Experience with a Modified Witzel Gastrostomy without Gastropexy

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The records of 161 adult patients who underwent a modification of the Witzel gastrostomy without gastropexy at Ellis Fischel State Cancer Hospital, Columbia, Missouri, between 1977 and 1980, are reviewed in detail and form the basis of this report. Six of these patients had gastrostomies on two different occasions. There was no mortality or major complication directly attributed to the procedure in this group of patients. Technical details are examined and considered most important in preventing intraperitoneal or extraperitoneal leak of gastric contents and migration of the catheter, the most commonly found complications of other techniques. Anterior gastropexy is considered unnecessary, thus simplifying the operation and eliminating gastric deformity and other related problems. The liberal indications of this procedure are discussed, and potential areas of technical pitfalls are reviewed. The personal experience of one of the authors (EMB) with 774 gastrostomies during a 15-year period using this technique confirms these conclusions. A random sample of 200 records of these patients were examined for complications of the operation. This study suggests that tube gastrostomy by the technique described is a reliable and safe procedure with wide applicability for patients undergoing major abdominal surgery. The relatively few complications are more than compensated for by the degree to which postoperative comfort and care are facilitated.

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TUBE GASTROSTOMY traditionally has served two main purposes: gastric and upper intestinal decompression, and feeding when the distal gastrointestinal tract is functional and nourishment cannot be given orally. This study evaluates the results in adults of a modified Witzel gastrostomy without gastropexy for gastointestinal decompression after selected abdominal operative procedures. Use of the operation of tube gastrostomy decompression has been more liberal than is practiced generally. It is recognized that there are proponents of the concept that postoperative gastrointestinal decompression by any method is usually unnecessary. The authors' purpose is not to reargue the pros and cons of elective postoperative decompression but to present the results of tube gastrostomy as they have used it for this purpose.

Gilchrist (1953) was an early advocate of gastrostomy tube postoperative gastric decompression to avoid the complications incident to an indwelling nasogastric tube and to promote patient comfort.[5] Farris and Smith (1956) documented the complications of nasogastric intubation, and advocated tube gastrostomy for the patients then undergoing truncal vagotomy and drainage procedures.[4] The Stamm gastrostomy was the preferred operation; either a Foley or a Mallacot-Depezzer catheter was introduced through the anterior gastric wall and held in place by multiple (usually two) purse-string sutures of catgut that inverted the gastric wall snugly around the catheter, following which the tube was passed through the abdominal wall and the stomach and parietal peritoneum were sutured around the exit site. The inflated Foley bag or the head of the Depezzer catheter played an important role in preventing displacement of the tube from the stomach. Apparently, this is the type gastrostomy that is most commonly used at the present time. One of the most recent studies favoring this operation was that of Meissner et al. in 1976, in which 70 patients had a Stamm gastrostomy with gastropexy without significant complications.[8]

Jabczenski and Starkloff (1962) were among the earliest to report the complications of elective tube gastrostomy by the Stamm technique and advised caution in its "routine" use.[7] Their most frequent complication in 123 patients was leakage of gastric juice around the tube and persistent drainage after the tube was removed. Twenty-three percent of their patients had significant complications directly related to the tube gas-

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trostomy. Gustavsson and Klingen reported in 1978 that migration of the Foley catheter into the duodenum caused obstructive jaundice.[6] Connar and Sealy, in 1956, reported 125 patients having Stamm gastrostomies with 14.4 percent nonfatal complications, most of which were due to leakage around the tube and gastric fistula.[2] Bryk (1977) has described difficulty in gastric emptying secondary to displacement of the antrum by the gastropexy.[1] Cooper and Buston, in 1948, reported the results of gastrostomies done for feeding purposes in 199 patients, 25 of whom were below the age of 10 years. Seventeen of 96 patients having Stamm gastrostomies had severe stomal problems.[3] Sherman and Cosgrove (1973) reported three instances of pyloric obstruction resulting from Foley catheter migration because of inadequate fixation of the tube at skin level.[9]

The impression gained is that elective tube gastrostomy is more or less in disrepute because of the complications that may result. The operation is reserved for those patients who most urgently need it because of age, respiratory, or nasopharyngeal problems, or, of course, for feeding purposes. Apparently, the Witzel gastrostomy has been used very little, and the authors know of no reports of complications from its use. The technique was described by Professor Witzel in 1891 with the comment that "No surgeon likes to do gastrostomy unless it is urgently indicated for feeding purposes in a patient who is starving."[10] The technique he described resulted in less leakage of gastric juices around the tube to excoriate the skin or cause peritonitis. It is still used today, chiefly for small tube enterostomies, but is apparently infrequently used for gastrostomy. Although this article reports experience with a "modified" Witzel gastrostomy, the procedure is essentially the same as that originally described, *i.e.*, a seromuscular tunnel around a gastrostomy tube passed through the abdominal wall without suturing gastric wall to the parietal peritoneum. Professor Witzel would be astonished at the frequency with which it is being used for elective gastric decompression.

Materials and Methods

One hundred sixty-one patients underwent a modification of the Witzel gastrostomy without gastropexy at Ellis Fischel State Cancer Hospital, Columbia, Missouri, between 1977 and 1980. Six of these patients had gastrostomies on two occasions. A reivew of their records formed the basis for this report (Table 1). Age, sex, concurrent abdominal procedure with which this technique was used, length of stay of the tube, and complications are reviewed. The experience of one of the authors (EMB) with 774 gastrostomies using this technique and performed at Barnes Hospital in St. Louis, Missouri, over a 15-year period from 1960 to 1974 is reviewed. Two hundred randomly chosen gastrostomies from this latter group are examined in detail to present a meaningful sample of the complications incurred in this individual experience (Table 2).

TABLE 1. *Modified Witzel Gastrostomy Without Gastropexy, Ellis Fischel State Cancer Hospital, 1977–1981*

Total patients	161
Females	105
Males	56
Mean age (18 to 100 years)	60
Indication for gastrostomy	
Gastric decompression only (group I)	133
Decompression and subsequent feeding (group II)	21
Feeding only (group III)	13
Surgical procedures associated with gastrostomy	
Colectomy	44
Laparotomy for obstruction or intestinal fistula	40
Abdominoperineal rectal resections	16
Major cytoreductive surgery for ovarian cancer	14
Advanced head and neck tumors (feeding gastrostomy)	13
Radical cystectomy	10
Exenterative pelvic surgery with urinary diversion	15
Gastroduodenal surgery	7
Major biliary and pancreatic procedures	5
Radical hysterectomy	3
Total Operations	167
Complications	
Serous or ascitic fluid leak; subsided in two to three days; no gastric fistula	2
Infections*	2
Mortality	0

* One patient who had an open pelvic colon operation had infection of separate subcostal incision for gastrostomy.

Technique

The gastrostomy is usually performed at the conclusion of the associated major abdominal operation. Decompression of the stomach is maintained during the procedure with a nasogastric sump tube introduced at the time of induction of anesthesia. A size 16 or 18 French red rubber catheter is prepared by making an additional one or two openings in the distal 5 cm in order to provide better drainage. These openings in the catheter should be made carefully and should not exceed the diamter of the tube lumen. Making too large an opening in the tube will obviate its effectiveness beyond this point due to gastric mucosa being sucked into and occluding the lumen. The site of insertion of the gastrostomy tube is selected along the greater curvature of the body of the stomach, within approximately 2 or 3 cm of the gastroepiploic branches. The body of the stomach is preferred in order to avoid the possibility of narrowing the antrum and interfering with gastric emp-

TABLE 2. *Complications in 200 Randomly Selected Modified Witzel Gastrostomies at Barnes Hospital between 1968 and 1975*

Complication	Number
No complications	188
Minor complications	
Temporary nonfunction or inadequate function of tube requiring insertion of nasogastric tube	6
Drainage of ascitic fluid around tube on 9th postoperative day; ceased upon removal of tube; no pain or fever	1
Pain on removal of tube with slight temperature elevation requiring continued hospitalization for two or three days	2
Total	9
Major Complications	
Subcutaneous abscess after removal of tube requiring readmission for incision and drainage; no fistula	2
Subcutaneous abscess associated with gastric fistula that closed in two or three days after drainage	1
Total	3
Mortality	0

tying. Care is used to make an opening in the stomach no larger than that necessary to admit the tip of the gastrostomy tube. This can best be done by placing a Babcock clamp at a right angle to the greater curvature (Fig. 1). With the stomach thus stabilized and thrown into a fold at the selected site, the gastric wall is then pinched between the thumb and index finger of one hand, and small stroking cuts are made through the

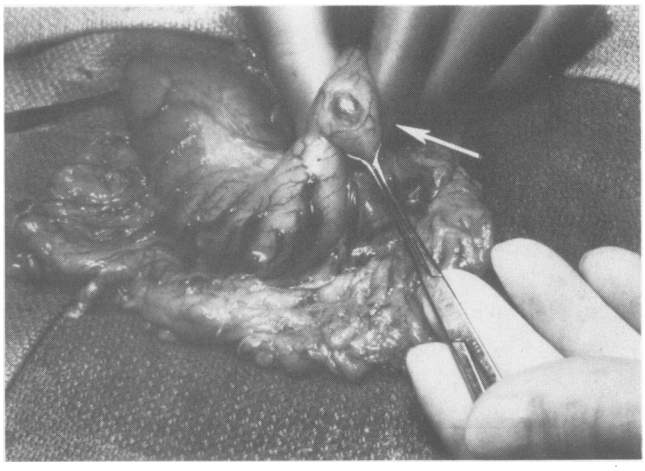

FIG. 1. By using a Babcock clamp and a pinching hold of the gastric wall, the serosa and muscularis of the stomach can be incised minimally to allow the mucosa to bulge into the wound (arrow). The opening through the mucosa can then be made quite easily and no larger than necessary to admit the gastrostomy tube (size 16 or 18 French).

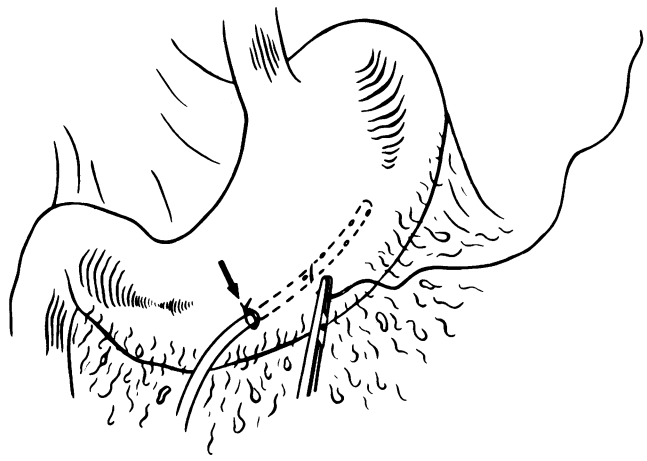

FIG. 2. The direction of the tube should be cephalad toward the fundus of the stomach, and the Witzel canal is started 2 to 3 cm proximal to the entry site of the catheter. Note the first circumferential anchoring suture (arrow).

serosa and muscularis until the mucosa bulges into the wound (Fig. 1). This is usually an essentially bloodless procedure, but any significant bleeding should be controlled before the mucosa is opened. The pinching hold on the stomach wall should not be released, since this will allow the exposed mucosal layer to retract out of view, necessitating a further search for it, requiring more time, resulting in more bleeding, and making a larger hole in the mucosa than is necessary. Producing this hole in the stomach wall is the essence of simplicity and should take only a few seconds to accomplish. Using a pointed knife blade with a "stabbing" technique is definitely not the way to do it.

Prior to passing the tube through the mucosal opening, it is wise to tie a silk suture around it to mark the level to which it is to be introduced. The tube should be introduced at least 3 or 4 cm beyond the most proximal perforation in the tube. The silk suture will mark the level desired and help to prevent the surgeon from allowing migration of the tube into or out of the stomach during manipulation. The tube is advanced in a cephalad direction into the fundus of the stomach, ensuring that its tip will be in the most dependent portion of the fundus when the patient is in the recumbent position. It is passed up to the silk marker, where it is anchored to the stomach wall by a suture of 3–0 chromic catgut (Fig. 2). The placement of this anchoring suture is important in that the suture should not tear the mucosa and, consequently, make the opening into the stomach larger; the suture should take an adequate bit of muscularis and submucosa, and should be tied with a double knot before being passed around the catheter for tying. It is essential that the anchoring stitch be tightly in contact with the rubber catheter around its entire cir-

cumference and that no soft tissue be included. If soft tissue is caught within the anchoring stitch and tied against the catheter, the catheter will slide easily within the suture. After the catheter has been securely anchored, the marking silk may be removed.

Once the tube is firmly anchored to the gastrostomy site, a serosa-lined tunnel (Witzel canal) is created with 2-0 or 3-0 continuous absorbable suture material; the tunnel is initiated 2 to 3 cm proximal to the entry site of the catheter and carried around the tube and past the point of entry to the stomach for a distance of 5 or 6 cm, at which point the suture is tied and cut (Figs. 3 and 4). A second circumferential suture is then used to further secure the catheter to the gastric wall at the site of exit from the serosal tunnel, again with care to include no soft tissue between suture and catheter (Fig. 4). At this point the catheter should be tested to be sure it does not slip or slide. The serosa-lined tube must fit snugly around the catheter, and the sutures must be placed deeply into the muscularis of the gastric wall so there will be no chance of their pulling out and, thus, separation of the tunnel. If desired, the tunnel may be carried toward the greater curvature of the stomach, where the gastrocolic omentum can be included in the final sutures, further ensuring against a possible gastric leak.

Gastropexy is not performed, but the stomach is allowed to remain in its relaxed anatomic position, and the tube is brought out through the abdominal wall at a site that permits it to do so in as straight a line as possible. A sharp curve may lead to kinking and obstruction of the tube. The point of exit of the tube can be anywhere in the upper abdomen that seems appropriate for the individual case, but usually it will be through or just lateral to either the right or left rectus muscle. No attempt should be made to use the tube to pull the stomach wall into contact or proximity with the parietal peritoneum. The tube may be passed through a "collar" of omentum if the surgeon desires as added insurance against a leak. Secure fixation of the tube to the skin by heavy silk is then assured. If this technique is used, a free length of from 5 to 15 cm of tube will traverse the peritoneal cavity from stomach wall to the parietal peritoneum. This segment of tube will be sealed off rapidly and will eventually be surrounded by a fibrous tract. Because of the intraperitoneal position of the tube, it is inadvisable to try to remove it before a minimum of 12 to 14 days. By this time, the circumferential holding suture should slide out easily. Frequently, the patient will be ready for discharge from the hospital before the catheter can be removed safely or before the holding sutures have loosened; in this case, the catheter can simply be folded and covered with a small dressing, and removed, either in the office a week or ten days later or by the family physician after instruction by the surgeon. No great ceremony is necessary in removal of the tube, since, if the tract is well healed and if the opening into the stomach has been made as carefully as instructed above, there is practically no chance for a free peritoneal leak. The opening in the stomach and the sinus tract will close just as rapidly as in the case when a T-tube is removed from the common bile duct. If, for some reason, the possibility of a leak is to be considered, the

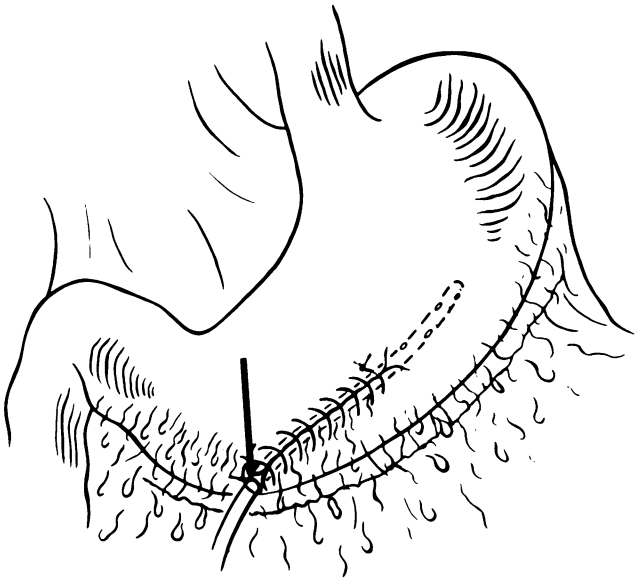

FIG. 3. The completed procedure. The omentum of the greater curvature may be included in the final sutures, if desired, or the catheter can be passed through a tag of omentum. The final circumferential fixation stitch on the catheter must be solidly and carefully placed (arrow).

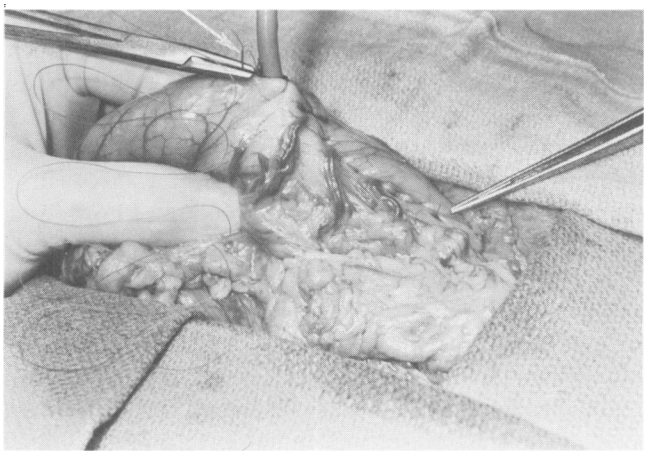

FIG. 4. The Witzel canal is completed, and a second circumferential suture is being placed to secure further the catheter to the gastric wall (arrow). The length of the canal is a factor in the low incidence of leaks and the rapid closure of the sinus after removal of the tube.

ultimate in safety should be achieved by removing the tube from the fasting stomach and withholding feedings for a period of hours. A definite risk occurs in patients who have had an accumulation of ascitic fluid. In such cases, if the tube is to be removed, the stomach should not only be empty but it is wise to insert a nasogastric tube for gastric saline irrigations prior to removal and for gastric decompression for several hours afterward. With this precaution, there is very little chance for a significant leak into the free peritoneal cavity.

After operation, the catheter is placed on low intermittent suction or on gravity drainage. Nurses are instructed to irrigate with normal saline four to six times per day. As gastrointestinal function returns, the tube is clamped and the diet advanced. The tube remains available to be put back into use at the first indication of inadequate gastrointestinal function.

Results

Between 1977 and 1980, 167 tubal gastrostomies were peformed in 161 patients at the Ellis Fischel State Cancer Hospital, six of whom underwent two gastrostomies at separate intervals due to a second major abdominal operation. There were no technical difficulties in creating a second gastrostomy using the same technique. Indeed, it was sometimes difficult to determine where the previous gastrostomy had been done. There were no firm adhesions between the anterior gastric wall and the parietal peritoneum, as may be the case with other techniques that involve anterior gastropexy.

There were 105 women and 56 men. The preponderance of females reflects the large number of radical pelvic operations performed at this institution for locally advanced malignancies. The ages ranged between 18 and 100 years, with a mean of 60 years. The gastrostomy tubes were ordinary red rubber catheters of 16 or 18 French size, although there was one each of size 14 and size 20, neither of which is considered appropriate for this purpose.

The surgical procedures associated with gastrostomy are shown in Table 1. The majority of the operations were of a major type in which gastric decompression for a period of four or five days, or longer, might be necessary. Only 13 gastrostomies were performed exclusively for feeding purposes. One hundred fifty-four of the operations were performed for postoperative gastrointestinal decompression, and in 21 of these patients, the tubes served for feeding purposes after gastrointestinal function returned and the oral nutritional intake was inadequate.

The length of stay of the catheter was a function of the time required for either decompression, feeding, or safe removal. In group I (Table 1) the tubes were used for an average of 6.6 days before being clamped, and they were removed at an average of 14 days. In group II, use was extended to 12.2 days, and the tubes were usually removed between two and three weeks after the operation. Catheters that were placed exclusively for feeding purposes were used in patients with advanced head and neck malignancies, and the length of stay of the tube averaged 28 days.

There were four complications in the 167 operations, a rate of 2.4%. All four complications were minor, and none resulted in prolonged hospitalization. In two patients, there was appreciable leak of serous fluid around the tube, without evidence of peritoneal or skin irritation. These leaks occurred during the third and fourth postoperative days, respectively, and subsided spontaneously two and three days later. Two additional patients had infection at the gastrostomy site. Induration and redness at the exit site of the catheter on the fifth postoperative day were seen in one patient; the signs of infection subsided four days later, after antibiotic therapy. The second infection occurred in an obese patient who had an open pelvic-colon operation. A tube gastrostomy was considered mandatory in this patient, and rather than exposing the stomach by dissecting through the upper abdominal adhesions, the gastrostomy was done through a short subcostal incision. The wound developed a subcutaneous *Escherichia coli* infection, requiring opening of the wound. There was no intraperitoneal infection, and the function of the gastrostomy tube was not interrupted.

There were no instances of tube migration, intraperitoneal leak, or skin excoriation. Removal of the tubes was simple when done at the proper time, and all exit sites closed and healed promptly. Oral feedings were resumed either in two or three hours or the next day after removal, depending on the preference of the surgeon. There was no instance of intraperitoneal leak associated with tube removal and no instance of gastric fistula.

Patient tolerance was excellent, with only a few complaints of minor discomfort at the exit site of the catheter. Nursing care was facilitated greatly by easier mobilization of the patient and more effective pulmonary care in the absence of the discomfort resulting from an indwelling nasogastric tube.

Barnes Hospital Experience

The results obtained in 200 randomly selected patients with temporary tube gastrostomies by the technique described here were reviewed for associated complications. All operations were done by one of the authors (EMB) or under his direct supervision. Random, rather than chronologic, selection of the cases was

used because of greater ease in locating the records on microfilm. The results are detailed in Table 2. All of these patients were adults, and most had major abdominal operations that had the potential of requiring prolonged gastrointestinal decompression. Twelve patients had complications, nine of which were minor. Nonfunction of the gastrostomy tube occurred six times, and a nasogastric tube was inserted. Nonfunction was usually of short duration, and the nasogastric tube was removed when function was resumed. Pain in the left upper quadrant upon removal of the tube occurred only two times in this sample. Neither of these patients developed abscess or fistula. Ascitic fluid drainage appeared around the tube on the ninth postoperative day in one patient. The tube was removed from the clean and empty stomach and the drainage promptly stopped, with no sign of intraperitoneal leak.

The only complications of significance were subcutaneous abscesses occurring some time after removal of the tube in three patients. All were readmitted to the hospital for incision and drainage. One of these patients had a minimal gastric fistula, which closed promptly.

To summarize the complications in this sample, the overall rate was 6%, with 1.5% of the complications being of significance. There was no death attributable to the gastrostomy.

There were several complications not picked up in the sample but remembered by the author in what must have been well over 1,000 gastrostomies done between 1946 and 1975. There was one death from peritonitis, in a patient with abdominal carcinomatosis, ascites, and intestinal obstruction in whom the tube was removed without the precautions necessary if ascites is present or suspected. The tube was not sealed off from the free peritoneal cavity. This is thought to be the only fatality directly due to tube gastrostomy in the entire Barnes Hospital experience of this author.

In one patient, after partial gastrectomy, the tip of the tube was inadvertently inserted into the lower esophagus. The patient had intractable hiccoughs and esophageal burning pain until the tube could be removed.

Another patient had inadequate fixation of the tube to the gastric wall, and early in the postoperative period, it slipped completely out of the stomach, resulting in an intraperitoneal leak requiring reoperation. The patient made an uneventful recovery.

A second patient required reoperation for displacement of the tube resulting from the tube and stomach wall being pulled up into contact with the peritoneum of the anterior abdominal wall where it was firmly held by an external skin suture around the tube. There were no supporting sutures between the anterior peritoneum and the gastric wall. The slight but continuous pull on the tube was enough to cause it to loosen and pull out of the stomach. The problem was recognized promptly and corrected by reoperation, with uneventful recovery.

No significant gastric fistula is recalled other than the minor one picked up in the random sample. No episode of bleeding into the stomach from the gastrostomy site is recalled.

Discussion

In the authors' experience, gastrostomy by the modified Witzel technique as described has proved safe, reliable, and simple to perform. Complications have been of a minor nature. Reoperation or prolongation of hospitalization has been rare. Although the operation is technically easy to perform, the surgeon must meticulously adhere to details. These include: 1) an opening through the gastric mucosa only large enough to permit the catheter to be introduced; 2) a snug, well-closed Witzel tunnel with absorbable suture material placed deeply into the muscularis so there is no chance of separation; 3) fixation of the cathether to the gastric wall with at least two sutures that positively prohibit slippage or migration of the catheter; 4) exit of the catheter through the abdominal wall without angulation and without tension on the stomach; and 5) removal of the catheter only after it has had time to be sealed off by adhesions and for the fixation sutures to have loosened, *i.e.*, between 12 and 14 days.

The advantages of the tubal gastrostomy include: 1) it is tolerated comfortably by the patient; 2) it provides effective decompression; 3) it facilitates care of the upper respiratory passages and lungs; 4) the tube is available for immediate return to function if the clinical course warrants it; 5) the tube may be used for weeks, if necessary, for either decompression or feeding purposes; 6) the operation is simple to perform; and 7) morbidity is low.

In general, the Witzel gastrostomy is used as described with most abdominal operations. The exceptions would be simple, uncomplicated procedures such as appendectomy or cholecystectomy for which gastric decompression, if used at all, would be necessary for only 24 to 48 hours. Even in these patients, tube gastrostomy would be preferred if the patient were debilitated, old, had pulmonary or upper respiratory tract disease, or if for any reason, a period of prolonged ileus might be anticipated. Major abdominal and extended pelvic cases have been provided with tube gastrostomies almost routinely. If the operation is in the lower abdomen and the stomach cannot be reached easily, the incision is extended to facilitate the gastrostomy, if warranted. If this is not practical, and gastrostomy is considered to be very important, a separate short subcostal incision is made without hesitation to accomplish it.

There are a few situations in which use of tube gastrostomy would seem to be contraindicated. Purulent peritonitis in the stomach area would increase the risk because of possible poor healing and delayed walling off of the tube and gastrostomy site. Prior irradiation therapy to the gastric area would increase the risk of poor healing. Tube gastrostomy in patients undergoing major abdominal vascular procedures with prosthetic grafts might be considered inadvisable.

Massive left upper abdominal resections, especially if associated with omentectomy and gastrectomy, may present a problem for tube gastrostomy in that walling off may be impaired by the absence of surrounding tissues. Prolonged gastrointestinal decompression may be necessary after such an operation. In order to avoid a prolonged indwelling nasogastric tube, on some occasions a catheter has been passed retrograde through the jejunum into the stomach through a gastrojejunal anastomosis. The same Witzel technique is used for the jejunostomy, with great care being taken not to angulate or constrict the jejunum.

When a gastrostomy is necessary for feeding purposes, the modified Witzel technique as described here has been used. Tubes that are to be left in for weeks or months should be observed carefully for signs of slippage and extrusion. This can be facilitated by an easily identified mark or suture at skin level, which will make a change in position of the tube immediately obvious. It may be necessary to change the holding skin suture if it should show evidence of loosening. The skin suture should be reinforced by properly placed adhesive strips, which could take the first shock if there is an accidental jerk on the tube. If the tube is accidentally withdrawn after two or three weeks, it, or a tube a size smaller, can usually be reinserted into the stomach through the tract if it is done immediately. If it is not done immediately, the tract will close, and reintroduction is impossible and hazardous if persistent attempts are made.

Special precautions are used when removing the tube from patients who have or have had benign or malignant ascites. In such cases, one cannot be sure that the tube will be walled off completely and should adhere to the precautions described earlier.

Gastropexy has been found to be an unnecessary addition to the operation. In addition to requiring more operating time, it is likely to produce its own complications through angulation of the tube, interference with gastric emptying, and tension on the gastric wall. The proximity of the stomach wall to the skin surface increases the risk of a gastric fistula when the tube is removed. The development of an essentially leak-proof gastrostomy, as described here, seems to have much less chance of producing the complications that are troublesome when other methods are used. It may be considered a disadvantage that the tube cannot be removed until a sinus tract has had time to form, but it is a disadvantage gladly accepted by both patient and surgeon in return for the postoperative comfort it has provided and the degree to which it has facilitated control and care of the patient.

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Discussion

Dr. Hiram C. Polk, Jr. (Louisville, Kentucky): For 16 years, since I finished my training with Dr. Bricker, we have employed this procedure as a personal method of choice and have tried to convince the residents who have worked with us that it is a useful procedure.

Indeed, this is very nearly a fail-safe method of gastric decompression. It is our impression that it is also extremely safe under conditions of patient noncooperation. We have had a number of these pulled out less than 48 hours after replacement. It causes no difficulty in any patient who does not have ascites. This is really a remarkably safe procedure.

I want to comment on the two or three recalled technical errors that we have suffered with the tube gastrostomy by this method; indeed, two of them are matters to which Dr. Bricker did not call a great deal of attention.

It is very important to secure hemostasis about the site of the gastric mucosal entry. We have had two intragastric hematomas and significant bleeds in something more than 1000 of these cases from failure to achieve hemostasis at the site at which the tube enters the gastric mucosa. You can do this simply with a loose necktie of catgut, and it works extremely well. It was shown in the illustrations; but it is the one technical problem that we have had that was not emphasized heavily.

I would think, because of the safety and the rapidity of this operation, that it really ought to become the procedure of choice. They drain very well, and the problems that he has outlined are exactly the ones we have seen. They are certainly infrequent, and I would not have thought, from recall, that they would have amounted to as much as 2%. Our estimate would be much nearer 1%.

I do want to emphasize that when these are employed, ascites might be a relative contraindication in this situation because of the nonfix-