ANESTHETIC MANAGEMENT IN PATIENT WITH LAPAROSCOPIC CHOLESISTECTOMY

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Abstract

Cholelithiasis is one of the most common diseases. One of the treatments that can be done is a laparoscopic cholecystectomy. This action is one type of minimally invasive procedure that aims to minimize trauma from the process, which aims to minimize trauma from the surgical process but with satisfactory results. Laparoscopy is a minimally invasive surgical procedure by introducing CO2 gas into the peritoneal cavity to create a space between the anterior abdominal wall and the viscera, thereby providing endoscopic access into the peritoneal cavity. Anesthesia induction was performed under general anesthesia with intubation. The procedure was successful and the patient returned to the ward in good condition.

Keywords : anesthesia, ,cholelithiasis, laparoscopy, cholesistectomy.

Introduction

Currently, gallstone disease (cholelithiasis) which is limited to the gallbladder is usually asymptomatic and affects 10-20% of the general population in the world [1]. The diagnosis is usually made by abdominal ultrasonography. Approximately 20% of women and 10% of men ages 55 to 65 have gallstones. The prevalence of cholelithiasis varies in each country. The geographic location of a country and ethnicity have a major role in the prevalence of cholelithiasis. In the United States, in 2017, about 20 million people (10-20% of the adult population) had cholelithiasis. Every year, 1-3% of people will have cholelithiasis and about 1-3% of people will have complaints. Every year, it is estimated that 500,000 cholelithiasis patients will have complaints and complications that require cholecystectomy (Heuman, 2017). The prevalence of cholelithiasis in

Europe is 5-15% based on several ultrasound surveys. In Asia, in 2013, the prevalence of cholelithiasis ranged from 3% to 10%. Based on the latest data, the prevalence of cholelithiasis in Japan is around 3.2%, China is 10.7%, North India is 7.1%, and Taiwan is 5.0% [2].

Cholecystectomy is indicated in symptomatic patients with proven gallstone disease (cholelithiasis) [3]. Laparoscopic indications for cholecystectomy are the same as for open cholecystectomy [4]. Because minimally invasive techniques have diagnostic and therapeutic applications in many surgeries, laparoscopic surgery is increasing in use in both inpatient and outpatient settings. While the laparoscopic procedure has advantages for the patient, it is also a challenge for the anesthesiologist. Laparoscopic technique or minimally invasive surgery is expected to be a future surgical trend. Even in 2010, around 70-80 percent of operations in developed countries will use this technique. In laparoscopic cholecystectomy, the type of anesthesia recommended is general anesthesia with endotracheal intubation with preoperative prophylactic antibiotics to treat biliary pathogens[5].

General anesthesia is an anesthetic used to induce unconsciousness during surgery. The drug is inhaled through a mask or breathing tube, or given through an intravenous (IV) line. A breathing tube may be administered down the throat to maintain proper breathing during surgery. The main goal of general anesthesia is to render the patient unresponsive and unable to feel stimuli while controlling autonomic. There are five main classes of anesthetic agents: intravenous (IV) anesthetics, inhalation anesthetics, IV sedatives, synthetic opioids, and neuromuscular blocking drugs. Each class has certain strengths and weaknesses. General anesthesia is most often used for major surgeries, such as hip and knee replacements, heart surgery, and various types of surgical procedures to treat cancer [6,7].

Material and methods

This article is a case report. A case report is made based on the findings in the patient in relation to the existing literature and theory. The tool used is an observation sheet to record the patient's condition and the patient's medical record.

Results

The results obtained in this case report are the patient's condition before and after the operation. The patient was diagnosed with cholelithiasis after a physical and supporting examination was carried out and then it was decided to perform surgery in the form of a laparoscopic cholecystectomy.

Discussion

Laparoscopic cholecystectomy has been performed on a female patient aged 46 years for indications of cholelithiasis. Before entering the operating room, the patient is prepared in advance. Laparoscopic cholecystectomy was then performed under induction of general anesthesia using the intubation technique. The operation took place from 12.50-15-10 WIB. The operation was successful and the patient returned to the room in a stable condition.

Patients who will undergo anesthesia and surgery both elective and emergency must be well prepared because the success of anesthesia and surgery is strongly influenced by pre-anaesthesia preparation. Pre-anesthesia visits for elective surgery are generally carried out 1-2 days in advance, while for emergency surgery the available time is shorter. The objectives of the pre-anesthesia visit are to prepare the patient's mental and physical optimally by taking anamnesis, physical examination, laboratory, and other examinations. Planning and selecting anesthetic techniques and drugs according to the patient's physical condition and wishes. Thus, complications that may occur can be minimized [8].

Premedication is the act of administering preliminary drugs in the context of administering anaesthesia. The purpose of giving premedication are to create a sense of comfort in the patient (relieve worries, provide calm, create amnesia, provide analgesia), to facilitate induction, maintenance, and awakening of anesthesia, reducing the amount of anesthetic drugs., reduces the incidence of hypersalivation, brachycardia, post-anesthesia nausea and vomiting, reduce physiological stress (tachycardia, rapid

breathing, etc.), and reduces gastric acid production [8]. The pre-medication used to this patient is viccilin 1,5 gram.

After preparing the patient and giving the premedication, the patient is taken to the operating room. Before the laparoscopic cholecystectomy was performed, the patient was anesthesized with general anesthesia endotracheal tube. Induction of anesthesia is the act of turning the patient from conscious to unconscious, thereby enabling the initiation of anesthesia and surgery. The drug that was induced in this patient was propofol After the patient sleeps due to induction of anesthesia, it is immediately followed by maintenance of anesthesia until the surgery is complete[9].

Laparoscopy is a minimally invasive surgical procedure by introducing CO2 gas into the peritoneal cavity to create a space between the anterior abdominal wall and the viscera, thereby providing endoscopic access into the peritoneal cavity. Laparoscopic preoperative procedures are similar to conventional surgery. The patient has to fast four to six hours beforehand, made a lot of bowel movements to deflate the intestines. Before fasting the laparoscopic patient is given liquid or porridge food, food that is easily absorbed, but low in residual, to reduce the amount of waste in the digestive tract. After the patient is anesthetized, the first operation performed is to make an incision under the umbilical fold of 10 mm, then a needle is inserted. veres is injected to introduce CO2 gas to a limit of approximately 12-15 millimeters of Hg. By giving the CO2 gas, the patient's stomach will swell. It aims to push the intestines down and create space in the stomach. After the stomach is filled with CO2 gas, a trocar is inserted. The device is like a tube with a valve for access to cameras and other tools during surgery. It is through the trocar that tools, such as scissors, ultrasonic blades, and cameras, are inserted and moved. The video shows how a needle to suture organs that are cut or bleeding is inserted through the trocar. In addition, there are clips made of titanium, which are safe and can be used instead of stitches. The clip serves to connect two separate parts. The titanium clip will be fixed in the body permanently, for life [3].

The selection of the type of anesthesia takes into several factors, including age, gender, physical status, type of surgery, operator skills and equipment used, skills/ability to

administer anesthesia and its facilities, hospital status, and patient requests. Currently, about 70-75% of operations in hospitals are performed under general anesthesia. Operations around the head, neck, chest, and abdomen are best performed under general inhalation anesthesia with the insertion of an endotracheal tube, since it is known that with this method the airway can be well controlled at all times. Regional anesthesia is not used routinely in laparoscopic procedures, because of irritation of the diaphragm from CO2 insufflation. can cause pain in the shoulder, plus the healing time for complete return of function can be long. With low-dose lidocaine and spinal opioid techniques, one study found that postoperative pain after gynecological laparoscopy was less than with general anesthesia with desflurane. Patients usually undergo a laparoscopic procedure under general anesthesia using a standard monitor. Noninvasive blood pressure measurement and capnography are important to follow the effects of hemodynamics and pneumoperitoneum on respiration and position changes. In laparoscopic cholecystectomy, the patient will be placed on an NGT for gastric decompression so that the visual field of the operation looks clearer[3].

Increasing experience with the laparoscopic technique has made most contraindications relative rather than absolute. However, it is probably best to avoid or to use extreme caution in patients with a coagulopathy, a diaphragmatic hernia, severe cardiovascular or pulmonary disease (including bullae), morbid obesity, increased intracranial pressure or space-occupying masses, a retinal detachment, acute glaucoma, impending renal shutdown, a history of extensive surgery or adhesions, sickle cell disease (because sickle crisis may be precipitated by acidosis), peritonitis, a large intra-abdominal mass, a tumor of the abdominal wall, or hypovolemic shock. Patients with shunts (e.g., ventriculoperitoneal) are at risk for gas emboli, shunt obstruction, and intracranial hypertension, all of which may occur during laparoscopy and may require intracranial pressure monitoring and ventricular drainage if laparoscopic surgery is necessary. In summary, most of the contraindications concern patients who are unable to tolerate extremes of position, pneumoperitoneum, and/or hypercarbia. Pregnancy is no longer considered a contraindication to robotic surgery. In order to preserve fetal and maternal wellbeing and to prevent premature labor, the anesthesiologist must weigh the effects of hypercarbia, pneumoperitoneum and extreme positions on the parturient who may

present with increased blood volume, increased cardiac output, decreased systemic vascular resistance (SVR), hypercoagulability, the supine hypotensive syndrome, increased respiratory minute volume, decreased residual volume, decreased functional residual capacity (FRC), increased oxygen consumption, mild hypocapnia, increased risk of aspiration, and decreased anesthetic requirement. This combination of factors tends to promote hypercarbia and hypoxemia. However, extreme hyperventilation may result in decreased uteroplacental perfusion. Arterial blood gas monitoring has been suggested to detect fetal acidosis because capnography may not reveal a large arterial to end-tidal difference in CO2 . In all cases, preoperative and postoperative fetal and uterine monitoring is essential[10].

CO2 is the insufflating gas of choice because it is nonflammable, does not support combustion, readily diffuses across membranes, is rapidly removed in the lungs, and is highly soluble because of rapid buffering in whole blood. The risk of CO2 embolization is small. As much as 200 mL of CO2 injected directly into a peripheral vein may not be lethal, whereas only 20 mL of air may prove to be so. In addition, CO2 levels in blood and expired air can easily be measured, and its elimination can be facilitated by increasing ventilation. As long as oxygen requirements are met, a high concentration of blood CO2 can be tolerated. Also, medical grade CO2 is readily available and inexpensive. It is for these reasons that the following gases are unsatisfactory for pneumoperitoneum: N2O (does not cause pain intra-abdominally but does not suppress combustion); oxygen (flammable); helium, air, and nitrogen (each has no hemodynamic or acid–base sequelae but can cause gas emboli); and argon (adverse effect on hepatic blood flow, emboli). It should be emphasized, however, that CO2 plays a dual role in the body, and it is not inert. Under normal circumstances, it is an intrinsic waste product of metabolism. During laparoscopic surgery, it acts as an extrinsic drug often present in quantities far larger than the body is physiologically capable of generating even with the most extreme exercise or hypermetabolic state. The disadvantages mainly stem from the fact that CO2 is not inert, and it has contradictory roles as an endogenous chemical and as an exogenous foreign substance. Changes in its concentration and tensions have enormous biochemical and physiologic consequences. Changes at the local tissue level are often at odds with the overall systemic effect. It causes direct peritoneal irritation

and pain during laparoscopy under local anesthesia because it transiently forms carbonic acid when in contact with the moist peritoneum. In addition, CO2 is not very soluble in the absence of red blood cells, and therefore, it can remain in gaseous form intraperitoneally (subhepatic) after laparoscopy, causing referred shoulder pain. Hypercarbia and respiratory acidosis occur when the buffering capacity of blood is temporarily exceeded. In addition, CO2 exerts widespread local and systemic effects that may manifest overall as hypertension, tachycardia, cerebral vasodilation, hypercarbia, and respiratory acidosis [10].

CO2 and water are the major end products of aerobic metabolism in the mitochondria of the cells. Carbonic acid, the major acid produced in the body, is uniquely volatile, and therefore, it must be eliminated mainly by the lungs. (Other acids are eliminated by the kidney.) At basal rate, an average adult manufactures approximately 200 mL of CO2 per minute (while consuming 250 mL of oxygen) or 12 L of CO2 (35 g) per hour. At maximal metabolic rate, it is estimated that the body can produce, transport, and excrete 90 to 100 L per hour, an 800% increase over the basal rate.

The body contains approximately 120 L of stored CO2 , most of it in the form of carbonate ion in bone. (This is approximately 100 times the amount of stored oxygen.) CO2 in the blood is in equilibrium with CO2 in different tissues. The rate of uptake and distribution of CO2 from the blood (where it exists as bicarbonate ion) depends on the perfusion and storage capacity of those different tissues. The well-perfused tissues, including brain, kidneys, and blood, come to rapid equilibrium. The medium-perfused compartment consists mainly of resting skeletal muscle. The slowly perfused compartment, mainly fat and bone (where it exists as the carbonate ion), has the largest CO2 storage capacity. In contrast to rapidly changing oxygen levels, CO2 levels reach equilibrium more slowly. These storage sites serve to buffer and stabilize blood CO2 levels because they provide a place for excess CO2 to “park” until ventilation can catch up and restore equilibrium. The increase in CO2 storage during laparoscopy is illustrated clinically by the decelerating rate of rise in EtCO2 despite continuing insufflation. Blood or end-tidal CO2 levels increase rapidly at first and plateau between 15 and 35 minutes despite continuing low flow insufflation. At constant ventilation,

CO2 levels increase but not as much as if no simultaneous storage processes were occurring. But if ventilation is increased to keep CO2 constant, then the increase needed is only approximately 40% of the predicted volume of ventilation because of the drain off of CO2 into the storage sites [11].

After the operation is complete, the patient is taken to the recovery room or to the intensive care room (if indicated). In general, extubation is best performed while the patient is under light anesthesia or awake. In the recovery room, monitoring of general condition, consciousness, blood pressure, pulse, breathing, temperature, pain sensibility, bleeding from drains, and so on is monitored. The patient was also given medication to help stabilize the postoperative condition in the form of fentanyl, ketorolac, ondansetron, tramadol, atropine sulfate, neostigmine and dexamethasone. Check blood pressure, pulse rate, and respiratory rate at least every 5 minutes for the first 15 minutes or until stable, then every 15 minutes. Pulse oximetry is monitored until the patient regains consciousness. Temperature checks were also carried out [12].

Conclusion

Cholecystectomy is indicated in symptomatic patients with proven cholelithiasis. Laparoscopic indications for cholecystectomy are the same as for open cholecystectomy. Because minimally invasive techniques have diagnostic and therapeutic applications in many surgeries, laparoscopic surgery is increasing in use in both inpatient and outpatient settings. While the laparoscopic procedure has advantages for the patient, it is also a challenge for the anesthesiologist. Laparoscopic technique or minimally invasive surgery is expected to be a future surgical trend. In laparoscopic cholecystectomy, the type of anesthesia recommended is general anesthesia with endotracheal intubation with preoperative prophylactic antibiotics to treat biliary pathogens.

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CONFLIC OF INTEREST

There is no compeing interest regarding the manuscript.

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AUTHOR CONTRIBUTION

All authors contribute to the study from the conceptual framework, data acquisition, data analysis, until reporting the study results through publication

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