

Professor Daniel Cherqui: my experiences with laparoscopic liver resection

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Prof. Daniel Cherqui (*Figure 1*), considered as one of the pioneers of laparoscopic liver resection (LLR), is Surgical Director of Liver Transplantation at Paul Brousse Hospital in Villejuif, France, and Professor of Surgery at Université Paris Sud. He is an internationally-renowned and highly experienced liver surgeon, as well as a prolific writer and thinker on innovations in liver surgery. Amongst other honors and awards, he was elected to the Order of the Legion of Honor of France and the American Surgical Association.

HBSN: *You have seen significant changes in liver surgery during your career. How important has laparoscopy been?*

Prof. Cherqui: The laparoscopic “revolution” happened while I was an already fully trained liver surgeon. It of course started with laparoscopic cholecystectomy, but very soon it was extended to almost every imaginable abdominal operation, except liver. This was made possible by developing new surgical skills, including complex dissection and suture and the development of highly efficient new technologies (enhanced video equipment, electro-surgical devices, and staplers).

Early on, I was convinced that liver resection—without reconstruction—was an excellent candidate operation for the laparoscopic approach. However, liver surgery has remained an area of resistance to laparoscopy for several years. This was due to perceived risks of uncontrollable bleeding and inadequate oncological margins. Another major reason was, in my view, the lack of training of experts on advanced laparoscopy. Indeed, laparoscopic liver

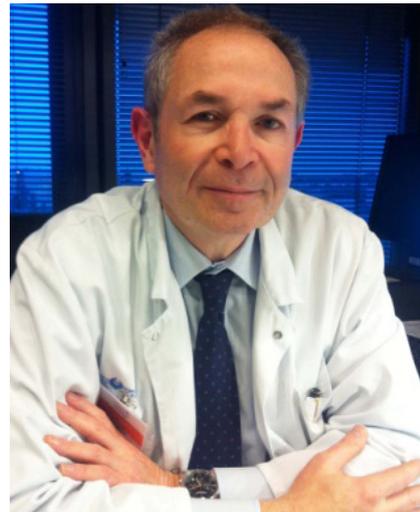


Figure 1 Professor Daniel Cherqui.

resection (LLR) is difficult procedure requiring expertise in both liver surgery and advanced laparoscopy. Mastering simple laparoscopic procedures, such as cholecystectomy, is clearly insufficient and a whole new set of skills has to be learned by the “open” liver surgeon. Conversely, being a laparoscopic surgeon without the background of indications and techniques in liver surgery is not sufficient.

I went through this process and performed my first case in 1996. I published my first series of LLR in 2000 and the first laparoscopic living donor hepatectomy in 2002. My experience is now over 400 cases and laparoscopic cases presently represent around 40% of my liver resections. A handful of other innovators went through the same process

around the same period and also published their experience. We were followed by several early adopters and now a majority of liver programs offer LLR to a select subset of their patients.

The literature consists of cases series, case-match comparative studies and meta-analyses. It must be acknowledged that there are no available randomized trials comparing with open surgery and LLR. Although such studies are desirable, they are very difficult to achieve as they would require hundreds of patients in each arm.

It should be emphasized that the vast majority of the literature is based on selected cases. These consist mainly of minor resections of small tumors (5 cm or less) located in segments 2-6, including left lateral sectionectomy, partial resections (i.e., resection of less than a segment) and segmentectomies. However, we and others have also shown the possibility of safely performing laparoscopic major resections such as right or left hepatectomy. Finally, living donor hepatectomy is a very promising but sensitive area for the minimally invasive approach in order to reduce morbidity and long term sequelae in those healthy donors.

Two consensus conferences were organized in 2008 and 2014. For the most recent one held in Morioka, Japan, a comprehensive review was published collecting over 9,000 LLR cases (1). Meta-analyses of comparative series have shown several short-term advantages of the laparoscopic approach over open surgery, such as decreased rates of bleeding, morbidity, and hospital stay. Surgical margins and long-term survivals were not inferior. Interestingly, no study found any disadvantage of the laparoscopic approach.

The Morioka Consensus Conference Statement will appear as a feature in the April 2015 issue of *Annals of Surgery*. The conference validated standard practice of the following procedures: left lateral sectionectomy and limited resections (i.e., partial resections and segmentectomies) in anterolateral segments. The conference also acknowledged a clear trend towards increasing extent and complexity of procedures. However, the jury emphasized that major resections and/or complex anatomical resections as well as living donor hepatectomy are still in an evaluation stage and require caution and a high level of expertise.

HBSN: *You have investigated laparoscopy in patients with cirrhosis and portal hypertension. Please summarize your most important findings and how your thinking has changed over the years.*

Prof. Cherqui: Interestingly, hepatocellular carcinoma (HCC), occurring mainly in patients with cirrhosis, is the

most common single indication for LLR, representing over 50% of the indications for malignancy. A major issue with surgery in cirrhotic patients is postoperative decompensation, including liver failure and ascites. Early in our experience, our group observed that LLR was very well tolerated by cirrhotic patients. In particular, we observed much less postoperative ascites than those after open surgery. This was confirmed by several authors and in meta-analyses. Portal hypertension is an established risk factor for increased morbidity and mortality following liver resection, even minor ones. LLR has expanded indications for minor resections for HCC to patients with portal hypertension. However, I still consider portal hypertension as a contraindication for major liver resection (i.e., resection of three segments or more).

HBSN: *Are there special laparoscopic techniques you use intraoperatively in these patients that you may not in those without portal hypertension and cirrhosis? What about steps during the post-operative period?*

Prof. Cherqui: Avoiding bleeding is very important. We liberally use intermittent inflow occlusion to perform a controlled bloodless transection. Other precautions include avoiding fluid overload, which is a common feature for all liver resections, and unnecessary division of collateral circulation. For example, recanalized umbilical vein must be recognized on preoperative imaging and preserved when present. In such cases, umbilical port placement must obviously be avoided and the round ligament kept undivided whenever possible. In spite of these specific issues, laparoscopy itself seems protective towards decompensation and ascites. Reasons may include less fluid requirements, avoidance of long abdominal incisions with muscle division, better collateral preservation, less manipulations and less respiratory impairment.

HBSN: *Has greater availability of deceased donor liver transplantation inhibited utilization and development of open and laparoscopic liver surgery in cirrhotics in the West?*

Prof. Cherqui: Undoubtedly. Deceased donor liver transplantation clearly provides the best overall and disease free survival in HCC patients by eradicating both the tumor and the underlying cirrhosis. However it is limited to patients with early tumors and, more importantly, it is hampered by severe organ shortage. Hence its intention

to treat efficacy is reduced because a significant number of patients drop off the waiting list due to tumor progression. Despite those limitations, many Western teams continue to preferentially offer transplantation patients with small resectable HCC. By contrast, Asian surgeons continue to offer resection as a first line treatment to patients with HCC. This is the result of unavailability of deceased donor organs and also of a long tradition of resective liver surgery, especially in Japan.

A growing body of literature shows that resection offers identical overall survival to transplantation, especially when the latter is studied in intent to treat (i.e., from the date of listing not the date of transplantation, hence including drop outs). Laparoscopic resection and anatomical resection both seem to improve the results of resection for HCC.

However, due to persistent underlying liver disease, resection is hampered by much higher recurrence rates than transplant. Most recurrences occur in the liver only. Patients must be screened for recurrence after resection and offered salvage transplantation whenever possible.

HBSN: *Do you find resistance from hepatologists when you recommend laparoscopic resection over locoregional therapies or transplantation for patients with portal hypertension?*

Prof. Cherqui: There is a place for resection and locoregional treatments. These must be discussed on an individual basis at multidisciplinary meetings. Hepatologists love efficient treatments and hate morbidity and mortality. Provided surgeons deliver good outcomes they are not resistant to laparoscopic resection and indeed they often push me in this direction.

HBSN: *Eastern surgeons commonly assess liver function based on indocyanine green (ICG) retention. This is rare in the West, where volumetry and indirect measures of portal hypertension are more common. Your thoughts?*

Prof. Cherqui: ICG is a global test that assesses liver function and portal hypertension (collateral circulation bypasses the liver and decreases ICG clearance). Eastern centers, mainly driven by Japanese authors such as Makuuchi, base their algorithms on ICG clearance. However, this does not replace volumetry which is required in cases of major liver resection. Due to atrophy/hypertrophy changes associated with cirrhosis, volumetric

studies are also required for bisegmentectomies such as left lateral sectionectomy. In our unit, we use a combination of Child-Pugh classification, MELD score, and clinical signs of portal HTN and volumetry to select patients for the extent of resection. Ideally portal HTN should be assessed by transjugular measurement of wedge/free hepatic vein pressure gradient. Surrogate indicators include platelet count, presence of esophageal varices at endoscopy, spleen size and collateral circulation on imaging. Evaluation of the extent of hepatic fibrosis by biopsy and more recently by elastometry is also an important issue to consider.

Finally, in patients with portal HTN requiring major resection, who usually have a small liver remnant (<40% of standard liver volume), the use of portal vein embolization is a major adjunct to the armamentarium.

HBSN: *We face an extreme shortage of organs for transplantation. Do you believe we should be more willing to perform laparoscopic liver surgery on patients with cirrhosis and portal hypertension? Should we alter our threshold for acceptable complications in this population because of potential improvement in survival over locoregional therapies?*

Prof. Cherqui: Definitely, major organ shortages should lead to increasing use of resection in patients with HCC and liver disease. It must be emphasized that not all cirrhotic patients have portal hypertension. As mentioned above, the degree of fibrosis must be assessed by biopsy or elastometry. Modern antiviral therapies for HBV and HCV may even be associated with reduction in the fibrosis score and possibly a lower risk of HCC recurrence after resection. In the absence of portal HTN, resection should be used liberally. By contrast, the presence of portal HTN remains a risk factor. In the presence of portal HTN, only limited resections should be considered (i.e., one segment or less). Portal HTN may also affect the natural history of HCC. A recent study from our group showed a higher rate of tumor progression in patients awaiting liver transplantation for HCC in the presence of portal HTN (2).

HBSN: *What is the future for minimally invasive liver surgery?*

Prof. Cherqui: As I mentioned above, early experience was mostly based on minor resections in the anterior segments. The past few years have showed a shift in paradigm with a

clear trend towards more extended and complex resections. New generations of surgeons will probably bring it to another dimension although the principles of liver surgery will need to be maintained. It is now clear that liver surgeons must be trained in advanced laparoscopy. The future of laparoscopic liver surgery is huge!

HBSN: Thank you very much.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

References

1. Wakabayashi G, Cherqui D, Geller DA, et al. Recommendations for laparoscopic liver resection: a report from the second international consensus conference held in Morioka. *Ann Surg* 2015;261:619-29.
2. Faitot F, Allard MA, Pittau G, et al. Impact of clinically evident portal hypertension on the course of hepatocellular carcinoma in patients listed for liver transplantation. *Hepatology* 2015;62:179-87.