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Presidential address

The Longmire I, II, and III operations

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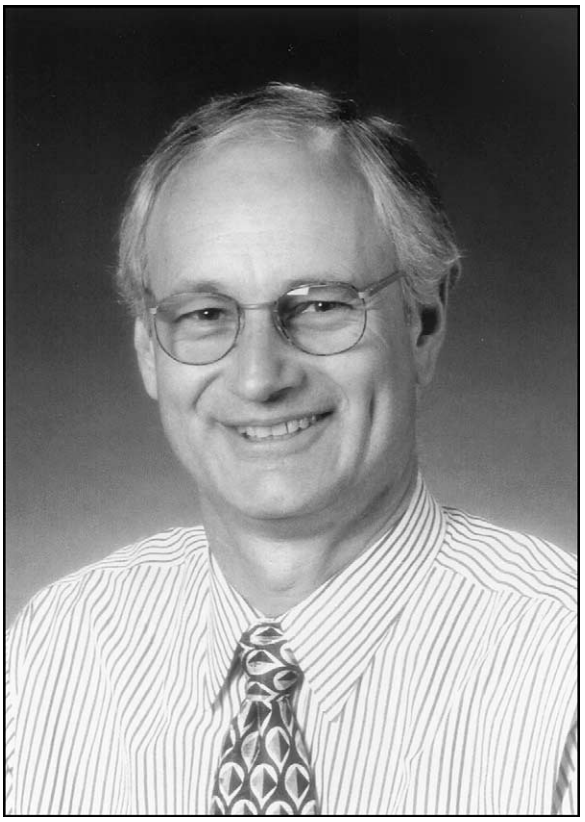
The influence of one's mentor shapes the career and perspectives for any young surgeon. Developing professionals receive subconscious guidelines as they slowly model themselves after their mentors. This influence imparts many of our characteristics such as whether one joins the American College of Surgeons or joins the regional or state surgical organizations. Most of all, the mentor is reflected in how we perform our operations. The latter could be the use (or nonuse) of routine intraoperative cholangiography, closing the fascia with interrupted or running suture, or (if practicing in a training institution) being scrubbed-in for almost all of every operation.

I chose the topic of this paper to illustrate how one mentor influenced me as a medical student and surgical resident and how this philosophy could have been gleaned from the medium of the mentor's career publications. All one has to do is read the works of the mentor to identify that person's philosophy within their own. The student will understand how much of the mentor's philosophy has been carried on by them, long after the mentor has retired.

As a UCLA medical student I was attracted to surgery by observing advanced surgery on the liver, biliary tract, and pancreas. At graduation in 1973, I was fortunate to have "matched" at the same institution for a surgery residency. While working on the hospital wards as well as in the large animal laboratory I came under the influence of my mentors, William P. Longmire, Jr., and Ronald K. Tompkins. Although Dr. Tompkins' influence originated back into medical school it was also during that period in the 1970s that I learned (unknowingly at the time) Dr. Longmire's philosophy. I realized this only by rereading his writings almost 30 years later. Needless to say much of his philosophy and surgical principles are embedded within my own.



L. William Traverso, M.D.

One of the Dr. Longmire's characteristics that I repetitively observed was that he was never satisfied with an established surgical technique. He was always thinking of better ways to accomplish a surgical goal, much as his mentor, Alfred Blalock, had shown him in the 1940s. What follows is a tribute to Dr. Longmire and three of the operations he devised, tested, and publicly described. During my training Ron Tompkins would refer to them as the Longmire I, II, and III operations but I have chosen the sequence of numbers based on the date they were first performed.

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Longmire I operation: intrahepatic cholangiojejunostomy, April 2, 1947

Doctor Longmire, as a senior resident had first assisted Professor Alfred Blalock in the fall of 1944 during the first subclavian pulmonary artery bypass in the treatment of tetrology of Fallot, an operation that made surgical history around the world and became known as the Blalock-Taussig operation. He noted that "I had assisted Dr. Blalock with the first 'blue baby' operation and had participated as a first assistant in the first 25-30 such cases that was performed by him" [1].

In a 1971 article, Dr. Longmire reviewed intrahepatic cholangiojejunostomy for biliary obstruction [2]. He reflected on his time as a resident surgeon at the Johns Hopkins Hospital in the mid 1940s. He and his other coresidents could not help but "feel the stimulating creative attitudes of our professor, Alfred Blalock. His dramatic success with the subclavian-pulmonary shunt operation in the treatment of Tetrology of Fallot, during what was then the glittering new field of cardiac surgery, inspired us all to want to hasten to the experimental laboratory to test almost any idea that occurred to us." Doctor Blalock "encouraged an active approach to any scientific problem, and often said that an idea should be tested in the laboratory before too much time was spent reading about the subject lest one become too confused or discouraged ever to give the idea a try" [2].

Doctor Longmire had an idea about treating babies with biliary atresia "the yellow baby" as contrasted to the "blue baby" with tetrology of Fallot. Since the abnormality with biliary atresia was in the extrahepatic biliary tree, Dr. Longmire reasoned "why not remove a wedge of liver tissue from the thin portion of the left liver lobe, opening an intrahepatic duct, and then draining such an open duct permanently into the upper intestinal tract, thus creating a bypass for bile flow from the entire liver" [2]. In babies with biliary atresia, the intrahepatic bile ducts were normally formed and even distended. Furthermore, this operation might also be applied in adults for the "exceedingly difficult and frequently rather unrewarding experiences in the treatment of traumatic strictures of the common duct in adults." In these adult cases anatomical landmarks in the porta hepatis were obliterated and injuries to the major vessels in the porta hepatis were at higher risk.

Doctor Blalock suggested to Dr. Longmire that experiments be devised to test that "an intrahepatic duct in one part of the liver would drain other intrahepatic ducts." Little was known about the internal anatomy of the liver in 1940. The classic studies of Healey and Schroy [3] were not to be published until 1953. In 1940 there were only assumptions about the relationships of the bile ducts between lobes, in fact the right lobe of the liver was then thought to include what we now know is the medial segment of the left lobe. Fortunately it was correctly assumed, other than at the bifurcation, there were no intrahepatic crossover connections between the two areas of liver drained by those ducts

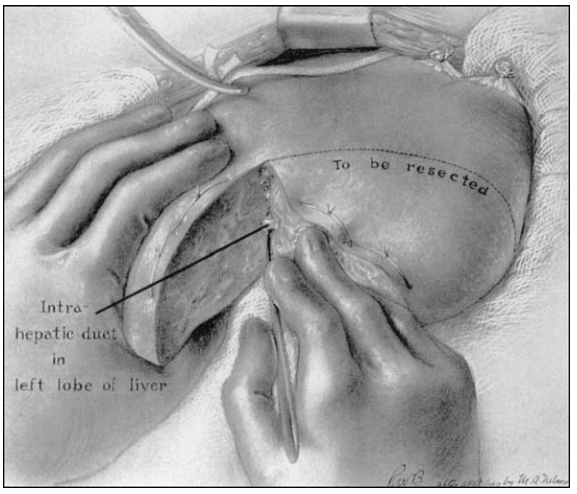

Fig. 1. The Longmire I operation. A portion of the left lateral liver segment has been resected and a loop of jejunum is being connected to the dilated intrahepatic duct. Inset shows cross section of completed anastomosis with an antimesenteric border of jejunal loop. Reprinted with permission from Longmire and Sanford [4].

(except possibly through the caudate lobes as suggested by Dr. Longmire's investigations [4]). Therefore, an intact bile duct bifurcation was mandatory for this new operation to succeed as a biliary decompressive procedure.

The first set of animal experiments failed because Drs. Longmire and Sanford attempted to design a two-stage operation in a canine model—common bile duct ligation, allow the bile ducts to distend, and then in 3 or 4 weeks one of the canine lobes were to be removed and anastomosis constructed between a dilated hepatic duct and the intestine. Unfortunately, none of the dogs survived for more than a week after complete biliary obstruction. The dog experiments therefore had to be completed by combining the creation of the common bile obstruction, removal of a hepatic lobe, and the biliary bypass into one procedure. This procedure was found to be feasible in dogs [2].

Next was the human application. The first operation was performed on April 2, 1947, when Dr. Longmire was a new attending surgeon at Hopkins. This patient, a 54-year-old woman, sustained a common bile duct transaction with primary repair on September 16, 1945. One and a half years later in November 1946 a choledochojejunostomy was required but her biliary construction also strictured. Therefore, on April 2, 1947, the third operation was intrahepatic cholangiojejunostomy (loop jejunostomy with enteroenterostomy) after left lateral lobe wedge resection was performed (Figs. 1, 2). The operation was successful. This first human adult case was reported to the Society of University Surgeons in January 1948 and published in *Surgery* in 1948 [4]. In this manuscript reference to their experience with three biliary atresia cases was made and the dog studies were briefly mentioned in the discussion. The three infant cases with biliary atresia were unsuccessful because no dilated intrahepatic ducts could be found and two of these

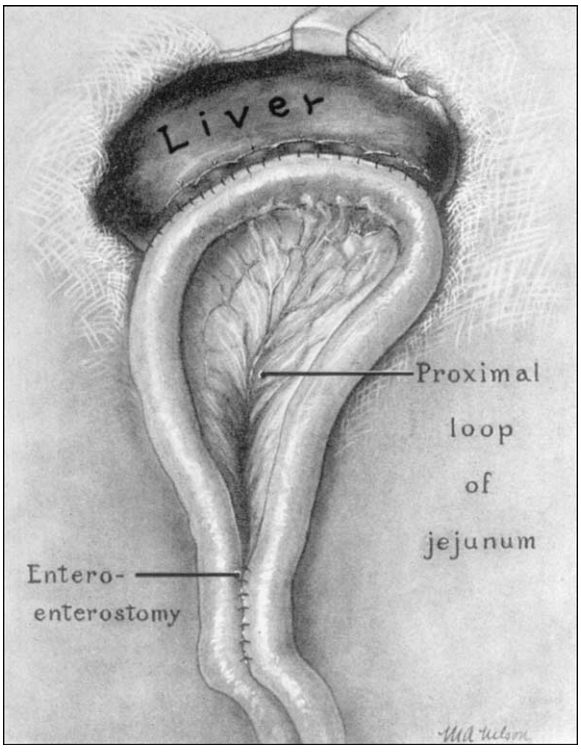

Fig. 2. The Longmire I operation. The final reconstruction of a left intrahepatic cholangiojejunostomy to a jejunal loop with enteroenterostomy. Reprinted with permission from Longmire and Sanford [4].

cases had tiny intrahepatic ducts connected to an intestinal limb but functioned only for a few days.

As stated in 1948, and again reemphasized in 1971, the indications for intrahepatic cholangiojejunostomy are limited. Traditional methods of repair should first be utilized in the treatment of benign stricture in adults (unless portal vein obstruction is present, see below). The use of this procedure for decompression of the biliary tree in patients with malignant obstruction is uncommonly indicated. Repeated attempts to utilize this operation for congenital biliary atresia had been uniformly unsuccessful. Doctor Longmire summarized the advantages of the intrahepatic cholangiojejunostomy when presenting the follow-up on four patients to the American Surgical Association in April 1949 [5]. The procedure offered three advantages over usual methods of repair: (1) less scaring and fewer adhesions were encountered in the left upper part of the abdomen than in the right; (2) after exposure of the intrahepatic duct, its superficial position in relation to the anterior abdominal wall facilitated an accurate anastomosis with the jejunum; and (3) no vital structures were present and thus could be avoided in the immediate operative area such as the portal vein or hepatic artery.

In 1971, Dr. Longmire indicated that the following must be present for the procedure to successful: “1) the intrahepatic ducts must be dilated. Drainage of contracted sclerotic ducts will not relieve the jaundice regardless of the patency or the size of the anastomosis, 2) the radiopaque solution must pass freely between the left and right intrahepatic ducts, drainage of the left duct alone may offer significant improvement if the obstructive right duct is not infected and if there is good hepatic parenchymal reserve, 3) the ducts must be clear of stones, gravel, or sludge that might interfere with proper drainage of the intrahepatic ducts in a retrograde fashion through the left hepatic system” [2].

A total of 28 cases by multiple authors were reported by 1956, 9 by Dr. Longmire. The indications for these procedures were benign disease (n = 19) and malignant (n = 9). The procedures for malignant palliation were done by others and the operation was never intended to be used as a malignant palliative procedure. Of these palliative cases only 1 lived for more than 60 days postoperatively even though biliary decompression was successful in all 9 [6]. In 1972 McArthur and Longmire [7] reported on an additional indication for intrahepatic cholangiojejunostomy in patients with benign strictures—when portal vein thrombosis is present. The extensive hepatoduodenal ligament venous collaterals could be avoided by using the left lateral lobe for biliary access.

What has happened to the Longmire I operation? Most reoperations for failed hepaticojejunostomy extend the incision into the extrahepatic left hepatic duct and are successful for two reasons. The patient is never allowed to develop secondary biliary cirrhosis because of interventional radiology or endoscopic techniques and the patient is in better condition to withstand reoperations because of attention to anesthesia, antibiotics, and nutrition. However, the biliary surgeon could well remember this operation in this day of increased bile duct injuries, particularly in the case of the multiply operated hilum or in case of portal vein thrombosis. The interventional radiologist has followed Dr. Longmire’s example and commonly uses the left hepatic duct as a decompressive site for percutaneous transhepatic biliary tube placement to decompress the biliary tree.

Longmire II operation: jejunal interposition after total gastrectomy, April 6, 1951

When Dr. Longmire finished his surgical residency at Johns Hopkins University in 1945 he joined the Hopkins’ staff until 1948 and then left to establish the new department of surgery at University of California, Los Angeles (UCLA), where he served as chairman for 28 years. While at Hopkins he became interested in gastric cancer. The science of surgery was improving and the surgical treatment of cancer of the pylorus and gastric fundus was being extended with the use of total gastrectomy. The latter “radical operation” for distal stomach neoplasms was felt to be advantageous because it was a “block resection” of the stomach and its regional lymph nodes. Total gastrectomy had a historical mortality rate of 35% to 60% but during the period of 1944 to 1945 several articles were published with an observed mortality rate of approximately 10% [8]. At

that time distal gastric cancer was treated with subtotal gastrectomy and a mortality rate of approximately 7%. Therefore there was much interest in using total gastrectomy to see if the 20% to 30% 5-year survival rate after subtotal gastrectomy could be improved.

In 1947, reporting in *Surgery Gynecology and Obstetrics*, Dr. Longmire provided results from the Johns Hopkins Hospital regarding their expanding experience with 20 cases of total gastrectomy, all of which had reconstruction with a jejunal loop usually brought up in a retrocolic fashion. The end of the esophagus was anastomosed to side of jejunal loop [9]. He optimistically summarized this report as their own mortality rate was also 10%. However, he noted that the "lack of adequate gain in weight, the excretion of abnormal amounts of fat in stools, the slow return of normal muscular strength, and persistence of occasional attacks of abdominal fullness and epigastric burning, are still problems to be solved, possibly by new surgical procedures or by improved postoperative medical management."

Just 2 years later in 1949 reporting in *Surgery*, Drs. H. William Scott and Longmire reported on an even larger number of total gastrectomy cases (n = 63) from Hopkins [10]. At that time 11 of the 63 patients were alive more than 12 months after total gastrectomy. Five patients had limited oral intake and were eating four to six meals a day, and 9 patients had gastrointestinal symptoms both during and after meals. Although most patients had good appetites and 8 had had "satisfactory gains in weight," the problem of digestive dysfunction after total gastrectomy was persistent enough to investigate some form of gastric reservoir construction.

The frequent occurrence of inadequate weight gain was explained by patients limiting their oral intake owing to two symptoms. The first was postprandial epigastric fullness or attacks of upper abdominal distress. This symptom was explained because of the lack of a gastric reservoir. The second was epigastric and substernal "burning" that occurred a few minutes after eating and caused "considerable difficulty." This latter symptom was felt to be almost certainly due to reflux of bile and pancreatic juice into the lower esophagus. A few patients developed a malignant outlet stricture of the anastomosis but "repeated endoscopic examinations" of the remaining patients showed no sign of stricture or obstruction. These observations became an important limitation of total gastrectomy for Dr. Longmire.

Soon after arriving in Los Angeles in 1949, he developed the jejunal interposition as a stomach replacement. In a 1952 *Annals of Surgery* article[11], Drs. Longmire and John Beal reported on a method to construct a gastric reservoir—the jejunal interposition. They also reviewed three other techniques previously described, one of which had first been done by Dr. Longmire.

Long enteroenterostomy

This first technique was a jejunal loop with the standard end-esophagus to side of jejunal loop anastomosis. Just below this anastomosis, however, a long enteroenterostomy between the afferent and efferent of the jejunum was made. This type of gastric reservoir was deemed the "long enteroenterostomy." In 24 of 63 total gastrectomy cases at Hopkins reported in 1949 by Drs. Scott and William Longmire, the long enteroenterostomy had been utilized. They felt that the latter was "advisable in order to obviate the postoperative 'burning syndrome.'" They also mentioned they had no experience with the Roux-en-Y type of esophagojejunostomy (a procedure routinely practiced today). The long enteroenterostomy they felt resulted in decreased esophagitis, secondary to regurgitation, and an increase capacity for oral intake, however, they admitted they had no definite data to support this opinion. They did feel that the long enteroenterostomy was not associated with as many undesirable side effects and recommended it in 1949.

Jejunal loop pouch

The second type of stomach reservoir replacement was the "complete side-to-side anastomosis of the jejunal loop of the esophagojejunostomy." Doctor Longmire probably was first to perform this operation for cancer and he did it in November 1944 while senior resident at Hopkins. He did so in an attempt to create a substitute gastric reservoir during a total gastrectomy for cancer. The reservoir was made by extending a long enteroenterostomy at the antimesenteric borders all the way to the tip of the jejunal loop (Fig. 3). Thus a pouch was formed. The end of the esophagus was connected to the tip of this pouch. This left a narrow isthmus of jejunum at the top of the enteroenterostomy and the esophageal anastomosis at the tip of the loop. Prior to the anastomosis to the esophagus the reservoir was brought up through the transverse mesocolon in a retrocolic position. In this first case a small area of impaired blood supply to the jejunal wall in the area of the esophagojejunal anastomosis resulted in gangrenous perforation with resulting peritonitis. The patient ultimately died, accounting for one of the two operative mortalities in the 1947 series of 20 total gastrectomies from Hopkins [9].

In 1945, Engel [12] reported two cases of total gastrectomy successfully completed in an almost identical way. Engel's first case was done in two stages for peptic ulcer beginning in May 1944 and with complaints of severe distress the patient was reoperated on the 28th postoperative day to create the pouch by long enteroenterostomy just below the end esophagus to jejunal loop anastomosis. At 6 months after surgery the patient had gained 15 pounds and was eating a "restricted diet" as he had to chew his food well. Engel was later to do another similar procedure in a woman with carcinoma of the fundus but in a one-stage procedure. He provided no follow-up.

Meanwhile Steinberg reported in 1949 that he had been perfecting a similar jejunal loop anastomosis in patients requiring partial gastrectomy for peptic ulcer or gastric cancer [13]. In 1946 he performed a near total gastrectomy

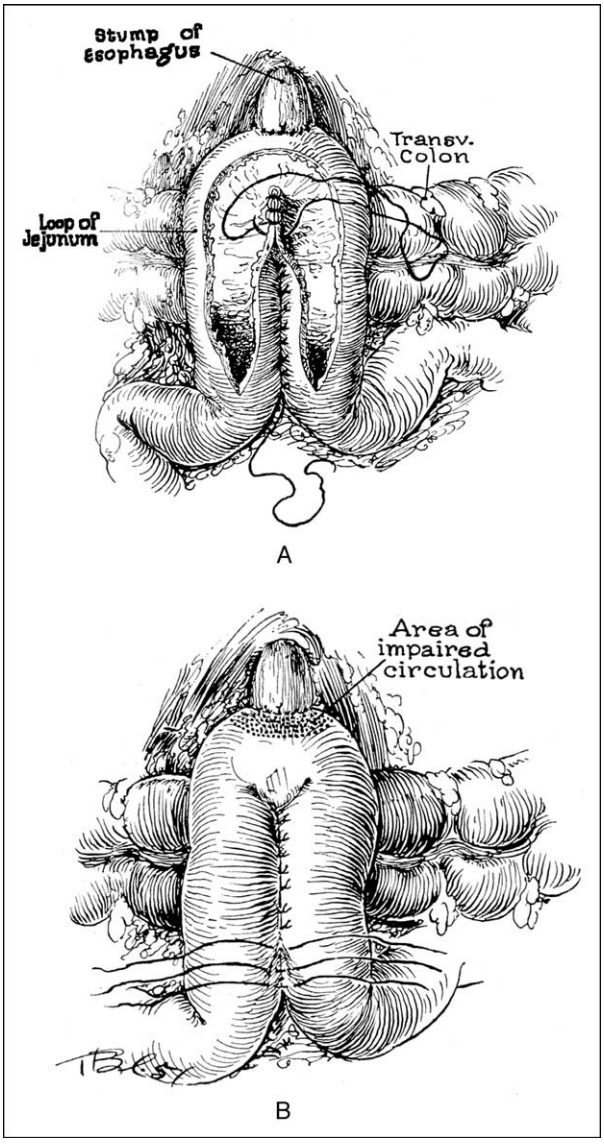

Fig. 3. The Longmire pouch. (**A**) Method used in creating a single lumen tube or pouch from a jejunal limb. (**B**) Area of intestinal wall in which circulation was impaired and subsequently perforated. Reprinted with permission from Longmire and Beal [11].

for gastric cancer and reconstructed with a pouch. This pouch was different as it was constructed in a way that avoided the isthmus of ischemic tissue below the esophagojejunostomy as in the Longmire pouch. The Steinberg pouch was a side-to-side enteroenterostomy that made a pouch which included the esophageal anastomosis rather than a separate anastomotic site of esophagus to jejunal loop. He called this technique the double barrel "pantaloons" anastomosis and used it in 25 cases of partial gastrectomy for peptic ulcer and cancer with results that were not provided in his report other than that they were "reassuring." Mortality and postoperative digestion was not detailed.

Doctor Longmire's summary in 1952 regarding his 1944 pouch technique was that "our experience with this technique would indicate that it is hazardous when employed at the time of total gastrectomy and functionally offers little more than a long enteroenterostomy" [11].

Interposition of ileocolic segment

The third type of gastric reservoir replacement was the "transposition of terminal ileum and ascending colon" that was advocated by Hunnicutt in 1949. The procedure was really an interposition of an ileocolic segment into the gap created after total gastrectomy between the esophagus and duodenum. At UCLA, Dr. Longmire performed two of these operations, the first being on February 19, 1951, and the second on February 23, 1951. In the first case after all the anastomoses were completed the segment became gangrenous and had to be removed. Reconstruction was by an end esophagus to jejunal loop with long enteroenterostomy. The patient subsequently developed an esophagojejunal anastomotic fistula. The second case performed just 4 days later was successful; however, a large left subphrenic abscess developed, which had to be drained 35 days later. The patient's weight increased by 15 pounds 5 months after surgery and he complained of recurrent mild attacks of diarrhea. Both of these cases had an 8-month follow-up.

In the days before preoperative mechanical and antibiotic bowel preparation Dr. Longmire summarized his opinion of the ileocolic interposition operation: "the hazards of bringing infection from the colon into an extensive freshly traumatized area of the upper abdomen and the dangers associated with the precarious blood supply of the transposed bowel may outweigh the advantages of such a gastric reservoir."

Interposition of jejunal segment

This Longmire II operation is also known as the Beal-Longmire operation. The fourth and the last of gastric reservoir replacements was the "transposition of an isolated segment of the jejunum." A segment of proximal jejunum 14 inches long was isolated and brought in a retrocolic fashion to connect the duodenum back to the esophagus, much like the ileocolic interposition but without the colon flora prevalent in this pre-bowel preparation era (Fig. 4). The first case of these latter procedures was performed by Dr. Longmire on April 6, 1951, and subsequently a total of 7 cases were performed through November 26, 1951 [11]. All of these patients had at least a 6-week follow-up, inadequate to really tell the advantages obtained as far as weight gain and gastric digestion was concerned. In the first 2 patients with 4- and 5-month follow-up, the report notes they were able to regain a regular diet and regain their preoperative weight. Unfortunately, 3 of the 7 patients had partial pancreatectomy at the time of the total gastrectomy and in 2 of them a subphrenic abscess developed, slowing the return to normal gastrointestinal activity.

The advantages of the jejunal interposition were listed as

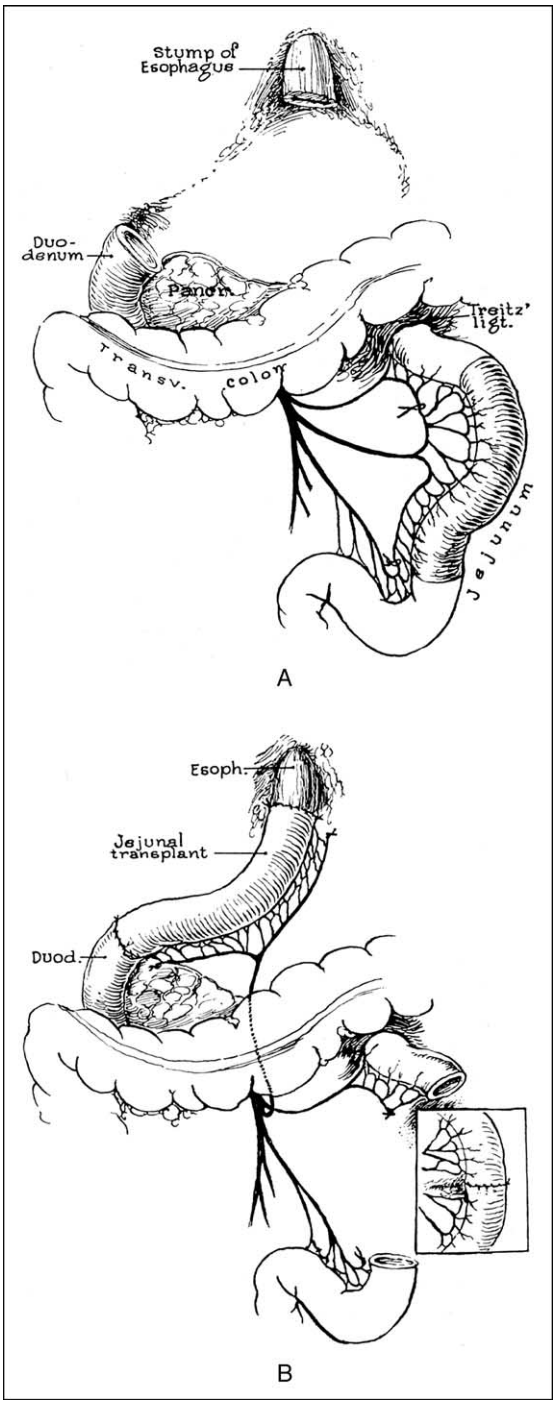

Fig. 4. The Longmire II operation first done on April 6, 1951, by Dr. Longmire at UCLA. (**A**) Method of mobilization. (**B**) Transposition of jejunal segment with intact blood supply. Reprinted with permission from Longmire and Beal [11].

follows: the procedure avoided the tension of an esophagoduodenostomy (a not too uncommon operation during the era of total gastrectomy if the duodenum was mobile), it increased the capacity of the reconstructed segment, it decreased regurgitation of bile and intestinal contents, and it (along with the ileocolic interposition) allowed normal passage through the duodenum [11]. Doctor Longmire summarized his experience with these 7 patients: "the early results in seven patients in whom a segment of jejunum has been placed between the esophagus and duodenum suggests that a substitute gastric reservoir of adequate capacity is provided, the normal flow of alimentary contents through the duodenum is maintained, and operative hazards of total gastrectomy are not significantly increased. All patients in this series who have been followed for over six weeks have shown progressive gain in weight." An addendum at the end of this article indicated that a total of 12 interpositions had been performed with 1 patient dying of a midesophageal perforation that was unexplained. Another patient had died of recurrent carcinoma. Ten patients were maintaining their weight satisfactorily. No mention of was made of the burning syndrome or the epigastric distress attacks. In 1957 writing in *Current Surgical Management* [8] on total gastrectomy for gastric cancer, Dr. Longmire indicated that in the last 24 cases of total gastrectomy he had used jejunal interposition for reconstruction, and "early observations indicate that this procedure may relieve certain undesirable symptoms related to the digestive tract after total gastrectomy."

What happened to this Longmire II operation? In 1972, writing in Sabiston's *Textbook of Surgery* [14], Dr. Longmire reflected on the philosophy of the 1940s and 1950s. The popularity for total gastrectomy in patients with gastric cancer had come and gone. In fact Dr. Longmire recommended its disuse. Originally the procedure carried with it a prohibitive mortality since first performed in 1897 by Schlatter. These figures ranged from 35% to 60%. Then in the mid 1940s reports of small numbers of consecutive cases without a death appeared. The reason was improved medical care partly heralded by antibiotics, blood banks, and fluid resuscitation. More extensive procedures were applied and total gastrectomy was one of them. However after a decade of experience with these larger resections the long-term survival results could not support its use over subtotal resection. Total gastrectomy only resulted in the potential for more side effects without survival advantage over partial resection.

Today total resection of the stomach is considered uncommon and indicated for the rare case where the tumor involves most of the stomach without evidence of distant spread. A report from UCLA illustrates these points. Adashek et al [15] reviewed 501 patients with gastric cancer seen at UCLA between 1956 and 1975. The patients were divided into two groups of 10 years each. They concluded that serosal involvement was one of the most important prognostic factors no matter what the time period. If the patients seen in the first decade were compared with those reviewed in the second decade, the stage of the disease was the same. Even though gastroscopy was becoming more common in the later decade the survival rate was no different in the earlier or later groups. The 5-year survival rate of 38% for subtotal gastrectomy was compared with the 10% rate after total gastrectomy. The authors noted "the partic-

ularly dismal results following total gastrectomy undoubtedly reflect the fact that the more extensive procedure, carrying the maximum operative risk, is applied to the patients with the most advanced disease." The Longmire II operation did not become common because total gastrectomy did not become common.

Longmire III operation: pylorus preservation during pancreaticoduodenectomy, February 26, 1977

In the 1970s, the UCLA surgery residency program was 6 years in duration—the last years' position was that of a "super chief." The fourth-year residents were assigned to the "private service" whereby the gastrointestinal "Blue" service was staffed by a fifth-, fourth-, and third-year resident plus an intern. The fourth-year resident or the "R4" had the responsibility to first assist on all of Dr. Longmire's cases. This was an enormous responsibility and most R4s essentially moved into the hospital during their 4 months with Dr. Longmire. Doctor Longmire and I had already published two papers together before my R4 opportunity and we therefore had developed a working relationship. At this time, Dr. Longmire was utilizing the Whipple procedure more frequently for chronic pancreatitis. In many cases, he would say, the head of the pancreas was the "pacemaker" of chronic pancreatitis and its removal will likely solve the patient's chronic pain problem.

During my first month on his service I helped with several Whipple procedures for chronic pancreatitis. I remember him stating during one of these cases that it was a shame to remove half of the stomach in a patient who did not have cancer. Hemigastrectomy was routine during pancreaticoduodenectomy for cancer because it removed, en bloc, the entire duodenum, pylorus, gastric antrum, and all the local nodes in these areas. At the same time, partial removal of the stomach reduced gastric acid production. The more stomach left in place, the higher the incidence of marginal ulceration. The most frequently adopted reconstruction in the 1970s was therefore the Child's version, which included hemigastrectomy. Doctor Longmire felt that preserving the pylorus would provide a metering function for gastric emptying and even though acid was being manufactured by the intact stomach, pylorus preservation would not result in marginal ulceration. If the procedure was done for chronic pancreatitis, the wide resection for cancer was an unnecessary maneuver.

It is not a surprise that Dr. Longmire wished to preserve the gastric reservoir to make the patients reconstruction "more physiological." Recall his experience 25 years before as he attempted reconstruction after total gastrectomy for gastric cancer. His jejunal interposition was to make the reconstruction "more physiologic" [11] after total gastrectomy and the effort was in parallel with his attempt to preserve the entire stomach during pancreaticoduodenectomy. Recall Dr. Blalock's suggestion to Dr. Longmire when he was a resident to apply a procedure before investigating the literature too thoroughly in order to avoid becoming discouraged or confused.

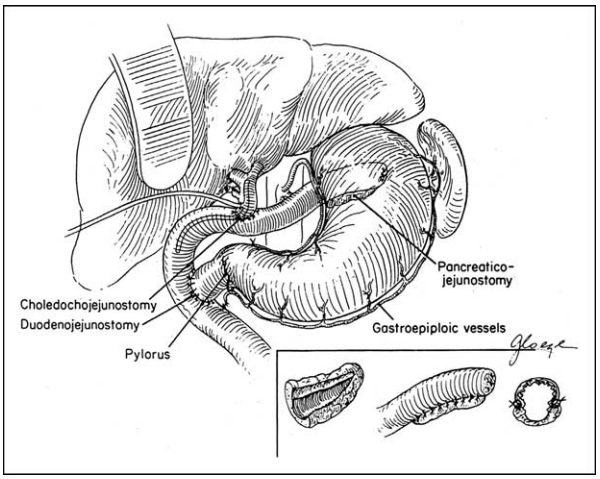

Fig. 5. The Longmire III operation first done on February 26, 1977, at UCLA by Dr. Longmire. Reconstruction with lateral pancreaticojejunostomy, end-to-side choledochojejunostomy, and end-to-side duodenojejunosotomy. Reprinted with permission from Traverso and Longmire [16].

Following the same philosophy that he had exhibited in the early 1950s with jejunal interposition to retain a more physiological reconstruction Dr. Longmire (and I as his R4 first assistant) preserved the duodenal bulb, pylorus, and entire stomach during pancreaticoduodenectomy for chronic pancreatitis. During that case, the duodenum became dusky and cyanotic. We resected the distal stomach performing a standard Child's reconstruction. Recall that in November of 1944, as a chief resident, Dr. Longmire had a fatality associated with poor circulation of a complete jejunal loop attached to end of the esophagus after total gastrectomy (Fig. 3B). Also recall that his first ileocolic interposition after total gastrectomy performed in February 1951 lost its blood supply after all of the interposition anastomoses had been completed. Therefore during his first attempt at ileocolic interposition, Dr. Longmire resected the anoxic bowel segment and converted to an esophagojejunostomy with long enteroenterostomy. Parallelism with the first attempted pylorus-preserving Whipple procedure at UCLA is evident because the following week after we converted to a Child's reconstruction we attempted another pylorus preservation, much like the second ileocolic interposition was tried again the next week in February 1951. This time, on February 26, 1977, we were successful in a 41-year-old man with chronic alcohol-related pancreatitis, severe abdominal pain, and a 38-pound weight loss. Endoscopic retrograde cholangiopancreatography had shown a totally obstructed main pancreatic duct in the head of the gland. Two months after surgery his pain was relieved and he had gained 21 pounds. After another successful case on May 10, 1977, for localized duodenal carcinoma the results of these two cases were published in 1978 (Fig. 5) [16].

At the American Surgical Association meeting in 1980

we presented a follow-up evaluation of 18 patients after pylorus preservation during pancreaticoduodenectomy, 8 of whom had undergone extensive gastric and pancreatic function tests [17]. We did not find marginal ulceration or postgastrectomy syndrome. Was the first pylorus preservation done at UCLA? Doctor Longmire had been discussing these cases with Dr. Martin Adson of Rochester, Minnesota. Adson indicated he had done a similar operation and Dr. Longmire invited him to discuss our paper in Atlanta. In that 1980 discussion [17] Dr. Adson indicated that he had successfully preserved the pylorus in 2 patients 5 years earlier (around 1975) and he had just contacted each of those patients. They were both "eating anything." Much later in a multicenter registry report of pylorus preservation cases [18] the authors delved into who had performed the first pylorus-preserving procedure. They found a report by Watson in 1944 at East Surrey Hospital just south of London [19]. Kenneth Watson had preserved the entire stomach and "one inch" of duodenum during a successful two-stage pancreaticoduodenectomy in order to "ensure maximal gastric digestion of protein and carbohydrate,...prevent the formation of anastomotic ulcer." Although the pancreatic stump was oversewn and a pancreatic fistula developed she had gained 11 pounds at 6 months postoperative without sign of recurrence. For some reason Watson never performed the procedure again.

What happened to the Longmire III operation? Although never intended to be an operation for cancer it has become the major reconstruction method for periampullary cancer in many major centers in North America, Europe, and Japan. A special tribute is that the Longmire III operation has been incorporated where Dr. Longmire received his surgical training, the Johns Hopkins University. Sohn and colleagues from Hopkins reported 564 Whipple/total pancreaticoduodenectomy procedures over a 15-year period between 1984 and 1999 with a mortality rate of 2.3%. Of the 564 cases in their report, 70% were with pylorus preservation, the Longmire III operation [20]. My own experience with the Longmire III operation over the last 5 years between 1996 and 2001 shows 215 cases with a mortality rate of zero, 76% being done for neoplasm (unpublished data). The patient survival is similar between pancreaticoduodenectomy with hemigastrectomy versus with pylorus preservation. With the help of an adjuvant therapy based on interferon chemoradiation we have recently reported an actuarial 2-year survival rate of 84%. Fully 88% had the Longmire III pylorus-preserving pancreaticoduodenectomy [21]

I wonder if new interest may arise in the Longmire II operation when total gastrectomy for the more uncommon gastric cancer is assisted by modern adjuvant treatment?

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