

## Current Controversies in Laparoscopic Cholecystectomy: A Roundtable Discussion

EDITOR'S NOTE: This roundtable discussion was held at the Vista Hotel, Newark, NJ, August 4, 1990 during the New Technologies in Surgery workshop.

### PANELISTS

**J. Raymond Hinshaw, M.D. (Moderator)**, *Emeritus Professor of Surgery, University of Rochester and Emeritus Chairman of the Department of Surgery, Rochester General Hospital, Rochester, New York*

**Brendan Carroll, M.D.**, *Attending Surgeon, Cedars Sinai Medical Center, Los Angeles, California*

**Leon Daykhovsky, M.D.**, *Research Scientist and Research Coordinator, Laser Lithotripsy and Micro Endoscopy, Cedars Sinai Medical Center, Los Angeles, California*

**Gerald Glantz, M.D.**, *Associate Clinical Professor of Surgery, UCLA School of Medicine, Los Angeles, California and Director of Surgical Laser Research, Wadsworth V.A. Hospital, Los Angeles, California*

**Raymond J. Lanzafame, M.D.**, *Assistant Professor of Surgery, University of Rochester Medical Center and Director of the Laser Surgery Center, Rochester General Hospital, Rochester, New York*

**Patrick Leahy, M.B., B.Ch., B.A.O.**, *Surgical Laser Research Fellow, Rochester General Hospital, Rochester, New York*

**Leonard Schultz, M.D.**, *Clinical Assistant Professor of Surgery, University of Minnesota, Minneapolis, Minnesota*

**Dr. Hinshaw:** Dr. Schultz, I first heard about laparoscopic cholecystectomy from you. Would you please tell us how you first learned about the procedure and how you learned to perform the procedure?

**Dr. Schultz:** We started to consider the possibility back in 1985, and the initial technique wasn't really learned from anyone else. I don't remember reading about it. It was a concept that our practice had developed. We wanted to find the least invasive way of carrying out general surgery. We realized that the gynecological surgeons who were the leaders in this field had used laparoscopy to do pelvic surgery. That's where the idea came from. At that point, we tried out the initial work in the canine model using a carbon dioxide laser and failed miserably. We put it on the back shelf until 1988 when we started back in the laboratory in the face of increasing pressure from our medical colleagues who said, "We can deal with gallbladder disease better than you can." By that point we had pelviscopic instrumentation and we now had a much better background in laser technology. So we started all over again.

**Dr. Hinshaw:** Dr. Daykhovsky, was your experience similar in getting started in this field? Had you heard of the procedure before, or did you think it up on your own?

**Dr. Daykhovsky:** Our group came to this project independently around the end of 1987 or the beginning of 1988. Drs. Edward Phillips, Brendan Carroll, and I started the research at Cedars Sinai. We developed a technique to remove the gallbladder laparoscopically without using any laser technology.

**Dr. Hinshaw:** Dr. Leahy, we think you were the first surgeon in North America to perform the procedure of laparoscopic cholecystectomy. How did you get started?

**Dr. Leahy:** My experience dates back to my research work in Canada in 1985 and 1986, during which time I was studying urinary tract disease. At that stage, I was interested in laparoscopy and had learned the procedure from gynecologists in Ireland during 1983 and 1984. I did my first procedure in January 1988.

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J. Raymond Hinshaw, M.D.  
(Moderator).

**Dr. Hinshaw:** It was through Dr. Schultz that I met Dr. Eddie Joe Redick, who performs KTP laser laparoscopic cholecystectomies, and from Dr. Reddick, I learned of Dr. J. Barry McKernan, who performs the procedure with the argon laser. Dr. Schultz, you use the neodymium:YAG laser to perform laparoscopic cholecystectomy, and Dr. Ray Lanzafame uses the KTP-532 laser. Three of our other panelists use no laser at all. Dr. Schultz will you tell us why you prefer the neodymium:YAG laser?

**Dr. Schultz:** We started to use the neodymium:YAG laser for this work and have continued to do so for the present. We are the most familiar with this laser, having had a reasonable practice with it since 1986. The delivery system of the neodymium:YAG laser represents one in which the laser power ends at the tip of the delivery system. We started using the artificial sapphire tip. This has since been replaced by a sculpted fiber tip. We realize that for those who are learning laparoscopic cholecystectomy for the first time and entering into laser technology as well, this is an exceedingly difficult thing to do.

**Dr. Hinshaw:** Dr. Lanzafame, why do you prefer to use the KTP-532 laser?

**Dr. Lanzafame:** I think this laser offers possibilities to someone who is well-versed in the use of the laser. We also use the YAG laser with sculpted tips. I am not as enthusiastic about sapphire or the sculpted fibers as some others are, and I found that, of all of the wavelengths available for open cholecystectomy KTP, in my hands, was probably the simplest to utilize. I should point out for the record that I don't believe that any single instrument, laser notwithstanding, is going to be used exclusively in any dissection, laparoscopic or otherwise. I think that's an important point to be made.

**Dr. Hinshaw:** Dr. Carroll, Cedars Sinai has long been a leader in at least some types of laser surgery, yet you don't use the laser. Would you explain yourself?

**Dr. Carroll:** We analyzed two hundred laparoscopic cholecystectomies that we performed with the electrocoagulation technique using a specialized hook cautery device that we had developed and found no incidence of postoperative hemorrhage. Intraoperative blood loss averaged less than 20 cc, and the average operating time in all cases was in the range of 60–70 minutes. We found the laser fibers were not always adequate to control liver bed bleeding and we frequently had to switch back to the coagulation unit in more acute cases with more difficult dissection. The plane of the dissection was more clearly delineated by manual dissection with the hook device. We found the electrocoagulation technique to be superior.

**Dr. Hinshaw:** Dr. Schultz has just indicated that he wants to make a further comment for our audience on this subject.

**Dr. Schultz:** I have one or two comments. First I think the question really is: Why did you select the cautery at the initiation of your experience with laparoscopic cholecystectomy rather than a retrospective review that you found cautery satisfactory. I would request that you speak to that particular issue. Why the initial choice of cautery versus laser?

**Dr. Hinshaw:** Dr. Carroll do you want to make another comment?

**Dr. Carroll:** We initially chose cautery because we were more familiar with the technique. Since it's identical to that performed in open cholecystectomy, we thought it would be more applicable to the general surgeon practicing in the community.

**Dr. Hinshaw:** Dr. Leahy do you have a comment.

**Dr. Leahy:** I agree that at this time, with the technology we have available, that electrocautery is probably one of the most appropriate ways to perform a cholecystectomy. However, I think we should make the point that the future of endoscopic surgery is complementary to the use of lasers, and as we become more innovative we will use lasers more often. I think we should not lose sight of that fact.

**Dr. Hinshaw:** That leads me to ask for a show of hands. My question is this. If the laser users are skilled and the cautery users are skilled, do you think that a patient really fares better because you have used one technique or the other?

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There is no show of hands, so there is no strong feeling that the patient will fare better if you perform the procedure well with the laser or with the cautery.

I would like you to describe some of the equipment which has helped make the procedure relatively safe and easy for the general surgeon to learn to perform laparoscopic cholecystectomy. Is that an appropriate question Dr. Schultz?

**Dr. Schultz:** It is an appropriate question. I would probably paraphrase it a little differently and say: "Do you think the operative procedure is safe at this point with current technology?" And I think the answer is "yes," but there is certainly a very definite learning curve that one has to go through. The learning curve is simply that the anatomy looks very different through the laparoscope than it does with the patient open, and the reason for that, of course, is that we're looking off of a two-dimensional screen rather than seeing three dimensions. The gallbladder is a fixed structure rather than one which is free to move through three hundred and sixty degrees. Since many of us take out gallbladders in a retrograde fashion, from the top down, one does have to learn the operation all over again. We always have a need to try to repeat our techniques as much as possible, open versus endoscopic, open versus laparoscopic. That is not always possible. We are starting to realize that we have to do this operation in somewhat different fashion from the way we perform open cholecystectomy.

**Dr. Carroll:** I agree with those points and I would add that I think the anatomy is better visualized laparoscopically, especially with the advent of the video camera attachment for the laparoscope. This allows several operators to view the operative field at the same time and come to a mutual conclusion about the anatomy. We formerly were making smaller and smaller cosmetic incisions and performing mini-laparotomies for gallbladder surgery. I think exposure and safety suffered because of this and that laparoscopy is less invasive and allows a better view of the internal anatomy.

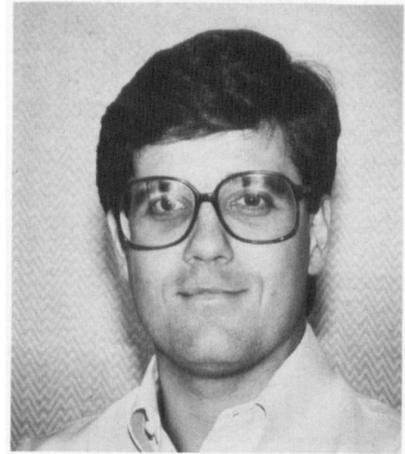
**Dr. Hinshaw:** I know that some of you advocate routine cholangiography during the performance of laparoscopic cholecystectomy. I know this is true of some of you who did not think it routinely necessary in performing open cholecystectomy. Have any of you had enough experience to feel confident that there are cases of laparoscopic cholecystectomy in which cholangiography is not necessary?

Our panel all agrees that they believe that it is wise to perform routine cholangiography during laparoscopic cholecystectomy. Nonetheless, other experts argue persuasively for selective cholangiography. At what stage of the procedure do you perform the cholangiogram Dr. Carroll, and how do you perform it?

**Dr. Carroll:** We perform the cholangiogram through a small opening in the cystic duct prior to cutting any tubular structures in the hilum. We use a cholangiogram catheter or ureteral catheter. The catheter is secured in place and a cholangiogram confirms the duct anatomy prior to transection of either the cystic duct or the cystic artery. A common problem has been confusing the cystic duct for either the common bile duct or the right hepatic bile duct.

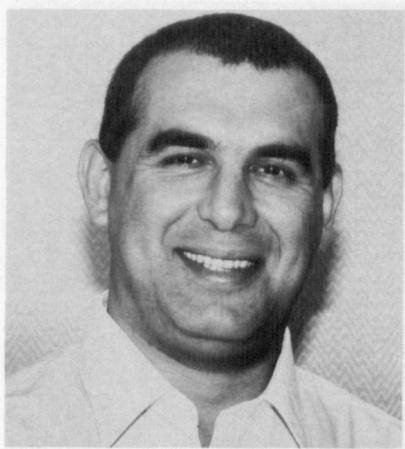
**Dr. Hinshaw:** Dr. Schultz, when do you perform cholangiography and what is your technique?

**Dr. Schultz:** Up to this time, we've performed or tried to perform cholangiography on everyone of our cases, and we start off at the very beginning of the operative procedure. We visualize the gallbladder, we grab the fundus of the gallbladder with a 5 mm grasper, and then put in a 17 gauge pericardial needle directly into the gallbladder, aspirate the bile, and then take a film after injecting contrast medium into the gallbladder. I don't know why it's necessary to take the x-ray during infusion of the dye, but it is if you expect to be able to visualize the common duct. Our data on the first hundred patients tells us that we can visualize a common bile duct with this technique 88 percent of the time. Eight percent of the time we have acute cystic duct obstruction. In the remaining percent the anatomy didn't allow the dye to pass into the common bile duct. We think this is a very efficient way of doing this and it's very easy. Moreover, my concern is that we try to simplify as much as possible. We have tried the technique that Dr. Carroll has described. We think technically it is a little more challenging than we would like to deal with.



Brendan Carroll, M.D.

## ROUNDTABLE DISCUSSION



Leon Daykhovsky, M.D.

**Dr. Hinshaw:** Some of our panel members do not advocate performing the cholangiogram through the gallbladder and I believe the reason is that they think it's easier to dissect the distended gallbladder than it is one that has been aspirated. Dr. Daykhovsky would you please comment on that?

**Dr. Daykhovsky:** Well, during development of this procedure we have tried to keep the operation as close as possible to the conventional type of surgery. We usually work on a distended gallbladder. It helps us to identify the line of dissection.

**Dr. Schultz:** I don't think I quite understand the problem that Leon is describing.

**Dr. Hinshaw:** Could you describe it for Dr. Schultz again so that we can find out if the two of you disagree on this.

**Dr. Daykhovsky:** The distended gallbladder is easy to dissect from the liver. It has a nice line of dissection.

**Dr. Schultz:** The question is, does a decompressed gallbladder hinder the dissection and I would say the answer to that actually is

"no." In my experience we have found that in order to visualize the cystic duct-common bile duct area, one must lift up the liver so that it's clearly in view. You have to be able to grab the gallbladder, not at the fundus, but rather toward the neck of the gallbladder. We have not been able to do this satisfactorily with the gallbladder fully distended. After the x-ray catheter has been put in the gallbladder bile is aspirated and the gallbladder is collapsed purposely. This allows the grasper to be placed further down on the gallbladder for additional retraction. This is in contradistinction to Dr. Daykhovsky, and I think it becomes a matter of choice rather than that this is necessarily better. Either way it works, I'm sure.

**Dr. Carroll:** We all agree that the lacerated gallbladder is harder to deal with during laparoscopic cholecystectomy because of spill of bile and stones, and that if your technique is able to prevent a tear or an inadvertent perforation, then I think it's useful. If you could perform the cholecystectomy without entering into the gallbladder, that also has advantages. I think it's a matter of operative experience and preference. The key concept is that the gallbladder is removed intact so all the stones come through the abdominal wall in the intact gallbladder.

**Dr. Hinshaw:** We all know that with either laparoscopic cholecystectomy or conventional cholecystectomy we can't always avoid going into the gallbladder. Spillage of bile and stones cannot always be prevented and complete gallbladder wall removal is not always possible. When these problems occur how do we deal with them Dr. Leahy?

**Dr. Leahy:** That situation very often arises during the learning curve for some surgeons. In my situation I have relied heavily on the use of bipolar coagulation using an alligator scissors, and very often I have had great difficulty dissecting the gallbladder and separating it from the liver. I have simply fulgerated the remnant of tissue that I had left adherent to the liver. Thankfully, that doesn't now arise, but on the learning curve when I had adopted a different method for extracting the gallbladder, it did. When the gallbladder perforates, I don't think it's any major concern. Basically, what happens is that you get a chemical irritation. I aspirate the bile as early as possible, irrigate and keep the area clean. I don't think there are any major complications as a result.

**Dr. Hinshaw:** Dr. Lanzafame, could you comment on the best ways to get a good cholangiogram?

**Dr. Lanzafame:** The first thing to remember is what position the patient is in. We most frequently have the patient in reverse Trendelenburg and rotated right side up in order to perform the dissection. The first rule of thumb is to either place the patient horizontal or in a few degrees Trendelenburg, and to rotate the patient slightly to the left, if not horizontal. The next point to address is what type of catheter to use. If using radiopaque or reusable catheters they should be oriented in such a way that they are parallel to the long axis of the common duct, and that usually requires clamping them with a towel clip or placing a suture temporarily through the abdominal wall in order to insure that you're not crossing the bile duct. If radiolucent catheters are used, it isn't a practical concern. Last but not least, if one is using one of the versions of cholangiogram laparoscopic instruments, one has to be certain that that instrument is not placed under any tension that would distort the anatomy and prevent the flow of contrast material into the duct.

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**Dr. Hinshaw:** Since this is an important step in the safe performance of the procedure, may I ask if any of you have further comments on the fastest way to obtain a good cholangiogram? Do you have any tips for our audience?

**Dr. Schultz:** I think the fastest way to get the cholangiogram is in the beginning when only the trocars are in place. You need only remember to pull the laparoscope back out of the trocar so the tip doesn't cross over the bottom of the common bile duct. There are only two trocars on the x-ray and visualization should be quite good. I find it easiest to keep the patient in neutral position.

**Dr. Hinshaw:** Any other comments?

**Dr. Glantz:** One thing to emphasize is that when doing the cholangiogram one must be careful that the hepatic ducts are in fact what you are visualizing. In doing open procedures, we are more interested in the common bile duct and the flow of dye into the common bile duct. In laparoscopic cholecystectomy we are much more interested in the right hepatic and common hepatic ducts which are more easily injured during this procedure and not so interested in the common bile duct, so it is important to make sure that the dye actually flows up into the hepatic ducts.

**Dr. Hinshaw:** You are all helping your colleagues in learning how to perform laparoscopic cholecystectomy. What advice do you give them, Dr. Daykhovsky, about selecting their patients while they are first learning the procedure?

**Dr. Daykhovsky:** Patient selection is a crucial point for the surgeon who performs the laparoscopic technique. We believe that the first twenty-five or thirty cases should be appropriately selected. Common duct stones, acute cholecystitis, and sclerosis are contraindications.

**Dr. Hinshaw:** Are you listing absolute contraindications even for the most skilled surgeon?

**Dr. Daykhovsky:** No this is for the first twenty-five. Limit yourself to the relatively healthy patient until you become skilled with the instruments.

**Dr. Hinshaw:** The original question was what criteria do you recommend to your colleagues who are just learning to do the procedure on selecting suitable patients? To clarify this, let us try to see if there are not contraindications to the procedure being performed by the most skillful person. Let me list some of the absolute contraindications that have been listed in the past to see how you feel about them. A patient with ascites. Does anyone not consider that an absolute contraindication?

**Dr. Schultz:** I believe that you can carry out laparoscopic cholecystectomy in a patient who has ascites and who has cirrhosis. The problem, of course, is what do you do with these people when they have prior histories of acute cholecystitis or pancreatitis associated with a gallstone passing down the common bile duct? These people are at major risk of going into hepatic failure. What are you going to do with them? I think you can successfully and safely take out the gallbladder laparoscopically. We have tried this in two patients. We have found, in fact, that there are some limitations. For example, the mobility of the liver is impaired by the hard sclerosis. However, you can certainly elevate it sufficiently to get down to the cystic duct-common bile duct junction for the cholecystectomy.

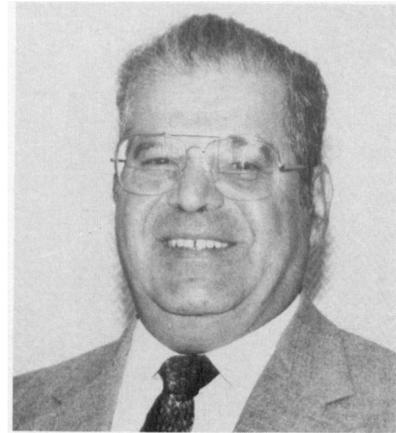
**Dr. Carroll:** In general I agree with Dr. Schultz, except that if the ascites is reflective of a significant portal hypertension then it might be prudent to avoid the laparoscopic approach because of the possibility of hemorrhage.

**Dr. Schultz:** I don't think that we would be doing this in the presence of an obvious caput medusae.

**Dr. Hinshaw:** Another condition that some have said is an absolute contraindication is acute peritonitis.

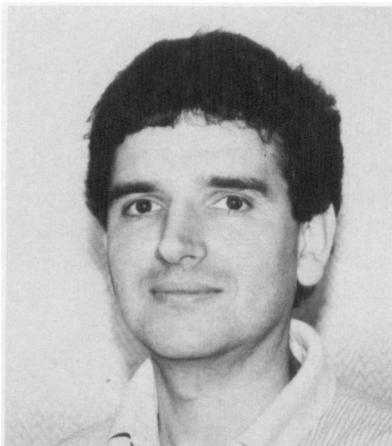
**Dr. Leahy:** I feel strongly that this is not a definite contraindication. I think the skilled endoscopic surgeon can deal very easily with the situation. However, for the physician who is less skilled I would recommend avoid the operation.

**Dr. Hinshaw:** We are going to talk about the most skilled, most experienced people. Do they have absolute contraindications or not? You say that acute peritonitis is not an absolute contraindication. Does anyone disagree?



Gerald Glantz, M.D.

## ROUNDTABLE DISCUSSION



Raymond J. Lanzafame, M.D.

**Dr. Glantz:** I take the opposite stance. I think it is a contraindication. It may be an indication for a diagnostic laparoscopy. I feel acute cholecystitis and perforated diverticulitis are relative contraindications to laparoscopic cholecystectomy.

**Dr. Hinshaw:** Chronic respiratory problems with chronic hypercarbia.

**Dr. Lanzafame:** In the patient with symptomatic gallbladder disease and respiratory insufficiency, the skillful endoscopist can perform that procedure safely and postoperative morbidity would probably be less than with a right subcostal incision. The important factor is determining whether or not the patient is a surgical candidate at all. I think the ultimate contraindication for any procedure, laparoscopic or otherwise, is that the patient cannot tolerate anesthesia. Other alternatives should be considered.

**Dr. Glantz:** We should not forget the possibility of doing cholecystostomy in a respiratory crippled patient under local anesthesia and avoiding general anesthetic altogether. We should not

forget this as an alternative.

**Dr. Carroll:** I agree with both statements. The experienced laparoscopist, if he's able to perform the procedure quickly, and if the anesthesiologist is able to maintain the patient's CO<sub>2</sub> at a safe limit below fifty for the duration of the procedure, then laparoscopy is warranted. However, if the laparoscopic approach is initiated and the carbon dioxide becomes a problem, then the pneumoperitoneum should be released. The patient should be hyperventilated and a standard approach for cholecystostomy or cholecystectomy should be initiated.

**Dr. Hinshaw:** Why is it that laparoscopic cholecystectomy is not being considered by you experts?

**Dr. Glantz:** I think it still suffers from the problem that in order to maintain peritoneal insufflation a general anesthetic is required. The value of doing the cholecystostomy is probably obviated by adding to it the general anesthetic.

**Dr. Hinshaw:** Another contraindication suggested by some is morbid obesity. Who would like to comment on that as an absolute contraindication?

**Dr. Leahy:** Again we are talking about this in the context of the skilled endoscopist. This cannot be cited as a distinct contraindication. In fact, operating on people with excessive tissue within the abdomen does not pose a major problem. It may be necessary to insert an additional trocar to increase or to enhance your field of vision, which will allow you to perform the procedure quite simply.

**Dr. Glantz:** I would like to add, that in my experience, where the obesity is so marked that the instrumentation is in fact too short to really accomplish the procedure, obesity becomes a relative contraindication. You may not be able to determine that until you actually have the patient on the operating table and then realize that your trocars are too short or that the instruments are not long enough to do the procedure safely.

**Dr. Carroll:** I agree that it does require special instrumentation for tremendously obese patients, but they do derive a significant benefit from the laparoscopic approach in the postoperative period. We have performed a number of procedures on patients weighing over four hundred pounds. It requires an especially long Veress needle, especially long trocars, and frequently, it requires some manual manipulation of the panus to allow the laparoscope and the instruments to reach the gallbladder during the procedure. It is a tough operation, but the patients really benefit from this approach because of their respiratory and mobility dysfunction.

**Dr. Hinshaw:** Except in the possible instance of the insulin-dependent diabetic, I think we all agree that the truly silent gallstone is a contraindication to cholecystectomy by any means. Are there any others?

**Dr. Carroll:** I would not perform a laparoscopic cholecystectomy at this time on a patient who is pregnant. I do not think there are enough data to know the effect on the fetus. I would personally not perform this procedure on a pregnant patient.

**Dr. Hinshaw:** I think that is a most valuable addition to our absolute contraindications at this time. Are there others that we forgotten?

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**Dr. Glantz:** I think perhaps not for the truly experienced laparoscopist who has had a great deal of experience. We are talking about more than twenty-five to fifty cases. The patient who has had repeated upper abdominal surgery and has extensive adhesions presents a difficult case, which the early laparoscopist should avoid. Perhaps later one can extend the indications and start doing these procedures, but certainly not initially.

**Dr. Schultz:** I would like to add an absolute contraindication at this particular time in the history of this technique. The patient who presents with clinical acute cholecystitis in the presence of a tender right upper quadrant mass is not an appropriate candidate for laparoscopic cholecystectomy.

**Dr. Hinshaw:** Have any of you performed a laparoscopic cholecystectomy under the circumstances Dr. Schultz has just described.

**Dr. Carroll:** Yes, and we have found frequently that the mass amounts to nothing more than phlegmonous omentum which is actually relatively easy to bluntly dissect off the surface of the gallbladder, after which the procedure becomes essentially routine. So I have not used that as a contraindication although I do agree with Dr. Schultz that this is not for the novice.

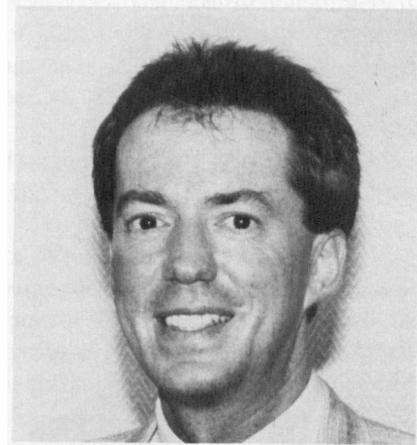
**Dr. Hinshaw:** Dr. Glantz if you were chairman of the department of surgery responsible for credentialing of the surgeons who perform laparoscopic cholecystectomy what requirements would you ask them to meet?

**Dr. Glantz:** Well, I think the first requirement is that the surgeon be credentialed to perform open cholecystectomy. They should attend a course in which there is a significant amount of hands-on training so that they become reasonably familiar with laparoscopic technique and with the laparoscopic cholecystectomy techniques. They should do their early procedures under a proctorship or under a monitoring system. In our institution we have used arbitrarily the number of five procedures which have to be monitored before someone can have independent privileges of their own. I think that can vary depending upon the institution. Other than that, I think each institution may have other criteria they may want to set up. I don't think any standardization has been set up yet other than these three criteria.

**Dr. Hinshaw:** Any other comments on this? Would all of you then agree with what Dr. Glantz has just said.

**Dr. Schultz:** I do not disagree with anything that Dr. Glantz has said, but I would like to add something. I do not believe that any general surgical registrant at any of these courses, no matter how good the instruction, no matter how good the hands on, can feel confident and capable of going back home to his hospital and starting to do this procedure on his own. In fact, I'm sure all of us would agree that the learning curve consists of a number of patients that one must do before we feel confident as laparoscopists. There are so many instruments and nuances of each one of those that have to be learned. It is very, very difficult to learn all of this over a weekend course. So how do we manage it? We feel very strongly at our hospital that it is important to work jointly with a gynecologist who we consider right now to be the most available instructor for general surgeons as they get into this type of surgery. It may be that, in your particular hospital, there is a very experienced laparoscopist who is a general surgeon. No problem. But for most general surgeons in this country, who have had no formal training in laparoscopy during residency, and who have not done anything more complicated perhaps in practice than a tubal ligation, I do not see how they can go right into gallbladder surgery without any additional instruction or monitoring by an experienced laparoscopist.

**Dr. Lanzafame:** It is helpful to remember that in institutions where laparoscopy may not be performed, that the surgeon who is contemplating doing this be mindful of the fact that a team approach is necessary. I think that is the key from the beginning; that the operating room staff understand the equipment. That you designate someone as a camera person, someone who will handle the instrumentation, and that, if possible, you train with a colleague with whom you can work well whether or not the individual is a laparoscopist. It is very helpful to have two people working together in the beginning, and from that point you can develop the program further. While I am not entirely certain that a preceptorship, whereby I mean going to observe for payment or gratis an experienced surgeon, is absolutely mandatory, I think that it would be wise for a surgeon



Patrick Leahy, M.D., B.Ch., B.A.O.

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Leonard Schultz, M.D.

to observe real-time surgery in the operating theater, being mindful of what's going on in the abdomen and outside the abdomen as well as what's happening on the video screen. This is something that simply is not available at most courses.

**Dr. Leahy:** I agree with all of the previous speakers, but I would like to make the point that general surgeons should assume the onus of responsibility, and I do not believe that general surgeons should be setting out to learn laparoscopy and laparoscopic cholecystectomy together. I think they should look at this critically. There is a learning curve in both, and they can learn a great deal from working with gynecological friends or an experienced general surgeon in this field and then progress to learning the technique of laparoscopic cholecystectomy. I also feel that the general surgeon should shoulder the responsibility and attend courses. He should evaluate himself critically with regard to his own degree of technical expertise in the course and take responsibility for his actions. I agree with the previous speakers that you don't simply attend a course and feel that

you are then trained and confident to perform the procedure.

**Dr. Hinshaw:** Let's say that a surgeon on your staff has proved that he performs laparoscopy and laparoscopic cholecystectomy safely. Would you require further training before allowing that surgeon to perform such procedures as laparoscopic appendectomy or laparoscopic vagotomy?

**Dr. Glantz:** Those procedures are still somewhat experimental. Perhaps not appendectomy, but certainly vagotomy. The criteria should be that one is an experienced laparoscopist first, then what procedures you do are going to depend upon the availability of such courses and the availability of literature that one can read to obtain sufficient knowledge before proceeding. For instance, I'm not sure that an experienced laparoscopic cholecystectomist, someone who has really done this procedure a number of times, necessarily needs another training course in order to do a laparoscopic appendectomy which, if anything, may be easier to do than the cholecystectomy. On the other hand, to go ahead and do a selective vagotomy through a laparoscope may require either additional training or additional course material when this type of material becomes available. To my knowledge, at the present time it is not available.

**Dr. Daykhovskiy:** I strongly believe even with extensive laparoscopic experience such new procedures as appendectomy, vagotomy with pyloroplasty, and lymph node dissection would require a physician to go back to the animal laboratory and develop or polish his technique.

**Dr. Hinshaw:** The problem that we will face is that the vast majority of surgeons in this country do not have the availability of a laboratory for animal work in order to develop these techniques. It is just not practical to expect them to do this. Unless we can somehow provide them some kind of a laboratory setting in an instructional course, it is not going to be practical to expect these people to do that. We have to develop courses in order to offer the opportunity for these surgeons to learn these techniques.

**Dr. Daykhovskiy:** Looking back on the history of developing laparoscopic cholecystectomy, I believe it developed in this country from the private attendings who really were the leaders in this field. They found the time and place to develop this new, unique procedure. I believe when they look to develop new surgical applications, they probably can find a place for their surgical research.

**Dr. Schultz:** I think this leads toward a next phase of education. It is out of the phase of workshops as we now know them. We really serve as a means of introducing the technology. The surgeon can lead to the phase of serious teaching, and by this I mean in the residency format. Remembering that our departments of surgery at present have no such training facilities for general surgeons, the next logical step after workshops is what I sometimes have referred to as a miniresidency. I think there are going to be a number of these new residencies developing, plus or minus the universities. But they will be of limited time span so that practicing surgeons can take time away, perhaps two or three weeks, and have a very good experience at a busy program in laparoscopy both in and out of the laboratory.

**Dr. Hinshaw:** I think that's a very good point, Dr. Schultz.

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**Dr. Carroll:** I agree with Dr. Schultz that the surgeon who performs an occasional laparoscopic surgery is never going to develop the clinical experience without some kind of intensive training. In the course of performing one or two laparoscopic procedures a year, he'll never gain the technical abilities that would be available to him if he were to devote intensively a significant period of time to a preceptorship or miniresidency.

**Dr. Hinshaw:** I think our present dilemma has to do with our general surgery residency programs not taking the leadership in this field. As they do, discussions such as we are having now need not exist ten years down the road.

**Dr. Glantz:** I can speak to that at least in my own residency program. We are actively engaged in teaching our residents these procedures, both in the laboratory and in the operating room. Our hopes are that we will have a generation of residents finishing in a few years who will be experienced laparoscopists. They will be able to continue this kind of work without the need for postgraduate courses. This should be part of their training program. We're trying to make it part of our training program, and I hope that other universities will follow suit.

**Dr. Hinshaw:** In my opinion, the chief executive of the hospital has a responsibility to ensure that surgeons have the equipment they require to perform laparoscopy and laparoscopic cholecystectomy safely. Do you agree?

**Dr. Leahy:** Yes, Dr. Hinshaw I condone and support your opinion. I, too, feel very strongly on this situation. I think the CEO has an obligation to provide safe equipment. Laparoscopic surgery requires a major investment in equipment to facilitate a safe procedure such as laparoscopic cholecystectomy. I think the CEO should provide the money and make funding available for this. In addition, I think the CEO in major institutions should be prepared to invest in research facilities so that the general surgeons on staff and research associates can work to develop further improvements in technique. We are in an unfortunate situation at the moment whereby certain individuals who have gained the expertise in this field feel that they have almost a divine right to hoard these techniques, and we are witnessing an explosion of illicit advertisements in the country attempting to woo patients. This is something that we should try to avoid. If we can encourage CEOs to invest time, money, and funding in the technology that we need to perform this, it will be seen as a show of support.

**Dr. Glantz:** There is one additional comment I would make, and that is to admonish our surgical colleagues, ourselves included, to make sure that the department of surgery is represented by the majority of the surgeons who come up with a single selection of equipment rather than see the infighting and bickering within the surgical staff as to what type of equipment we should be getting. It behooves us to be more interested in the type of equipment we are getting than most of us have been in the past. We have to be more solid in our unanimity as to what we need so that, in fact, the CEO can respond.

**Dr. Hinshaw:** Dr. Lanzafame will you comment on this? In the course of laparoscopic cholecystectomy you sometimes use a dilute heparin irrigating solution. This is a question I have asked you before: Do you think this is really useful?

**Dr. Lanzafame:** I think the use of an irrigating solution is useful. The reason I use that solution is that it is the way I was taught. It has been said that it helps reduce the clotting of blood in the abdomen and makes it easier to aspirate through the narrow cannulae. There are alternative methods, however. I think the best way to avoid that with experience is to aspirate even small quantities of blood as it is accumulated.

**Dr. Carroll:** I would disagree with the use of heparin in the irrigants. This procedure depends on surface coagulation and hemostasis on the surface of the liver bed and having heparin in the abdomen seems a dangerous situation. Clots can be extracted manually, and with large suction irrigation devices, quite adequately in the hands of the experienced laparoscopic surgeon. I see no indication or data to support the use of heparin or other additives to the irrigant.

**Dr. Glantz:** We're getting into another controversial issue which is beyond even the scope of this august body and that is whether or not miniheparinization is in effect a contraindication during surgical procedures. Whether it is valuable or not. Certainly we have used this in the past for prevention of deep thrombophlebitis in patients, and most surgeons have seen legions of complications because of this practice. I would think that the majority of surgeons around the country have stopped using miniheparinization. How you give the heparin

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does not matter. If you put heparin in the peritoneum, it has got to be absorbed and you are going to have a patient who is anticoagulated. You have to decide whether or not you think that that, in fact, is a benefit or whether it creates another problem.

**Dr. Hinshaw:** Dr. Glantz, I have observed how little of this solution Dr. Lanzafame uses, and I doubt that his patient is heparinized in any fashion. I am only asking a question: Is this a necessary gimmick?

**Dr. Glantz:** Either you use it or you don't. I fail to see why a couple of units of heparin in the abdominal cavity is going to be of any significance.

**Dr. Carroll:** This is a very good point. We have taken to placing venous compression devices on our patients lower extremities during laparoscopic cholecystectomy, because so many of our patients are obese and a large portion of the operation is performed with the head in a reverse Trendelenburg position with the feet dependent. This raises the venous pressure and reduces venous return. All patients are placed on the lower extremity compression device to prevent thrombosis. I am personally aware of two cases of life-threatening pulmonary embolism following prolonged laparoscopic cholecystectomy in the range of three hours.

**Dr. Leahy:** I tend to agree with Dr. Carroll. I think there is a need for sequential pneumatic compression on the lower limbs, especially during the learning curve of these procedures and especially when the patients are in the reverse Trendelenburg position.

**Dr. Hinshaw:** Does it matter whether the gallbladder is removed in the retrograde fashion or in the antegrade fashion?

**Dr. Leahy:** That is a very good question Mr. Chairman. I initiated my surgery upon the gallbladder operation from fundus toward the cystic artery. Now I've changed my technique to dissect the hilum and identify the cystic duct and cystic artery first. It depends on the expertise of the surgeon, as well as on the technique that the surgeon uses. In my own situation, I have found in the small contracted gallbladder it is very convenient to dissect the gallbladder from the fundus down. When I used this technique initially, I used an ambidextrous technique. I used both hands, and I had an assistant retracting the liver. This is not suitable in all cases. From my point of view it allows the surgeon to identify the cystic artery and I tend to identify the cystic artery as close to the gallbladder as possible rather than dissect it out.

**Dr. Hinshaw:** When do you recommend draining the abdominal cavity following laparoscopic cholecystectomy?

**Dr. Daykhovsky:** I believe that the decision depends on each surgeon who performs this procedure. If the surgeon believes that the placement of the drainage is necessary, it will be the safest thing to do. I question whether it is necessary at all to place drainage.

**Dr. Schultz:** I think a drain should be placed if you believe that there is infection or if you have bleeding. Let's take case number one, infection. The problem with this operation is that it is done so quickly that you really have no chance to find out whether there is infection, because by the time even a gram stain comes back the operation often times is completed. So you only learn after the fact, especially after the culture comes back. You have bacterial infection in only about ten percent of these cases. You can guess at infection, but you cannot be sure. The second part is you drain for blood. I would not drain for blood. In fact, we had seventeen percent of our cases drained and I really don't think that we accomplished a thing by putting those drains in at this point. For the ten percent chance of infection we irrigate. We irrigate until the fluid is clear with no evidence of bile leakage or bleeding.

**Dr. Glantz:** We know that if symptoms have persisted for more than two or three days, there is almost a hundred percent chance that the bile is infected and those patients ought to be drained. Only ten percent will likely need drains.

**Dr. Schultz:** Dr. Glantz, does that mean that if you have an acute appendicitis and a fair amount of pus around the appendix that you would drain all those cases or would you only drain for appendiceal abscess.

**Dr. Glantz:** I drain primarily in the face of appendiceal abscess, but I have no qualms if a surgeon drains for acute appendicitis of any type. The gallbladder becomes a little bit different. The abscess there is a little more difficult to treat in the postoperative phase. Another type of complication is a wound infection which is the major problem seen with an appendicitis patient.

**Dr. Lanzafame:** Perhaps the real issue is whether or not you drain routinely or selectively. In my own practice, I very rarely drain the gallbladder. If I have explored the common duct, I do drain. I believe that

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doing the procedure endoscopically affords me a greater possibility of good hemostasis. I use prophylactic antibiotics in all of the cases. I don't feel that the drains put through trocars are very effective. I don't see the point in draining a routine cholecystectomy patient.

**Dr. Glantz:** You bring up an interesting point, because certainly when we were all doing open cholecystectomies we differed in our opinions as to whether or not drains were necessary or not. I am of the school that drained all gallbladders simply because I could see no reason not to drain all gallbladders. I have to admit that during laparoscopy I rarely drain. And I think the difference is that we have better hemostasis, a better look at the liver bed than we've had in an open procedure. I think that the occasional patient still has to be drained, and I agree with Dr. Schultz that an indication for drainage is going to be infection. If I think the patient has a reasonable chance of having had a significant bacterial infection of the gallbladder at the time that I did the operation that patient I would drain.

**Dr. Schultz:** As an interesting aside, we tried to correlate the use of drains and the incidence of shoulder strap pain with the assumption being that if we had a drain in there on active suction, that we would suck out any residual carbon dioxide gas. The usual assumption here is that carbon dioxide decomposes to carbonic acid, and accumulates underneath the highest part of the diaphragm which is the highest part of the abdomen. We have found absolutely no relationship between the presence of an active drain and the presence or absence of shoulder strap pain.

**Dr. Hinshaw:** Are there any indications for laparoscopic common duct exploration?

**Dr. Daykhovsky:** Endoscopic or laparoscopic common duct exploration is a really new issue and a dilemma for the majority of surgeons who start to perform laparoscopic removal of the gallbladder. It requires special training, special instrumentation, knowledge, and expertise of the surgeon to work with wires, balloons, and fiberoptic endoscopic catheters. We have performed this procedure successfully in a number of patients. It has been done with both fluoroscopic and endoscopic control, and we believe this is a new field which requires extensive research, development, and training.

**Dr. Schultz:** I think, from the point of view of the guy in the trenches who is doing this type of surgery in a smaller environment, away from the expertise that Dr. Daykhovsky is describing, I would say that we have to rely upon our GI colleagues. For example, you're in the operating room; a cholangiogram is done and a common bile duct stone is found. What do you do? Well, what we do at present—and I recommend this—is to complete the operative procedure and the very next day the gastroenterologist proceeds with ERCP and stone extraction. Some people would say just let it go. I don't feel very comfortable about letting larger stones rattle around the common bile duct. We've done this particular technique in three patients to date and have had very, very happy results. Although one patient did have some mild pain which kept her in the hospital for one more day.

**Dr. Hinshaw:** Under what circumstances, if any, would you not dissect the cystic duct to its junction with the common duct?

**Dr. Daykhovsky:** It depends on the anatomy and the situation during surgery. We identify the cystic duct, perform cholangiography, and verify the anatomy before transection of the cystic duct. We transect where we inserted the cholangiographic catheter as soon as we believe the catheter has been placed appropriately.

**Dr. Carroll:** I don't think it essential to remove all of the cystic duct stump to prevent postoperative pain syndromes and cystic duct calculi.

**Dr. Hinshaw:** What Dr. Carroll is saying is something all of us here believe. There is no such thing as the cystic duct syndrome.

**Dr. Carroll:** I've not had a problem leaving the cystic duct stump in either open or laparoscopic cholecystectomy. I think an important issue is that you should clearly have identified in your mind's eye where the junction of the cystic duct with the common bile duct is, so that you have not accidentally tented up the common bile duct.

**Dr. Schultz:** It is interesting that we take the opportunity of describing a new technique and then progress from that technique to throwing out all of the bath water. Unfortunately, I'm one of those guys who has happened to have seen a cystic duct remnant with a gallstone just sitting in it. As far as I'm concerned, the concept of a cystic duct remnant capable of producing initial gallstones unfortunately still holds true. The only time that I would say that the cystic duct need not be dissected down to its apparent juncture with the common

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bile duct is when you consider it to be the better part of valor not to pursue the dissection, but I would not at this point recommend to those who are getting into this technique not to value a reasonable dissection of the cystic duct.

**Dr. Carroll:** In the majority of patients, the cystic duct does not enter the common duct from the lateral side, but it curves around toward the medial side and enters on the medial side of the common duct in at least fifty percent of the cases. I honestly don't think that we'll be dissecting the cystic duct around from behind the common bile duct either open or closed. And when we think we're hitting the actual cystic duct/common duct juncture, we're really several centimeters away from the insertion site. I don't believe in the cystic duct syndrome. Retained stones are just that; retained stones.

**Dr. Hinshaw:** You've expressed my opinion that a stone in the cystic duct was there all along. It didn't form there; but I can't prove that. Dr. Gerald Kirshenbaum of Denver has, in my opinion, written more extensively and cogently than most others on the subject of the economics of laparoscopic cholecystectomy.

Let's take up some of the more controversial questions. Should the surgical fee be more, less, or the same for laparoscopic cholecystectomy versus conventional cholecystectomy.

**Dr. Leahy:** I feel strongly on this situation. I do not think we can accept the fact that laparoscopy is merely a tool to help us to take the gallbladder out. What, in fact, we are doing is two procedures, and I feel that the surgeon should be paid for the cholecystectomy in addition to a percentage of the laparoscopic procedure. I think we should also recognize the fact that in order to become trained in this speciality, the general surgeon who is already a highly trained surgeon must at considerable expense to himself gain more expertise in this field. This brings up another picture, I think, in the field of endoscopic surgery. The surgeon must have a comprehensive understanding of endoscopic surgery per se and we are now polarizing many of our surgeons into this subspecialty field. We must also remember that not all surgeons are capable of being trained in endoscopic surgery. Some general surgeons will specialize in endoscopy.

**Dr. Glantz:** I disagree with that vehemently. A cholecystectomy is a cholecystectomy is a cholecystectomy, and I really feel that the fee for a cholecystectomy should be the same regardless of the methodology for removing the gallbladder. I see no reason why we should charge for the laparoscopy since I really feel that it is only a tool for doing a cholecystectomy. On the other hand, we should not accept less.

**Dr. Schultz:** I have to agree with Dr. Leahy. I do not believe that laparoscopic cholecystectomy is equivalent in any way to what is customarily considered conventional open cholecystectomy. It is a much more complicated, much more technically demanding method of extraction of the gallbladder than is the open technique. There is absolutely no similarity in this operation to conventional cholecystectomy. For example, there are no sponges for retraction, there are no retractors in the abdomen. The instrumentation that we use, such as laser technology, or the use of CO<sub>2</sub> gas, none of these methods, none of the expertise necessary to look at a TV screen, or the appreciation for the optics of the operation is similar to open cholecystectomy. None of these have any correlation to open cholecystectomy. All of them require additional training. All of them are of a much more subtle technique than we usually see with conventional cholecystectomy. I agree, therefore, with Dr. Leahy that, in fact, there should be reimbursement for the additional technology.

**Dr. Hinshaw:** Dr. Schultz, Dr. Kirshenbaum has explained how the type of insurance plan can prove rewarding to the hospital for replacing conventional cholecystectomy with laparoscopic cholecystectomy, or it can be financially damaging for the hospital. Would you discuss that for us?

**Dr. Schultz:** I think we've had many discussions with our hospital administrators, and I think because of their forward thinking and vision, they understand that anything that is right for the patient is what they want to do. And what they found because of this positive attitude, which is enlightened, is that, yes, the cost of gallbladder surgery in their hospital has gone down approximately twenty-five to thirty-five percent in actual numbers. The number of gallbladders done in their hospital because of the new technology had quadrupled in the last year. Overall, the hospital has done better by providing this newer method.

**Dr. Hinshaw:** The next question follows on that one. All of us recognize there are societal advantages in laparoscopic cholecystectomy to the patient, to the patient's family, to the patient's employer. In light of these advantages should it be permitted for a third-party payer to penalize a hospital for providing the service?

**Dr. Glantz:** Absolutely not. I think it is unconscionable that insurance companies would even consider this. They are the beneficiaries in the long term with the great reduction in terms of disability insurance, in

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terms of the length of time that the patient will be out of work and unable to function, and as such they should be more than satisfied with that and not penalize the hospital for providing a better method of care.

**Dr. Schultz:** Dr. Glantz has hit on a number of important items, but I think I probably put them in somewhat different categories. From the point of view of the medical health insurance industry, their problem with this operation is, of course, they have had insufficient data in contrast to what has been available through the years to evaluate new technology. Therefore, they do not know at this point how the cost structure of laparoscopic cholecystectomy can be reflected in their premiums. Until they have that knowledge, they are having a great deal of difficulty in saying whether or not they accept it. They have to decide how it will affect their premiums. On the other side of the coin, companies themselves, many of whom are now self-insured, are saying to those insurance companies: We want you to find out, we want an answer now because if we use this type of technology, patients go back to work in four or five days, on average, instead of in five or six weeks. It means fewer disability payments for us. The disability insurance industry is very different from the health care insurance industry. How all this affects their bottom line as an industry has to be evaluated by them before they take these techniques off the experimental list and finally make a decision about them. The term to me, "experimental," really means, fellows, I just don't know what to do with this right now. That's their dilemma and we can of course help them by passing out the information we gather as quickly as possible.

**Dr. Hinshaw:** I appreciate the thoughtful comments the panel members have made tonight.