it may amount to nothing more than an ill-defined fulness in the right iliac fossa. In only one case that I have operated on have I failed under anaesthesia to find this, and I lay stress on the great value of this method of investigation in young children who resent examination, and in adults with fat belly walls. This description of the formation and presence of a tumour would be incomplete without a reference to those exceptional cases in which the cecum and vermiform appendix occupy some unusual part of the pelvis. Should an erratic appendix become inflamed, the irregular position of the point of the greatest tenderness and the tumour would be very puzzling, yet a few brilliant examples are on record of diagnosis and successful operation of such cases.

Is anything to be learnt by examination per rectum or per vaginam? In a limited number of cases a tumour may thus be felt, but I believe it is exceptional for a tumour thus to be located which cannot be felt through the abdominal walls. Personally I have once obtained the same information in this way, but the examination of the abdominal walls failed to give it. From the published reports of cases it is evident that other observers have reaped greater advantage from bimanual examination. It therefore should not be omitted as part of a routine examination.

A symptom not to be ignored, though not commonly present, is pain before, during, or after micturition. It is due to the position of the inflamed appendix within, or close to, the brim of the pelvis. The inflammatory process extends thence to the peritoneal coat of the bladder and as the organ is stretched, relaxed, and contracted, pain is produced. I have met with it in five cases, all males. In one of them retention of urine resulted, which I was called on to relieve, the presence of appendicitis not having been recognised until I detected it. In one of the others the pain connected with micturition was the chief trouble of which the patient complained. Curiously enough, the only patient I have operated on for appendicular abscess opening into the bladder (a female) had no pain at all on micturition at any time.

The patient practically always assumes the dorsal decubitus, lying as a rule with the legs extended. Exceptionally the right hip is flexed to relax the muscles and fasciae overlying the inflamed area, and when general peritonitis exists both lower limbs must be kept extended. If the muscles of the abdominal wall will be fixed more or less completely and will be little used in respiration. This rigidity of the belly does not necessarily imply that peritonitis exists; indeed, I have seen it in a marked degree when I have had positive evidence by operation that there has not been general peritonitis. Nevertheless, it is a sign which no prudent surgeon will ignore, as it tells that a severe infection has involved the appendix, and that extension to the general peritoneal cavity is one of the results to be apprehended.

Distension of the abdomen with rigidity is much more significant of peritonitis. Now I had hesitated to say that the combination of the two certainly indicates the presence of general peritonitis. In three very acute cases upon which I operated, all of which recovered, both marked rigidity and distension existed, and I am bound to say I believed that general septic peritonitis was present, the more so as two of them were vomiting frequently. Yet the cessation of all the bad indications immediately after removal of the vermiform appendix in one case, and drainage of an ill-defined collection of pus around the vermiform appendix in the other two, leaves me in doubt whether I had not diagnosed general extension to the peritoneum when it did not exist.

The patient's face is worthy of study. Early in the disease it is the puckered face of pain, especially in children. As the acute pain subsides the face becomes more restful. If general infection of the peritoneum occurs we have the flushed face of septicemia or the pinched collapsed face which, known as the facies Hippocratica, stamps the case as one of severe peritoneal inflammation.

Delirium is not often present, but when there is a septic condition it may be, as in septicemia from other conditions. There is nothing characteristic about it, but it is of evil prognosis.

COLECTOMY.

By F. T. PAUL, F.R.C.S., Surgeon to the Liverpool Royal Infirmary.

In placing the following seven cases of colectomy on record, I am aware that my contribution may have the reverse effect to that which I would wish, that is to say, if it should be thought that colectomy is a safe and satisfactory operation, that surgery has made no advance. On the contrary, it is quite possible that my statistical data contradict the current opinion, but it is a fact that surgeon and patient have no experience. As a matter of fact, these seven cases represent the education of an individual surgeon, and the resulting mortality has more reference to the impossibility of attaining sound judgment and technical skill without practical experience, than it has to the chance of success consequent upon proper conditions. Surgery has not at present by common consent laid down any laws regarding colectomy. The whole subject may be considered sub judice pending further evidence; but in the narration of these cases I shall take the opportunity of expressing an opinion as to the class in which my judgment is best suited for the operation, and as to the most safe and satisfactory methods of accomplishing it. A short history of each case is given in chronological order, and the notes will show the path which I have followed in trying to find success. There may be a difference of opinion as to the lessons to be learnt from these cases and the deductions which should be made from them; but facts are always useful, and if none of them deserve to be regarded as guides to success, at least some may have value as a warning against failure.

CASE 1.—In May, 1880, I was asked by Dr. Briggs to see a patient in one of his wards, aged 49. She had been suffering for the past few months from increasing colicky pains, which had recently culminated in absolute constipation. She was a spare woman, a good deal shrunken down by her illness, her temperature normal. There was complete obstruction, with frequent vomiting of greenish fluid, and constant attacks of violent colicky pains, abdominal distension, and vomiting of large quantities of bile and bilious green material. The patient had been placed on the patient of the cecum and the large intestine appeared to be distended. The biliary urine was passed, and the persistant bile would be seen to move along the bowel from the cecum to the sigmoid flexure. The rectum was quite empty, and we therefore felt sure that the strictures must be situated either in the upper part of the rectum or the sigmoid. Having decided to operate, the patient was removed to the infirmary and put under the influence of chloroform. I made an incision in the left
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Inguinal region, drew out the sigmoid flexure, and found there, as we had expected, a small malignant ring stricture, which was easily excised. At this time I unfortunately imagined approximation by invagination on the large bowel at the ileo-cecal junction. This was rather a mistake, as the large bowel accommodating itself to the new condition, it tended to unfold gradually, and became wiry. There was a considerable leak in the bowel, and it was more than a week before a satisfactory job had been accomplished, and released the clamp on the distended upper end of the bowel. There was no leakage, so that the patient began to put on weight, and was removed to the wound. I had taken much longer than I had expected, and it was with a feeling of considerable disappointment that the patient left. This feeling was very soon justified by subsequent events; for, soon after she recovered from the effects of the chloroform, the bowels began to act violently, and she was attacked by a deepening of the collapse; she gradually became more and more cachectic during the night. She was so weak that the surgeon was found that some leak had occurred, which was much, but quite enough rapidly to put the finishing touch to a long and exhausting operation.

The loss of this patient was clearly due to a mistaken operation. Barring the severity of the symptoms the case was a most suitable one for colectomy. The growth was small; it was the least malignant type, and in the least possible situation, and the patient, though very ill, was of a wiry kind that generally make a good recovery. I know now that if I had been content with an inguinal colotomy involving the removal of a loop of bowel my patient could scarcely have died. The sigmoid was fastened down, and in this case had formed a just estimate of the value of inguinal colotomy. And I feel almost equally sure that continuity of the bowel might have been successfully restored, but by a method which was not tried until after other failures.

CASE IV.—On February 11th, 1891, a female aged 51 was admitted into the Royal Infirmary under my care with intestinal obstruction. She was very ill before admission, and had begun to suffer from pains in the abdomen and constipation, but with the help of medicine the bowels were moved every day. Eleven days before admission she woke up with pain and vomited. From this time she had complete obstruction, and vomited everything. On admission I saw that there was no evidence of acute abdominal or febrile vomiting. Nothing could be felt in the rectum, but stricture of the large intestine was diagnosed, and right lumbar colostomy was at once performed. She passed liquid feces, and a few solids, as soon as it was opened. For a few days she remained very ill, but soon began to pick up, and in less than a week was quite out of danger. When the abdomen was collapsed a further examination revealed a tumour in the descending colon. On February 23rd, the patient's condition having very much improved, I decided to excise the growth without further delay, as the operation seemed to me much less dangerous owing to the bowel being kept empty by the artificial anus. The tumour was larger than a pigeon's egg, but there was nothing very alarming about its excision because the patient possessed even moderate powers of resistance. More the operation very badly, and the time the growth was excised had not sufficient strength to enable me to suture the ends of the bowel together, so I brought them out of the abdomen. The patient was not once vomited, and might have been, and more blood was lost in dividing the mesenteric vessels than in removing the growth. The bowel was placed on a very weak and collapsed condition, and though everything was done to restore the state of exhaustion increased, and she died at the end of thirty-four hours.

I consider that the loss of this case was due chiefly to a want of appreciation of the profound and prolonged effect of a serious attack of intestinal obstruction, and partly to the absence of sufficient technical skill. I have since met with other cases, showing how seriously and for what a long time obstruction lowers the constitution, especially when there has been febrile vomiting, and how badly such patients bear a second operation if undertaken before they have fully regained strength.

CASE II.—On February 11th, 1891, a female aged 71 was admitted into the Royal Infirmary under my care with intestinal obstruction. The patient was a thin, anemic woman who had been ill for at least six months, and had had her first symptoms of abdominal obstruction for several months earlier. She had lost much, and had had her first abdominal symptoms for about two to three months. Since then she had suffered more or less from diarrhea, abdominal pain, and occasional sickness. He had been steadily losing flesh, and had become very pale. On examining the abdomen, which was not distended, a tumour the size of a large orange could be felt in the right iliac fossa, apparently involving the ileo-cecal junction with the help of Mr. Mowbray, who discovered it under the circumstances. This was the small ring of gangrene which had disintegrated it out. It was a large mass of growth, and necessitated the removal of 2 feet of intestine. On admission he had his first symptoms of abdominal obstruction for several months earlier. The operation was a graver one than I had contemplated; he bore it as well, as very little blood was lost owing to the vessels being carefully ligatured. He was able to take cod liver oil and tea, and I helped enable him to do so; but was not, at any rate, the direct cause of death; but this case taught me that invagination was not the best method of approximating the large bowel, as it might as well be left to be dealt with as it would be by ligation. I should be inclined to ligature into each end and the intervening portion cut off. Although the growth was large and the patient anemic and much reduced, the operation did not appear to be at all severe. The tubes were removed on the seventh day and a rapid recovery took place, the highest temperature recorded being 99.4°.
This patient again demonstrated the comparative safety of simple colectomy performed in this way, even when the operation itself was an extensive one; but I was not content that she should remain for life like the last case with all the discomforts of an artificial anus. She readily submitted to a second operation, having for its object restoration of the continuity of the bowel. On February 17th, the patient having perfectly recovered, and being in a suitable condition of health, I resected the ends of the bowel and united them with sutures. The result was unfortunate. Acute peritonitis supervened, from which she died on the fourth day.

I was naturally very much disappointed to feel that having arrived at a safe method of removing the growth, there yet remained a great risk to the patient's life in endeavouring to re-establish the natural channel, and I decided that it would be better to bear the evils of artificial anus if to avoid them it was necessary to take the chance of a fatal peritonitis. There remained, however, to be tried the old plan of restoring continuity by Duperuyten's enterotomy, to which very little risk attached. If such a method could be perfectly successful when the spur was accidentally formed by Nature, how much more ought it to be so when a spur was deliberately constructed with the object of subsequently safely becoming unfit to attend to her household duties, finally took to bed. When seen in consultation with Dr. James Hendry she was in a weak state of health with colicky pains, and severe vomiting due to chronic intestinal obstruction. The bowels were only moved with great difficulty, and the motions contained much blood, and sometimes a quantity of gas and fluid faeces allowed to escape. When the bowel had emptied itself the opening was clamped, and the mesenteric tube was in the way of the growth. As a result the peritoneum was opened and drawn, bulged into the wound with the gut having been ligatured, and the spur squeezed, and two inches of gut was removed. A thrill of gas and fluid faeces allowed to escape. When the bowel had emptied itself the opening was clamped, and the mesenteric tube was clamped, and the mesenteric divided, the loop of gut brought out of the wound. About half an inch of glass intestinal drainage tubes were tied into each end. Two hours after the operation the mesentery was drawn together with green calget, and the tubes were tied. The wound was stitched up in the way of the mesentery and gut, and by the third day a quantity of fluid motion had been passed through the lower tube into the intestines, and the abdominal distension disappeared. There was no vomiting, and in every way she was comfortable and doing well. The temperature did not once exceed 98°F., and she made a rapid recovery. The upper tube was removed on the seventh day, and the lower one, which was in the proximal end of the bowel, on the tenth day. On March 1st a finger was introduced into the bowel on the site of the spur, and the two ends were felt to be in contact as far as the finger could reach, so a long dressing forceps was applied to the bowel and a tube inserted into each side, and the handles fastened together with indiarubber tubing. On March 14th the forceps came away, a good part of the spur having been divided. On March 16th the operation was repeated, and this time the spur was removed for a full circular depth. It now only remained to close the artificial anus, so the rosette of mucous membrane remaining on the surface was separated from the skin and sutured together, and the skin closed over it. Primary union occurred, and henceforth the bowels were moved by the natural passage.

The operation was satisfactorily completed as far as the operation was concerned; but I knew from the first that this was one of the typically malignant class, and that life could not be much prolonged. The patient was young, the tumour was large, and already at the time of the operation there were some prominent glands scattered about the mesocolon. Hence, though the case demonstrated the feasibility and success of each stage of the operation, it did not add much to the lustre of colectomy. Within a few months I heard that there was already evidence of internal recurrence which she died in October, eight months after the operation.

**Case VII.**—1886.—The patient was a small man, aged 37, with sallow complexion and dry skin. Ten years earlier he had suffered from severe pain in the right inguinal region, and fifteen weeks before admission he was attacked with similar pains in the same region. He had to stop work and send for the doctor, who says he had no inflammation of the bowels. In the course of a fortnight he felt better and tried to resume work, but was soon laid up again. He then came under the care of Dr. A. B., of Millom, to whom I am indebted for the opportunity of subsequently treating him, and who correctly diagnosed that he was suffering from chronic intussusception. When admitted his chief symptoms were obstinate constipation and frequent vomiting and violent colicky pains in the abdomen. Handling the abdomen at once caused spasm to pass, and visible peristalsis; it was not distended, and palpation revealed a large ill-defined tumour in the right inguinal region, which extended up into the loin, and which was distinctly affected by the patient's respirations. With the permission of his friends the bowels were moved occasionally, but apparently without giving any rise to any motions contained any solid or liquid, and contained very little mucus, and no blood. The vomited matters consisted of whatever was in the stomach at the time, the act being frequently excited by the attacks of colicky pain. The tongue was furred and the breath foul. The urine, I am afraid, was not examined. On December 22nd I made an incision over the swelling, and found it everywhere covered with yellowish adhesions, some of which were half an inch thick. It took quite half an hour of rapid operating to divide them all and liberate an enormous concave containing an intussusception, which was about 8 inches long and extended up into the ascending colon. Although the bowel had been invaginated for such a long time I was able to reduce it. The handling, however, was very rough, and it was not considered by myself or others present that it was possible to raise the abdomen. The mesentery was therefore ligatured and divided, and the entire mass measuring 14 inches in length, and very heavy, was cut from the bowel. I was unable to lie near the wound under the bowel, so that if any hemorrhage occurred the blood might escape externally. I rather anticipated this contingency, and the stump consisted of several tubes which were brought out side by side, and sutured together as usual. The tissues were of a very thin nature, and I was able to lie near the wound with impunity. I think it very possible that if any hemorrhage occurred the blood might escape externally. I rather anticipated this contingency, and the stump consisted of several large vessels, and I observed that no matter how tightly ligatured they were in such cases it was usually several hours later, when the ligatures slacken owing to the fluids being squeezed out of the tissues. As a matter of fact it did occur here during the operation, and the dressing was forced up and down. Had the stump been so placed as to allow the blood to collect in the peritoneal cavity it might have gone badly with him. With him I did not think it necessary for the bowels were unusually hyper trophyed—this patient at first suffered from shock, but the patient recovered, and did not in any way suffer. The convalescence was uneventful. The temperature remained normal throughout, never becoming unfit to attend to her household duties, finally took to bed.
WILLING in the colecotomy comparatively to the removal, I have been so exhausted and afterwards呕吐; I have not been satisfied with the method. On January 12th without any reason he vomited his dinner. This created no alarm in my mind or mine, and when he vomited again he said it was only because he had been eating much wrong food, than he was accustomed to. I put him on careful diet, and did my best to stop the vomiting; but it was repeated from day to day until he became very thin, and his abdomen absolutely empty. In course of time he became completely exhausted and died, death taking place seven weeks after the operation, and without any signs since division of the spur was commenced. I confess I did not know the cause of his vomiting, though I ought to have done so. All we made out was that there was no local cause for it, as the alimentary canal and peritoneum were perfectly sound. A post-mortem examination was made by our pathologist, Dr. Abram, who found the cause of death to be uraemia due to advanced granular contraction of the kidneys; the right weighed 1½ ounce, and the left 1½ ounce, the structure being much degenerated and cystic. This was the only disease present in the body.

The post-mortem examination in this case, however, afforded a valuable piece of evidence respecting the condition of the bowel. It was found that the two ends were completely united on the twelve; and in whom the double scissors had been quite safe to cut down the spur for a full 3 inches from the first. The knowledge of this fact added considerably to my confidence in the operation, and made me more reconciled to the unexpected loss of my patient.

CASES FOR WHICH COLECTOMY IS SUITABLE.

Having now recorded the cases, I wish to make a short and clear statement of my views as to those which are most suitable for operation, and as to the best and safest methods of accomplishing it.

First as to the selection of cases. Young subjects, with a comparatively short history, who are passing mucus and blood in the motions, and in whom the tumour is large enough to be felt, are the cases in which the growth is most malignant. Unless very large, the affected part can be safely removed, but recurrence must be expected. Older people, upwards of 45, with generally a longer history of gradually increasing constipation, frequently culminating in absolute and sudden obstruction, often have a ring stricture, which is much less malignant, and when satisfactorily removed may undoubtedly be followed by permanent cure. Personally I am willing to remove the growth in almost all cases in which there are no secondary deposits; but those who wish to select carefully should be content with colotomy in the former class, and restrict colectomy to the latter. In passing I again direct attention to the frequency with which the abdominal pain (colic), flatulence, and vomiting of the earlier stages of chronic obstruction are mistaken for dyspepsia. The sooner the disease is recognised the better is the surgeon’s chance of success.

MODE OF PERFORMING THE OPERATION.

The operation may be accomplished in two very different ways: one by immediate and one by delayed approximation; each in my judgment being suitable for a certain class of case. Each may be carried out by a considerable diversity of methods, but I have formed a distinctly favourable opinion of a special method for each. When the patient is in good condition, the abdomen not distended, the tumour small, and the proximal end of the bowel not greatly hypertrophied, I have advised immediate approximation by the primary apposition button method. But when the opposite of these conditions prevails I strongly urge that the ends of the bowel should be brought out in the manner explained and illustrated, and I feel sure, though I have been unfortunate in the sort of cases I have had to do with, that this method of bringing out the ends is much safer than any plan of immediate approximation, all statistics notwithstanding. The important steps of the operation are as follows: 1. Explore first in the middle line unless the stricture has been located. 2. Make a sufficiently free incision over the site of the tumour. 3. Having cleared away any adhesions, ligature the mesentery with the help of an aneurysm needle, and divide it sufficiently to free the bowel well beyond the growth on each side.

4. Let the loop of bowel containing the growth or stricture hang out of the abdomen, and sew together the mesentery and the adjacent sides of the two ends, as shown in the engraving. See that the stump of mesentery lies beneath the bowel, where, if deemed advisable, it can be drained by packing cyanide gauze down to it.

5. Ligature tightly a glass intestinal drainage tube into the bowel above and below the tumour and then cut away the affected part. Do not cut off first or blood will be necessarily lost. Only the proximal tube is really necessary. The distal end may be closed or included in the proximal ligature.

6. Close the ends of the wound with a few silkworm gut sutures, passing through all the layers of the abdominal wall; no others are necessary.

When the operation is performed in this way all the vessels, except those in the primary incision, are tied before they are cut, and the intraperitoneal work is rendered quite bloodless.

The second stage of the operation, that of breaking down the spur with an enterotome, should generally be undertaken about the tenth of those putrefactive organisms which interfere dangerously with the vitality of healing tissues locally, and of the system generally, we have seen that our drain opening has not only carried off these products from the damaged tissues, but has given access from without to those very septic organisms against which we were anxious to guard our wound. In many cases too we appear to have lost sight of the fact that aseptic vital fluids, even in considerable amount, may be pent up under an unbroken skin or in a deep cavity without any disturbance, local or general, until they are absorbed completely. This is well illustrated by the case of large subcutaneous haematoma, which only rarely lead to dangerous conditions when let alone. In short, we have often ignored the capacity of the natural forces, when protected from external interference, to take care of the organism without any help from ourselves. We are now beginning to recognise this, and to make it a common practice to close even the largest wounds, provided they are clean, without any provision for drainage, and with almost absolute certainty they will be cured in their deepest parts, as completely by first intention as superficial parts do under similar conditions.

But I venture to think that there is another aspect of the same subject to which we have not given a due amount of thought, namely, the limits of drainage in the case of certain conditions which are undoubtedly produced by the presence of saprophytic or pathogenic organisms, though perhaps not intensely toxic.

Some years ago I endeavoured to show1 that tuberculous