EDITORIAL

COMPLICATIONS IN LAPAROSCOPIC SURGERY
KEEP HAVING HIGH INCIDENCE

Unfortunately, Complications in Laparoscopic Surgery happen, and the fact is that they keep having high incidence, despite all interest and “calls for attention”. As some consequences can be important, considering the sequels they may cause, the interest for understanding how they happen and the reasons why they show keeps having a high interest.

Nowadays, a very used term related with these problems is “Precision Surgery”. As a matter of fact, it is, a summary of the kind of practice we all do, mostly, if not in all cases: performing surgery with utmost care and attention, step-by-step.

Another issue regarding these problems, is that it is also very difficult to convince surgeons to perform “better”; this is the kind of surgery every surgeon is convinced he (or she), “is already performing at “TOP QUALITY”.

As a matter of fact, this happens in every case of surgery where the surgeon is more active, using it most commonly, and where he (or she) thinks they “excel”.

Using, just as an example, the Iatrogenic lesions of the biliary tract, we can realize that, already in 1944, the great surgeon Grey-Turner was writing in the Lancet: “CBD lesions are, almost always, a result of an accident during surgery and, therefore, it can only be attributed to the surgical profession. These lesions cannot be a normal operative risk…”; (1) and A. R. Moossa, in a personal communication said: “we can generalize the 3 dangers of biliary lesions as:

1. Dangerous disease, like late acute cholecystitis, portal hypertension,
2. Dangerous anatomy, considering there are anomalies in 10-15% of cases,
3. Dangerous surgery, when the surgeon performs with technical deficiencies.

We can understand the appearance of complications, following the so-called Reason’s Model of complications, or events”. This is also known as the Swiss Cheese model (fig. 1). Considering a series of slices of swiss cheese, when all holes of it are in a line, meaning that we face a “lining” of possible errors or “mishaps”, then, all conditions are arranged for the complication to happen.

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Fig. 1. The “Swiss Cheese” model of accident in laparoscopy

If we compare errors leading to complications in surgery, with the ones happening in high technology industries, we can see some similarities. They are based, mainly, in four orders of facts: Technical failures, Not following established rules, Ignorance of certain aspects of the process and Visual failures or misguidance for what one is
There are certain General Factors, explaining these facts, and the General Etiology of Complications in Laparoscopic Surgery: starting with some technical situations, we have, inadequate placement of trocars, bad field exposition, bad light, bad anesthesia, surgeon (or team)’s inexperience, surgeon (or team)’s tiredness, lack of knowledge of eventual anomalies, patient issues, disease itself, inappropriateness (somehow) of the surgeon and/or surgical team, inappropriateness of the instruments.

Some points should be followed to minimize complications.

To start, let’s not simplify Indications; these should follow the Guidelines for Indications for any kind of Laparoscopic surgery, not “forcing” the indications for each proposed patient.

Just because Laparoscopic Surgery is “simpler” do not see it as a reason for widening indications.

There are other problems related with the “Learning Curve” although this might be an issue to discuss separately, if one considers the concept of “Learning Curve” by itself. To start with, the “Learning Curve” for Laparoscopic Cholecystectomy, for instance, goes well beyond 50 cases and the operating time keeps lowering till 200 cases; on another hand, the improvement in the cognitive skills to deal with difficult cases continues for more than that. This according with Voitk et al., as published in the Am J Surg, in 2001 (2).

But the risk goes beyond “first cases”; according to Morgenstern et al., in a paper published in Am J Surg, in 1995, in a single institution, the first 1284 cases had a rate of complications of - 0.58% the following 1143 cases had a similar rate, - 0.50% (3).

Calvete et al., published a paper in 2000, in Surgical Endoscopy, where they made an enquiry to 1500 surgeons and realized that about 30% of the rate of Bile Duct Injuries reported by those surgeons occurred after the first 200 cases (4).

What we can summarize is that surgeon’s experience does not minimize the risk.

Way et al., published a very good paper in Annals of Surgery, in 2003, showing an interesting point for causes of Common Bile Duct lesions in Laparoscopic Cholecystectomies (5).

This paper shows that only 3% of the causes of CBD lesions are technical; the other 97% are a result of what is called illusion visualization of reality (fig. 2). The brain, through a process called “Heuristic” shows its “laziness”. As such the brain shows what it believes is the wish of the person to see. This leads to “Intentional” actions from surgeons, leading to unintentional results. We can show some examples of these processes: “Heuristic” Processes.

In this image, most people believe that they are seeing two triangles, a white one and a black one. In truth, there are no triangles at all: there are only three angles and
Complications in laparoscopic surgery keep having high incidence

three “Pack Man” in such a disposition that they show the composed image one’s brain processes as a composite one. This image is called - Kanizsa’s Triangle (fig. 3).

![Fig. 3. Kanizsa’s Triangle](image)

Another example is the image above: depending on the first time one looks at it (and the fact that there is a mention of “first time” is because after this first viewing, it will be quite difficult to see it otherwise).

Another way of understanding “Heuristic” Processes is the watching of this turning image of a lady. Some persons will be able to see her turning Clockwise, some others turning Anti-clockwise: the authors of this image have found out that the ones seeing her turning Clockwise have a dominance in their brains, from the Right Brain, and the ones watching her turning Anti-Clockwise have a dominance from their Left Brain, as shown in the image (fig. 4). Now, turning into interpretation of this turning image: The Right Brain provides Anarchic Thinking, Intuitive ways of seeing life, Holistic, Synthetic and Subjectivity; while the dominance of the Left Brain, provides Logic Thinking, Sequential, Rational thinking, Analytic views, and Objectivity. Many problems arise, in fitting their ways of thinking, to the ones who can see the image turning both ways, as it may happen to a 5% number of persons, seeing it happen sequentially.

![Fig. 4. “Heuristic” Process](image)

A totally different aspect is Instrument Problems; of these we can consider two main ones: Use of Electrosurgery; when it is used too often for too long periods. The hook in general is very difficult to control, despite considerations by surgeons that in their hands all instruments are safe; when used to cut some structures, hooks can cut suddenly, being left free and almost uncontrollable and being able to transmit its heat to the organ it touches. Another issue is the fact (often forgotten) that all heating devices, including most of the thermal sealing and cutting instruments go to very high temperatures (up to 300ºC) and they take about 30 seconds to come back to zero. Very frequently surgeons are seeing using the instrument immediately after a “cutting session”, to set aside or to dissect other organs.

Another situation arises from some disturbance in the electrical protection of the instrument, which usually is not visible, or looked for. One point more regards the use of the wrong instrument for a certain task; it is to be noted that any surgeon shall not be carried away, showing one’s “abilities”
with every type of technology.

We can say that Lesions in Laparoscopic Surgery are serious lesions, but can be avoided (or, at least, minimized) by: a cautious approach when dealing with any kind of Laparoscopic surgery (1, 6).

Keeping a very liberal policy of conversion or asking for specialized help when facing any unexpected intra-operative problems and considering that by its specificity they should always be dealt with by experienced teams in reference centers, especially if the idea is to solve the problem still with a Laparoscopic approach.

Another precaution measure is to always use Prevention attitudes, and these may (or should) include: surgical access always adapted to patient’s morphology, which can be different - do not use a “standard” approach; get always a good exposure of the surgical area and - again, always - get a good identification of structures, before any definitive measure (1,7).

Appropriate and correct dissection always, identifying all structures, clamp any vascular pedicles if in face of any big hemorrhage. Because of the reasons previously mentioned, take great care with the use of electrosurgery; do always use the highest human and surgical good sense (despite being what all surgeons say they do); have adequate knowledge of the local anatomy and of eventual anomalies. One very important point, often forgotten for several reasons is “When in doubt, stop and re-evaluate” and keep always keep a humble attitude.

Any surgeon must be aware of situations and of his (or hers) capacities; as such, every time one thinks it is advisable, ask for help...

Summarizing, one shall always be very aware of some Basic Rules (not to forget) (1, 8):

- No Surgeon is “protected” against this problem.
- Correct and complete training in Laparoscopy is mandatory.
- The leading Surgeon is responsible for the adequacy and quality of all the equipment and adequacy and quality of the team.
- THERE WILL BE MANY OPPORTUNITIES FOR DISASTER “…those who fail to remember the past, are doomed to repeat it…” (Santayana)

**Tips for Safe Cholecystectomy** (1, 8):

- Urinary bladder evacuated just before anesthesia and surgery;
- General anesthesia;
- Open insertion of first cannula;
- All instruments must be introduced, operated and removed under vision;
- Fundus retracted upwards towards right shoulder;
- Gall bladder neck retracted down and out;
- Cystic lymph node is an important landmark - keep to its right;
- No cautery in Calot’s triangle - it should be used in gall bladder bed only;
- Clipping of the cystic duct flush with the common bile duct is not required;
- It is safer to leave a few mm of cystic duct than to encroach even 1 mm on the common bile duct;
- Double clips on the retained side of the cystic duct and cystic artery;
- Ligature, Haemoclip, Endoloop and stapler are useful devices to tackle a wide cystic, duct;
- Beware of wide cystic duct, long cystic duct, vertical cystic duct - it may be common bile duct;
- Very soft (normal) liver, fatty liver and cirrhotic liver can easily be injured.
Complications in laparoscopic surgery keep having high incidence during retraction;
- Fundus first is a useful technique in difficult cases;
- Partial cholecystectomy is an option in case of difficulty;
- Panic should be avoided in case of bleeding;
- Pressure with a gauze or the mobilized gall bladder will control the bleeding or make it controllable;
- Desperate blinks attempt to clip or coagulate a bleeding point in a pool of blood must be avoided;
- Stumps (cystic duct/cystic artery) should be examined and re-examined for security of clips and any bile leak/bleed;
- Gall bladder bed should be irrigated and examined for any bleed/bile leak (from a cholecystic-hepatic duct);
- Presence of bile should make the surgeon stop and look for the source of bile - gall bladder or bile duct;
- Extraction of gall bladder under vision to make sure that there is no bile/stone spill;
- Spilled bile should be sucked out;
- Spilled stones should be looked for and removed;
- Cholecystectomy should not be considered a small/routine operation and should not be taken lightly/casually;
- Surgeons should avoid the temptation to get their names into books of records.

The day after cholecystectomy, the patient should be without pain, sitting up in the bed, having her breakfast and wanting to go home - vitals should be stable/normal and abdomen soft; if not, observe the patient in the hospital for another day.

As general conclusions, it can be said that these are serious lesions. They can be avoided (or at least, minimized), by a cautious approach, a surgeon’s liberal policy of conversion and asking for specialized help when facing unexpected intraoperative problems. No surgeon is “protected” against this problem, and correct training in laparoscopy is mandatory. These lesions, by their specificity, should always be dealt with by experienced teams in reference centers. Only this way, complications can be minimized, and quality and good outcomes guaranteed.

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REFERENCES
ULTRASTRUCTURAL ASPECTS OF VACUOLAR DEGENERATION OF CARDIOMYOCYTES IN HUMAN ENDOMYOCARDIAL BIOPSIES

Vacuolar degeneration of cardiomyocytes is a histological finding commonly encountered during routine light microscopic examination of human endomyocardial biopsy specimens. The vacuoles appear as intracellular clear areas lacking myofibers. By itself, this finding has little diagnostic value, but may have important clinical implications when the vacuolar contents are of etiological significance (e.g., accumulation of abnormal metabolites), and the clinical importance is increased when the disease is treatable. Thanks to its great resolving power, electron microscopy can often reveal the contents of the vacuoles and lead to a correct diagnosis. It can be used to differentially diagnose lysosomal storage diseases such as Fabry, Danon, and Pompe disease, doxorubicin cardiomyopathy, mitochondrial cardiomyopathy, autophagic degeneration, and accumulation of subcellular organelles (mitochondria, lipofuscin, glycogen granules, endoplasmic reticulum, etc.) as a nonspecific finding in failing cardiomyocytes. In conclusion, observing vacuolar degeneration of cardiomyocytes under a light microscope provides little information because it does not enable one to identify the contents of the vacuoles. On the other hand, electron microscopic examination can often reveal the contents of vacuoles and lead to a correct cardiac disease diagnosis. But even under an electron microscope, the contents of vacuoles cannot always be identified, and so undiagnosed cases remain. These may be patients with novel disease entities waiting to be discovered. Considering the great diagnostic value of electron microscopic examination, the authors strongly recommend fixation of a small piece of tissue samples for electron microscopy at every endomyocardial biopsy procedure (Takemura G, Kanamori H, Okada H, Tsujimoto A, et al. Ultrastructural aspects of vacuolar degeneration of cardiomyocytes in human endomyocardial biopsies. Cardiovascular Pathology 2017; 30: 64-71).

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