Complications in Laparoscopic Surgery

Cavit Avci • José M. Schiappa
Editors

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A Guide to Prevention and Management

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Editors
Cavit Avci
General and Laparoscopic Surgery
Istanbul University Medical School
Istanbul
Turkey

José M. Schiappa
Department of Surgery
Hospital CUF Infante Santo
Lisbon
Portugal

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Foreword

Not willing to prejudge what professional historians will decide, those in charge of writing history with a capital "H," the starting point of the endo-laparoscopic revolution in digestive surgery can be pinpointed to around 1987, the dawn of the last decade of the twentieth century. In 2015, the middle of the second decade of the twenty-first century, the maturation of results already validated allows for a constructive critical inventory. This shows how timely the book conceived and realized by José Schiappa and Cavit Avci, and by the expert contributors they have invited, is. Receiving their invitation to write this preface was a great honor for me and I am grateful to them for it. They also gave me the pleasure of being the first person to read the book, and I have no doubt that future readers will be equally delighted.

The title gives clues: *Complications in Laparoscopic Surgery. A Guidebook to Prevention and Management.* Is it possible that a quarter century after its beginning, the new way to perform surgery, so contested in the beginning and having finally spread all over the planet, can still cause complications? The answer is "Yes," because errors are still possible in choosing appropriate indications, and gaps still persist in some teaching programs devoted to good technical practice. We must congratulate the authors for having the courage to recognize these aspects and to try to find a solution for correcting them; this is imperative for reinforcing our patients' safety and satisfaction. Nowadays, medical literature is more focused on "novelties and advanced techniques" – options that can indeed seem more attractive to younger generations, but are too recent to be considered definitively validated. It is premature to make a proper choice between marketing announcements without a future and beginnings of promising developments that are possibly sustainable; let these novelties first cross the "filter" of scientific studies done by reliable, specialized institutions.

Let us focus our attention on this book's enhancing the relevance of everyday laparoscopic surgery, renamed "*conventional* laparoscopic surgery" after 25 years of uninterrupted successes. In this way we can teach it better and fine-tune it. We can consolidate what is already the trustworthy platform for launching new techniques in the clinical testing phase and also the trusted refuge in case of the test's failure – in which case the surgeon can always return to a conventional validated laparoscopic procedure during the same surgery, a true guarantee for the patient's safety. This has been our *golden rule* since 1989, when we launched the first procedures of endo-laparoscopic surgery. At that time, the only option was reverting to

open surgery. For the time being, that *golden rule* must remain our priority, but the surgeon now has the choice of returning to other options that are already within the realm of conventional endo-laparoscopic procedures that are so beneficial for our patients.

"*Efficient surgery combined with patients' safety*" is the goal of this book; to reach that goal, I invite you to read it attentively.

There are seven chapters, each one having been selected by the editors to provide an example of the seriousness of their experiences, described from the point of view of complications.

Chapter 1. It is not possible to perform any laparoscopic surgery without first creating a space to work in under the closed abdominal wall of the patient. This is a subject of general interest regarding the establishment of the pneumoperitoneum by insufflating the abdominal cavity (also called the "coelomic cavity"). The reason that the term "coelio-surgery" [1] is preferred is that it is more precise – at least in the French language – than laparoscopic surgery. Insufflation of the virtual cavity needs very precise maneuvers and a complete respect for the safety tests in order to avoid serious or even lethal complications, and recent statistics have confirmed this. Levent Avtan, the author of this chapter, gives a complete review of how to program minimally invasive surgery so it does not turn into tragedy.

Chapters 2, 3, 4, 5, 6, and 7 address global issues, with some observations about the history of surgery (especially Chaps. 2 and 3). Each chapter is devoted to a particular procedure that was chosen because it had been scientifically confirmed for a long time and is performed daily all over the world. Each of the authors presents his own personal concept of the intervention he writes about, describing their indications, their technical techniques, an exhaustive description of all possible complications and their causes, ways of treatment, and ways of prevention while always trying to maintain, as much as possible, the advantages for the patient of the minimally invasive approach. They describe their strategies, their own prescriptions, advice, and "tips and tricks" in order to avoid any pitfalls that might be hidden, even at the early stage of choosing the right operative procedure, as well as at the second stage, i.e., during the chosen procedure's progression.

Although the authors have written the chapters based on their own personal experiences, reading them gives the impression of a great homogeneity of points of view. This confirms the concept of the uniqueness of surgery that we considered as fundamental since the very beginnings of minimally invasive surgery. We were "hammering out" that principle in France during the early conferences, and to our first visitors, with Philippe Mouret, François Dubois, Edmond Estour, Pierre Testas, François Drouard, and also with our first assistants, who soon became our first emulators between 1987 and 1989. "Let's not oppose open surgery to endo-laparoscopic surgery. The latter is a divergent branch merging from the central trunk of evolution of open surgery, as a result of oncoming technical innovations. We have to integrate them at the right places for the greater patients' benefits. This does not mean the disappearance of open surgery; on the contrary, it will continue its own evolution with its own indications and its further merging of new innovative branches." This concept was to us non-questionable evidence, as it matches the patients' endless

demand "to be treated at best with the fewest possible adverse side effects." Endoscopy opened for them the era of more comfortable surgery – the minimally invasive surgery whose limits of expansion are not yet determinable today.

Between 1987 and 1990, the only visceral surgeons with this point of view were the gynecologists [2], who took the great step forward in 1973, moving from exploratory laparoscopy to surgical laparoscopy to cure ectopic pregnancy. We were very few then, with the digestive tract surgeons following closely this evolution; the reason was that around 1975, with the beginning of the creation of separate medical specialities, the module dedicated to gynecologic procedures became optional in the educational program for residents in general surgery, and few people made that choice, which was completely abandoned later on. In 1988, very few digestive surgeons were able to understand how the invention of the minivideocamera made surgery possible without laparotomy. The great majority of them were fascinated by the dazzling successes of open surgery, then at the apogee of its development. In addition, the professors in charge of their education taught them that the unavoidable price to pay for these successes was the drawbacks of laparotomy. The larger they are, the more they allow better intra-corporeal vision and a deeper penetration of the surgeon's hands in reaching the operating field. "For big surgeons, big incisions" was the popular saying. Our small group of "pro-coelioscopists" thought exactly the opposite, that there was no need to open in order to see better, and the duo of laparoscope and minivideocameras will take care of that, making the introduction of hands deep inside a patient's body unnecessary. Surgeons' hands will work from a distance, outside the body, maneuvering more and more sophisticated tools.

From the start, we were absolutely certainty that we had the key to the future of surgery, but first we had to convince others. The operative handling of laparoscopy was different from that of open surgery and learning it necessitated a long and difficult training period with, at that time, very basic tools that did not allow for complex maneuvers. All this made its practice difficult and potentially dangerous for a small number of indications. Beginning in 1988, the minivideocamera worked as our "absolute convincing weapon" for that purpose, especially when it became easier to purchase. It was quite good at changing the minds of the "coelio-indifferent" and "coelio-skeptical;" fortunately, the latter were more numerous. In fact, it was not as successful among the "anti-laparoscopy-by-principle" adherents. They were not numerous, but they were important as their group included almost all the main leaders of academic teachers in digestive surgery. The solution was to subtly introduce our "absolute weapon" inside the scientific societies in charge of validating research and teaching works concerning therapeutic innovations. This type of society already existed in Europe (Germany, Benelux, France, Italy), but they usually worked without real interconnections, having a weak impact regarding innovations in surgical procedures. We managed to unify them and make them more efficient, by founding, for instance, EAES [3] in 1989–1990, after receiving advice from our American colleagues. In 1981 in the U.S., they founded SAGES [4], a society that had as its objective the creation of a program of education and research in endoscopic endolumenal digestive surgery, conceived by surgeons for surgeons and obtaining its

accreditation from the federal authorities in charge of these matters, which was achieved around 1986. For the founders of EAES, it was the best model to follow.

In Europe, despite free access to our operating rooms, which were open to all surgeons who wanted to visit, the use of our "absolute weapon" in live demonstration sessions during our first symposia, the progress remained rather modest regarding the acceptance of this new kind of surgery. We lacked the impact of regular, successfully performed major laparoscopic operations to wake up the "coelio-indifferent," to obtain the definitive adhesion of the "coelio-skeptical" and to break apart the *a priori* convictions of the "anti-laparoscopy-by-principle" people. This indeed happened on April 24, 1989, when one of our group presented the laparoscopic cholecystectomy [5] technique at the annual congress of SAGES, in Louisville, Kentucky, in the U.S. In front of an international audience, it was the ideal resonance box for launching the "big-bang" necessary to sweep away all doubts regarding the introduction of laparoscopic surgery to the everyday practice of surgeons all over the world. Laparoscopic cholecystectomy has already been recorded in the history of surgery as being the emblematic operation that opened the gates of minimally invasive surgery.

Chapter 2 of this book, authored by Dr. José Schiappa, relates, as mentioned, to laparoscopic cholecystectomy. This is hardly a surprise for me, since he understood, as did Dr. Cavit Avci, the "big-bang" from Louisville, and both joined EAES where they became representatives of their countries – countries at the most distant extremities of southern Europe, i.e., the western Portugal and eastern Turkey; this is very meaningful. They immediately became our friends and colleagues, taking a very active part in the whole establishment and development of what became EAES, a member of IFSES [6], always bringing improvements in endo-laparoscopic surgery to the rest of the world. Both knew Philippe Mouret very well and had the greatest respect for him, as we all did; this respect definitely deserves an important place in the foreword of their book.

Philippe Mouret is the developer of the technique known as "laparoscopic cholecystectomy," the technique now used by thousands of surgeons all over the world. He successfully completed this operation in his first attempt, in March, 1987, and operated successfully on more than 3,000 patients until his death in 2008. Of course, with the passing of time, and dozens of technical modifications and new instruments – some of them from Philippe Mouret himself – the quality and safety of this operation have improved, but his strategical approach and his original sequence and movements remain the same.

Today, laparoscopic cholecystectomy, which began the "breakthrough" in the spirit of surgeons favoring the use of endoscopes in their everyday practice, is still a strong label of creativity. It is often a research model for testing the validity and interest of a new instrument and of a new operative technique. It was the first laparoscopic procedure designated as the "gold standard" for the treatment of gallbladder lithiasis by the NIH [7] in Bethesda, Maryland, in September 1992. At the beginning of the twenty-first century we were still surprised, together with Philippe

Mouret, to find so many papers in the medical literature relating to complications from this surgery, already so standardized. With all the evidence, José Schiappa shows us that there is always progress to be made in this area. In his chapter, he describes the benefits that modern imaging has brought for detecting anatomical variations in the biliary tree, important preoperative knowledge necessary for preventing peroperative lesions. He shows in detail new strategies and the "tips and tricks" of the operating procedures related both to prevention and to repair.

Chapter 3 is devoted to the treatment of gastro-esophageal reflux, a complex pathology of which some components raise questions that are always interesting and timely. Let us remember that in chronological historical order, during the last decade of the twentieth century, some of the fundoplication procedures were the second to obtain their homologations immediately after laparoscopic cholecystectomy. However, new minimally invasive techniques are arising, using the endolumenal approach. Dr. Cavit Avci approaches these difficult and still-pending problems in a thorough way, focusing his view on the study of complications.

Chapters 4, 5, 6, and 7. In addition to the analysis above, it is necessary to point out that each author has fully respected the pre-established writing guidelines agreement as per the title of the book about complications; as such, it would be repetitive to mention the contents chapter by chapter. All are as informative as the first three chapters. Kudos to the authors, all internationally known and recognized experts in their fields. It is necessary, however, to emphasize the precision and pertinence of the choice of bibliographic references and of the schematic illustrations throughout the entire book. In addition, illustrating the texts with video clips manages to show the updating of this book's pedagogic quality, since studying surgery is at first understanding the correct mandatory maneuvers to be done to perfection, through animated images in order to reproduce them properly at the time of actual surgery.

In conclusion: This book gives a good picture of what has become the "state of the art" of seven major procedures of laparoscopic surgery – nowadays classified as "*conventional*." The book will find its place in university libraries, training and educational centers for endoscopic surgery, as well as in the personal libraries of residents in abdominal surgery. It will also interest surgeons already involved in daily practice and concerned with their obligations of continuing education. With the up-to-date information that it contains, this book also consolidates the platform for launching innovative research programs devoted to building the future of surgery as it is done in institutes for advanced education and research in minimally invasive surgery [8, 9].

We wish the book great success.

Doctor Jacques Périssat MD, PHD, FACS
Emeritus Professor of Digestive Surgery
University Victor Segalen, Bordeaux France
Member of the National Academy of Surgery, Paris
Honorary Member of the American Surgical Association

Bibliographic References

1. Le Journal de coelio-chirurgie founded in 1992, Edmond Estour chief Editor www.coelio-surgery.com
2. Bruhat MA (1994) Coeliochirurgie: Véritable avancée chirurgicale ou simple tentation du possible. Bull Acad Natl Med 178:199
3. *EAES*: European Association for Endoscopic Surgery. Founded in 1990 www.eaes-eur.org
4. *SAGES*: Society American Gastro-intestinal Endoscopic Surgeons. Founded in 1981 www.sages.org
5. Périssat J, Collet D, Belliard R (1989) Gallstones: laparoscopic treatment by intracorporeal lithotripsy followed by cholecystectomy or cholecystectomy. A personal technique. Endoscopy 21:373–374
6. *IFSES*: International Federation Societies Endoscopic Surgeons. Founded in 1992 www.ifses.org
7. Perissat J (1993) Laparoscopic cholecystectomy: The European Experience. Presented at the NIH consensus conference on gallstones and Laparoscopic cholecystectomy, Bethesda Maryland USA September 14–16, 1992. Am J Surg 165:444–449
8. European School of Laparoscopic Surgery G-B. Cadière President and Director: www.lap-surgery.com
9. IRCAD France J. Marescaux President and Director: www.ircad.fr

Acknowledgements

The editors acknowledge the surgeons who have anonymously provided the video clips shown with complications. Since all surgeries have complications, it is extremely important that the video clips, like those shown in this book, be used for educational purposes. We recognize the importance of exposing complications that have occurred in order to understand what went wrong and what can be done to improve surgical safety.

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Contents

Table of Contents for Videos

Electronic supplementary material is available in the online version of the related chapter on SpringerLink: http://link.springer.com/

Introduction

Since the first cases on laparoscopic surgery published and presented to the surgical community at the end of the 1980s there has been an enormous "explosion" of its practice all over the world. Depending upon the progress of surgery in each country, this introduction was either a little faster or slower, but soon every country had someone using the approach; however, together with the introduction of the approach came problems.

Many of the surgeons using the new technique were young and without much surgical experience. This, together with the complete change in the surgical approach, led to many complications that were already quite reduced in "classic," open surgery – namely in cholecystectomy, where the rate of lesions to the biliary tract increased dramatically.

Progressively, laparoscopic surgery began to be used in other areas, even becoming the "gold standard" approach for some of these pathologies. Examples are, besides laparoscopic cholecystectomy, the surgical treatment of GERD, and non-traumatic colorectal and spleen surgery. Also here, the rate of complications showed that a great deal of attention had to be given to the education and training of all surgeons involved. When laparoscopic surgery began, most training was done through short courses; many were Industry-related and were followed by surgeons willing to jump on the "laparoscopy wagon," invited there by the industry. These courses, mostly, were not certified and were not teaching in depth or correctly, all of the necessary details on how to perform laparoscopic surgery safely.

This can explain the need that many people think is absolutely necessary to impose: to re-evaluate all teaching programs in laparoscopic surgery and keep offering duly validated training courses and conference discussions on how to minimize the dangers of specific types of this approach.

The impact of these changes can make the difference between high and low rates of complications and iatrogenic lesions in laparoscopic surgery. It has been shown that no surgeon is immune to the possibility of having iatrogenic lesions develop during at least one such surgery; besides, the so-called "learning curve," considered by many to be the main cause of complications, has proven to be not so. Many complications occur in the "consolidated" phase of a surgery; there are several reasons for this, and the texts in this book address that.

- *The risk goes beyond "first cases"*; *first 1284 cases* (*in a single Institution*) – *0.58 % / following 1143 cases – 0.50 %* (*Morgenstren et al.*, *Am Surg*, *1995*)
- *Enquiry to 1500 surgeons – about 30 % of BDIs occurred after the first 200 cases* (*Calvete et al.*, *Surg Endosc 2000*)
- *Surgeon's experience does not minimize the risk*; *without safety measures and careful acting*, *every surgeon can be struck by one of these complications*.

Learning curve and incidence of iatrogenic lesions
Laparoscopy France (24,300 patients) 0.27 % USA (77,600 patients) 0.6 %
Portugal (14,455 patients) 0.25 %
Italy (13,718 patients) 0.24 %
Metanalises 0.8–1 %
Laparotomy Johns Hopkins (H.Pitt) 0.1–0.2 % San Diego (A.R.Moossa) 0.5 %
Paul-Brousse (H.Bismuth) 0.2 %
Cornell Univ. (L.Blumgart) 0.2 %
Port. Soc. Surg. (B.Castelo) 0.55 %

This explains the purpose of this book: to help, as much as possible, to minimize some of these problems. In the various chapters we try to give some advice on the possible complications of each type of surgery and a few "tips and tricks" on how to avoid them. Each chapter is complemented by video clips showing examples of complications of surgical approaches to the pathology the author addresses. We suggest that readers look carefully at the video clips and try to identify the mistakes being made. It is also possible to try to find out, beforehand, what is going to happen as the video clip runs and what can be done to avoid the complication.

These video clips are from real surgeries that were given to us by the surgeons who performed them, during which there were complications; they were given for educational purposes. We thank them for providing the clips, and it goes without saying that that these – anonymous – contributions are crucial for the education of surgeons trying to minimize possible complications. Only the realization that any surgeon can be a protagonist, but for different reasons and, as such, cause a serious complication, will provide us with the capabilities of understanding the absolute need to act in a constant, safe way.

Istanbul, Turkey — Cavit Avci
Lisbon, Portugal — José M. Schiappa