

mal test. The fact that only two of 12 patients had pain during their secretin test is also evidence against their pain being secondary to an obstruction to outflow of pancreatic secretion.

It is difficult to separate the role of septectomy from that of sphincteroplasty in these results. Sphincteroplasty was necessary in order to gain full visualization of the ampullary septum. That sphincterotomy or sphincteroplasty alone can provide pain relief in patients with stenosing papillitis has been well recorded.^{4,6,11-13} None of the patients in this study had evidence of advanced fibrosis of the papilla of Vater. The fact that four of the six patients with unsuccessful prior sphincteroplasty had a good result lends further weight to the possibility that the septectomy may be the critical component of this procedure.

A search of the literature has not revealed a systematic assessment of ampullary septectomy and sphincteroplasty for post-cholecystectomy pain. Excision of the septum in cases where there is obvious stenosis of the opening of the duct of Wirsung is common practice. In this situation, there is usually overt evidence of chronic fibrosing pancreatitis. None of the patients in this series had evidence of advanced pancreatic disease. We have, however, performed this procedure on three alcoholic patients with fibrosing pancreatitis and normal gallbladders. All have continued to drink and have persistence of their pain. The fact that 23 of the patients in the present study were abstainers from alcohol may have contributed in some way to the relative success obtained in this series.

The reason for episodic pain in these patients is not known. We presume that it is pancreatic in origin, rather than arising from the biliary tree. A simple obstructive hypothesis is advanced to explain the syndrome, but unfortunately, methods to test this hypothesis are lacking. Furthermore, the physiology and hence the pathophysiology of the Vaterian system is complex and

poorly understood. It is likely that the mechanisms of pain production involve a variety of neural and humoral influences. As these are being studied, the efficacy of ampullary septectomy should be tested by a controlled randomized trial in view of the encouraging preliminary results.

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DISCUSSION

DR. MARSHALL K. BARTLETT (Boston, Massachusetts); A good many years ago we became interested in the work of Drs. Doubilet and Mulholland on sphincterotomy, and we began to select some patients, most of whom had had a previous cholecystectomy, and who were still having attacks of pain, which we thought might be due to some outflow obstruction to the pancreatic duct system. Selection of these patients to me has always been very difficult. Alcohol, drugs, emotional overlay—these may be present, some or all of them, to confuse the picture; and I think this really has been the crux of the problem over the years.

Our standard technical approach has been very much like the one you have heard described just now. We expose the papilla transduodenally, and try to standardize on a 15 mm sphincteroplasty. We have done several hundred of these operations at the Massa-

chusetts General Hospital. They have been done by many surgeons and it is not possible to completely standardize any procedure when it is done by many people. As much as possible, we have kept to a 15 mm sphincteroplasty.

And then we identify the opening of the duct of Wirsung, and we believe that it normally should admit a three millimeter dilator without difficulty. If it will not, we incise the septum, as Dr. Moody has described, and continue until it is at least three millimeter in diameter. We have not attacked that septum quite as vigorously as Dr. Moody has.

We outline the pancreatic duct system, as he does, and as you know, sometimes the duct of Wirsung will not be the main drainage system. If it is not, we identify the papilla of the duct of Santorini, and do plastic procedure on it to provide an adequate lumen.

We have had reasonable success with this over the years, but certainly nowhere near 100%, and the difficulty of patient selection is still our greatest problem.

The retrograde endoscopic injection of the pancreatic duct, of course, has been helpful, and sometimes dictates an entirely different approach.

DR. WILLIAM P. LONGMIRE, JR. (Los Angeles, California): Dr. Moody has proposed an interesting concept to account for intractable upper abdominal pain in certain patients whose pain cannot otherwise be explained. Certainly, it would seem logical to assume that a complex anatomical and physiological mechanism such as the ampulla of Vater, which regulates the flow of two of our most important digestive secretions, might well be the origin of a variety of unpleasant symptoms when malfunction occurs.

Symptoms suspected of being associated with dysfunction of the sphincter of Oddi may, of course, be related to the biliary system or to the pancreas. If the pancreas is suspect, either on the basis of a history of elevated serum amylase or evidence of pancreatitis at operation, we have also divided the choledochopancreatic septum during the performance of a sphincteroplasty in a small number of patients.

When performed in patients with so-called unexplained intractable abdominal pain, the high recurrence rate of symptoms following sphincteroplasty has emphasized the glaring lack of any specific, objective, preoperative diagnostic tests that we can use to select patients for this operation.

In recent months ERCP has been helpful in seeking objective evidence of sphincteric malfunction. One finding of importance, for example, is the location of a duodenal diverticulum intimately associated with the sphincter area. A second finding is a very tight sphincter opening into which it is difficult to impossible to introduce the cannulating tip of the instrument. A third, as Dr. Moody has stated, is moderate dilatation of the biliary system of the duct of Wirsung, or both. And finally, still another finding of importance is the delay in emptying of the biliary tract when dye is introduced either through the scope or intravenously.

In his presentation today Dr. Moody carries us one step further into this never-never land, in attempting to identify patients whose symptoms are related solely to pancreatic duct stenosis, and whose symptoms may be relieved by septectomy.

I wish only to express the opinion that this operation must certainly be approached with caution because (1) there are still no reliable, specific preoperative diagnostic tests to identify most of the patients who might benefit from such a procedure, and secondly, despite the excellent results in Dr. Moody's skilled hands, this remains an operation that has serious hazards.

DR. LARRY C. CARY (Columbus, Ohio): One of the questions that Dr. Moody has raised, and one that has been emphasized by the other discussants, is the need to establish the diagnosis accurately, in order to properly select the patients that require this operation, or who are likely to benefit from it. We have had a small experience in the last 12 or 15 months at Ohio State, and I'd like to share just a bit of that with you.

(Slide) These are the laboratory values in a group of 12 patients having exactly the operation you have heard described today. A significant number of patients have had elevated alkaline phosphatases preoperatively, and I wonder if Dr. Moody has found that to be true in his experience.

The Nardi test, that is, the administration of morphine and prostigmine, has been quite useful in reproducing the symptom complex, especially the pain that these patients have, and it's given us some encouragement that we're able to select patients who will benefit from the operation with some accuracy.

Dr. Longmire emphasized that these operations do have some danger, and that's certainly been true in our experience. Seven patients have had pancreatitis postoperatively. The majority have had just transient elevations in their amylase, with some abdominal pain, and I can emphasize the lack of severity of the pancreatitis by pointing out that our postoperative average days' stay has been ten, which compares favorably with Dr. Moody's average of 12.

Four patients have had one episode of postoperative cholangitis, all of which have been mild. There have been no recurrences after the first episode. In reviewing these data, the complication rate in these

12 patients is about two thirds, albeit that most of the complications have been relatively mild.

(Slide) The response to the Nardi test has been interesting because in the six patients with positive responses in the nine upon whom the test was done, five developed postoperative pancreatitis. In those who had negative responses, only one developed postoperative pancreatitis.

(Slide) Ten of our patients have been totally relieved of symptoms, and have had no further attacks of pain, and no longer require medication. One still required an occasional non-narcotic analgesic, and in one it's a little early for us to be sure about the outcome.

I'd like to ask Dr. Moody a couple of questions. If such a cooperative study were to evolve, Dr. Moody, how would you suggest the patients be selected? Have you done biliary manometrics on these patients, and do you think they would be useful in helping to select the patients that might benefit? And finally, have you put a T-tube in the common duct in your patients?

DR. THOMAS TAYLOR WHITE (Seattle, Washington): The questions which I see being asked today are, first of all, is the pain due to pancreatitis? Only about 15–20% of patients I see who are sent to me with this type of postcholecystectomy pain actually have pancreatitis at all. Secondly, and perhaps most important of all of us, is it real, or is this something imaginary, related to drugs, psyche, or something else? And thirdly, is it due to sphincteric spasm, stricture, or an undemonstrated common bile duct stone which we can't see on any of our tests?

While all these questions are difficult to document, as Dr. Moody has pointed out, we have found that there are three methods which are of some use, and may perhaps be of some value, if we are going to evaluate these patients better. First of all, Dr. Cary just mentioned the Nardi Test. I use a variation of this, which consists of giving secretin, and measuring amylase, lipase, alkaline phosphatase, and bilirubin, one and four hours after the administration of the drug intravenously. If one or more of these parameters is elevated, we have the documentation needed to approach the patient in a proper fashion.

Secondly, if tests of this nature are completely negative, what we have been doing for some years, in patients who have real pain, is to ask the anesthetist to do celiac and intercostal blocks on the patient. The patients who have negative intercostal blocks and positive celiac ganglion blocks sometimes really do have something which is wrong with them; and there's another documentation.

The third approach, the one at the operating table referred to by Dr. Cary, is one of doing manometry. I first noted an elevation of pressure about fifteen years ago, when I put a clear plastic tube into the cystic duct of a patient who has been repeatedly seen by various physicians, and with all test forms to be normal. As soon as the catheter was tied in place, the bile ran up to 31 cm above the bile duct, documenting biliary hypertension.

It's not always this dramatic, but a biliary pressure of 16 cm or more, and certainly 20 cm or more, and a reduced flow, will indicate increased resistance at the sphincter, and give us documentation which people can hang their hat on.

Finally, I believe that the reduced pancreatic pressure which Frank mentions after he has done a septoplasty is, in fact, due to the fact that he's made the hole bigger, he's put a No. 5 French catheter in a hole which was tight at first, and loose later, and the pancreatic juice runs around it afterwards. I've seen this happen repeatedly.

Lastly, another problem of doing a septectomy lies in the fact that the pancreatic duct isn't always in the same place, such as is illustrated in his illustration. It may be deep within the sphincter, adjacent to the bile duct way out at the tip of the papilla, or it may be two or three centimeters higher up in the duodenum. It's practical to do this operation in only about two thirds of patients.

DR. KENNETH W. WARREN (Boston, Massachusetts): I think the fact that Dr. Moody has reported a small series here, and that they're carefully studied, is the most important aspect of this presentation.

A central theme has run through the discussion, and I certainly would support it and that is the difficulty of deciding whether or

not this patient really has any fibrosis or scarring or increased pressure in the duct.

As all of you know, for many, many years we have done sphincteroplasties on both the common bile duct and the duct of Wirsung, and it was only after we started doing something directly on the duct of Wirsung that our results improved when we used this method in treating chronic pancreatitis, or, indeed, even in fibrosis of the sphincter of Oddi.

The definition of this disease is something like the definition of philosophy. It's like a blind man in a dark room looking for a black cat when the black cat isn't there.

It is easy to make this presumption, and I've made it, I'm sure, when it didn't exist; but I think there is a real place for this procedure. The way Dr. Moody has performed it is important, because it must be a rather substantial sphincteroplasty, with the removal of the septum, or division of the septum.

I think it is certainly difficult to do manometric pressures after you have divided the sphincter. I think if you're going to do that, you're going to have to reinsert the catheter, or some type of method (a catheter that has a balloon on it, perhaps) so that you are sure that you are measuring the precise pressure.

On the other hand, it probably is not necessary when the sphincteroplasty is done on the duct of Wirsung. Generally, a gush of pancreatic secretion ensues. Very often it has a little calcium in it, or some debris; and I do feel that there's a place for this. But the difficulty, as Dr. Longmire emphasized, is how you identify this place.

Something I have added to this procedure in recent years, I think, is most helpful; and that is, once I remove this septum, I insert a No. 5 or No. 6 ureteral catheter, bring it out of the stab wound in the duodenum, separate from duodenotomy, and use that as a vent for five or six weeks, until this area has healed.

I happen to be one who does not subscribe to having studies such as this done in 15 or 20 different centers, for the reason that Dr. Bartlett said: It's difficult enough in his own great institution to see that these are done in the same way.

DR. FRANK G. MOODY (Closing discussion): I'm indebted to Dr's. Bartlett and Nardi for the idea of excising the transampullary septum in this population of patients. I'd like to comment on the problem of how to assess the size of the opening of the duct of Wirsung. If it will not admit the smallest lacrimal probe, then it surely is compromised by scar. Many of the pancreatic ducts in this series would admit a three millimeter probe, and therefore were not compromised by this measurement. Why these patients should have resistance to flow through this sized opening is difficult to explain.

Dr. Longmire brought out some very important points as regards ERCP. We have used it in the past two and one-half years, and have the general impression that if we can't get a pancreatogram by this means that we probably are dealing with an abnormal papilla. Usually the catheter wants to slip into the pancreatic duct, but it's difficult to get it into the bile duct.

Dr. Cary reminds me that this, indeed, is a multi-sphincter disease. These people invariably have symptoms of spastic colon. Many of them have had problems at the esophagogastric junction, and also at the pylorus, and some of them have peptic ulcer disease. I think that's very important to keep in mind.

It wasn't clear from Dr. Cary's presentation whether he, indeed, did the septectomy. I'd just like to say that, in our concept, we think that's where the problem is. We don't know if this is pain from obstruction to the outflow of pancreatic juice or not. I rather suspect that it probably is not, because in only two of the 12 patients that we injected with secretin were we able to reproduce the pain. And I think that's a very important negative observation.

As regards biliary manometrics, what we've learned over the past three or four years, working with primates (we're working with rhesus monkeys and baboons on this problem) is that there seems to be no communication between the bile duct and the pancreatic duct as regards pressures. We can run the pressures up in either system, and it doesn't reflux in the other system, even though they are connected anatomically in this species. So apparently the septum acts as a sort of flap valve, and I don't believe that biliary manometrics would really help us very much in identifying problems in this patient population. Yes, three patients did have an elevation of the alkaline phosphatase, and we couldn't really relate that to anything unusual in the papilla, except for the stenosis that we felt was around the opening of the duct of Wirsung.

Dr. White asked: Is it a real disease? I think we have to ask ourselves that, and it's certainly a question that my residents ask all the time, when these patients come in. As a matter of fact, they think I'm pushing an operation that's looking for a disease. And it sort of looks like that, because there really are no objective findings, and the only numbers that I have are the ones that are related to the change in the pressure.

Tom, we measure this pressure by inserting the catheter, or the needle, proximal to the opening, not through the opening; so, indeed, we are measuring the resistance across the opening of the duct of Wirsung. And it is difficult to make the snip, and not make it so far that you cut up into where the catheter is. But the snip clearly gives a gush of pancreatic juice, and the pressures drop.

In two patients the pressures didn't drop. One had a good result, and one had a fair result. The two patients that had a marked drop in pressure fell into the poor group. So I don't know what the pressures are going to mean over the long run.

As regards sphincter spasm, we're studying this in the opossum, which is a handy creature because the sphincter of Oddi is outside of the duodenum, and we can place electrodes into this, and we can measure entrainment and spike potentials as they relate to gallbladder evacuation, flow through the bile duct, and also duodenal contraction. So we're starting to get a little bit of a fix on the motility aspect of this problem.

Dr. Warren mentioned his experience with this particular procedure, and he didn't mention the number. I'm glad he didn't; it would have been embarrassing, because it's huge. He's done this many times. I'm not sure whether he's done it on patients that have been quite as mysterious, and lack objective findings, as the patient population that we have worked on.

As regards putting a ureteral catheter up into the duct of Wirsung, he sort of likes to get tubes into most orifices and leave them there for a while. I'd be reluctant to do that, because I think that might lead to further inflammation, injury, and fibrosis in the area. But apparently it works, because he's getting some pretty good results with it.