although it was recognized that the clinical features were not altogether indicative of that condition.

Operation.

The abdomen was opened by a right paramedian incision, the rectus muscle being displaced outwards. The appendix was normal. A dark red mass, measuring $3\frac{1}{2}$ by $1\frac{1}{2}$ inches, was found adhering by its lower extremity to the middle of the ascending colon. This was easily separated, and proved to be an isolated (or accessory) portion of omentum attached by a twisted pedicle directly to the transverse colon, and well to the right of the main organ. It was found impossible to untwist the pedicle owing to an elastic recoil which at once reproduced the original torsion, thus demonstrating that the anchoring of the mass by its lower end to the ascending colon was not essential to maintain the torsion. The twist, of two complete turns, commenced about half an inch distal to the colic attachment, so that it was a simple matter to ligature the pedicle close to the transverse colon and remove the mass. Appendicectomy was performed, and the abdomen closed. The patient made an uneventful recovery, and was discharged on December 8th.

In the eighteen cases collected by Cowell the ages ranged from 14 to 55; this case is therefore the oldest on record.

In considering such an apparently rare condition as abdominal torsion of the great omentum one wonders whether any (or many) such cases have been missed through the use of a gridiron incision to open the abdomen.

For the accompanying illustration my thanks are due to Dr. W. O. Reid, Dundee.

REFERENCE

¹ *British Journal of Surgery*, 1925, vol. 12, No. 48, p. 738.

A METHOD OF ESTIMATING THE SIZE OF AN ENLARGED PROSTATE.

BY

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It is always difficult to estimate the size of an enlarged prostate, and the usual method of recording this by comparison with the size of a tennis ball, apple, or other object is unsatisfactory. To note that the prostate is enlarged to the size of a large apple does not help one at a subsequent examination, and if the case is referred to another surgeon this note is of no value, depending as it does on the personal opinion of the first examiner, whose idea of a large apple may differ from that of the next person to examine the patient. In order to make some sort of accurate measurement I have been using the following device, which, if not scientifically exact, at least gives definite figures which can be checked at any future examination.

The three measurements I wish to obtain are: (1) the width—that is, the distance from side to side; (2) the vertical—the distance between the upper and lower edges;

(3) the thickness—that is, the distance between the floor of the prostatic urethra and the rectal wall.

To measure the width of the gland I use a metal probe 30 cm. long. The patient bends over a couch; the left forefinger is passed into the rectum and maps out the prostate, noting any hardness, inequality, or tenderness. The probe is then introduced along the palmar surface of the finger, and carried

FIG. 1.

by the finger to the left lateral limit of the gland, as represented by the line b—c (Fig. 1). An assistant holds a sheet of cardboard resting against the back of the patient's thighs, and marks with a pencil the position of the end of the probe (c). The finger then moves the probe across the gland to the right lateral limit of the swelling, and the new position of the end of the probe is marked on the cardboard (d—e). With the nail of my right forefinger I mark the point where the probe enters

the anus, and withdraw the probe. Laying the probe on the cardboard, and measuring the distance between the points e and c, I can obtain the distance between the points b and d, which I record as the width of the prostate.

To measure the vertical length a piece of drainage tube 20 cm. long is slipped over the probe and pushed up to the point (Fig. 2). The left forefinger is passed into the rectum, and the probe with its rubber cover introduced along the palmar surface, and pushed up until the finger reaches the upper limit of the gland. Keeping the probe in this position, the rubber cover is gently pulled down by the right hand until the lower margin of the gland is reached. The rubber and probe are then pinched together and removed. The uncovered end of the probe is measured, and this gives the vertical length of the gland.

FIG. 2.

To measure the distance between the floor of the prostatic urethra and the rectal wall I use a rigid rubber-covered probe (Fig. 3, A) soldered at right angles to a 10 cm. rule (B). A brass block (C) 2 cm. square and 4 cm. long is slotted to slide along the rule, and is drilled at the upper end to form a sleeve fit for a catheter (X). A circular window (Y) is drilled in the centre of the block to serve as a window through which the scale can be read.

FIG. 3.

The catheter is passed gently into the bladder until urine flows. The rectal tube is passed into the rectum and pressed against the prostate. An assistant then very gently slips the end of the catheter into the hole in the brass block and slides the block backward towards the rectal probe until the tissues prevent further movement. As the catheter and probe are rigid and parallel the thickness of the gland is shown by the point on the scale that is seen through the window. An x-ray photograph taken with the patient lying on his side with the instrument in position showed the lines of the rectal probe and catheter to be quite parallel.

The three measurements are recorded in my notes. I take some dental wax and mould it into the shape given by the measurements, adding any irregularity or abnormality discovered by the examining finger. The model is labelled with the patient's name, and serves as a record of the examination.

While not suggesting that this method is ideal, I may claim that it is painless and gives some fixed figures to record.

OPERATIVE TREATMENT OF ACUTE PERFORATED ULCER OF THE STOMACH AND DUODENUM:

OBSERVATIONS ON SIXTY-SEVEN CASES.

BY

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It is generally admitted that duodenal ulcer, like appendicitis, is markedly on the increase, and that the complication of perforation is now common. In patients suffering from duodenal or gastric ulcer perforation is said to occur in 23 per cent. of male patients and in 9 per cent. of female.¹ Spontaneous recovery occurs only occasionally; I have seen only one such case, upon whom it was necessary, some months later, to operate for pelvic abscess and a recrudescence of the symptoms of ulcer. Perforation is often a "seasonal" complication: it occurs with greater frequency during the

winter months, and more especially during the lessened vitality which is generally associated with the later months of winter. During the month of December, 1924, I had under my care in my own wards at the same time no fewer than 10 cases of perforated duodenal ulcer.

During the past fifteen years I have operated on 64 cases of perforated duodenal and pyloric ulcer and 3 of gastric perforation. A number of duodenal cases have been of the juxtapyloric variety, the ulcer and surrounding induration invading both the pylorus and duodenum. All these cases have been in males, and all have been ulcers of the "chronic" variety, with sudden perforation into the free abdominal cavity. In 53 the perforation occurred on the anterior wall of the first part of the duodenum or pylorus; one on the posterior wall of the duodenum. In 10 the site was the upper surface of the pylorus or duodenal "cap," and in 3 the lesser curvature of the stomach.

It is a surgical platitude to insist that success in treatment depends on early diagnosis. The practitioner who recognizes this serious condition at once deserves more credit for his patient's recovery than the surgeon who operates. The object of this paper is to discuss the fundamental principles of surgical procedure, about which, at the present time, there is so much controversy.

My first 7 cases (1910-11) were dealt with by simple suture of the perforation, with the usual drainage of the site of perforation and pelvis. Of these 5 recovered and 2 died (a mortality of 28 per cent.); the interval between perforation and operation varied from four to thirty-eight hours. Of the 2 who succumbed, in one the perforation had occurred thirty-two hours and in the other thirty-six hours before operation. Of the 5 recoveries 2 returned with recurring symptoms of ulcer, and were later dealt with by gastro-enterostomy. My eighth case, dealt with by simple suture, was complicated a few days later by leakage at the site of perforation, with the appearance of bile and gastric juice through the wound. The perforation was then again closed, and posterior gastro-enterostomy performed. The rapidity of this patient's recovery was so striking that in my next case I was led to undertake the combined operation, with a most successful result.

The number of cases since operated upon has been 59; 2 were treated by simple suture and 57 by suture and gastro-enterostomy. The latter cases represented almost every grade of perforation, with intervals varying from two to thirty hours following perforation. The age of the patients ranged from 18 to 60. Among the last 12 cases there was only one death, which followed three weeks after operation owing to deficient drainage.

TABLE I.—Summary of Results.

	Cases.	Recovered.	Died.	Mortality per cent.
Simple suture... ..	9	6	3	33
Suture and gastro-enterostomy...	58	46	12	20

Total mortality of 67 cases = 22 per cent.

Assuming that the condition of the patient will warrant such a procedure, the question of gastro-enterostomy in these circumstances usually depends on the period which has elapsed since perforation; the age, sex, and general health of the patient; and last, but not least, the immediate facilities for undertaking such an operation. Deaver and Pfeiffer² have recently published a similar number of cases, performing the combined operation in 45, with the loss of only 3, while Mr. G. P. Mills³ has also published a series of 22, with a mortality of 4.5 per cent. A study of the records of my own cases, and of others, has led me during the past few years to perform the combined operation as often as possible.

The early complications which may arise after simple suture are: leakage at the site of perforation some days after the operation; haemorrhage from the ulcer; perforation of a second ulcer; persistent vomiting, from the narrowing of the pylorus or duodenum. The remote complications are: frequent recurrence of symptoms of ulcer with possible re-perforation, in addition to the diffi-

culties encountered in a possible second operation; from adhesions, etc.

Immediate gastro-enterostomy has certainly, in my experience, reduced the mortality. The combined operation does not entail any increased risk to the patient. It represents an additional fifteen or twenty minutes under the anaesthetic, but this is more than counterbalanced by its immediate advantages.

1. The operator can boldly and efficiently infold the perforated area, without risk of subsequent stenosis at the gastric outlet or leakage at the point of closure.

2. Fluids can be given by the mouth almost immediately after recovery from the anaesthetic.

3. The peristaltic movements of the intestine can be earlier stimulated by the administration of purgatives, thus counteracting the distension of the intestine due to partial paralysis.

4. A more rapid and efficient drainage of the peritoneal cavity by an early action of the bowels is produced; this, I consider, is one of the most important advantages. These points have been well brought out by H. J. Paterson.⁴

Complications.

The cause of failure in a considerable number of my cases has not been immediate shock, but either subsequent bronchopneumonia or a subphrenic or residual abscess. Protection of the patient, both during and after operation, has been followed by marked improvement in respect of the first complication, and there have been no deaths from it in the last 15 cases.

The question of drainage is still a debated point—the tendency is to drain less. Complete closure of the abdomen after perforation is a very uncertain "surgical gamble"; it is impossible to forecast whether complications will ensue or not. I have lost one case through deficient drainage, and strongly urge that the pelvis, at least, should be drained in all cases in which perforation has occurred more than two hours before operation.

The Operation.

I have found the perforation is most securely closed by a double row of interrupted fine silk sutures; an initial purse-string suture often causes trouble—it will cut through the friable indurated and oedematous tissue, and so enlarge the perforation. Catgut is liable to digestive action, when leakage ensues. Simple dry mopping of the soiled abdomen is resorted to, and the posterior gastro-enterostomy performed in the usual way; a suprapubic "stab" wound is then made, and a drainage tube passed down into the pelvis.

After-History.

It was difficult to follow these patients up, but I have seen all of them from time to time—some a few months and some many years after operation. I have not been called upon to deal with any complication beyond ventral hernia on one occasion. The majority appear to have been entirely cured. Some have complained of symptoms obviously due to adhesions, the inevitable result of severe peritonitis. It must be realized that if gastro-enterostomy is performed for uncomplicated ulcer or for its perforation the process of physiological digestion has been profoundly altered. The patient should be warned of this, and his diet and habits regulated to meet the new conditions; this is well emphasized by Sir Berkeley Moynihan.⁵

I have read with great interest the recent criticisms of the combined operation, and especially those of Mr. Zachary Cope,⁶ whose judgement and experience I have reason greatly to respect. The method adopted in dealing with the cases here recorded was not influenced by the results of others, but rather by my own personal experience as time went on; it appeared to me that the anastomosis helped, in very large measure, the recuperative powers of the patient—first by "indirect" drainage and elimination, and secondly by the early administration of fluids by the mouth, with no danger of subsequent leakage through the diseased and friable perforated area. It is easy to allow enthusiasm to warp judgement, and it is possible that my mortality percentage might have been lowered by restraint.

As time went on, however, results improved. Table II contains an analysis of the cases dealt with during the last six months of the year 1924, drawn up by my house-surgeons, Dr. J. I. Noble and Dr. W. F. Jones, at the Liverpool Stanley Hospital and Brownlow Hill Infirmary. The cases were treated by combined suture and gastro-enterostomy; 11 made uneventful recoveries, 1 died three weeks after operation from residual abdominal abscess; all were of the male sex.

TABLE II.—Analysis of 12 Cases Operated on during the last Six Months.

Age.	Hours between Perforation and Operation.	Site of Perforation.	Age.	Hours between Perforation and Operation.	Site of Perforation.
46	8½	Lesser curvature of stomach.	20	4½	Duodenum.
21	3½	Duodenum.	33	7½	Duodenum.
47	23½	Duodenum, death	38	3½	Duodenum.
40	25	Duodenum.	24	6	Duodenum.
22	3	Duodenum.	28	2	Posterior surface of stomach.
40	9	Pylorus.	59½	8	Duodenum.

Mortality = 8 per cent.

In conclusion, I do not in any way suggest that the combined operation should be the routine treatment; it depends entirely on opportunity and circumstances. If one is constantly undertaking gastric surgery, and the facilities are favourable, I think the combined operation is both an immediate and remote advantage to the patient, and should be done if the patient's condition will allow it. On the other hand, it should not be undertaken by the "occasional" operator, or in circumstances when warmth, light, skilled assistance, or suitable operative facilities are absent. Simple closure is then the safest method. The complication of bronchopneumonia undoubtedly increased mortality in my earlier cases, but it has latterly almost entirely become eliminated by suitable preparation of the theatre and patient and by careful after-treatment.

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TREATMENT OF THREATENED GANGRENE OF THE ARM DUE TO INJURY OF THE MAIN ARTERY.

BY

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IN the following two cases, seen several days after the axillary or brachial artery had been torn across, the extent of the threatened gangrene was greatly minimized by a simple method of treatment.

A man, aged 39 years, was admitted to Bradford Royal Infirmary on July 11th, 1923. Five days previously he had been getting off the back of a moving motor lorry, and had been dragged by his left arm for some distance. On admission, the left hand and forearm and the lower third of the upper arm were cold, swollen, and very tense, and did not show any evidence of circulation. The left axilla was occupied by a large, tense, fluctuating swelling, obviously a haematoma, due to rupture of a large vessel, probably the axillary artery. There was no bone injury. It was clear that the collateral circulation had succeeded in reaching only the upper two-thirds of the upper arm, and it appeared possible that the tension under the deep fascia had determined its limit. I accordingly made free incisions through the deep fascia of the arm, down as far as the wrist, so as thoroughly to relieve all tension. During the following ten days warmth gradually returned to the part, extending about one and a half inches further down each day, until it eventually reached the level of the proximal phalanges. Gangrene, however, appeared in the fingers, and presently involved the whole of the hand. Amputation was performed on August 6th at the wrist-joint. He was discharged from hospital on August 20th, and his wounds were all soundly healed by December 6th, his forearm being quite useful and showing no trophic changes. The fluid swelling

in the axilla became gradually and completely organized, with free movement.

On July 19th, 1925, I was asked to see a similar case with a view to giving an opinion as to the site of amputation for impending gangrene.

A child, aged 5 years, had, three and a half days before, sustained a severe fracture-dislocation of the right elbow. This was reduced and put up on a rectangular splint. Two days later the fingers were observed to be blue and cold, and the splint was removed and the arm watched. The condition was not due to tight bandaging. When I saw the child the hand and forearm up to beyond the elbow were quite cold, with some blebs on the skin below the elbow. The forearm up to beyond the elbow was very tense. There was a good deal of ecchymosis over the lower part of the brachial artery, which we presumed was torn. On the analogy of the previous case, I made very free incisions in the deep fascia over the whole area of tension. The flexor sublimis digitorum was found to be already gangrenous. Within twelve hours normal warmth had been restored as far as the wrist, and partial warmth, which soon became complete, in the hand and fingers. Both the flexor sublimis and the flexor profundus sloughed down to the radius, after which the wound healed. Suppuration occurred in the wrist-joint, in which, on October 31st, the date when a note was last made, sinuses still persisted. No amputation was necessary.

It may be deduced that a slight collateral arterial circulation existed after the accident in both cases, but that the tension obstructed the venous return, and thus there was a further increase of tension which inhibited the feeble arterial flow. The tissues bulged freely after the incision of the fascia, and this, together with the rapid improvement in the case of the child, justifies the inference that relief of tension was the essential point in treatment. The absence of interference with the actual lesion of the artery, leaving the collateral circulation as intact as possible, no doubt contributed to the successful result. In the case of the man the recovery of vitality after the limb had been practically or entirely devoid of circulation for days is remarkable.

Memoranda :

MEDICAL, SURGICAL, OBSTETRICAL.

NOVASUROL AND OTHER DIURETICS IN CARDIAC OEDEMA.

THE article in the issue of the *JOURNAL* of January 16th (p. 80) by Dr. C. G. Lambie on the diuretic action of novasurol interested me greatly. Following the lines suggested by Keith,¹ Rowntree,² and others I have, so far, treated two cases with striking results, the method employed only differing from that of Dr. Lambie in that ammonium chloride was used, both as a preliminary diuretic and also during the administration of the novasurol itself.

Case I was a woman, aged 67, with myocardial degeneration but no valvular disease. Extra-systoles were present. The lower limbs were enormously oedematous; the dropsical effusion extended to the subcutaneous tissues of the back and abdomen, and also slightly to the hands. A moderate degree of ascites was present, and there was also slight jaundice. Rest in bed over a period of some weeks, Karel diet, the administration of digitalis alternatively with other cardiac tonics, and the use of diuretics such as theobromine sodium salicylate and theocin all failed, the oedema growing steadily worse. Ammonium chloride was then administered in capsules, to a daily total of 5 grams, in divided doses. Low salt fluid diet alone was allowed, and the daily intake restricted to 800 c.cm. By this means a slight diuresis was induced. Novasurol was then given on four occasions at intervals of three days, by the intramuscular route, each dose consisting of 0.5 c.cm. Following each injection the urine increased markedly in amount, with a corresponding decrease in oedema, but unfortunately the attendants could not be prevailed upon to preserve the total for measurement. At the end of thirteen days all oedema had completely disappeared, to the relief of distressing symptoms formerly present. Gradual myocardial failure, however, supervened, and the patient died some days later, without, however, a return of the dropsy.

Case II was that of a man, aged 46, suffering from chronic nephritis with salt retention, albumin being present in the urine to the extent of 4 per cent. The legs were greatly swollen, with severe ascites and oedema of both lung bases. Treatment was adopted on similar lines with fluid intake restriction to 28 oz., and the urine, which before treatment amounted to 25 oz. a day,

¹ Keith, Barrier, and Whelan: The Diuretic Action of Ammonium Chloride and Novasurol in Cases of Nephritis with Oedema, *Journ. Amer. Med. Assoc.*, September 12th, 1925.

² Rowntree, Keith, and Barrier: Novasurol in the Treatment of Ascites with Hepatic Disease, *Ibid.*, October 17th, 1925.