I heartily agree with Drs. Ochsner and Grant who do not, as a rule, break down adhesions to remove the appendix in acute cases; but who first drain, then remove the appendix later. Adhesions are life-savers and should not be disturbed merely for the purpose of removing an organ which can be removed without danger subsequently.

DR. W. T. REYNOLDS, Kansas City, Mo.: Recent studies of the blood have taught us that in localized abscesses there has been an autogenous vaccination which has brought about a great resistance. In peritubal abscesses we never think of draining the abscess and leaving a leaky tube. The same proposition confronts us in the vast majority of instances in localized appendiceal abscesses. It is not usually hard to find a line of cleavage which makes it comparatively easy to divide the adhesions and find the diseased appendix. I am heartily in accord with the essayist and have found in my own experience a greatly reduced mortality in fearlessly draining from the bottom of the pelvis.

DR. VAN BUREN KNOTT, Sioux City, Ia.: Not many years ago at a meeting of this society we listened to claims that no appendicitis patient should be operated on. So I am not surprised to find men still claiming that a leaking, stinking appendix should be left in an abdomen to make the patient as uncomfortable as possible. Reform does not always come at once, but slowly and usually through hard knocks. But as far as my own experience is concerned, I am removing this appendix for a different reason. Some seem to think that the removal of the appendix at the time of the original operation is merely a matter of cosmetics—not that there is any reason to think that its removal can do the patient any good. But that is not the point. We remove the appendix to lower the mortality; and my mortality has been reduced from 8 to 1 per cent. in these cases; and these men will have to show me a lower mortality than 1 per cent. in these abscess cases before I will agree with them.

Sioux City is a small town, but we are near Missouri; and we shall be glad to show anybody who doubts the kind of work we are doing there. Two or three good men in Omaha and in Kansas City, Dr. MacLaren, of St. Paul, and other men throughout the middle west, are doing this kind of work. Dr. Ross tells me he has not left an appendix in the abdomen in four years and that in nearly every one of these cases he has described to you of subphrenic abscess, that came to post-mortem, he found there was always an appendix left. It is a fact that patients will not die from peritonitis; we did not have a death from peritonitis in this series of cases. I believe most cases of circumscribed abscess will die of sepsis rather than peritonitis, and they will be more apt to die of sepsis if drainage is superficial.

I am surprised to find so many different hidden pus pockets scattered through the lower portion of the pelvic cavity. These could not be reached by incomplete surgery. In my experience such surgery leads to an unnecessarily high mortality.

It is all nonsense to say that after the abdomen is opened you will decide whether or not you will remove the appendix, because no man can decide whether an appendix will come out hard or easy, if it is more or less tangled with adhesions.

No one should undertake this operation who is going to occupy thirty minutes in finding the appendix and getting it out after the peritoneum is opened; and if he does start to remove it and backs out because it is a little hard, he has exposed his patient to all the trauma he would get any way.

Dr. Ochsner says if he thinks his patient is going to die, he leaves the appendix. But this is just the class of cases in which we remove them.

DR. GEORGE G. ROSS, Philadelphia: I agree with what Dr. Knott has said. I have not left an appendix in four years, and as yet I have had no occasion for regret.

I believe that the mortality in these acute appendicular localized abscesses is not so much due to the infection of the peritoneum as it is to the fact that the infection gets behind the endothelial coat of the peritoneum. It is this type of retroperitoneal infection that is attended by a very high mortality for the reason that the retroperitoneal space cannot be drained.

TUMORS OF THE MESENTERY

WITH A REPORT OF FOUR CASES *

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In spite of the contributions that have appeared from time to time concerning mesenteric tumors and the interest manifested in certain reported cases, there is good reason to believe that these growths have been neglected and that they have not received the systematic attention to which their importance entitles them. That they are comparatively uncommon is admitted; but this would seem to supply a stronger reason for their careful study. When one has to depend on text-books or even on readily available periodic literature, one must encounter serious difficulty in the management of such cases. Under the clearest conditions, they require judgment and, above all, experience which may be gained at the cost of stumbling on them unawares.

In this paper an attempt will be made, first, to classify the existing pathologic and clinical knowledge of the subject; second, to record some personal cases, which will bear on questions of diagnosis and operative method; and third, to review the important articles found in the recent literature. It will not be necessary to go into historic detail, since Douglas¹ covered the facts in 1903, and both Vance² and Bowers³ restated them in 1906.

ORIGIN

Our topic includes only those tumors which originate in the mesentery itself and not the so-called retroperitoneal growths. The latter may arise from any tissue behind the peritoneum and push forward between the layers of the true mesentery. They have served in a way to confuse the classification.

In order to appreciate the situation and character of these tumors, it is well enough briefly to consider the mesentery, its development and its structure. Any fold of peritoneum connecting a part of the intestine to the posterior wall of the abdominal cavity may be called a mesentery, though this unqualified term is generally employed to designate the special portion of the membrane attached to the small intestine (*mesenterium commune*).

In the development of the embryo, as the right and the left halves of the body cavity come toward each other, the early connective tissue is compressed into a primitive mesentery, which is attached to the whole length of the alimentary tube, from the stomach to the anus. Intestine and peritoneum are developed together, two layers of the serous membrane investing the bowel. When fully formed the mesentery is fan-shaped, its length of insertion being many times that of its fixed attachment. It runs obliquely from left to right, extending from the second lumbar vertebra, crossing the spinal column, to the right sacro-iliac joint. Its root, or point of origin of the two layers, is 6 inches in length, while the convex intestinal edge is 21 feet long (Gray).

Between the two layers of peritoneum that constitute the mesentery, run arteries, veins, lymphatic vessels, lacteals, and nerves—all imbedded in connective tissue and fat. These enter and leave through the posterior space, where the intestine is not completely surrounded by serous membrane. It is readily seen, therefore, that

* Read in the Section on Surgery of the American Medical Association, at the Sixty-Second Annual Session, held at Los Angeles, June, 1911.

1. Douglas: *Surgical Diseases of the Abdomen*.

2. Vance: *Ann. Surg.*, 1906, *lxiii*, 366.

3. Bowers: *Ann. Surg.*, 1906, *lxiv*, 892.

tumors of the mesentery must be largely of the mesoblastic or connective tissue type.

VARIETIES

Growths of the mesentery may be solid or cystic. Cysts are by far the more common and, according to their contents, are either serous, chylous, hemorrhagic, hydatid or dermoid. Solid tumors are benign or malignant. The former are lipoma, myxoma and fibroma and the latter sarcoma. It is very probable that the lipomata greatly outnumber the others, but sarcomatous degeneration is said to take place sooner or later in the majority of the simpler neoplasms. The lipomata and fibromata are very often prone to attain an enormous size. The pathology of these tumors differs in nowise from that of similar growths in other organs.

ETIOLOGY

Little can be said of the etiology, because, indeed, little is known of it. Undoubtedly, some growths are congenital in origin, and certainly many exist for a long time before they are recognized. It is in such cases that the influence of trauma is given credence, for an injury may light up or call attention to a preexisting growth. Bachmann⁴ refers to this fact in his report of the case of a boy of 9, who, eight weeks before examination, had fallen across a barrel and on whom an autopsy was done two months later, which showed large masses of multiple fibromata in the mesentery. He quotes Pean as having noted the fact that large tumors may be present for years, only to be revealed in their final stage by some sort of traumatism. Age and sex apparently are not factors in the occurrence of these growths. In childhood, however, we very rarely meet the solid tumors.

REPORT OF CASES

Before discussing more practical questions, it will be well to put on record the cases which form the basis of this paper. By virtue of those peculiar coincidences which sometimes crop out in our work, four mesenteric tumors fell to my lot last year, within the space of six months, the last three coming all within a period of a little more than one month. They are presented in the order of their occurrence.

CASE 1.—Dermoid Cyst of the Sigmoid Mesocolon.—Mrs. Y., aged about 40, of frail constitution, mother of three children, two weeks before coming under observation, had a sudden severe abdominal pain, beginning in the right iliac region, but quickly transferred to the left; she vomited and had fever. There was a history of previous colics and of one attack nearly a year before resembling this, except that the pain was chiefly in the bladder region.

Examination.—On the first visit, March 28, 1910, temperature was 101; there was pain and tenderness all over the abdomen, but particularly at the border of the left rectus, low down; very little distention. At the second visit, evening of same day, the tenderness was much less, but the fever much higher (104); local signs diminishing. It was agreed that no interference should be advised until the acute process had passed away. By April 12 there was a practical subsidence of fever and pain; the abdomen was flat and the patient's general condition was good. Local symptoms were centering in the right lower iliac region, where a very sensitive mass could be felt; this mass was easily palpated on bimanual examination and gave indistinct fluctuation. A likely diagnosis was pyosalpinx, but in the absence of any history leading to that affection, it was considered improbable. No definite statement was ventured.

Operation.—Rex Hospital, April 13, 1910: right rectus incision. A mass of adhesions was encountered around the

bladder, uterus and cecum; the sigmoid flexure had been drawn far over to the right and within the folds of its mesentery, near the intestinal border, was found a somewhat flattened cyst of the size of an orange. In the process of enucleation the cyst was ruptured and the character of its contents—teeth, hair and bone embedded in a mushy material—was determined. The mesenteric vessels were uninjured and no ligatures were required, only whipping over the edges with catgut. The uterus, tubes and ovaries were normal; the appendix, being engaged in the adhesions, was removed. A drainage tube with tape was inserted into the lower angle of the wound.

The patient had a very pleasant recovery and is in better health than she had been for several years. The specimen (Fig. 1) is a typical dermoid cyst, containing hair and a well-marked alveolar process with several perfect teeth.

Dermoid cysts of the mesentery are, of course, very rare. According to Bell and Yeoman,⁵ up to 1908 about 150 cases of mesenteric cysts were found scattered throughout the literature; but of all these cases, there are certainly not more than twenty described as dermoids. These writers report a dermoid of the jejunal mesentery in a woman of 24, which was felt as a large, round, tender and movable "lump" between the uterus and the bladder, and thought to be a fibromyoma of the uterus. It was found lying between the folds of the mesentery with a loop of bowel curving around it. Attempts at enucleation being unsuccessful, the entire cyst was excised, the hole in the mesentery closed and a loop of bowel resected. The patient made a tedious recovery. Ehler⁶ also operated successfully on a patient, aged 22, for a dermoid cyst of the descending colon, which had to be dissected widely and was associated with another similar cyst at the hilum of the kidney. These two are the only other dermoids of the mesentery reported since 1907, and bring the number to not more than twenty-three, including the case herewith presented.

Dermoids, wherever found, have their origin in fetal inclusion or implantation from the ectoderm and are, therefore, congenital growths. They belong to the class of teratomata. The mesenteric forms are commonly derived as post-rectal dermoids, which may develop at any point along the infolding process. They do not usually give clinical signs until long after infantile life and are more apt to contain teeth than are dermoids in any other situation.

CASE 2.—Sarcoma of Sigmoid Mesocolon.—M. A. F., male, colored, aged 50, for several months had been troubled with abdominal pain and tenderness. At first his bladder was irritable; lately his rectum had been troubling him. He was sent in with a diagnosis of bladder tumor. He had lost about 30 pounds in weight.

Examination.—In appearance he was emaciated and hollow-eyed. The abdomen showed a hard nodular tumor, low down, near the mid-line, but chiefly to the left; on rectal examination it was found somewhat movable and apparently lying on the rectum. It had exactly the "feel" of a uterine fibroid in a woman.

Operation.—St. Agnes Hospital, Sept. 1, 1910: a low left rectus incision. About a pint of serous fluid was in the cavity. The large tumor (Fig. 2) was attached to the sigmoid flexure and was seen to spring from its mesentery. With some difficulty the growth was stripped off the bowel and enucleated from the mesosigmoid. The raw areas were closed with catgut. There were metastatic growths lower down, along the rectum and behind the bladder. The operation lasted twenty-five minutes.

At first the patient did well, but he became distended and vomited and, though his bowels moved and the pulse was never very rapid, he died on the fifth day. No autopsy was allowed. The pathologic report proved the tumor to be a round-cell

5. Bell and Yeoman: Brit. Med. Jour., 1908, II, 810.

6. Ehler: Rev. de méd. technique, Prague, 1908, I, 38.

4. Bachmann: Inaugural Dissertation, Erlanger, 1908.

sarcoma. It was not so soft as such growths usually are and was definitely encapsulated.

Since 1906, when Vance² reviewed the literature and in addition to his own case, found seven others of mesenteric sarcoma, there have been reported two more. These were both of mixed type. König's⁷ case was that of a woman, 69 years of age, with cyanosis, dyspnea, anasarca, ascites and a feeble pulse. He tapped and drew off 15 liters of fluid, locating a tumor of the shape and size of a child's head below the umbilicus. Operation revealed a tumor, partly solid and partly cystic, growing from the mesentery and loop of small intestine. Extirpation and resection of portion of bowel, with use of the Murphy button. Uneventful recovery followed. Microscopic examination showed the tumor to be a fibrosarcoma with large spindle cells. Marullaz⁸ presents the case of a man, aged 65, who had noticed swelling of the abdomen for two years. It was 108 cm. in circumference; the patient's general condition was poor, but no edema or ascites was present. At operation the large growth was found adherent to the stomach and transverse colon; resection was necessary for its removal and the patient died thirty-six hours afterward. The tumor weighed over 6 kg., and turned out to be a myxosarcoma of the mesentery.

CASE 3.—Blood Tumor of Mesentery.—J. S. F., male, aged 60, had always been healthy up to a year ago, when he began to have pain in his right side. He was treated in January, 1910, for what was thought to be appendicitis. He seemed to recover in four days and did not complain again for six months. At that time an enlargement was found in his right abdomen. He was then advised to seek surgical aid, but declined. For the past three months he had lost much flesh and strength, but had been almost free from acute pain.

Examination.—There was found in the right half of the abdomen a swelling of the size of a grapefruit, located almost on a level with the umbilicus. It was freely movable and seemed too far forward for the kidney. A mesenteric growth was the most probable condition.

Operation.—At Rex Hospital, Sept. 23, 1910: an incision in the right rectus muscle exposed the hard nodular dark-red tumor, which grew in the mesentery of the ileum. It encroached so closely on the intestinal wall and appeared so plainly malignant that a lateral anastomosis was decided on. Nine inches of the bowel were removed along with a corresponding amount of mesentery down to its root. The patient did very well until the second day, when he suddenly developed pain, vomiting and delirium without unusual distention, and died probably from gangrene of the intestine. It was impossible to make a post-mortem examination. The pathologist's report, somewhat of a surprise, was as follows: "Sections from four different portions of tumor show only young connective tissue (an organizing clot). No indication of malignancy" (Fig. 3).

This was a very difficult case. Resection was undoubtedly demanded, and yet one hardly hoped to have success with it. The large V-shaped portion of mesentery, which had to be excised, contained thrombosed blood-vessels, and they probably extended into apparently healthy areas beyond the line of division. Malignant degeneration of a preexisting growth was certainly suggested by the history. Possibly a slow-forming mesenteric thrombosis may have accounted for the condition. There is a chronic thrombosis which gives rise to a large blood tumor between the layers of the mesentery, but it is much more rare than the acute form. Codman,⁹ in speaking of this condition, says: "I have

not made the diagnosis in any of them, nor do I expect to in the next." According to Douglas,¹ mesenteric blood-cysts may be due to injury with non-absorption of the effusion or to hemorrhage into a preformed cyst, as observed by himself. No sort of possible history of traumatism could be elicited in the case now being considered. So, in the light of the pathologic findings, it has been put down as a blood-tumor of the mesentery, due most probably to a long-continued process of embolism and thrombosis.

CASE 4.—Round-Cell Sarcoma of Transverse Mesocolon.—Mrs. G. W. D., 52 years old, had her menopause in 1904. In June, 1910, she began to flow again and this went on almost continually to the time of her admission on Oct. 6, 1910. Soon after the flow started, she felt an enlargement in her right side, accompanied by more or less pain. This lump continued to grow rapidly. During this time she lost weight, perhaps 20 pounds or more, and did not feel well at any time.

Examination.—A very freely movable tumor, about 8 inches long and 4 inches wide, soft in consistency, was found apparently attached near median line, below and just to the right of the umbilicus; it could be pushed into the pelvic region and might easily be mistaken for an ovarian cyst; the uterus was normal; no growth on the cervix or on the endometrium; the adnexa showed no disease.

Operation.—Oct. 7, 1910, Rex Hospital: A long median incision below the umbilicus revealed a mass rolled up in the omentum. This was tied off and the tumor brought up. It was a growth (evidently sarcoma) of the transverse mesocolon and was shelled out without wounding the bowel or the mesenteric vessels. The bleeding was easily controlled. Hard metastatic nodules were felt in the pelvic cul-de-sac. The pathologist reported "sarcoma—round-cell type."

The patient made an easy operative recovery and went home in two weeks. Before she left the hospital, the growth was larger than it was when she came in, and she died at her home about one month later.

There was no opportunity here to do any bowel resection owing to the secondary growths and the patient's enfeebled condition. The diagnosis was evident from the rapidity of the tumor growth and the patient's malignant appearance. It was a typical mesenteric sarcoma (Fig. 4), its consistency being, as described by Bazin,¹⁰ "neither soft nor fluctuating, but pasty; the surface not smooth but lobulated." It differed markedly from that of the second case in this series, though they were of the same cellular type. The comments made under that case will apply here.

DIAGNOSIS

One hesitates to lay down any rules whatever for the diagnosis of mesenteric tumors. It is often impossible to say beforehand that a recognizable enlargement is certainly a growth of the mesentery, and it may be well to feel contented simply with deciding in most cases that surgical intervention is or is not indicated. Exploratory diagnosis is unquestionably the easiest and surest way. A few principles for guidance, however, may be set forth, these being based on the collected experience of those who have in late years written on the subject. Douglas is the only author who gives adequate consideration to the diagnosis. I shall not here undertake a labored presentation of symptoms and signs. Rather will it be better profit to lay emphasis on those things which point to an existing tumor as being possibly mesenteric and to mention those conditions which might prevent confusion in distinguishing this growth from some other neoplasm.

Subjective symptoms, if present, are not usually distinctive. Pain, which is the most important, is not apt

7. König: München. Med. Wchnschr., 1906, III, 330.

8. Marullaz: Arch. de méd. exper. et d'anat. path., 1907, xix, 203.

9. Codman: Med. and Surg. Papers, Mass. Gen. Hosp., III, No. 2, p. 140.

10. Bazin: Thèse, Paris, 1907.

to be attributed to the rare condition of a mesenteric tumor, but more probably to biliary, nephritic or appendicular colic; constipation is nearly always the rule, and digestive troubles, especially nausea and vomiting, are common, but so they are in many other conditions. Intestinal occlusion, volvulus and invagination may result from the presence of the tumor and give the symptoms attending those conditions.

Fig. 1.—Dermoid cyst of sigmoid mesocolon.

Fig. 2.—Sarcoma of sigmoid mesocolon.

The signs that most clearly give evidence of mesenteric tumors concern their position, their mobility and their relation to other organs. They are situated either in the middle line or far to either side over the course of the large bowel. Free mobility is the most important single sign, as no other abdominal tumor will show this

to the same degree. The motion from side to side is especially marked. This may in a measure be diminished when the tumor is allowed to advance to a great size. If it can be determined that the tumor is separable from the solid viscera, a long step forward in the diagnosis will be made. Bazin speaks of a zone of resonance in front of or below the growth, and Douglas suggests that this may be of value in eliminating pelvic tumors, if the patient is examined in the Trendelenburg posture. König regards these as the important points: colicky pains radiating toward the umbilicus, the presence of bowel over the tumor and unusual mobility of the growth; and yet in his case none of these signs was present. Ascites is one of the common complications.

Fig. 3.—Blood tumor of mesentery.

The differential diagnosis offers a wide field of problems. Chief among these are ovarian cysts (which figured very strongly in the fourth case of my series), tumors of the liver, enlargements or displacements of the kidney, growths of the bowel itself and cysts of the pancreas. It will hardly be expedient to go over the detailed characteristics of these conditions, as they are well known. One must keep them strongly in mind, however, when differentiating abdominal growths and be prepared to learn that the diagnosis of mesenteric tumors is not a simple affair. Their very rarity is a reason for their being often overlooked. Reporting a fibromyxolipoma of the mesentery four years ago, Wiesinger¹¹ remarked: "In the many thousand laparotomies

¹¹ Wiesinger: Mitt. a. d. Hamburg. Staatskrankunst., 1907, vii, 191.

performed by the author for several years, this is the only case he has observed." Cysts, more than the solid tumors, are likely to furnish sources of error in diagnosis, from the areas of fluctuation usually present. These may be noted also in a lipoma when soft and of large size, as mentioned by Terrier. Bazin considers the diagnosis of sarcoma very difficult. He lays stress on "the rapidity of the growth, the cachexia and the more or less profound yellow tint of cancer." Furthermore, he seems to advise aspiratory puncture; this, he states, "will yield a cystic liquid mixed with blood, which is not the case in a lipoma owing to its lack of vascular supply." The European surgeons, as a rule, write very unconcernedly of this method, as if it were their custom to aspirate all abdominal swellings for diagnostic purposes—a practice which surely cannot be commended. Myxoma of the mesentery has been confounded with multilocular cyst of the ovary. Diagnosis must depend on excluding all possible evidence of the latter.

PROGNOSIS

The outlook depends largely on the character of the growth. Danger results not only from malignancy which may be present or imminent, but also from pressure due to the large size such tumors often attain. Early recognition and prompt removal are the remedies for both of these perils. Unfortunately, late diagnosis and tardy removal have appeared to be the order of the day, and thus the mortality has been high. In 1898 Begouin collected notes of twenty-nine solid tumors of the mesentery; of the patients only fourteen

Vance's twenty-seven collected operations the intestine was resected thirteen times, with seven recoveries and six deaths; three of the tumors were sarcomata and all the patients died, while of the five fibromata cases only one resulted fatally. Obviously, one should be aware of the risk when electing to perform resection. Yet Murphy removed two feet of bowel, Lexer six and a half feet, and Shepherd seven feet eight inches, all successfully, for benign growths. It must be conceded, of course, that the cases suitable for resection are those in which malignancy is evident or in which the growth by its size or situation encroaches dangerously on the bowel; both of these conditions will naturally be associated with a high death-rate. Most assuredly the danger is increased by the removal of a portion of the bowel and the time consumed in the consequent anastomosis, on account either of shock, which has been given as the cause of death in many of the operations, or of gangrene of the intestine, resulting from injury to the nutrient vessels, or of peritonitis, due to imperfect technic. We can heartily join Wiesinger, therefore, in his advice to avoid resection wherever possible, and, as a sort of corollary, to be careful not to wound the blood-vessels of the mesentery in extirpating the tumor. When that golden age shall arrive, in which the surgeon will be given early the privilege of examining and, if it seem wise, of operating on these patients promptly, then the vexatious questions which have just claimed our attention may trouble us less and less.

Fig. 4.—Round-cell sarcoma of transverse mesocolon.

survived the operation (mortality 51.7 per cent.). Writers have since stated that our results are now better; but more recent reports do not show great improvement. Vance, in 1906, found twenty-seven cases in the literature of the five years preceding and eleven of the patients died, a mortality of 40.7 per cent. Since that date, I have records of nine cases (including two dermoids) with three deaths; these, added to the four of my own, give a total of thirteen cases with six deaths, or 45.1 per cent. mortality.

OPERATIVE METHODS

In deciding on the proper procedure at the operation, one must have in mind three questions: First, is the tumor benign or malignant? Second, is it primary and isolated? Third, how much, if any, intestine is to be sacrificed in its extirpation? These points are often very difficult to determine. Since the last issue must depend on the first two, the whole matter may be resolved into a decision on the indications in any given case for resection of the bowel. The mortality percentage will be closely concerned with this decision. In

HAVE WE AN IDEAL OPERATION FOR INTERNAL HEMORRHOIDS?

A NEW HEMORRHOID CLAMP

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It is proper to acknowledge, by way of introduction, that no operation in surgery of equal importance has been performed as often or with as uniform success as that for the relief of internal hemorrhoids. This record is all the more remarkable when the number and indeterminate qualifications of the operators are considered, and when the many diverse methods advocated and practiced are called to mind.

It is probably no exaggeration to say that operation by the ligature and clamp-and-cautery methods has been performed hundreds of thousands of times under every imaginable condition, with a resulting mortality so low as to be practically negligible. And the same is true of an additional large number of cases in which the long list of modified and new methods have been employed. With this phenomenal history of achievement, it would seem that there is little ground for criticism either of the standard or of the more recently devised methods of operating. And let me hasten to add that such is not the purpose of the present brief paper, except in so far as the several methods fail to conform to the accepted principles and precepts of modern surgery.

Now what are those principles and precepts as applied to the surgery of internal hemorrhoids? Among the more important are: (1) complete hemostasis, (2) immediate closure of the operative wounds, (3) preservation of the function of the parts, (4) permanency of cure, and (5) due consideration of the factors of safety, simplicity of technic, time required for recovery, and the amount of post-operative pain. Antisepsis is not included in the list for the reason that at the present