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Laparoscopic Cholecystectomy under Segmental Thoracic Spinal Anesthesia

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ABSTRACT

Introduction: Cholelithiasis or gallstones are hardened deposits of digestive fluid that can form in gallbladder. The treatment of gallstones depends upon the stage of disease. Once gallstones become symptomatic, definitive surgical intervention with cholecystectomy is usually indicated (typically, laparoscopic cholecystectomy is the first-line therapy). Laparoscopic cholecystectomy removes the gallbladder and gallstones through several small incisions in the abdomen. This case report aims to discuss the managent of segmental thoracic spinal anesthesia in laparoscopic cholecystectomy. **Case:** We report on the cases of 2 patients who undego elective laparoscopic cholecystectomy. Female, 53 years old, will undergo laparoscopic cholecystectomy, performed anesthesia with segmental thoracic spinal anesthesia technique using the anesthetic agent 3 ml of Levobupivacaine 0,5% + 25 mcg of Fentanyl, requiring a sensory block to at least T10-T11 dermatom. Patients received a 1,2 mcg target control infusion (TCI) propofol intravenous is administered as intermittent boluses to achieve deep sedation. The operation lasts 1 hour, with a bleeding 15 cc and urine output 100 cc, hemodynamically stable. Female, 42 years old, will undergo laparoscopic cholecystectomy, performed anesthesia with segmental thoracic spinal anesthesia technique using the anesthetic agent 3 ml of Levobupivacaine 0,5% + 25 mcg of Fentanyl, requiring a sensory block to at least T10-T11 dermatom. Patients received a 3 mg of midazolam intravenous is administered as intermittent boluses to achieve deep sedation. The operation lasts 1 hour, with a bleeding 15 cc and urine output 150 cc, hemodynamically stable. The level and duration of sensory block, intensity and duration of motor block were recorded. A 20 % or more decrease in MAP compared to baseline was considered as hypotension, iv ephedrine 5 mgr bolus administreted. **Conclusion:** Laparoscopy is a surgical procedure that uses minimally invasive surgical techniques (minimally invasive surgery) where the doctor uses a small telescope / camera that is inserted into the stomach and surgical instruments in mini form. This procedure has many advantages because it is not invasive, the amount of bleeding can be reduced, postoperative pain can be minimized. Regional anesthesia procedure in laparoscopic cholecystectomy based on several studies and case reports can be performed and is a safe procedure.

1. Introduction

Cholelithiasis is the medical term for gallstone disease. Gallstones are concretions that form in the bile duct, usually in the gallbladder. Cholelithiasis can be divided into several stages, asymptomatic (presence of gallstones without symptoms), symptomatic (biliary colic), and complex (causing cholecystitis, choledocolitiasis, and cholangitis). About 60-80% of cholelithiasis is asymptomatic. Cholecystectomy is the only definitive therapy for symptomatic stones, which is removing the stones and gall bladder, to prevent recurrence of the disease.[1]

The operative technique can be open cholecystectomy or laparoscopic cholecystectomy. Laparoscopic cholecystectomy is the standard for the management of cholelithiasis patients. Laparoscopic cholecystectomy is associated with small skin incisions making the postoperative condition more pleasant for the patient. This technique offers many advantages of improving patient recovery with

reduced pain, shorter hospital stay time, and faster return to normal daily activities. This approach is also more cost effective for health providers.[2]

In practice, laparoscopy is usually performed under general anesthesia, but regional anesthesia have proven useful. Spinal anesthesia is more effective than general anesthesia, especially in laparoscopic cholecystectomy. The addition of fentanyl as an adjuvant to reduce the need for bupivacaine doses and shorten the onset time of the anesthetic blockade, thus eliminating the side effects of larger doses and bupivacaine which can improve block quality. Spinal fentanyl is often combined with local anesthetics to add to the sensory block of spinal anesthesia. Different sedation treatments in cases using propofol which provides a strong sedative effect and midazolam provides a moderate sedative effect. The use of the agent intravenously helps to keep the patient calm and relaxed during surgery. The use of propofol has been shown to provide less postoperative side effects.[3]

2. Case Presentation

The female patients, 52 years old, is admitted to Dr Mohammad Hoesin Palembang with complaints of upper right abdominal pain. The patient also complained that jaundice all over the body since ± 11 months, nausea (+), vomiting (+), fever (+). BAB is black, the BAK is dark yellow. The patient treated and said there was a stone in the gallbladder, so that she advised to control regularly and take medication. In the last month, the patient also complains of upper right abdominal pain, nausea (+), vomiting (+), and she suggested for surgery. The patient did not have a history of hypertension, diabetes mellitus, allergies, and asthma. No patient's family experiences anything like a patient.

On physical examination, it was found that the patient was sick and conscious. Blood pressure 120/80 mmHg, pulse rate 70 times per minute, temperature 36,0oC, breath rate 18 times per miute. Normal head. Both conjunctiva are not anemic; the sclera is not icteric. The neck does not feel enlarged lymph nodes. Normochest chest shape left and right symmetrical on static an dynamic examination, and from auscultation of bronchovesicular breath sounds, there was no ronchi or wheezing in both lungs. Adomen and extremities within normal limits.

On supporting examination showed Hb 11.3 Leukocytes 8270 Ht 34 Platelets 252000 ESR 41 Direct bilirubine 0.10 Indirect bilirubine 0.30 Total bilirubine 0.40. On abdominal ultrasound examination, multipel cholelithiasis with cholesistitis. Radiological examination within normal limits. Electrocardiography within normal limits.

Anaesthetic management was performed with controlled breath intubation technique using the anaesthetic agent 1,2 mcg of TCI propofol titration until the patient fall asleep, 3ml of levobupivacaine 0,5% and 25 mcg of fentanyl. The operation lasts 1 hour 30 minutes with a bleeding 15 cc. During intraoperative hemodynamics is relatively stable. After the procedure, the patients return to the room.

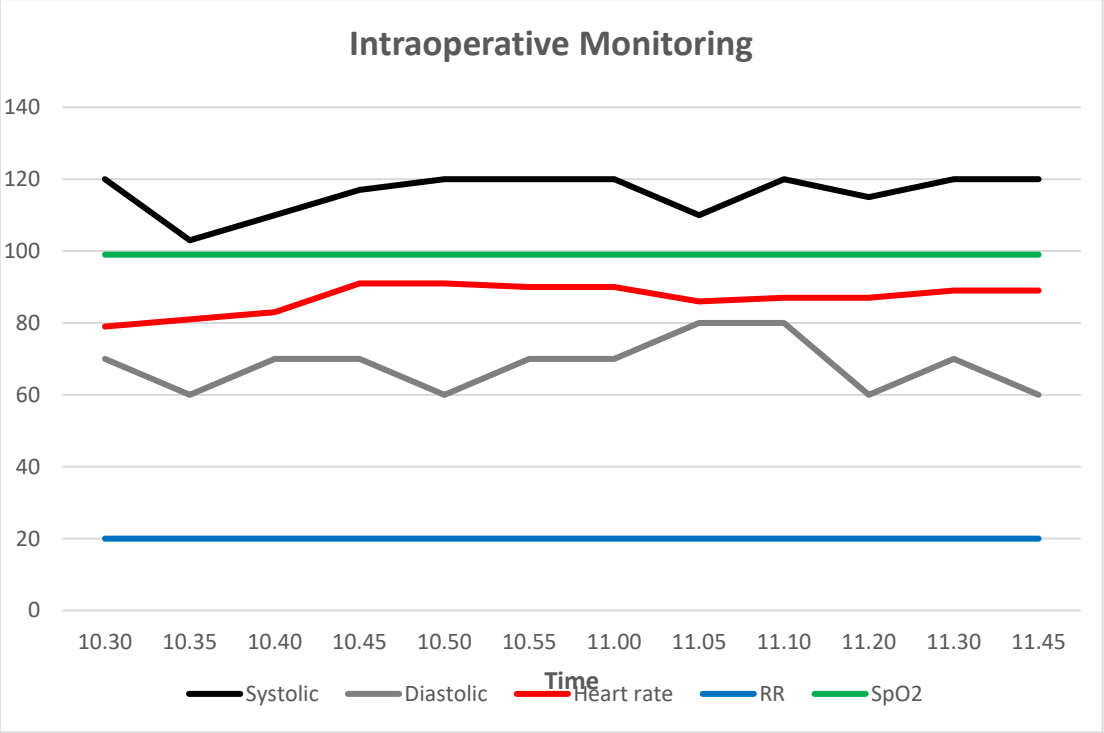

Figure 1. Hemodynamic monitoring.

The female patients, 42 years old, is admitted to Dr Mohammad Hoesin Palembang with complaints of upper right abdominal pain. The patient also complained that jaundice all over the body since ± a year, nausea (+), vomiting (+), fever (+). The patient treated and said there was a stone in the gallbladder, so that she advised to control regularly and take medication. Ten days ago, the patient also complains of upper right abdominal pain, nausea (+), vomiting (+), and she suggested for surgery. The patient did not have a history of hypertension, diabetes mellitus, allergies, and asthma. No patient's family experiences anything like a patient.

On physical examination, it was found that the patient was sick and conscious. Blood pressure 120/70 mmHg, pulse rate 86 times per minute, temperature 36,0oC, breath rate 18 times per miute. Normal head. Both conjunctiva are not anemic; the sclera is not icteric. The neck does not feel enlarged lymph nodes. Normochest chest shape left and right symmetrical on static an dynamic examination, and from auscultation of bronchovesicular breath sounds, there was no ronchi or wheezing in both lungs. Adomen and extremities within normal limits.

On supporting examination showed Hb 13.0 Leukocytes 7900 Ht 41 Platelets 263000 ESR 19 Direct bilirubine 0.30 Indirect bilirubine 0.50 Total bilirubine 0.80 AST 19 APT 14 Ureum 13 Creatinine 0.71 Natrium 145 Potassium 4.2. Radiological examination within normal limits. Electrocardiography within normal limits.

Anaesthetic management was performed with controlled breath intubation technique using the anaesthetic agent 3 mg of midazolam and 0.25 mg of atropine sulfate until the patient fall asleep, 3ml of levobupivacaine 0,5% and 25 mcg of fentanyl. The operation lasts 1 hour 30 minutes with a bleeding 15 cc. During intraoperative hemodynamics is relatively stable. After the procedure, the patients return to the room.

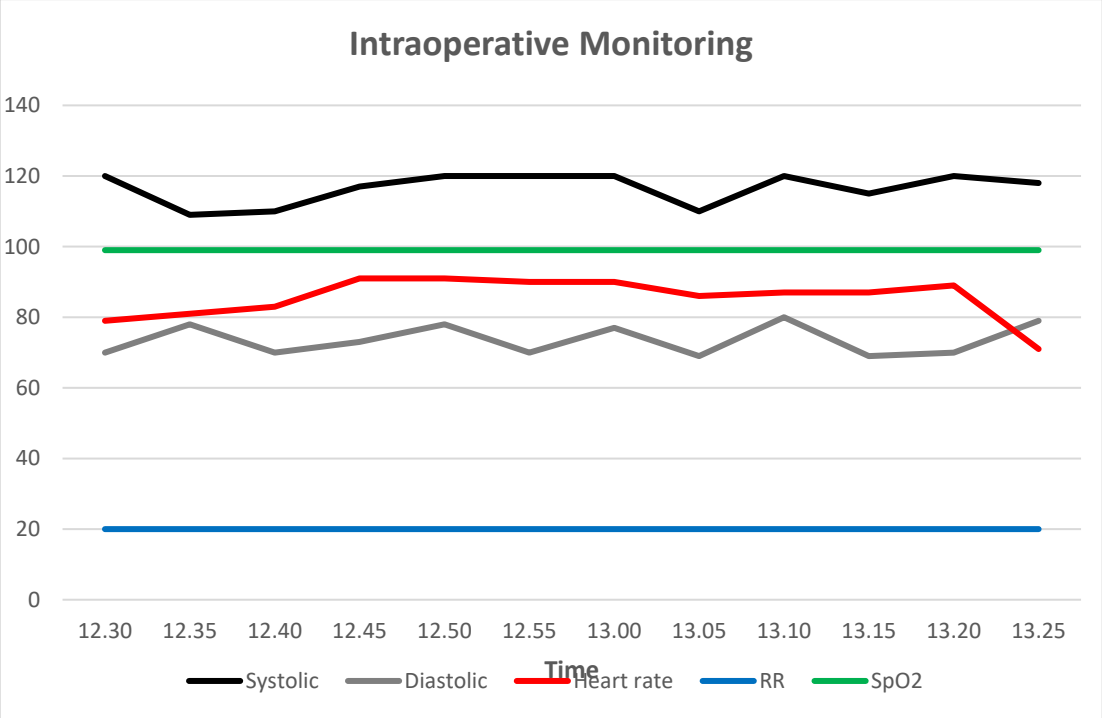

Figure 2. Hemodynamic monitoring.

3. Discussion

The preoperative evaluation focused on identifying patients with severe lung disease and impaired heart function. In this case report, both patients used a thoracal segmental spinal anesthetic technique with a 10-11 thoracal puncture with a size 27 of spinocaine with a dose of 3 ml of levobuvipacain 0.5% and 25 µg of fentanyl which differed in the first patient using 1.2 mcg of TCI Propofol and in the second patient 3 mg of midazolam was used for sedation. Both patients were hemodynamically stable intraoperatively and there were no complaints of nausea, vomiting and dizziness.[4,5]

The sedative effect of using propofol has a strong sedative effect and midazolam has a moderate sedative effect. Midazolam which belongs to the benzodiazepine group has a very short half-life, is soluble in water, and a faster recovery process during withdrawal. Midazolam is routinely chosen as a first-line sedative in regional anesthesia, the half-life is about seventy minutes whereas for longer operations it will take more than one hundred minutes to fully recover. The time required for sedation onset and recovery is much faster with propofol compared to midazolam under spinal anesthesia.[6,7]

The patient's clinical response can be assessed through a sedation score, one of which is the Modified Ramsay Sedation Scale (RSS). The RSS assessment is from a score of 0 to 6, where a score of 0 is paralysis and cannot be evaluated, a score of 1 patient is conscious, a score of 2 patients is in light sedation, a score of 3 patients is moderately sedated and a response to a non-pain stimulus, a score of 4 patients is moderately sedated and responds. for pain stimuli, a score of 5 patients was sedated and responded only to pain stimuli, and a score of 6 patients was sedated and did not respond to pain stimuli. Midazolam administration to 128 (42.52%) of 301 patients had an RSS score of 3, while 173 patients (57.48%) had an RSS score of 2.In the propofol group, 8 (80%) of 10 patients had an RSS score of 3 and 2. patients (20%) had an RSS score of 2.Bagchi et al., found that MAP and HR were significantly lower in patients receiving

propofol than midazolam for sedation during spinal anesthesia.[6,7]

Prior to performing thoracal spinal anesthesia, all patients were monitored with non-invasive blood pressure, oxygen saturation, and all monitored data were recorded at 5 minute intervals. Abucath no 20 placed on the left hand for rehydration and drug administration. Initially, rehydration using 500 mL of Ringer's lactate and administration of 2 g of cephalosporin, 50 mg ranitidine, 40 mg omeprazole, 10 mg dexamethasone, 8 mg ondansetron, and 10 mg metoclopramide before spinal anesthesia. Then, the patient patient was given supplemental oxygen through the nasal canul at a rate of 3 l / m. Fentanyl (1 µg.kgBW) and midazolam (1 mg) were given before spinal anesthesia. After the spinal injection is performed, the patient is placed in a supine position, and the head is tilted downward 20-30 degrees. If the blood pressure drops by more than 20% from the base line, an intravenous infusion of phenylephrine hydrochloride solution, 0.004%, is initiated and titrated for effect. With a ventilator setting of 50% oxygen in the air using a system syringe and a tidal volume of 8-10 ml / kg and the ventilation rate adjusted to maintain a PaCO2 value of 35 to 40 mmHg. Before performing thoracal spinal anesthesia, all patients were monitored with non-invasive blood pressure, saturation. oxygen, and all monitored data were recorded at 5 minute intervals. Abucath no 20 placed on the left hand for rehydration and drug administration. Initially, rehydration using 500 mL of Ringer's lactate and administration of 2 g of cephalosporin, 50 mg ranitidine, 40 mg omeprazole, 10 mg dexamethasone, 8 mg ondansetron, and 10 mg metoclopramide before spinal anesthesia. Then, the patient patient was given supplemental oxygen through the nasal canul at a rate of 3 l / m. Fentanyl (1 µg.kgBW) and midazolam (1 mg) were given before spinal anesthesia. After the spinal injection is performed, the patient is placed in a supine position, and the head is tilted downward 20-30 degrees. If the blood pressure drops by more than 20% from the base line, an intravenous infusion of phenylephrine hydrochloride solution, 0.004%, is initiated and titrated for effect. With a ventilator setting 50% oxygen in the air using a system syringe and a tidal volume of 8-10 ml / kg and the ventilation rate adjusted to maintain a PaCO2 value of 35 to 40 mmHg.[8]

Spinal anesthesia is more effective than standard general anesthesia in postoperative pain control while the patient is hospitalized. In a feasibility study conducted by Van Zundert et al. 2017, it was performed on patients with ASA I or ASA II physical status and aged 18-75 years, and the exclusion criteria were body mass index> 32 kgm2, active cholecystitis, and the presence of contra-conditions. indications for elective surgery or spinal anesthesia. 10 mg of oral diazepam is given 1 hour of operation. The patient was subjected to CSE with a 10 thoracic puncture using a Tuohy no 16 needle and 27 spinocain after the cerebrospinal fluid flow had been confirmed with the correct site, 1 ml of 0.5% bupivacaine (5 mg / ml) and 0.5 ml of sufentanil (5 mg / ml). ml) be deserted. The epidural catheter was then inserted and the tuohy needle was removed and the catheter fixed, leaving 4 cm in the epidural space. Administered oxygen in the nasal canul 4 liters / minute.[8]

The ephedrine administration differed between the first and second patients, where the first patient received 15 mg and the second patient received 20 mg after spinal anesthesia. Ephedrine was administered to the first patient at 10.35 and the second at 12.35. Administration 6 mg of epinephrine bolus intravenously and repeated every 3 minutes to give a titration effect in the event of hypotension (decrease in mean arterial pressure more than 20% decrease in mean arterial pressure). Hypotension and bradycardia can easily be treated with IV ephedrine and atropine. The first patient underwent the operation for 90 minutes and the second patient underwent the operation for about 60 minutes. Laparoscopic cholecystectomy is a gold standard

procedure because of the short operating time, early mobilization, reduced postoperative pain, and quick recovery. A study by Imbelloni et al., 2011 regarding the comparison of bupivacaine doses in laparoscopic spinal cholecystectomy showed differences in the duration of motor and sensory blocks. Decreased duration of motor blocks in relation to sensory blocks by 45.9% with 15 mg of bupivacaine and 33% with 7.5 mg of bupivacaine.[9]

The timing of surgery and any intraoperative incidents were recorded, especially those associated with the type of spinal anesthesia, namely shoulder pain, headache, nausea, and pruritus. Hemodynamic effects, need for nasogastric tube, duration of pneumoperitoneum, duration of anesthesia (from puncture to dressing), and need to increase intraabdominal pressure> 8 mmHg were evaluated in both groups. The time for the block to reach the dermatomal level T3 and the regression time for the sensory and motor blocks were also recorded (Imbelloni, 2011). The sensory block regression time was approximately three hours.[9]

Motor blocks were confirmed using a modified Bromage scale. The quality of motor block during intraoperative value is 3. Bromage scale 0 where the patient is able to lift the extended leg, Bromage scale 1, the patient can only flex the knee, full movement of the ankle; 2, no knee movement, few ankle movements; 3, total paralysis. Sensory and motor blocks were recorded before the operation started and after the operation was completed (Ellakany, 2013).[10]

Postoperative pain was assessed using a visual analogue scale at the time of 1, 2, 4, 8, 12, 24 and 48 hours after the completion of surgery. Both patients had a low pain scale (VAS <1). In both patients, postoperative no neurological sequelae, such as paresthesia. Paresthesia can occur with spinal and peripheral block techniques. Paresthesia can occur with any spinal anesthetic technique, but is potentially more significant when the needle is inserted over the tip of the spinal cord. Thus, thoracic spinal anesthesia is another anesthetic technique that can be used in certain situations.

4. Conclusion

Laparoscopy is a surgical procedure that uses the technique of minimally invasive surgery. This procedure has many advantages because it is not invasive, the amount of bleeding can be minimized, postoperative pain can be minimized. The laparoscopic cholecystectomy procedure can be performed under general anesthesia and regional anesthesia. Regional anesthesia procedure in laparoscopic cholecystectomy based on several studies and case reports can be performed and is a safe procedure performed in healthy patients without comorbidities as well as in patients with respiratory and geriatric disorders. More case reports are needed regarding the effectiveness of the use of regional anesthesia for the laparoscopic cholecystectomy procedure.

5. References

1. Tzovaras, G., Fafoulakis, F., & Pratsas, K. Spinal VS General Anesthesia for Laparoscopic Cholesistectomy Interim Analysis of A Controlled Randomized Trial. American Medical Association, 2008;497-501.
2. Kejriwal AK, Begum S, Krishan G, Agrawal R. Laparoscopic cholecystectomy under segmental thoracic spinal anesthesia: A feasible economical alternative. Anesth Essays Res. 2017 ;11:781-3.
3. Imbelloni, L. Spinal anesthesia for laparoscopic cholecystectomy: Thoracic vs. Lumbar Technique. Saudi Journal of Anaesthesia, 2014 ;8(4), 477.
4. Langoo, S. A., Jan, S., & Ahmad, T. (2019). Thoracic Segmental Spinal Anaesthesia as Useful Alternative to General Anesthesia in Patient with Respitratory Insufficiency: A

Case Study. Journal of Clinical Research in Pain and Anaesthesia, 1-3.

5. Mehta, N., Gupta, S., Sharma, A., & Dar, M. R. (2015). Thoracis Combined Spinal Epidural Anesthesia for Laparoscopic Cholecystectomy in A Geriatric Patient with Ishemic Heart Disease and Renal Insufficiency. Local and Regional Anesthesia, 101-104.
6. F Maliwad J, et al. Sedative effect of propofol and midazolam in surgery under spinal anaesthesia: A comparative study. Indian J Clin Anaesth. 2020;7(1):187–91.
7. Harde M, Gujjar P. Current Sedation Practices in Procedures under Spinal Anaesthesia (SA). Int J Contemp Med Res [IJCMR]. 2019;6(6).
8. Van Zundert, A. J., Stultiens, G., Jakimowicz, J. J., & Van Der Borne, B. Segmental Spinal Anaesthesia for Cholesistectomy in A Patient with Severe Lung Disease. British Journal of Anaesthesia, 2006;464-466.
9. Imbelloni LE, Sanťanna R, Fornasari M, Fialho JC. Laparoscopic cholecystectomy under spinal anesthesia : comparative study between conventional-dose and low-dose hyperbaric bupivacaine. 2011;41–6.
10. Ellakany M. Comparative study between general and thoracic spinal anesthesia for laparoscopic cholecystectomy. Egypt J Anaesth [Internet]. 2013;29(4):375–81.