PLATE 3.
Mr. W. B. Gabriel - - - - - Tumours of Rectum

FIG. 1. Radiographs (A & B) on successive occasions after a barium enema in case of villous tumour of pelvic colon showing persistent filling defect.
FIG. 4. Specimen removed by perineal excision from a male aged 49, showing large villous tumour in the lower third of the rectum. Malignant change has taken place in the portion of the growth seen on the right hand side. (Adenocarcinoma grade 2, B case).

FIG. 3. Lower half of specimen removed by perineo-abdominal excision showing large villous growth in the upper third of the rectum. Malignant degeneration has taken place at its upper border. (Adenocarcinoma grade 2, B case).

PLATE 4.
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BENIGN TUMOURS OF THE RECTUM.

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The well-recognized differentiation of benign tumours of the rectum into those of epithelial origin (adenoma and papilloma) and those of connective tissue origin is important and useful for many reasons. Epithelial tumours have the following characteristics:—(1) They are common, and in any series of cases will be found greatly to outnumber the benign tumours of connective tissue origin. Thus during the years 1934 and 1935 out of 53 patients with benign tumours admitted into St. Mark's Hospital, 27 were adenomata and 16 were villous tumours. There were 6 cases of polyposis and 4 lymphomata. One point of interest in these figures is the fairly high incidence of villous tumours, a type of growth which is generally regarded as being extremely rare. These figures do not include polypi removed in the out-patient department. (2) They are frequently multiple. (3) They have a marked tendency sooner or later to undergo malignant change and this fact is now so well established that it needs no further elaboration. It may be helpful within the scope of this article to discuss some problems of diagnosis, the early stigmata of malignancy and the various methods of treatment which are available.

The Diagnosis of Epithelial Tumours.

The symptoms of a rectal adenoma or papilloma vary greatly according to the situation and size of the tumour. In many cases a small tumour in the ampulla of the rectum produces no symptoms at all, and is discovered by chance in the course of proctoscopy or routine sigmoidoscopy. This is such a common occurrence in a rectal clinic that it forms a weighty argument in favour of carrying out a complete rectal examination, including sigmoidoscopy, in every case even though the symptoms may be trivial or well explained by some local condition in relation to the lower part of the rectum or the anal canal. The characteristic symptoms of a rectal adenoma or papilloma may be, in varying degrees, bleeding, discharge, tenesmus, diarrhoea and occasionally lower abdominal pain.

Bleeding may occur from an adenoma or papilloma when the surface is friable or ulcerated, especially if the tumour is sufficiently low down to be extruded from the anus. Severe haemorrhage has rarely taken place as the result of spontaneous avulsion of part of the growth.

Discharge may be noticeable as a result of secretion of mucus from the surface of the growth, or from irritation of the neighbouring rectal mucous membrane. It is seen at its maximum in cases of large villous tumours, in which cases the patient is likely to give a history of the passage of large amounts of clear mucus from the rectum, the symptoms remaining unchanged for a long time, sometimes for years.

Diarrhoea is of course accounted for by the irritation produced by a large polyp, and tenesmus is an expression of the patient's instinctive efforts to extrude and pass a foreign body from the rectum.

Lower abdominal pain is usually due to spasm of the colon when a polyp is situated in the recto-sigmoid region; recurring slight attacks of colo-rectal intussusception may take place.
General symptoms such as anæmia from repeated slight hæmorrhages, and loss of weight and strength from loss of sleep may occur.

Clinical Methods of Diagnosis. The routine methods of digital examination, proctoscopy and sigmoidoscopy suffice in practically all cases. A movable polyp in the rectum is however an elusive body to feel and often slips about in a disconcerting manner, suggesting a hard fecal mass until it is pinned down and clearly felt to possess a pedicle; this applies particularly to children. Clinically it is often difficult to decide if a benign tumour should be called an adenoma or a papilloma, but generally speaking if the tumour has any degree of a pedicle it is probably an adenoma, whereas a soft sessile tumour is more likely to be the villous type. An adenoma has a smooth or lobulated surface, which may be friable in parts or slightly ulcerated. Its colour is usually a much deeper red than that of the surrounding mucosa, but in the case of a villous tumour it is worth noting that if the patient has a secondary anæmia, the colour of the tumour may also be distinctly pale and not too easy to differentiate from the pale mucous membrane of the rest of the rectum. Sigmoidoscopy will not only enable the presence of a polyp to be detected but its size, mobility, and the nature of its surface may be noted. The presence of a pedicle, its thickness and length will be ascertainable; if the polyp is high up, it may be possible to grasp the pedicle with some sort of long forceps of the alligator or Brünings' type and apply gentle traction in order to see if there is any likelihood of the tumour being subsequently delivered outside the anus for removal.

Three common difficulties should be mentioned: —

1. A polyp seen in the upper rectum may actually arise much higher, i.e. in the pelvic colon and be seen lower down either owing to the formation of a long pedicle, or to its being intussuscepted into the rectum. A recent case of this sort has lately been seen in which a sessile tumour at 20 cms. retreated above the examining sigmoidoscope to 27 cms.; laparotomy showed a chronic intussusception of a pelvic colon tumour into the rectum.

2. A sessile villous tumour is very often more extensive than would appear at first sight. Its margins are soft and impalpable, and on account of its protuberant and irregular surface an incomplete estimate of its size is liable to be formed by proctoscopy and sigmoidoscopy.

3. If the sigmoidoscopic appearance suggests that multiple polypi are present, it should be remembered that this condition is somewhat resembled by an advanced condition of ulcerative colitis, when irregular polyoidal islets of mucous membrane may be left as remnants of the ulcerative process, but these are not true polypi. In hyperplastic tuberculosis, and in the inflammatory state associated with rectal strictures, irregular masses of granulation tissue may be observed, but these are granulomata and not adenomata; they only cause symptoms mechanically, or they may be mainly symptomless when compared with the causative condition.

The presence of rectal discharge or blood may add to the diagnostic difficulties and it cannot be emphasized too much that the best and wisest course in many of these cases is to re-examine the patient. Digital examination and sigmoidoscopy can be repeated on several occasions without disturbing the average patient and without special preparation in the way of purgation or enemas; alternatively, examination under anaesthesia (general or low spinal) may be required to enable the surgeon to "size up" a difficult case and to decide upon the best method of removal.
Another problem relates to the question of multiple tumours. The frequency of these renders it necessary in the case of what appears to be a solitary polyp to exclude the presence not only of other polypi, but also of the graver lesion, an established carcinoma. Any visitor to the pathological department of St. Mark's Hospital will see there so many specimens of polyposis intestini, of multiple adenomata (non-familial), of carcinoma-adenomata, of multiple villous tumours, and of carcinomata which have clearly arisen in benign epithelial tumours, that an ineffaceable impression will be made of the difficulties in diagnosis and treatment which some of these cases may present. Sometimes indeed only the passage of time will enable the true and full diagnosis to be made, and the following case may be briefly outlined as an example of the way in which an unfortunate concatenation of circumstances in a stout subject may militate against early diagnosis.

Case—The patient, H.W.C., was a very stout man aged 58 years, who complained of a lump which had protruded from the anus on defaecation for about 3 years; it was associated with bleeding and pain. Examination showed some internal haemorrhoids and a simple direct fistula; sigmoidoscopy revealed a pedunculated adenoma the size of a large walnut in the upper part of the rectum. Under spinal anæsthesia this was delivered outside the anus, the pedicle being secured by transfixion with a catgut ligature and then divided with a diathermy knife. The fistula was also laid open and the patient made a rapid recovery. Pathological examination proved the tumour to be an adenoma, the cells of which were actively proliferating but there was no definite evidence of malignancy. Some two months later the patient was readmitted on account of a lump in the left lower abdomen of two weeks' duration; it was felt as a large rounded mass, hard in consistence, fixed and tender. A barium enema showed irregular filling and narrowing of the iliac colon to be present. Laparotomy confirmed the presence of a fixed and irremovable mass in relation to the iliac colon, either malignant or inflammatory, but no tissue for section was obtainable. Later an abscess became localized on the outer side of the mass and was drained. Next a vesico-colic fistula developed and a transverse colostomy according to Broders classification, was done. The patient's general condition progressively declined and he died eight months after first coming under observation. The autopsy revealed a huge fungating adenocarcinoma of the colon, grade 3 which had extended into the bladder and also had obstructed the left ureter.

In all probability the tumour was inoperable even when the patient was first seen, but it is just possible that if a barium enema had been given when the rectal polyp was discovered there might have been a happier issue to the case.

Radiological Diagnosis. By giving a thin barium enema, evacuating it and then inflating the colon with air under radiological control it is now possible to demonstrate polyposis of the colon. This method is known as the double contrast method or the method of air mucosal relief. A benign tumour of the recto-sigmoid or pelvic colon may occasionally be revealed by a filling defect in an ordinary barium enema film. Fig. 1 (Plate 3) is from an example of a tumour of the lower pelvic colon, which was discovered radiologically by Dr. H. C. H. Bull as a filling defect which persisted in an identical part of the colon in several films. Laparotomy showed a soft growth to be present, which was excised by Paul's method, and proved to be a villous tumour 2 inches in diameter. It should be remembered, however, that a negative barium enema examination should not be taken as conclusive in a case with suspicious symptoms, and here again the necessity for re-examination is evident, the screening and films being done in the lateral and oblique planes as well as the antero-posterior.
The Early Stigmata of Malignancy. From a clinical standpoint, if a patient with a benign rectal tumour reports an increase in the severity of the symptoms, particularly bleeding and discharge, it should be taken as indicative of the onset of ulceration and possibly of a malignant change. Similar exacerbation of symptoms in a patient known to have *polyposis intestini* should be regarded as a warning of malignant degeneration which in this type of case may take place at more than one spot simultaneously. In estimating whether an adenoma or papilloma is still entirely benign the most important observation is made with the examining forefinger in those cases in which the tumour is within reach. An adenoma should be appreciated as a soft, or at most a firm tumour; if the surface or base is hard it has almost certainly become malignant, and the same decision must apply to any adenoma which has become palpably ulcerated on the surface. If an adenoma is shown by a finger and sigmoidoscope to have become sessile, there is a strong probability that it is the result of malignant change. There should not be much bleeding from simply touching the surface of an adenoma with a finger or sigmoidoscope, and if the tumour is so friable that it bleeds profusely this fact also should be noted with suspicion. The larger, in other words the older, an adenoma the more likely is it to be malignant, and a tumour more than $\frac{1}{2}$ inches in diameter will probably show histological evidence of carcinoma in one or more places.

In assessing a villous tumour on the other hand, the mere size of the growth, in terms of the area of the rectal wall involved, gives no certain indication one way or the other. A villous tumour may extend over many square inches and yet be still a simple tumour. The only certain indication of malignant transformation is palpable ulceration with induration at the base of the growth, and a suspicious finding would be any unusual firm protuberance of the growth into the rectal lumen, indicating rapid growth at that part.

Value of Biopsy. The removal of fragments from the surface of a rectal adenoma or papilloma seldom does more than confirm the nature of the benign tumour. If the problem is that of suspected early malignant change a negative biopsy finding cannot, of course, be regarded as conclusive. Occasionally however by taking a number of fragments with Brünings’ forceps from different parts of the tumour, one may with luck find that one or two fragments show a definite carcinoma to have developed, and the problem of selecting the right treatment is accordingly simplified.

The Treatment of Epithelial Tumours.

Local Excision. A considerable proportion of rectal adenomata have pedicles which permit them to be brought down outside the anus. The operation can equally well be done under general or low spinal anaesthesia, or after infiltration of the anus and sphincters with novocain. The tumour is usually rather slippery and may with advantage be held in a piece of dry gauze; the pedicle should then be examined and should be felt to be soft and completely free from induration. It is transfixed by a round-bodied needle carrying a No. 1 or 2 catgut ligature with which the pedicle is securely ligated. The pedicle is then divided with scissors or a diathermy knife about $\frac{1}{2}$ inch distal to the ligature, which is then cut to $\frac{1}{2}$ inch and the stump allowed to retract into the rectum after haemostasis has been verified.

Local excision is also suitable for villous tumours in the middle and lower thirds of the rectum. The tumour must be fairly small and must be proved to
be capable of being brought down outside the anus so that normal mucous membrane can be reached at the upper border. The tumour is then excised together with a clear margin of healthy mucous membrane all round; successive cuts with scissors are made beginning at its upper pole, and the rectal wall is repaired with interrupted catgut stitches. In some instances a villous tumour of the lower rectum can be removed completely by a partial Whitehead operation; the tumour is limited to the mucous membrane and it is not necessary to excise any of the muscular wall of the rectum.

**Diathermy.** A pedunculated adenoma which cannot be delivered outside the anus on account of its height should be tackled by means of Frankfeldt’s diathermy forceps (Fig. 2). This is an instrument with an insulated shaft and a forceps end which enable a pedicle to be grasped and coagulated by a diathermy current. The shaft is supplied in three lengths and it can be employed at any height that can be reached by a sigmoidoscope. This method of cutting through a pedicle would appear to be safer than by using a wire snare, for the coagulation takes longer and there is less risk of subsequent bleeding. Multiple adenomata, whether pedunculated or sessile, can often be removed or destroyed by this instrument.

Diathermy removal is not a suitable method for dealing with a villous tumour as the primary method of treatment, but if after local excision there should appear any sign of small outlying recurrences they may be destroyed by diathermy applied through a blunt electrode, or by means of Frankfeldt’s forceps.

**Conservative resection** of the rectum may be considered sometimes in the case of a large adenoma with probable malignant change, or for an extensive villous tumour. The method adopted would be sleeve resection with circular repair, or sometimes a posterior proctotomy may be done with resection of a portion of the rectal wall and repair by suture. These methods, however, are accompanied by a considerable risk of local sepsis and fistula formation, and a preliminary temporary colostomy may be advisable, the rectum being carefully cleared by irrigation from the colostomy before the resection operation is undertaken.

**Radical excision** of the rectum is often the only sound method of removing certain of these tumours. Colostomy and perineal excision are advisable for extirpation of a villous tumour involving such a large portion of the rectal circumference that local resection is impossible, or if the tumour has recurred extensively after a previous attempt at local excision (Figs. 3 and 4 (Plate 4)). Perineal excision is also indicated in the case of large rectal adenomata which cannot be excised locally either from the fact of their being sessile or from the presence of definite signs of malignant degeneration. A combined excision of the rectum, preferably by the perineo-abdominal operation in one stage, is required when the tumour arises in the upper third of the rectum. A villous tumour has very soft margins which may be difficult to feel, and, if the case is one of a large villous growth in the recto-sigmoid region, the operator will be more certain of effecting a complete removal if a perineo-abdominal excision is done rather than by relying on a high perineal excision.
The operative treatment of polyposis is too large a subject to be dealt with here, but in those cases in which a carcinoma has developed in the rectum or recto-sigmoid region, or those in which the symptoms suggest such a development, a perineo-abdominal excision with removal of as much colon as possible would appear to be indicated.

Whenever a benign tumour of the rectum is removed it should be sectioned and examined microscopically. If proof or even suspicion of malignant change is forthcoming the patient should be re-examined at regular intervals for some years. If a carcinoma develops at the summit of an adenoma it will probably be removed completely by local excision of the tumour, but if the malignant change is at the base the risk of recurrence is much greater and a further radical excision may be necessary for recurrence at a later date.

A word of warning may be made here regarding the use of radium and X-rays. Consider the case of an adenoma which has been excised by transfixion and section of the pedicle: the pathologist reports evidence of malignant change and the surgeon has the responsibility of deciding what should be done. In such a case I do not think any form of radiation should be given. If carcinoma cells have been left in the rectal wall it is very problematical whether radon seeds, radium needles or X-rays will destroy the cells, and it is arguable that recurrent growth may be thereby stimulated. There is no likelihood either of a villous tumour being improved, much less cured, by radio-therapy; a clean surgical excision by one of the methods outlined above is the only satisfactory method. A large epithelial tumour therefore, even though histologically benign, often can only be eradicated by the same radical methods that would be applied to a group A carcinoma by Dukes' classification.*

Benign Connective Tissue Tumours.

These are mostly rarities such as angioma, myoma, myxoma and the very rare rectal dermoid. A submucous lipoma of the rectum is a rare form of rectal polyp, but a more common one is the polyp which, on section, is found to consist of lymphoid tissue—a lymphoma. I have met with several examples of this at all ages from a child aged 4½ to an adult of over 30 years. A lymphoma of the rectum is a benign tumour and does not recur after local removal.

The commonest benign tumour under this heading is the so-called fibroma, or fibrous polypus of the lower rectum; this usually arises in a large internal pile as the result of thrombosis: it almost always occurs in the position of one of the three primary piles, and presents as a smooth polyp covered with pale squamous epithelium. It is quite easily missed on examination unless the examining finger is swept carefully round the rectum; on proctoscopy the polyp is usually seen, and if the patient is asked to strain down as the proctoscope is withdrawn the polyp will be extruded outside the anus and an estimate of the patient's disability can then be formed. A polyp of this type is readily removed by transfixion and division of the pedicle.

A smaller fibrous polyp may arise in a hypertrophied anal papilla and is treated in a similar way. If a fibrous polyp has produced an associated fissure, the sphincter may need stretching, or relaxation by injection of one of the oil-soluble anaesthetics. A fissure in the middle line posteriorly sometimes results from a fibrous polypus in connection with the right posterior pile, and in such a case it may be necessary to drain the fissure by a short triangular incision in order to ensure satisfactory healing.

* For significance of classification see article by Sir Charles Gordon-Watson, page 338.