Minimally Invasive Surgery of the Liver: An Update

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"Your old road is rapidly agin'.
Please get out of the new one
If you can’t lend your hand
For the times they are a-changin’.

Bob Dylan, 1964

2.1 Introduction

These prophetic words, written and sung by Bob Dylan almost 50 years ago, may well apply to the (relatively) new field of minimally invasive surgery of the liver (MISL). Nowadays the open approach to liver surgery (OLS) quickly falls behind in comparison with MISL. Older surgeons still have ringing in their ears the repeated warnings concerning risks related to laparoscopic cholecystectomy (LC). Prominent remarks included a possible increased risk of bile duct injuries [1], a prolonged learning curve [2], and the need for young surgeons to have well-established training in OLS before starting to perform LC. None of these alarms has overcome the tide of LC diffusion, and none of them proved to be effectively true. Thanks to many training modalities, such as dry lab, wet lab, simulators, virtual realities, and practice in large animals (pig), young surgeons directly enter into liver surgery using the laparoscopic approach, and open cholecystectomy is almost always and everywhere an embarrassing memory.

So what is the future for MISL? The answer is bright if we take into account the following considerations:

• In 1991, the first report of a hepatic resection appeared by Reich, followed by Gagner [3], which was followed by the first multicenter report, by Azagra, concerning resection of benign lesions [4]. From then on, in PubMed, the number of recorded publications rose to more than 150 in 2011 as an increasing number of centers began practising MISL (Fig. 2.1).
In the report by Aldrighetti et al. in this volume (Chap. 35), more than 1600 minimally invasive liver resections (LR) have been performed in Italy in 39 centers in the last 7 years, with only one third of them in surgical units thoroughly dedicated to hepatobiliary surgery.

A national school of hepatic surgery in Italy was established by Lorenzo Capussotti, and in some affiliated centers, such as ours, MISL is taught and practiced by attending students.

In a few centers scattered through the country, including ours, practical teaching using pigs allows basic and advanced procedures to be performed.

Industry strongly supports the development of new transection devices and staplers that have, de facto, modified the technical approach to LR, facilitating accomplishment of the procedure.

Since MISL was first introduced, laparoscopic liver surgery (LLS) has been considered a promising technique due to fact that no reconstruction is demanded for resections – with the exception of Klatskin tumors that are, thus far, not considered among indications for LLS. Also, problems related to hypothetical air embolism have been overcome by anesthesiological management using low caval pressure and attention to appropriate indications. Hemorrhage in the transection plane is consistently diminished due to the intra-abdominal pressure induced by the gas, although we should consider that care for bleeding sources must be taken for both resection surfaces.

The Louisville Consensus Conference [5], held in 2008, clearly stated indications and safety limits for MISL codifying (Table 2.1):

- Liver segments: all segments but 7 and 8 can be approached because of the inability to date of instruments to overcome axial projection on the surface plane. In this regard, robot-assisted surgery may contribute to including surgical indications to these two posterior segments also

- Lesion size

- Appropriate benign lesions