Gastric Bypass for Morbid Obesity

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This is a report on 402 consecutive gastric bypass operations performed for morbid obesity. The operation involves the construction of a small (30–60 ml) upper gastric pouch connected to a Roux-en-Y jejunal limb by an anastomosis no larger than 1.2 cm in diameter. Concomitant patient ailments included hypertension, gallbladder disease, arthritis, and diabetes. Three patients died postoperatively, and the overall immediate morbidity was 4.2%. Ninety percent of the patients have achieved and maintained a satisfactory weight reduction. However, residual problems include anastomotic leaks, inadequate weight reduction, and few but significant difficulties such as anemia, kidney stones, and marginal ulcer. All of the obesity-associated diseases responded favorably, either disappearing or being greatly ameliorated.

Individuals who are 100 pounds, or 46 kg, above ideal weight are considered to be morbidly obese. While one can use nomograms for identifying ideal body weight, Devine [1] has developed a formula for determining ideal weight which can be applied to all individuals and takes into account differences in weight according to sex. Thus, for females the ideal body weight is 45 kg + 2.3 kg per inch over 5 feet in height; and for males, ideal body weight is 50 kg + 2.3 kg per inch over 5 feet. In order to make these calculations simpler for the average patient, a similar approach can be used in pounds as follows: for females, 100 pounds for 5 feet and 5 pounds per inch thereafter, and for males, 110 pounds for 5 feet and 6 pounds for each inch thereafter. Thus, the ideal weight for a 5'7" female is 135 pounds (61.4 kg) and for a 5'7" male it is 152 pounds (69.1 kg).

While morbid obesity itself will decrease life expectancy, it is well recognized that obesity is associated with the early development of cardiopulmonary disorders, hypertension, and diabetes [2, 3]. It is also associated with arthritis, thrombophlebitis, and a number of other less serious but nevertheless sometimes debilitating illnesses. The control of morbid obesity has been a challenge to all physicians. A variety of nonoperative approaches have been used in an attempt to control morbid obesity, but these rarely lead to permanent weight reduction.

These failures, however, led to the development of surgical means of controlling morbid obesity. The ideal operation should be safe in terms of operative morbidity and mortality, effective in terms of adequate weight loss postoperatively, and associated with minimal or no long-term adverse effects on the individual. The gastric bypass operation, with the rationale of simply reducing caloric intake by making the gastric reservoir so small the patient cannot consume more than 1,000 calories per day, appears to meet these 3 major criteria very well. After 3 years of experience, Mason reported in 1969 on 22 patients who had undergone a gastric bypass for the control of morbid obesity [4]. Five years later a controlled randomized prospective comparison of the jejunoileal and gastric bypass operations in the morbidly obese was carried out in our institution. The early results of that experience were reported in 1977 [5]. Upon completion of the study and analysis of long-term follow-up, only gastric bypass is offered to the morbidly obese patients in order to gain permanent weight reduc-
tion. Although the jejunoileal bypass operation satisfies the first 2 criteria quite nicely, the long-term sequelae observed in the prospective study appeared to be too significant to recommend it as an acceptable procedure. This report concerns the first 402 consecutive patients who have been subjected to the gastric bypass operation at the University of Kentucky Medical Center.

**Selection of Patients**

The absolute criterion for consideration of an operative procedure for the morbidly obese patient is that he or she be more than 46 kg (or 100 pounds) over ideal body weight. In addition, it is required that the patients give evidence that they have attempted to lose weight by at least one nonoperative approach and preferably by several. In general, the patients who choose to consider an operation for permanent weight reduction have already utilized many nonoperative approaches without success. These have included various diets, so-called diet pills, incarceration in hospitals or “fat farms,” psychotherapeutic approaches including hypnosis and rational behavior therapy, staples placed in the ear, and even wiring the teeth in occlusion.

The patients are interviewed in an outpatient setting which includes allowing them to read a brochure prepared within our department, containing pictorial material that gives the patient a clear understanding of the operation itself; the rationale for the operation; the expected weight reduction pattern; and the risks involved, including the possibility that the operation could prove fatal. If the patient accepts the recommendation that a gastric bypass operation be performed, the procedure is scheduled with a modicum of preoperative evaluation being done. In addition to the usual routine tests done for any operative candidate, the patient undergoes a lipid profile, thyroid function tests, liver function tests, and a suitable coagulogram. Unless there are indications for other more extensive radiological evaluations, an oral cholecystogram and an upper gastrointestinal series are the only x-rays done preoperatively.

**Operative Procedure**

As our experience with this operation has increased, a few modifications have been made. One operative principle underlying the procedure is that the gastric reservoir should be of no greater than 60 ml capacity. In fact, in more recent years the capacity of the gastric pouch has been reduced to 30–45 ml. Although we did go through a phase of measuring the volume in the pouch, this proved to be both cumbersome and sometimes inaccurate, depending upon the amount of pressure applied. We have more recently tended to simply “eyeball” the upper pouch to specific measurements. The other important operative principle is that the anastomosis should be small (less than 1.2 cm in diameter) and nondistensible.

Initially, the operative procedure was exactly the same as that advocated by Mason and Ito [4], which consisted of transecting the stomach between staple lines so that the upper gastric pouch had a capacity of approximately 60 ml. A loop of jejunum was then brought up in a retrocolic fashion and a 1.2-cm anastomosis was made between the stomach and the loop of jejunum, after which the anastomosis was brought inferior to the opening in the transverse mesocolon and fixed in place. This was performed in the first 7 patients, but was cumbersome and the procedure was modified. The surgical management of the stomach remained the same, but the jejunum was transected 15 cm distal to the ligament of Treitz and the distal limb of jejunum was brought retrocolic to the gastric pouch. An anastomosis was made between the cut end of the stomach on the greater curvature side and the antimesenteric border of the jejunum. The jejunal limb was then straightened and tacked to the edges of the opening in the transverse mesocolon. A Roux-en-Y jejunojejunostomy was performed approximately 35 cm distal to the gastrojejunostomy in an end-to-side fashion. This procedure was accomplished in the last 43 patients of the prospective series and continued until August, 1978. In an effort to reduce the incidence of anastomotic leak, a complete staple line was placed across the stomach, and the limb of jejunum was anastomosed to the greater curvature side of the stomach as a side-to-side gastrojejunostomy. The stomach was not transected. The leak rate decreased dramatically, and the operation was done more expeditiously.

A standard 2-layer anastomosis between the stomach and jejunum is preferred. A posterior row of seromuscular 3-0 silk sutures is placed, after which small openings are made in the jejunum and the stomach, and the mucosal edges are approximated with a running 3-0 chromic catgut suture. The anastomosis is completed anteriorly with interrupted 3-0 seromuscular silk sutures. Inadequate weight reduction in some of our patients has been associated with a dilatation of the gastrojejunostomy, much more frequently than enlargement of the pouch. The technique of the gastrojejunostomy has, therefore, been modified quite recently so that a running 3-0 Prolene® suture is placed circumferentially between the rows of silk and catgut, in order to avoid dilatation of the gastrojejunal anastomosis.