



Original research

Physiopathology and clinical considerations of laparoscopic surgery in the elderly



Pietro Caglià*, Angelo Tracia, Antonino Buffone, Luca Amodeo, Luciano Tracia, Corrado Amodeo, Massimiliano Veroux

Department of Medical and Surgical Sciences, Advanced Technologies “G. Ingrassia”, University of Catania, Italy

ARTICLE INFO

Article history:

Available online 30 May 2016

Keywords:

Laparoscopy
Elderly
Surgery

ABSTRACT

Objective: The marked improvements in medical technology and healthcare, lead an increasing number of elderly patients to take advantage of even complex surgical. Recently, laparoscopic surgery has been accepted as a minimally invasive treatment to reduce the morbidity after conventional surgery, and a number of studies have demonstrated the feasibility of laparoscopy with significant advantages also in the elderly. On the other side, the laparoscopic procedure has some drawbacks, including prolonged operation time and impact of carbon dioxide pneumoperitoneum on circulatory and respiratory dynamics. This paper will review the physiopathological implications of laparoscopy, as well as the current literature concerning the most common laparoscopic procedures that are increasingly performed in elderly patients.

Materials and methods: A systematic review of the current literature was performed using the search engines EMBASE and PubMed to identify all studies reporting the physiopathological implications of laparoscopy in the elderly. The MeSH search terms used were “laparoscopy in the elderly”, “physiopathology of laparoscopy”, and “pneumoperitoneum”. Multiple combinations of the keywords and MeSH terms were used with particular reference to elderly patients.

Results: Although laparoscopy is minimally invasive in its dissection techniques, the increased physiologic demands present particular challenges among elderly patients.

Conclusions: Laparoscopy and its safety in the elderly patients remains a challenge and the evaluation of this approach is therefore mandatory. Although many studies have demonstrated the applicability and advantages of the laparoscopy also in the geriatric population, with low rates of morbidity and mortality, in elderly patients undergoing general surgical procedures the physiologic demands of laparoscopy should be carefully considered.

© 2016 IJS Publishing Group Ltd. Published by Elsevier Ltd. All rights reserved.

1. Introduction

Citing figures from the World Health Organization, the proportion of elderly people aged 65 years or more was 9.9% and life expectancy is currently 74.4 years for men and 81.8 years for women because of recent improvements in early diagnosis and a well-developed mass-screening program [1,2]. With improved life

expectancy the proportion of people surviving their 80s is predicted to rise proportionally in Western countries [3].

Moreover, the marked improvements in medical technology and healthcare, lead an increasing number of elderly patients to take advantage of even complex surgical procedures and we can expect that the number of elderly patients operated on electively or in an emergency setting will follow the same tendency.

The introduction of laparoscopic surgery in 1987 and its widespread use has increased the number of elderly patients undergoing this surgical approach. The general trend in general surgery for the past 25 years has been the shift from conventional surgical procedures towards minimally-invasive alternatives. Recently, laparoscopic surgery has been accepted as a minimally invasive treatment to reduce the morbidity after conventional surgery, and a

* Corresponding author. Department of Medical and Surgical Sciences, Advanced Technologies “G. Ingrassia”, University of Catania, Via S. Sofia 86, 95123 Catania, Italy.

E-mail addresses: cagliapi@unict.it (P. Caglià), traciang@unict.it (A. Tracia), a.buffone@unict.it (A. Buffone), luka_amod@yahoo.it (L. Amodeo), lucianotraccia@me.com (L. Tracia), amodeo@unict.it (C. Amodeo), veroux@unict.it (M. Veroux).

number of studies have demonstrated the feasibility of laparoscopy also in the elderly [4–8].

The elderly in fact represent a unique surgical challenge because of the associated complex comorbidity and diminished cardiopulmonary reserve. Where feasible, laparoscopic surgery is becoming the gold standard in the treatment of many common pathologies that affect elderly patients and may have a larger impact compared to the younger population. It is therefore imperative that general surgeons are comfortable with the management of elderly patients and their surgical pathologies. Given the prevalence of this particular operative procedure, it is clear that factors that influence outcomes, especially when morbidity is added to the vast number and the high costs of laparoscopic procedures, will have a large impact on healthcare expenditures.

This paper will review the physiopathological implications of laparoscopy on the elderly, as well as the current literature concerning the most common laparoscopic procedures that are increasingly performed on these patients.

2. Physiopathological implications of laparoscopy

Recent advances in laparoscopic surgery have benefited patients by a minimally invasive procedure. On the other side, laparoscopy has some disadvantages, including prolonged operation time and impact of carbon dioxide pneumoperitoneum on circulatory and respiratory dynamics [9–15].

Carbon dioxide, the most widely used gas in laparoscopy, has the advantage of being quickly absorbed and excreted, inexpensive and non-flammable. When insufflated into the abdominal cavity, carbon dioxide normally diffuses across the peritoneum, and is carried by the circulation to the lung, where it is expired [16]. However, some adverse effects have been associated with the increased systemic carbon dioxide load manifested by recordable increases in arterial PCO₂ after laparoscopy [17,18]. The establishment of pneumoperitoneum is generally associated with increased cardiac filling pressures and an increase in blood pressure and systemic vascular resistance [19–21]. To overcome the increase in systemic vascular pressure healthy patients can increase the contractility of the heart [22].

While most of these changes do not result in clinical significance, they can assume considerable importance in patients with comorbid conditions, especially those that result in decreased cardiopulmonary reserve, as are common in elderly patients.

CO₂ absorption is a problem associated with laparoscopic surgery, which can cause significant morbidity, in patients with severe cardiopulmonary disease, if alveolar ventilation is not increased sufficiently to avoid hypercarbia and significant acidosis [23,24].

For cardiopulmonary compromised patients it can be difficult or even impossible to increase the contractility of the heart and they are therefore prone to develop cardiac failure during pneumoperitoneum [25,26].

Furthermore, despite laparoscopic surgery is being widely accepted and generally considered safe, there have been several reports of mesenteric ischemia and bowel infarction after routine laparoscopic procedures. Most of these complications have occurred in patients with evidence of preoperative cardiovascular, hepatic or renal compromise [27,28].

“The higher the pressure, the better the view” is the axiom often cited by surgeons who needed adequate exposure for laparoscopic procedures, but the maintenance of elevated intra-abdominal pressure for the duration of the procedure could be unfortunately associated with numerous undesirable consequences.

Particularly elderly patients exhibit a decline in reserve including cardiopulmonary function, and the impact of pneumoperitoneum in such patients is not fully elucidated.

Intra-abdominal hypertension is usually defined as an intra-abdominal pressure of 12 mmHg or more and is already sufficient an increasing pressure from 10 to 15 mmHg, as usually used in laparoscopy, as well as operating time, to significantly decrease the splanchnic blood flow even at a constant intra-arterial pressure [29,30].

Related to the technical complexity and length of laparoscopic procedures, organ ischemia-reperfusion injury and oxidative stress associated with pneumoperitoneum may become a more significant problem.

Several significant respiratory system changes during laparoscopic surgery are often reported. In studies of patients undergoing laparoscopy under local anesthesia, the patients responded to intraperitoneal CO₂ with hyperventilation [31]. Abdominal CO₂ insufflation elevates the intra-thoracic pressure and adjusting patient positions by the head-up or head-down tilt results in a change in pulmonary compliance [32,33].

Intra-abdominal pressure may also transfer across the diaphragm into the thoracic cavity, which can increase gastroesophageal reflux and aspiration risk in susceptible patients. Furthermore, this transfer can be further increased by Trendelenburg positioning [25].

Moreover the maintenance of this positions for several hours can lead to expression of edema of the head, the neck and the upper airway with reduction in pulmonary compliance and severe dyspnea [34–36]. In order to avoid ventilatory leak during mechanical ventilation and to prevent aspiration, especially for patients in head-down position, maintenance of adequate endotracheal tube cuff pressure is important [37].

A further aspect is represented by the enzymatic alterations in the liver. The level of serum Aspartate-aminotransferase (AST), Alanine-aminotransferase (ALT), and often also total bilirubin (TBL) usually increased significantly during the first 24 h after laparoscopic surgery. The effects are transient and reverted back to normal within a few days post operation. The major causative factor seemed to be the CO₂ pneumoperitoneum [38,39]. In most of the laparoscopic surgery patients, the transient elevation of serum liver enzymes showed no apparent clinical implications but particular care should be paid in patients with pre-morbid liver disease or severe hepatic impairment [40,41].

3. Common laparoscopic procedures in the elderly

Regarding the therapeutic approaches, the excellent results achieved with the use of laparoscopy for cholelithiasis, laid the foundations to the modern use of this surgical technique in a variety of diseases [42–44]. Here we briefly analyze the most common laparoscopic procedures that particularly affect the elderly.

3.1. Laparoscopic cholecystectomy

About 20% of the abdominal surgical procedures performed in those older than 80 years are hepatobiliary [45,46]. Although the prevalence of gallstone formation increases with age and many studies have examined the results of laparoscopic cholecystectomy in elderly patients [47–50], the treatment of gallstone disease in this age group is a challenging [51,52]. This group of patients has in fact an incidence up to 55% of complicated gallstone disease, such as acute cholecystitis, jaundice, choledocholithiasis, cholangitis, and gallstone pancreatitis [48,53]. Both acute cholecystitis and old age are significant risk factors for mortality and prolonged hospital stay after open cholecystectomy [54,55]. Acute biliary disease in the elderly is associated with a considerable increase in operative morbidity and mortality, when compared with non elderly patients [56–58]. Laparoscopic cholecystectomy is currently the procedure

Download English Version:

<https://daneshyari.com/en/article/4285373>

Download Persian Version:

<https://daneshyari.com/article/4285373>

[Daneshyari.com](https://daneshyari.com)