the laparoscopic approach in hematologic diseases. Surg Endosc 1998; 12:101–106.
43. Verheyden CN, Beart RW, Clifton MD, Phyliky RL. Accessory splenectomy in the management of recurrent idiopathic thrombocytopenic purpura. Mayo Clin Proc 1978; 53:442–446.
44. Pearson HA, Johnston D, Smith KA, Touloukian RJ. The born-again spleen: return of splenic function after splenectomy for trauma. N Engl J Med 1978; 298:1389–1392.
45. Juliá A, Araguás C, Rosselló J, et al. Lack of useful clinical predictors of response to splenectomy in patients with chronic idiopathic thrombocytopenic purpura. Br J Haematol 1990; 76:250–255.
46. Schwartz SI. Role of splenectomy in hematologic disorders. World J Surg 1996; 20:1156–1159.
47. Eubanks S, Newman L, Lucas GT. Reduction of HIV transmission during laparoscopic procedures. Surg Laparosc Endosc 1993; 3:2–5.
48. Grossbard ML. Is laparoscopic splenectomy appropriate for the management of hematologic and oncologic diseases? Surg Endosc 1996; 10:387–388.
49. Klingler PJ, Smith SL, Abendstein BJ, Hinder RA. Hand-assisted laparoscopic splenectomy for isolated splenic metastasis from an ovarian carcinoma: a case report with review of the literature. Surg Laparosc Endosc 1998; 8:49–54.

Discussion

DR. WILLIAM C. MEYERS (Worcester, Massachusetts): Congratulations, Dr. Katkhouda, for this classic series. Like you did with several gastroesophageal procedures, you have documented laparoscopic splenectomy to be a safe and effective procedure. I am sure you remember back to the beginnings of laparoscopic surgery for the general surgeon the remarkably safe and efficient way that laparoscopic cholecystectomy came into being. In a lot of ways, however, the general surgeon began laparoscopic surgery with one of the tougher operations, one with a distinct Achilles heel, i.e., bile duct injury. Nevertheless, partially because of the importance of cholecystectomy to general surgeons and the general surgery market in general, laparoscopic cholecystectomy penetrated surgical practice heavily, performed in over 70% of cases in the U.S. by 1994. Splenectomy in a lot of ways is easier than laparoscopic cholecystectomy. For example, it is not obvious that it has a real Achilles heel like lap chole. Let me ask you several questions. First, is there an Achilles heel for laparoscopic splenectomy? Is the Achilles heel bleeding? Conversion rates? Pancreatitis? Or the nurses who roll their eyes because you are taking too long? What is the downfall for surgeons beginning this procedure? And where are the lawsuits going to come from? Second, what about the learning curve? How do you measure the learning curve with respect to laparoscopic splenectomy? Is it length of time? Conversion rate? Do you have any data on this? Third, laparoscopic cholecystectomy has penetrated the surgical market now about 90%. What would you predict the penetration rate to be for laparoscopic splenectomy? And lastly, a question that relates to laparoscopic procedures in general. When we presented in the early 1990s an early series of laparoscopic Nissen fundoplication, several authorities challenged us about whether we were really doing the same operation laparoscopically as we did open. The same challenge needs to be asked about splenectomy with respect to accessory spleens. What is the expected rate of finding accessory spleens in this series compared to conventional techniques? And I suspect that you actually are better at it. What are the data with respect to this? Dr. Katkhouda, I continue to be impressed by your contributions to laparoscopic surgery! You and your delightful method of teaching have been a great inspiration to many young surgeons! Congratulations on this paper!

DR. NAMIR KATKHOUDA (Los Angeles, California): Dr. Meyers, your first question was regarding the Achilles heel of this operation. In our paper, we had two patients with pancreatitis. We also converted our patients for bleeding. Pancreatitis is definitely a problem when performing this operation, especially when the hilum is approached anteriorly. There might be a slightly higher risk of trauma to the pancreas in this case as others have performed this operation using a posterior approach to the hilum mimicking the open approach and they have reported a lower rate of pancreatitis. Nevertheless, the real problem is not trauma to the pancreatitis because the incidence is very low, but intraoperative bleeding. Intraoperative bleeding in laparoscopic splenectomy is almost always related to poor technique during control of the splenic hilum. We looked at the type of vasculature of splenic vasculature and we found in 75% of our cases, patients had a distributed type where multiple vessels branch off from the main trunk, about 2 centimeters from the hilum as compared to about 25% of our cases that presented with a nondistributed mode also called magistral type of distribution where the splenic vein and artery are in a compact bundle and approach the hilum undivided. We have reserved the use of the GIA for the second type of vasculature and the use of individual clips for the distributed mode. Tailoring the technique to the type of anatomic distribution of vessels was a safe and effective way of reducing the type of injuries to the vessels. One word of caution: capsular tears of the spleen are a real a problem when using laparoscopic techniques because of the lack of a helping hand to move the spleen around. One should be very cautious not to grab the spleen by the capsule but only to grab the connective tissues to avoid any capsular tears leading to bleeding and eventual postoperative splenosis and recurrence of the disease. You asked a question about the learning curve. This is a real issue, as the operation is an advanced and more difficult laparoscopic procedure. Nevertheless, with a very standardized approach and a rigorous protocol, we have been able to teach this operation effectively. About 90% of our cases were performed by residents and fellows with supervision by senior attendings. Our data shows the operating time was reduced by half after about 30 cases. You asked about the penetration rate for laparoscopic splenectomy. This is an important question and it is best answered by addressing the prevalence of the disease. ITP is a common benign disease affecting predominantly women between the ages of 15 and 45. The incidence is about 16 new cases per 100,000 patients a year and approximately 15,000 to 20,000 patients are diagnosed with ITP every year in the United States. This is not a small number. If we include other hematological indications such as refractory TTP, hereditary spherocytosis and hemolytic anemias, the potential number of laparoscopic splenectomies could be greater. We are also seeing more patients with secondary ITP related to HIV coming to our institution. As those patients live longer, they will probably present with secondary ITP before developing full-blown AIDS and they might be well indicated for the laparoscopic approach as it provides an extra protection from irrigant and fluids to the surgeon. You asked about the possibilities of the laparoscope approach to look for accessory spleens, and the impact on results. The hematologic significance of accessory spleens is unclear. It is not clear how much they contribute to the failure. It is believed that about ten percent of relapses of ITP after splenectomy are due to missed accessory spleens. In all cases they have to be looked for

carefully, even in the pelvis, and they have to be excised. It might be important to review the patients with recurrent ITP after splenectomy and scan them for possible accessory spleens. Some studies have reported a lower number of accessory spleens found during laparoscopy. Our rate of accessory spleens after laparoscopic splenectomy was equal to the open results and we believe that the magnified view of the laparoscope is helpful.

PROFESSOR ALAN G. JOHNSON (Sheffield, England): This is a most impressive series. But I still have a problem with your final conclusion, as you might expect. If two operations are effective and safe, then I think we must look at cost effectiveness as one of the main outcomes in any health care, especially as early discharges now become the norm after any surgery, and postoperative pain relief is becoming so much more effective. The significance of the costs will depend on the actual health care systems. In Britain, it is operating room time that is the limiting factor to our practice. Three hours in the OR will be a major disincentive to the laparoscopic approach, because the open operation would probably take less than an hour. Costs must be discussed into any of these studies we are now doing.

DR. NAMIR KATKHOUDA (Los Angeles, California): Thank you for your question about cost. Obviously, cost is significantly reduced by a shortened hospital stay after laparoscopic splenectomy. I agree that there is an increased expense involved with the use of laparoscopic equipment and there is cost involved in the increased length of the procedure. But the ultimate cost to the payor and to the patient is probably reduced as the patients stay less than after open surgery and ultimately return to full activity sooner. Patients improved postoperative comfort and cosmesis should be considered. You asked a question about the length of the procedure. In our institution, the procedures are performed by residents and fellows in training. This technique has a steep learning curve. When the procedure was performed by an attending, the operating room time was reduced by half. Currently, those procedures are performed in our institution in less than 2 hours.