Reviewing our proved cases of urinary calculi and hyperparathyroidism, we found that the pre-operative serum calcium levels were all recorded to be persistently greater than 12 mg./100 ml., although Pyrah (1956) and Black (1953) have reported cases with pre-operative serum calcium values less than 12 mg./100 ml. In 21 patients with urinary calculi seen in the period 1955-9, and in whom the serum calcium values continued to range from 11 to 12 mg./100 ml., a follow-up period of two to seven years has shown no conclusive evidence of hyperparathyroidism; some of these patients have shown excess excretion of urinary calcium, and in one there was radiological evidence of new stone formation, but none of these abnormal features have occurred consistently or together in the same patient. It seems unlikely, therefore, that any cases of hyperparathyroidism have been overlooked in the patients attending this unit with urinary calculi.

At the present time it is felt that patients with serial calcium values consistently greater than 10.5 mg./100 ml. and urinary calcium outputs on an ordinary diet consistently in excess of 350 mg./24 hours should be admitted to hospital for more elaborate investigations of calcium metabolism, although in our experience it is unlikely that a diagnosis of hyperparathyroidism will be established unless the serum calcium concentration is persistently above 12 mg./100 ml.

It is intended to continue to follow up the group of patients who have had minimal hypercalcaemia (11-12 mg./100 ml.), though it seems unlikely that after an interval of two to seven years without recurrent stone formation a diagnosis of hyperparathyroidism will be made in any of them.

Summary

Because of the low incidence of hyperparathyroidism in patients with urinary calculus disease attending the urological unit of the Queen Elizabeth Hospital during 1955-9 the methods of diagnosing this condition have been reviewed. The frequency distribution of the normal serum calcium and phosphorus in 112 patients attending the unit has been redetermined, as a result of which the upper limit of normal serum calcium is now taken as 10.5 mg./100 ml., and the range of serum phosphorus was found to be greater than previously accepted and therefore its determination in the diagnosis of hyperparathyroidism is considered to be of less value.

A group of 21 patients with urinary calculus disease and serum calcium levels in the range of 11-12 mg./100 ml. has been followed up over a period of two to seven years and the diagnosis of hyperparathyroidism has not been established in any of them.

A review of the eight patients in whom a diagnosis of hyperparathyroidism was confirmed shows that in all cases the serum calcium level was persistently above 12 mg./100 ml. prior to operation.

As a result of this review it is felt that, for practical purposes, patients with urinary calculus disease should be admitted to hospital for more elaborate investigations of their calcium metabolism only if their serum calcium concentration is persistently greater than 10.5 mg./100 ml. and the urinary calcium output on an ordinary diet is consistently in excess of 350 mg./24 hours.

I wish to thank Mr. G. H. Baines, at whose suggestion this investigation was undertaken. I am also indebted to Mr. Neville Crawford, of the Surgical Research Laboratories, Queen Elizabeth Hospital, and Dr. A. Gedie and his staff of the

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LATE RESULTS OF HAEMORRHOIDECTOMY BY LIGATURE AND EXCISION

BY

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Since Anderson (1909) reported his observations on "The After-Results of the Operative Treatment of Haemorrhoids" few studies on this subject have been published despite the passage of more than fifty years. His remarks were based on the results of 300 haemorrhoidectomies performed at St. Mark's Hospital, London; 150 were treated by the ligature-and-excision operation described by Salmon, and the remainder by either Whitehead's operation or the clamp-and-cautery technique.

Miles (1919) and Milligan, Morgan, *et al.* (1937) have since described modifications of the ligature-and-excision operation. These were designed to secure a low tie of the haemorrhoid pedicle, thus avoiding large raw areas within the anal canal and reducing the risk of later stricture formation. The techniques of haemorrhoidectomy described by these authors have been extensively practised for many years, but the only detailed follow-up studies of the results which we have been able to discover are those

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†Since this paper was submitted for publication another communication on the results of haemorrhoidectomy by the Milligan-Morgan method has emanated from Söderlund, *Acta chir. scand.*, 1962, **124**, 444.

of Mikkelsen (1951), Samenius (1951), and Cormie and McNair (1959).† With the reintroduction of submucosal haemorrhoidectomy by Parks (1956), it seems appropriate to try to determine with accuracy the outcome of the ligature-and-excision operation as at present practised.

To this end, therefore, we have studied the late results of this operation for haemorrhoids in the Professorial Surgical Unit of the General Infirmary at Leeds, special attention being paid to the incidence of recurrent symptoms and recurrent haemorrhoids, of post-operative complications, and of late sequelae. The functional results have also been carefully analysed.

Though the operations under review have been performed by a number of surgeons, the technique used followed closely that of Milligan, Morgan, *et al.* (1937), and has been described in detail by Goligher (1961).

Clinical Material

The present study includes all patients who had been treated by the ligature-and-excision type of haemorrhoidectomy in this unit during 1955–8 inclusive, and who thus had their operation performed four or more years ago. Of 189 such patients, 17 are known to have died, none in the immediate post-operative period. Of the remaining 172, 138 (80%) have been personally interviewed and examined. Of the 34 not reviewed, seven are known to have shifted to distant parts of the country, making interview impracticable, and the remainder are untraced. The length of follow-up ranged from three to seven years, with an average of just under five years.

Men were almost twice as numerous as women, there being 89 males and 49 females. The age at the time of operation ranged from 29 to 82 years, more than half the patients being between 40 and 60 years. Nine patients had an associated fissure-in-ano, and this was treated by internal sphincterotomy through one of the haemorrhoidectomy wounds.

Previous History.—The length of history varied considerably, and in some cases was more than 20 years. Eighty-five stated that they had experienced trouble for more than five years before operation. Four patients had had a previous haemorrhoidectomy.

Table I shows the incidence of individual symptoms in the 138 cases reviewed. Altogether 119 patients complained of pain or discomfort prior to operation, and 25 stated that it was their main complaint; only four of these cases had fissures at the time of operation.

TABLE I.—Incidence of Symptoms Before Haemorrhoidectomy in 138 Patients

Bleeding	119 cases	Soreness or discomfort ..	13 cases
Prolapse	114 "	Discharge	31 "
Pain	106 "	Pruritus	63 "

Results of Operation

Immediate Post-operative Complications.—Twelve patients experienced some recorded complication as shown in Table II. The commonest was haemorrhage—reactionary or secondary—which occurred in six patients.

TABLE II.—Complications After 138 Haemorrhoidectomies

Reactionary haemorrhage	4 cases	Fistula	1 case
Secondary	2 "	Fissure	1 "
Faecal impaction "	3 "	Haematoma in skin bridge	1 "

Time Off Work.—The period in hospital was usually 7 to 10 days, but the average time taken for complete healing of the wounds was roughly four and a half weeks. This latter also represented the average duration of the time off work in these cases.

Recurrence.—It was far from easy to assess the incidence of recurrent haemorrhoids by objective means alone because of the generally admitted difficulty, on proctoscopic examination, of drawing a clear line of distinction between a normal state of affairs and small internal piles. Actually, adopting the same standards that we apply in our rectal clinic, some two-thirds of the post-haemorrhoidectomy patients were adjudged to show some evidence of first-degree piles, but only four of them had recurrent symptoms. Eighteen were recorded as having early second-degree piles, but symptoms were present in only three. No case had recurrent third-degree piles. Seven patients therefore had further symptoms attributable to recurrent haemorrhoids. All complained of bleeding, usually of small amounts on several occasions, but one had an appreciable single bleed. Three patients had further treatment by injections to control the bleeding, but none required operation. In addition to bleeding, one patient complained of mild prolapse, one of pruritus, and two of pain. The average length of follow-up on these seven patients was approximately five years. Recurrent rectal or anal pain occurred in nine patients: in two it was associated with bleeding and recurrent haemorrhoids, and in one with an anal fissure; in six no definite cause could be found. Pruritus associated with haemorrhoids was difficult to distinguish from mild idiopathic pruritus ani. Two-thirds of those who initially complained of this symptom were relieved after operation. It did, however, persist in 20 patients, with objective evidence of pruritus in only eight.

Skin Tags.—Seventy-one of the patients had some evidence of skin tags at the time of review, but in the great majority these were small and asymptomatic. Only three complained of discomfort due to lumps or chafing attributed to skin tags, but in 13 there was associated pruritus. Eight patients with skin tags also complained of "soiling."

Fissures.—Shallow fissures were found on examination in three cases, but in only one was it causing pain.

Stenosis.—In no case was a symptomatic anal stricture found, and in all cases a finger could be passed through the anal canal into the rectum. However, in two cases a definite narrowing of the upper end of the anal canal could be appreciated, and was thought to be due to scarring in the mucosal layer. In addition a more general narrowing was felt in four cases, thought to be due to fibrosis in the wall of the anal canal. Proctoscopy could not be tolerated by these six patients because of discomfort, which could not be accounted for by the presence of any other pathological condition.

Functional Results

Post-operative function was carefully assessed, using the same standards as were employed in previous reports on the results of operative treatment for fistula-in-ano (Bennett, 1962) and fissure-in-ano (Bennett and Goligher, 1962):

(a) Thirteen patients (9%) complained of occasional leakage of flatus not experienced before operation. Two of these reported that it was a daily event, but in the remainder it occurred less often.

(b) Eight patients (6%) noticed occasional inadvertent passage of faeces, but in only one was this a frequent occurrence. It was usually associated with the passage of diarrhoea stools, which they found more difficult to control than before operation.

(c) Twenty-three patients (17%) complained of repeated soiling of their underclothes, despite careful attention to toilet. In about one-third it occurred every day, but in the remainder less often. Some had learned to prevent "soiling" by washing a short time after defaecation, but others had tried this without success. Four of these patients had also undergone an internal sphincterotomy for associated fissure-in-ano.

One or more of these defects were found in 36 (26%) patients.

All patients were asked if they felt that the operation had been successful, and it was reassuring to find that 128 were completely satisfied. The remaining 10 had minor reservations, but, despite the recurrence of mild symptoms or the presence of some functional imperfection, they expressed their overall satisfaction with the result.

Discussion

In determining the late results of any operation it is obviously desirable to have a lengthy follow-up. Unfortunately this is more difficult to achieve in connexion with a relatively minor operation, such as haemorrhoidectomy performed on basically fit subjects, than with more major procedures. All too often patients, once relieved of their anal complaints, show little inclination to return for review years later. Indeed, many of those included in this survey were interviewed and examined in their homes. In aiming at a long-term review we have been unable to trace every case, but we feel that examination of 80% of all patients thought to be alive three or more years after operation, with an average length of follow-up of nearly five years, forms a sound basis for statistical analysis.

Although it is a tenet of classical teaching that uncomplicated haemorrhoids are usually painless (Gabriel, 1948; Goligher, 1961), pain or constant discomfort was present in 86% of our cases before operation, and was the main complaint in 18%. Further, it was apparent that much of the patients' satisfaction after operation was due to relief of this discomfort.

Pruritus was also common, occurring in nearly half of the cases. Certainly it was not always associated with prolapsing piles or mucoid discharge. It proved to be the symptom least relieved by haemorrhoidectomy.

As expected, immediate post-operative complications were uncommon. Reactionary haemorrhage was the most frequent complication, and in one case was due to slipping of a ligature on a pile pedicle; in the others bleeding occurred from small vessels in the wounds. Secondary haemorrhage was uncommon and its incidence (1.4%) was similar to that reported by Gabriel (1920).

It will be specially noted that no comment has been made on the incidence of post-operative pain, which could be regarded in a sense as a complication of the operation and undoubtedly one much apprehended by the average patient about to undergo haemorrhoidectomy. The reason for this omission is that it is quite impossible in a retrospective study of this kind, relying for information regarding the immediate post-operative period on the data available in the ordinary clinical notes and on the patients' imperfect recollection years later, to attempt the difficult task of assessing with any degree of accuracy the severity of the patients' discomfort during that time. This matter is, however, being considered in a separate forward inquiry.

The length of time off work varied with the occupation and psychological make-up of the patient. Some took many weeks to return to work; the reason was often

obscure and unrelated to post-operative troubles. These few more tardy patients served to extend the average time off work beyond three weeks, which was probably a more accurate estimate for the normal patient.

We found the incidence of recurrence difficult to assess because so much depends upon the interpretation of this term. The majority had some evidence of haemorrhoids on examination, though they were usually small and asymptomatic. Seven (5%) have been considered as definite recurrences because of the development of related symptoms. Each of the seven complained of bleeding, but only three have required treatment by means of injection.

Although no instance of symptomatic anal stricture was encountered, some narrowing was appreciated in six patients (4%). But this was of minor degree as shown by the fact that it always transmitted the examining finger. We would emphasize that routine post-operative dilatation was not employed in this series, and that the regular passage of an anal dilator was reserved for the dozen or so cases in which the development of fibrous stenosis was thought to be specially likely, as when one or two of the skin bridges had been sacrificed.

The incidence of minor defects in anal control in normal people was previously investigated (Bennett and Goligher, 1962) and it was found that 10% experienced inadvertent passage of flatus, 3% had occasional unexpected leakage of faeces, and 2% noticed frequent soiling of their underclothes. By comparison, 9% of the haemorrhoidectomy patients under review experienced some leakage of flatus, 6% had uncertain control over faeces (usually when fluid), and 17% complained of "soiling." Though all the patients stated that these defects were not present until after operation, it is only in the case of "soiling" that a marked difference from the normal figure occurs. This was also the commonest defect in anal control after internal sphincterotomy (28%) (Bennett and Goligher, 1962) and after orthodox treatment of anal fistulae (23%) (Bennett, 1962). Any attempt to differentiate precisely between these imperfections is probably artificial, but the fact that 26% of patients had one or more defects three years after operation is surprising. It must be remembered, however, that these defects are minor and, though regarded by the patients as a nuisance, certainly do not amount to frank incontinence. None the less one patient regularly wore a perineal pad for added protection and confidence.

As none of the sphincter fibres are divided in a standard haemorrhoidectomy—though the possibility of slight inadvertent damage to the superficial layers of the internal sphincter cannot be entirely excluded—it may be assumed that the functional imperfections are related essentially to the removal of sensitive anal-canal skin. Duthie and Gairns (1960) have demonstrated the profusion of free and organized sensory-nerve endings supplying the greater part of the anal-canal lining, and Bennett and Duthie (1962) have shown that this sensory epithelium could play a part in normal continence. Whether an insensitive anal-canal scar, weakened sphincteric action, or other as yet unelucidated factors are responsible, it is apparent that minor imperfections of continence do sometimes occur after haemorrhoidectomy as well as after other anorectal operations.

It is also of interest to note that four of the nine patients in whom haemorrhoidectomy was accompanied by internal sphincterotomy experienced minor defects in anal control.

It is generally held that a properly performed haemorrhoidectomy should be curative, and that it also produces a satisfied and grateful patient. We believe the results of

this follow-up study confirm these contentions in the vast majority of patients.

Summary

A series of 138 patients have been reviewed for an average of just under five years after haemorrhoidectomy by the ligature-and-excision method.

Recurrence of haemorrhoids sufficient to cause symptoms was noted in seven (5%). Three required subsequent injections, but none needed further operation.

Anal stenosis, sufficient to prevent the passage of a proctoscope of $\frac{1}{4}$ -in. (2-cm.) diameter, but allowing an ordinary digital examination of the rectum, was present in 6 patients (4%). In the other 132 patients proctoscopy with a full-sized instrument was unimpeded.

Minor defects of anal control occurred in 26% of patients, consisting of impaired continence for flatus (9%) or faeces (6%), or of frequent soiling of underclothes

(17%). Sometimes more than one defect was present in the same patient.

A total of 128 patients were highly pleased with the result of the operation, and the other 10 had only minor reservations regarding their satisfaction with the outcome.

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TREATMENT OF "REFRACTORY OBESITY" WITH "FORMULA DIET"

BY

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The difficulty of securing a satisfactory and lasting reduction of weight in obese patients is reflected in the use of so many and varied dietary regimens. Despite these, a considerable number of obese out-patients fail to lose weight on subcaloric diets. Such patients we have defined previously as having "refractory obesity" (Duncan *et al.*, 1960), and they form an admirable group for evaluating any new weight-reducing diet or drug.

Recently, powdered food preparations, or "formula diets," have been introduced for the treatment of obesity. It was hoped that by replacing the patient's usual cooked and appetizing meals with a palatable but satisfying drink of known caloric value the patient would be less tempted to overeat.

We report the results of a 12-weeks trial of one of these preparations in a group of patients having refractory obesity.

Methods and Materials

Forty-six women, mostly middle-aged housewives, were chosen, all of whom (1) were clinically obese and with one exception overweight by at least 20% of their ideal weight (U.S.A. Medico-Actuarial Investigation, 1912); (2) had attended the dietetic out-patient department throughout the previous year and had not responded satisfactorily to the prescribed conventional diet containing 900–1,400 calories; (3) had not lost weight significantly in the three months before the trial; and (4) were not known to have any cardiac disease and had no clinical evidence of oedema.

Fifteen were mild diabetics who required neither insulin nor oral hypoglycaemic drugs and showed only minimal and occasional postprandial glycosuria.

Nine patients did not complete the 12-weeks trial. Two of these went on holiday, one became oedematous, one developed an acute exacerbation of peptic ulcer symptoms, and two were unwilling to continue because of nausea or severe constipation; three made little or no attempt to follow the recommended regimen and ate large quantities

of ordinary foods, but their failure could have been predicted from previous knowledge of their personalities.

The relevant data of the 37 patients who completed the twelve-weeks trial are set out in Table I. Most had taken part in previous trials of phenmetrazine and methylcellulose (Duncan *et al.*, 1960) and/or diethylpropion (Seaton *et al.*, 1961), but none had taken any anorectic agents in the year prior to the present study.

The Product.—Each $\frac{1}{2}$ -lb. (227-g.) tin of formula diet, containing 70 g. of protein, 20 g. of fat, and 110 g. of carbohydrate, provides about 900 calories. The preparation is fortified with various vitamins and minerals and is supplied in several flavours—plain, vanilla, butterscotch, orange, and chocolate. It is prepared for use by adding about 2 pints (1,140 ml.) of water to the contents of one tin and stirring to obtain a smooth mixture. This provides four large glassfuls, each of which replaces a main meal.

Conduct of the Trial.—The purpose of the study was explained to all patients about one month before it was started. They were asked initially to try to eat nothing but the formula diet but were allowed water and other non-caloric drinks to satisfy thirst. If they could not adhere to this strict regimen they were to be permitted, in addition to the formula diet, small quantities of low-calorie foods and drinks, a list of which was supplied to them. They were warned that constipation might occur and were asked to take a simple aperient if necessary.

Each reported at fortnightly intervals for 12 weeks, and was weighed in almost the same indoor clothing, interviewed by one of us, and given two weeks' supply of formula diet in the flavours preferred. The degree of adherence to the recommended regimen was ascertained (formula diet alone, formula diet plus permitted foods, formula diet plus prohibited foods). Because the patients knew the doctors well they freely confessed when they had eaten prohibited foods and gave their reasons. They were catechized regarding the occurrence of side-effects due to the diet, such as constipation.