

# Choledochoduodenostomy for Palliation in Unresectable Pancreatic Cancer

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**Objective:** To determine whether choledochoduodenostomy provides adequate long-term palliation of obstructive jaundice in unresectable pancreatic cancer.

**Design:** Consecutive case series.

**Setting:** Tertiary referral center.

**Patients:** From 1980 to 1997, 79 consecutive patients (45 men, 34 women; mean age, 67.8 years) with biopsy-proved pancreatic cancer found to be unresectable at operation.

**Intervention:** All patients had resectable disease by preoperative criteria. At exploratory laparotomy, unresectability was determined by the presence of liver or peritoneal metastases, encasement of major vascular structures by tumor, and/or celiac lymph node involvement. Choledochoduodenostomy for biliary bypass was performed in 71 (90%) of 79 patients; Roux-en-Y choledochojejunostomy was performed in the remaining 8 patients.

**Main Outcome Measures:** Resolution of jaundice, duration of hospital stay, mean survival, postoperative complications, and evidence of recurrent biliary obstruction.

**Results:** All patients experienced rapid resolution of jaundice. Average hospital stay was 8.3 days. Mean survival after operation was 13.1 months (range, 2 weeks to 62 months). Postoperative mortality was 3%. There were no biliary or duodenal leaks. Four patients (6%) required hospitalization for gastrointestinal hemorrhage; however, only 1 (1%) was from peptic ulceration. No patient developed recurrent biliary obstruction.

**Conclusions:** Choledochoduodenostomy provides rapid, long-lasting relief of jaundice, with little morbidity and a low rate of duodenal ulceration, and is the palliative operation of choice when patients are found to have unresectable disease at operation or when stenting procedures fail.

*Arch Surg.* 1998;133:820-825

**P**ANCREATIC adenocarcinoma is one of the leading causes of cancer death in the United States, and was responsible for an estimated 27 000 new cases and 28 000 deaths in 1997.<sup>1</sup> Unfortunately, most patients have unresectable disease at the time of diagnosis, and in this subset of patients, relief of biliary obstruction becomes the focus of therapeutic intervention. The recent introduction of dynamic spiral computed tomography has aided in identifying patients who have unresectable disease; preferably, these patients should undergo endoscopic stent placement. However, a significant number of patients initially felt to have operable tumors are still found to have unresectable disease at exploration. Additionally, some patients are unable to be stented or have poorly functioning stents that fail to relieve the biliary obstruction. In both these

sets of patients, operative biliary bypass must be undertaken.

Traditionally, Roux-en-Y choledochojejunostomy has been the recommended technique of biliary-enteric bypass in unresectable pancreatic cancer. Choledochoduodenostomy has not been advocated in malignant disease, primarily because of concern over anastomotic leak of duodenal contents and over late obstruction by tumor growth.

This study was undertaken to determine if choledochoduodenostomy as a method of biliary bypass in unresectable pancreatic cancer is safe, with a low incidence of anastomotic leak and immediate postoperative complications; is reliable, producing rapid resolution of jaundice; and, most importantly, is durable, with a low incidence of delayed biliary obstruction caused by progression of tumor.

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## PATIENTS AND METHODS

The medical records of 79 consecutive patients undergoing biliary bypass for unresectable pancreatic cancer from 1980 to 1997 were reviewed. For all patients, age, sex, immediate postoperative complications, resolution of jaundice, and length of hospitalization were recorded. Late complications such as the development of duodenal obstruction, gastrointestinal hemorrhage, and recurrent biliary obstruction were documented, and mean survival was determined. Follow-up was obtained by medical record review and interview when appropriate. All patients were followed up to the point of death.

Prior to operation, all patients were considered to have no contraindications to resection for cure. At exploration, however, unresectability was determined by the presence of biopsy-proved liver or peritoneal metastases, encasement of major vascular structures by tumor, and/or celiac lymph node metastases. Pancreatic adenocarcinoma was confirmed by biopsy in all cases.

## RESULTS

There were 45 men and 34 women in the study. The mean patient age was 67.8 years (range, 45-98 years). Of the 79 patients with unresectable tumors, choledochoduodenostomy was performed for biliary-enteric bypass in 71 patients (90%). During the study period, 8 patients (10%) required Roux-en-Y choledochojejunostomy because of tumor encroachment on the proximal bile duct or inability to adequately mobilize the duodenum for anastomosis. Unresectability in the 71 patients undergoing choledochoduodenostomy was determined by major vascular involvement by tumor in 23 (32%), celiac lymph node metastases in 17 (24%), liver metastases in 16 (23%), carcinomatosis in 4 (5%), and advanced age and/or significant comorbid medical illness in 9 patients (13%). In 2 patients (3%), the reason for unresectability was not specified in the operative report. No patient underwent a routine prophylactic gastrojejunostomy, although 4 patients (6%) required gastrojejunostomy for impending gastric outlet obstruction. The mean hospital stay was 8.3 days (range, 4-16 days).

Six patients (8%) experienced complications in the immediate postoperative period. Three patients (4%) had delayed gastric emptying requiring prolonged hospitalization. One patient (1%) developed a wound infection. Two patients (3%) died within 30 days of operation; one died of a myocardial infarction and the other of unknown causes. No patient developed an anastomotic leak. All patients had clinical resolution of jaundice.

Twelve patients (17%) experienced delayed complications, which consisted of gastrointestinal hemorrhage or gastric outlet obstruction. Among 4 patients (6%) who had gastrointestinal hemorrhage requiring transfusion, 1 (1%) had bleeding from both a duodenal ulcer and marginal ulceration in a gastrojejunostomy. The other

3 patients bled from esophageal varices, gastritis, and tumor erosion into the duodenum. Eight patients (11%) who did not initially undergo gastrojejunostomy developed delayed gastric outlet obstruction from tumor growth and eventually required duodenal bypass at a mean time of 16.5 months after initial operation (range, 5-30 months). No patient developed recurrent jaundice as a result of tumor invasion into the duodenum or into the anastomosis itself.

Mean survival was 13.1 months, with a range of 2 weeks to 62 months. All patients were followed up until the time of death.

## COMMENT

The goal of any operation undertaken for palliation in patients with unresectable pancreatic cancer is to perform the simplest procedure that results in the lowest incidence of immediate complications, such as anastomotic leak, and also results in the lowest incidence of recurrent biliary obstruction requiring reoperation. Debate continues over which method of biliary-enteric bypass best accomplishes this goal. In the past, cholecystojejunostomy has been advocated owing to its safety and technical ease of performance, but it has been associated with poor resolution of jaundice and a high rate of recurrent jaundice due to tumor growth obstructing the cystic duct.<sup>2,5</sup> Roux-en-Y choledochojejunostomy has been advocated by many authors because of a low rate of recurrent obstruction, ranging from 2% to 13%.<sup>3,4,6</sup> However, technically this is a more demanding and time-consuming operation; more importantly, Roux-en-Y choledochojejunostomy is a nonphysiologic biliary-enteric reconstruction, which results in hypersecretion, peptic ulceration, and gastrointestinal hemorrhage.<sup>7</sup> Unfortunately and mistakenly, choledochoduodenostomy has been largely avoided as an option for palliative bypass in unresectable pancreatic cancer, because of fear of eventual biliary obstruction by advancing tumor growth.

With the exception perhaps of cholecystojejunostomy, choledochoduodenostomy is simpler to perform than other forms of biliary-enteric bypass. There is only one anastomosis to create, and it has been shown in the literature that blood loss and operative time are reduced in choledochoduodenostomy as compared with Roux-en-Y choledochojejunostomy. Potts et al<sup>2</sup> observed that, in 61 patients undergoing choledochoduodenostomy for unresectable pancreatic cancer, mean blood loss was 390 mL, compared with 730 mL in patients undergoing Roux-en-Y choledochojejunostomy. Also, in the same set of patients, the mean operative time was significantly different—184 minutes in the choledochoduodenostomy group, compared with 244 minutes in the Roux-en-Y choledochojejunostomy group.

In addition to its technical simplicity, choledochoduodenostomy is also associated with a lower complication rate in the immediate postoperative period when compared with other forms of biliary-enteric bypass. One of the concerns in creating a direct bile duct-to-duodenum anastomosis has been the fear of leakage of both bile and duodenal contents. However, none of the 71 patients in our study experienced an anastomotic leak.

In addition, the literature does not demonstrate an increase in the incidence or severity of bile leak following choledochoduodenostomy. Blankensteijn and Terpstra<sup>8</sup> compared choledochoduodenostomy with choledochojejunostomy for both benign and malignant indications, and had bile leaks in 3 (5%) of 64 patients with choledochoduodenostomy vs 5 (10%) of 49 patients with choledochojejunostomy.

Choledochoduodenostomy may also be preferable because, as a simpler operation with a low morbidity, hospital stay is significantly reduced. In our study, the mean postoperative stay was only 8.3 days. Potts<sup>2</sup> also showed a shorter hospital stay following choledochoduodenostomy (9.9 days) when compared with that of patients undergoing both Roux-en-Y choledochojejunostomy (11.3 days) and cholecystojejunostomy (14.1 days).

One of the most significant problems associated with Roux-en-Y choledochojejunostomy has been the high incidence and severity of gastrointestinal hemorrhage. Deziel et al<sup>4</sup> documented upper gastrointestinal hemorrhage in 9 (15%) of 60 patients undergoing Roux-en-Y choledochojejunostomy for unresectable pancreatic cancer. Of 235 patients who underwent palliative bypass for unresectable pancreatic carcinoma, Meinke and colleagues<sup>7</sup> documented 47 patients (20%) who experienced severe gastrointestinal hemorrhage, 12 of whom died as a direct result of bleeding. In 19 patients in whom the actual source of bleeding was identified, peptic ulceration was responsible for hemorrhage in 14 (74%) of the 19. The increased incidence of gastrointestinal hemorrhage in these patients is 3-fold. Patients with pancreatic cancer have pancreatic ductal obstruction, and therefore a diminution of protective alkaline secretions that pass into the duodenum. In addition, with a Roux-en-Y reconstruction, the alkaline biliary secretions are diverted away from the duodenum where they could help neutralize gastric acid. Finally, the Roux-en-Y limb itself results in gastric hypersecretion, which further exposes the duodenum and gastrojejunostomy to the erosive effects of gastric acid.<sup>9</sup>

Compared with Roux-en-Y choledochojejunostomy, choledochoduodenostomy is a more physiologic operation in that it keeps the duodenum bathed in alkaline secretions, thereby neutralizing gastric acid and maintaining normal feedback mechanisms of gastrointestinal secretion. This may result in a lower rate of ulcer formation compared with that of Roux-en-Y choledochojejunostomy. In our study, only 1 patient (1%) developed peptic ulceration that hemorrhaged and required blood transfusion. This compares favorably with other studies in which the incidence of gastrointestinal bleeding following choledochojejunostomy ranges from 4.7% to 15%.<sup>4,10,11</sup>

Traditionally, the rationale for not performing choledochoduodenostomy for palliation in unresectable pancreatic cancer has been the fear of delayed biliary obstruction by tumor growth. This fear may be more hypothetical than real, however. In our study, not a single patient undergoing choledochoduodenostomy developed late biliary obstruction.

Recent literature supports the fact that delayed obstruction by tumor growth is no more common follow-

### Recurrent Obstruction With Respect to Type of Biliary Reconstructions\*

Source	No./Total (%) of Patients		
	CDD	CDJ	CCJ
Aranha et al <sup>12</sup>	0/8 (0)	...	...
Singh et al <sup>3</sup>	4/16 (25)	8/60 (13)	10/74 (13)
Potts et al <sup>2</sup>	1/61 (1.6)	2/25 (8)	6/32 (18)
Welvaart <sup>6</sup>	...	1/5 (20)	4/25 (16)
Huguier et al <sup>10</sup>	83/1159 (7.1)	39/611 (6.4)	14/237 (5.9)
Deziel et al <sup>4</sup>	0/8 (0)	5/39 (12.8)	6/28 (21)
Present series	0/71 (0)	...	...
<b>Total</b>	<b>88/1323 (6.6)</b>	<b>55/740 (7.4)</b>	<b>40/396 (10.1)</b>

\*CDD indicates choledochoduodenostomy; CDJ, choledochojejunostomy; and CCJ, cholecystojejunostomy. Ellipses indicate not applicable.

ing choledochoduodenostomy than it is following cholecystojejunostomy or Roux-en-Y choledochojejunostomy. In fact, among more than 2400 patients collected from recent series, recurrent obstruction after choledochoduodenostomy occurred in an average of only 6.6% of patients (range, 0%-7%), which compared favorably with a recurrence rate of 7.4% (range, 6%-20%) in patients undergoing choledochojejunostomy and 10.1% (range, 6%-21%) in patients undergoing cholecystojejunostomy (**Table**).

In patients with unresectable pancreatic adenocarcinoma, the mean survival time is short. Among the 71 patients undergoing choledochoduodenostomy in our series, 52 patients (73%) survived less than 15 months. Overall, the mean survival time was only 13.1 months. The natural progression of this disease is so rapid that most patients with unresectable pancreatic cancer simply do not live long enough to develop recurrent biliary obstruction. Therefore, these patients require a bypass that will provide adequate palliation for a relatively brief time. It has been shown that prophylactic gastrojejunostomy is usually unnecessary in the setting of unresectable pancreatic carcinoma, because most patients do not survive long enough to develop late gastric outlet obstruction.<sup>13</sup> Similarly, choledochoduodenostomy provides adequate decompression of the biliary tract because most patients do not survive long enough for recurrent biliary obstruction to occur.

Although none of the patients in our study experienced recurrent jaundice, the literature suggests that a small number of patients will still experience recurrent biliary obstruction following choledochoduodenostomy.<sup>2,9</sup> In this setting, choledochoduodenostomy theoretically offers another significant advantage over Roux-en-Y choledochojejunostomy—the ability to perform endoscopic stent placement. In contrast, patients undergoing Roux-en-Y choledochojejunostomy who develop recurrent biliary obstruction require either transhepatic stent placement or operative decompression, both of which are less desirable.

In conclusion, this study demonstrates that choledochoduodenostomy is an effective operation for bypass in unresectable pancreatic adenocarcinoma. The incidence of bile leak is very low and the operative mortality rate is favorable compared with other methods of biliary-

enteric anastomosis. In addition, because choledochoduodenostomy is a more physiologic biliary reconstruction, the incidence of gastrointestinal hemorrhage is low. Contrary to traditional teaching, choledochoduodenostomy does not seem to predispose to recurrent jaundice from progressive tumor growth. If recurrent obstruction were to occur, endoscopic stent placement remains an option. When operation is undertaken in patients with pancreatic cancer that is found to be unresectable, we believe that choledochoduodenostomy is the palliative operation of choice.

Presented at the 69th Annual Session of the Pacific Coast Surgical Association, Maui, Hawaii, February 15, 1998.

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## DISCUSSION

**L. William Traverso, MD, Seattle, Wash:** The authors use choledochoduodenostomy whenever possible to perform a biliary bypass in patients with pancreatic cancer. They challenge the standard use of a Roux-Y limb. They feel the procedure is simpler, just as safe, and just as durable. Have the authors supported their bias in this presentation or in their manuscript so that the members of this audience might begin to question whether the standard jejunal connection could be replaced with a simpler duodenal connection?

I agree that the duodenal anastomosis is simpler and in this study appears to be associated with low in-hospital morbidity and mortality. But the real issue is the durability of the choledochoduodenostomy. This retrospective review could be more supportive of the authors' view if the following questions were answered.

First, the criteria for entry in this study are not clear, particularly concerning the data that pertain to the quality and quantity of biliary obstruction, both preoperative and postoperative.

All of the patients were undergoing operation with an intent to resect for cure. Did they all have biliary obstruction? And to what extent? What was the preoperative incidence of jaundice? What was the preoperative mean level of bilirubin? In the manuscript, the authors note that no patient during follow-up had recurrent jaundice due to invasion of tumor into the duodenum or the anastomosis. Did any patient develop postoperative jaundice from something other than tumor, for instance, the occurrence of sludge at the anastomosis or reflux of foreign material into the biliary tree? To assess the durability of the choledochoduodenostomy with something other than jaundice, were there any symptoms or signs suggesting partial obstruction or stricture of the anastomosis in the postoperative period? Also, how long were these anastomoses at risk for failure? To assess this risk, the reader would need to know more about the method of follow-up, the percent follow-up, and the mean and median survival times.

No information can be gathered from this study in regard to the frequency of acid-induced postoperative gastrointestinal bleeding. We didn't hear anything about the patients with jejunal anastomoses, but we can say that the patients who did bleed after choledochoduodenostomy did so mainly not due to acid lesions but because of variceal bleeding or tumor erosion.

Disregarding all of these previous questions for the authors, I believe the side-to-side choledochoduodenostomy is a durable operation for the short time that these patients remain alive. In 1980 in the *Archives of Surgery* we found this same durability for cholecystojejunostomy. In that UCLA study, the gallbladder anastomotic durability was not adequate for benign disease, but it was for the short time required for malignant disease.

In regard to benign disease and using the choledochoduodenostomy, I am a fan of it, particularly for bile duct transection or excision of a choledochal cyst. These patients live a long time and an end choledochal-to-side duodenal anastomosis is a good operation. A side-to-side choledochal anastomosis has too high an incidence of problems over time, in my experience, for clogging with debris, sludge and stones. However, I believe this paper today has the potential to say that the side-to-side choledochoduodenostomy has sufficient durability to treat malignant biliary obstruction.

The side-to-side choledochoduodenostomy of this study is successful because bile is capable of passing through almost anything, even an almost completely obstructed duodenum downstream from their anastomosis. Probably many of these cases developed that duodenal stenosis but didn't show biliary obstruction because of this biliary phenomenon. My one last question then is, in the 8 patients with need for postoperative gastrojejunostomy, did any of these have any subtle signs of biliary obstruction, ie, rising liver function tests, not necessarily jaundice or signs of cholangitis?

I enjoyed this paper. I disagree with the authors that ERCP is not possible after choledochojejunostomy. Dr O'Connell, it would have been really nice to know your operative times. This was not listed in the manuscript either to prove that this operation is faster.

**Lawrence W. Way, MD, San Francisco, Calif:** I have several questions. First, during the period of the study were any other procedures done for palliation of jaundice, and how did they fare? In other words, how was this operation selected if it was one of several?

Second, did any of the patients have postoperative radiation therapy or chemotherapy, and, if so, did it affect the fate of the bypass?

Third, if choledochoduodenostomy works as well as you report, why not do the technically simpler cholecystojejunostomy instead?

Fourth, why was a gastrojejunostomy not performed more often, since duodenal obstruction develops in about 15% of patients as the next major clinical event?

Finally, the difficulty from re-routing of bile into the jejunum rather than into the duodenum stems more from decreased amounts of bicarbonate entering the duodenum (to neutralize gastric acid) than from hypersecretion of acid by the stomach.

**William P. Schecter, MD, San Francisco:** Do you advocate prelaparotomy laparoscopy to identify patients with metastatic disease who are not resectable and to exclude them from laparotomy? I was disappointed that there was no comparison made between the choledochoduodenostomy patients and the endoscopically treated patients. Is there any reason to be more aggressive with open biliary drainage? I am using stents more and more in my own practice.

What did you do with the gallbladder in these patients? Did you take any of the gallbladders out and, if so, what are the indications in your practice to remove the gallbladder when you are going to do a choledochoduodenostomy?

**Dilip Parekh, MD, Los Angeles, Calif:** I have a question related to entry of your patients into the study. Patients with unresectable pancreatic cancer include 2 diverse groups of patients—patients with metastatic disease, and patients with advanced locoregional disease. The median survival of patients with metastatic disease is 3 to 6 months for pancreatic cancer. However, more than half of the patients with advanced locoregional disease treated with chemoradiation will live beyond a year. How many patients in your study were distributed between the 2 groups and was your group with advanced locoregional disease treated with chemoradiation? How many of these patients developed evidence of recurrent biliary obstruction such as elevated liver enzymes or elevations in bilirubin?

Finally, your 11% incidence of gastrojejunostomy is for the whole group. What were the total numbers of patients with advanced locoregional disease and what percentage of that group developed gastric outlet obstruction, and should you not have added a prophylactic gastrojejunostomy in that group if that incidence was high?

**Mark A. Vierra, MD, Stanford, Calif:** I am just curious if you have some sense of how often you are winding up with patients who in fact prove not to be resectable at the time of surgery. Our experience with the quality CT scans we get these days is that it is really very uncommon for us to go to the operating room to operate on a patient and not be able to complete that procedure. Prophylactic or palliative biliary bypasses are really uncommon. Most of those patients get stented in our experience.

**Edward A. Dainko, MD, San Bernardino, Calif:** I want to ask a question since the choledochoduodenostomy is an operation that is not using defunctionalized bowel. There was no mention made of the incidence of ascending cholangitis or stricture that may have developed. I realize the average length of duration of this operation was about 13 months. In benign disease we know that when using the duodenum we do have an incidence of stricture in the first 10 to 36 or 40 months and a certain incidence of ascending cholangitis that must be addressed.

**Thomas R. Russell, MD, San Francisco:** This is a very nice review from 1980 to 1996, but isn't this paper only of historical significance? In the future, using laparoscopy and ultrasound, most patients can be staged more accurately and avoid an open procedure. Thus, stents will be placed in radiology.

**Dr O'Connell:** What we wanted to do today is have a paradigm shift because in US textbooks, the recommended way to treat this disease is Roux-en-Y choledochojejunostomy. We started doing this because we were challenged by the complications that we were seeing with Roux-en-Y choledochojeju-

nostomy, mostly gastrointestinal bleeding. In fact, at one time, we were doing prophylactic vagotomies to help prevent that. That was made even worse with a gastrojejunostomy because you really had unprotected bowel connected to the stomach. That is why we got away from doing routine gastrojejunostomies also.

This has been an evolving thing over the last 18 years and to answer Dr Russell's question first: yes, the number of patients we are doing are less and less because of preoperative staging, and maybe this is why I wanted to get it on the program today because maybe next year or the year after it will be even less. But, even then, every once in a while you may be surprised at operation by unresectability and you have to do something, or at times they can't drain a patient successfully by stent. We just wanted to say that choledochoduodenostomy was the simplest, most straightforward, and most effective way to proceed.

Dr Traverso, all of the patients had clinical jaundice, but this really varied. Why we didn't mention it in the manuscript is because it varied greatly. Some of these patients in the most recent series had preoperative stents put in and at the time of operation the bilirubin was coming down to almost normal levels. However, all patients presented with clinical jaundice at one time or another and had bilirubin levels from 6 to over 30 mg%. Postoperatively there was no reobstruction from any cause, either tumor or benign. This procedure was done for palliation and no patients developed reobstruction or cholangitis. They may have had some rise in their alkaline phosphatase level, either due to metastatic disease or to partial obstruction. But the main thing that you are there for is not to fix the alkaline phosphatase. It is to palliate the patient, and they were all palliated until they died.

Several discussants' comments stated that choledochoduodenostomy may not be a good operation for long term. But these patients are not long-term patients. And essentially, this works up to the time of death. One hundred percent of patients were followed to the time of death, which varied from 2 weeks to 62 months, with a mean of 13 months, and 75% of the patients lived less than 15 months.

It was mentioned by several discussants that the patients needed gastrojejunostomies. Again, although 10% of patients developed gastric outlet obstruction and needed gastrojejunostomies, this element was not the purpose of this talk. We had another paper that we published about a year and a half ago dealing with the subject of not doing routine gastrojejunostomies. In our series, 11% of the patients fail and need gastrojejunostomy. You have to make a decision whether you think that is a good idea to let 11% of these patients fail. However, doing a routine gastrojejunostomy is not without morbidity. A lot of these patients don't empty well. They get what is called circus motion where the food goes out the duodenum, comes right back into the stomach, and goes out the duodenum again. So if they are obstructed, a gastrojejunostomy is very worthwhile. If they are not obstructed, you can have a lot of problems with physiology and well being of the patients including the development of marginal ulcers. What we try to maintain (as much as possible) is the basic physiology of the patient. We get the bile back into the duodenum where it belongs and didn't do any routine duodenal bypasses.

As far as Dr. Traverso's questions regarding cholecystojejunostomy, his series showed that it had an acceptable obstruction rate of only 8.5% in patients overall with malignant disease, but very poor in benign disease—about 25%. However, in his study, in those patients with malignant disease who survived beyond a year, over 22% failed with a cholecystojejunostomy. So for that subset of patients it did not do well. Choledochoduodenostomy fared well in our series for all types of patients. Also, you have another negative things with the cholecystojejunostomy besides durabil-

ity, and that is the bile is not going into the duodenum but going into a jejunal limb. And again, you can't do easy ERCP stenting if you have a Roux-en-Y limb or you have other jejunal loop if the anastomosis fails.

Also, the challenge about how much faster this operation was: we didn't compare this in our study. But the Pott study from Cleveland Clinic did compare that and it was an average of 180 minutes for a choledochoduodenostomy vs 240 minutes average time for the Roux-en-Y cholecystojejunostomy.

As far as Dr Way's questions, there were no other procedures done. It was either Roux-en-Y cholecystojejunostomy in 10% of the patients, or choledochoduodenostomy in 90%. Our preferential treatment was the choledochoduodenostomy. We only did the cholecystojejunostomy when the disease was going far proximally into the bile duct, almost up to the bifurcation, or the duodenum was involved and could not be adequately mobilized.

Again, we did a side-to-side choledochoduodenostomy using single-layer 4-0 Vicryl sutures.

There were very few patients actually who had adjuvant therapy. This is again over 17 years, and it is not our practice to do adjuvant therapy for unresectable disease. It is adjuvant when you think you have the patient cured and are treating presumed microscopic disease. Again, there is no good proof in the literature that either chemotherapy or radiation therapy in unresectable disease increases the length of survival or quality of survival.

Also, Dr Way mentioned the development of peptic ulcers. There are probably 2 reasons why you get duodenal or marginal ulcers after cholecystojejunostomy. The biggest reason is that there is no bile going into the duodenum to neu-

tralize the acid and that is why we put the bile back. There is also experimental work called the Mann-Williamson phenomenon in dogs showing that a Roux-en-Y cholecystojejunostomy actually produces gastric hypersecretion so there may be 2 things going on, gastric hypersecretion and lack of neutralization.

Dr Schecter's question regarding laparoscopy: we don't do that routinely, certainly in the early part of the studies. However, everybody's right regarding advances in preoperative evaluation. With the use of the dynamic CAT scan, there are less patients being taken to the operating room now who are found to be unresectable. So again, the need to do operative bypass will be much less in the future. Dr Schecter also asked what we do with the gallbladder. One hundred percent of the time the gallbladder comes out since the gallbladder with any kind of a bypass operation is a nonfunctional organ and all it can do is cause trouble.

Dr Parekh asked about our treatment as far as chemotherapy and radiation. This varied, but very few were treated this way. And again, no patient developed cholangitis or rejaundiced any time during the period. Again, Dr Vierra, we agree, we are taking fewer patients to the operating room to do this bypass surgery.

Regarding Dr Dainko's question about the defunctionalized bowel, again, choledochoduodenostomy is the operation for patients who don't have a long time to live. This may not be the operation for benign disease. It may not be the operation for patients who are going to live a long time. But in this subset of patients with pancreatic cancer who have a short period of time to live, it seems to be an effective, durable type of palliation.

#### IN OTHER AMA JOURNALS

##### ARCHIVES OF INTERNAL MEDICINE

##### Internal Medicine, Psychiatry, and Emergency Medicine Residents' Views of Assisted Death Practices

Laura Weiss Roberts, MD; Brian B. Roberts, MD; Teddy D. Warner, PhD; Zachary Solomon, MD; James T. Hardee, MD; Teresita McCarty, MD

**Background:** Although studies have revealed conflicting attitudes within the medical community regarding assisted death practices in the United States, the views of current resident physicians have not been described.

**Objective:** To investigate the perspectives of residents from 3 medical specialty fields regarding the acceptability of assisted suicide and euthanasia practices as performed by 4 possible agents (the resident personally, a referral physician, physicians in general, or nonphysicians in general) in 6 patient scenarios.

**Method:** An anonymous survey exploring responses to 6 patient vignettes was conducted with a convenience sample of all residents in the internal medicine, psychiatry, and emergency medicine training programs.

**Results:** A total of 96 residents, 72% of those asked, participated in this study. Overall, residents expressed opposition or uncertainty regarding assisted suicide and euthanasia. The residents were disinclined to directly perform such practices themselves and did not support the conduct of assisted suicide practices by nonphysicians. Respondents were somewhat more accepting of other physicians' involvement in assisted death activities. Conflicting views were expressed by residents, with emergency medicine residents more likely to support assisted suicide practices in 4 of 6 patient vignettes than either internal medicine or psychiatry residents. Residents who reported being influenced by religious beliefs (21 respondents [22%]) did not support assisted death practices, whereas those influenced by personal philosophy (74 respondents [77%]) expressed less opposition.

**Conclusions:** This study explores the uncertainty and differing views of residents from 3 fields about physician-assisted suicide practices. Study findings are considered within the larger literature on clinician attitudes toward assisted suicide and euthanasia. *Arch Intern Med.* 1997;157:1603-1609

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