Arati Srivastava and Ashutosh Niranjan. Secrets of safe laparoscopic surgery: Anaesthetic and surgical considerations. J Minim Access Surg. 2010 Oct-Dec; 6(4): 91–94

LINK - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2992667/

Abstract

In recent years, laparoscopic surgery has gained popularity in clinical practice. The key element in laparoscopic surgery is creation of pneumoperitoneum and carbon dioxide is commonly used for insufflation. This pneumoperitoneum perils the normal cardiopulmonary system to a considerable extent. Every laparoscopic surgeon should understand the consequences of pneumoperitoneum; so that its untoward effects can be averted. Pneumoperitoneum increases pressure on diaphragm, leading to its cephalic displacement and thereby decreasing venous return, which can be aggravated by the position of patient during surgery. There is no absolute contraindication of laparoscopic surgery, though we can anticipate some problems in conditions like obesity, pregnancy and previous abdominal surgery. This review discusses some aspects of the pathophysiology of carbon dioxide induced pneumoperitoneum, its consequences as well as strategies to counteract them. Also, we propose certain guidelines for safe laparoscopic surgery.

INTRODUCTION

Laparoscopic surgery is one of the most important diagnostic and therapeutic tools in the present surgical era. Since 1987, when the first laparoscopic cholecystectomy was successfully performed by Phillipe Mouret, this has become the gold standard. The benefits of minimal access techniques include less pain, early mobilization, minimal scar and shorter hospital stay, which have further increased its applications.[1] This minimally invasive procedure requires pneumoperitoneum for adequate visualization and operative manipulation. Systemic changes, in particular cardiopulmonary changes, also depend on the intra-abdominal pressure and the gas used. The major problems during laparoscopic surgery are related to the cardiopulmonary effect of pneumoperitoneum, systemic carbon dioxide absorption, venous gas embolism, unintentional injuries to intra-abdominal structures and patient positioning.[2,3] The goal of every laparoscopic surgeon should be to identify the risk factors, which may adversely affect anaesthetic as well as surgical outcome. We are briefly summarizing physiological changes associated with laparoscopic Surgery and listing some tips for laparoscopic surgeons.

CONCLUSION

Laparoscopic surgery, a modern surgical technique, has gained popularity over conventional abdominal surgery. There are a number of advantages of laparoscopic surgery as compared to an open procedure. These include reduced pain due to smaller incisions and minimal blood loss and shorter recovery time. The key element in laparoscopic surgery is the creation of pneumoperitoneum, which is generally made by CO2. The major problems during laparoscopic surgery are related to CO2-induced pneumoperitoneum, which can affect the cardiopulmonary function, systemic carbon dioxide absorption, extraperitoneal gas insufflation, venous gas embolism, unintentional injuries to intra-abdominal structures and patient positioning. Additional problems may occur in the obese, the pregnant ladies and in those who have had previous surgery. These problems can be averted if certain precautions have been kept in mind. These are:

All the cardiopulmonary-compromised patients should be assessed preoperatively by a physician or a cardiologist. They are not contraindications for laparoscopic surgery. High-risk consent with intensive monitoring is mandatory to prevent mishaps.

Informed consent for risk of anaesthesia in cardiopulmonary-compromised patients, additional port placement in case of previously operated patient, risk of abortion or preterm delivery in case of pregnant women should be explained.

Lower pressure pneumoperitoneum (10–12 mmHg) with proper hydration of patient can prevent the consequences of preload and afterload on cardiac function.

Minimize the operating time by taking the help of experienced person.

Using helium or nitrous oxide gas for the creation of pneumoperitoneum, if available in cardiopulmonary-compromised patients.

Measuring the et-CO_2 and arterial blood gas analysis, especially in cardiopulmonary-compromised patients and pregnant women to avoid fetal acidosis.

Extra long trocar and instruments may be needed in obese patients. Precaution to prevent DVT should be taken in these patients.

First port placement for creation of pneumoperitoneum in previously operated patients or in pregnant women should be done by either open/Hasson technique or by optical technique. This port should be away from previous scar and gravid uterus.