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Hemodynamic profile of a female patient through a caesarean section and appendectomy with spinal anesthesia in UKI general hospital 2016-2018

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Abstract
Spinal anaesthesia is one of the most frequently used regional anaesthetic techniques, especially for surgical procedures in the lower abdomen and lower extremities, such as in patients with Caesarean section and appendectomy anesthesiologist at the UKI General Hospital. The research design used was cross-sectional, conducted in September 2018, with a sample of 30 respondents from patients with SC and 30 respondents from patients with appendectomy with a total sampling technique of sampling. The study results showed hemodynamic differences in patients with Caesarean section and Appendectomy. It is hoped that the results of this study are expected to be used as basic data as reference material in order to improve the quality of hospital services, especially regarding the care of patients with Caesarean section and Appendectomy with spinal anaesthesia.

Keywords: hemodynamics, caesarean section, appendectomy, spinal anesthesia

Introduction

Spinal anaesthesia is one of the most commonly used regional anaesthetic techniques, especially for surgical procedures in the lower abdomen and lower extremities. Many advantages are obtained from regional anaesthesia techniques, especially spinal anaesthesia, including shorter procedures, faster onset of action, the better quality of sensory and motor blockade, preventing a complete stress response, and reducing intraoperative bleeding [1]. One of the disadvantages of regional spinal anaesthesia is the limited duration of action, whereas we are often faced with operations that require a long time [2]. Spinal anaesthesia also provides several desirable effects, such as sedation, increasing patient comfort during surgery, longer sensory and motor block duration, prolonging the effect of postoperative analgesia, and reducing the incidence of post-anaesthesia shivering [3].

The term section Caesarea comes from the Latin *caedere*, which means to cut or slash. In obstetrics, the term refers to a surgical procedure that aims to give birth to a baby by opening the mother's abdomen and uterus walls [4]. Delivery by Caesarean section is intended for certain medical indications, divided into indications for mothers and babies. Sectio cesarean delivery or Caesarean section should be an alternative to delivery when normal delivery is no longer possible. Although deliveries are in the normal category or uncomplicated labour, if complications occur, the treatment always adheres to the priority of the mother and baby's safety. In this section, Caesarea operation is the last choice of delivery after considering how vaginal delivery is not feasible [5]. Every woman wants her labour to go smoothly and can give birth to a perfect baby. Labour can go normally, but it is not uncommon for the delivery process to experience obstacles and must be carried out through surgery. It means that the fetus and mother are in an emergency condition and can only be saved if delivery is carried out by surgery.

Vaginal delivery is considered a difficult labour process. It tends to be dangerous for the mother-to-be and her baby, so cesarean section, even though it is a method of delivery by performing major surgery on the abdomen, tends to be preferred over delivery through the birth canal (vaginal). Although Caesarean section was still a scary thing in the past, with the development of sophistication in obstetrics, that view began to shift. Now delivery by cesarean section is often a choice of delivery. Data from the WHO Global Survey on Maternal and Perinatal Health 2008 showed 46.2 per cent [6]. Even though the cesarean operation tariff has more than tripled in all regions in China, the increase in cesarean operations is still happening. Even among urban women, 64.1 per cent of all births are by cesarean [7]. The World Health Organization (WHO) sets the average standard for cesarean delivery in a country is around 5-15 per cent per 1000 births in the world. An increase in deliveries by cesarean section in all countries occurred since 2007-2008, namely 110,000 per birth throughout Asia [8].

In Indonesia itself, the incidence of the cesarean section also continues to increase, both in government hospitals and in private hospitals. According to the Indonesian Demographic and Health Survey (IDHS) data, there is an increasing trend of cesarean sections in Indonesia from 1991 to 2007, 1.3-6.8 per cent [9]. Cesarean deliveries in cities are much higher than in rural areas at 11 per cent compared to 3.9 per cent. Births by cesarean section of 9.8 per cent of the total 49,603 births from 2010 to 2013, with the highest proportion in DKI Jakarta (19,9%) and the lowest in Southeast Sulawesi (3,3%) [8]. In general, the pattern of delivery by cesarean section according to

the characteristics shows the highest proportion in the top ownership index quintile (18.9%), living in urban areas (13.8%), employment as an employee (20.9%) and higher education/graduated from PT (25.1%) [10]. Caesarean section surgery is often performed as an elective or emergency surgery. The most common indications are failure to progress in opening the birth canal, fetal distress, cephalopelvic disproportion, abnormal fetal position, premature birth, and a history of previous cesarean section [11].

Acute appendicitis is a bacterial infection of the appendix (appendix). Various factors play a role as the originator. Blockage of the lumen of the appendix is a factor proposed as a triggering factor in addition to hyperplasia of lymph tissue. Tumours of the appendix and Ascaris worms can also cause blockage. Another cause that is thought to cause appendicitis is the mucosa erosion of the appendix due to parasites such as Entamoeba histolytica. Epidemiological research shows the role of eating habits low in fibre and the effect of constipation on the incidence of appendicitis. Constipation will increase intracecal pressure, which results in the emergence of functional blockage of the appendix and increased growth of normal colonic flora [12]. All of these facilitate the onset of acute appendicitis.

Appendicitis can be found at all ages, only in children less than one-year-old. The highest incidence is in the 20-30 year age group, after that it decreases. The incidence of men is 1.4 more than women [13]. Appendicitis in Asia and Africa in 2004 was 4.8% and 2.6% of the total population [14]. The incidence of appendicitis in Indonesia was 596,132 people with a percentage of 3.36% and increased in 2010 to 621,435 people with 3.53% [15]. Appendicitis is the second-highest non-communicable disease in Indonesia in hospitalization. Inflammation of the appendix is an inflammatory disease (inflammation) in the digestive system, which is generally an emergency measure; appendicitis is an acute inflammation of the vermiform appendix.

Appendectomy (surgery to remove the appendix) should be performed as soon as possible to reduce the risk of perforation. This surgical procedure will cause pain in postoperative patients with appendicitis. Along with the development of medical technology, surgical techniques for appendicitis can be performed with open surgery or laparoscopy. Open surgery is a surgical technique with a 2-3 inch (5-7 cm) long incision in the right lower quadrant (Davis-Rockey) or oblique incision (McArthur-McBurney). In contrast, laparoscopy is a minimally invasive surgery (action by making small incisions) that require the help of cameras, monitors and special instruments to perform surgery through the monitor screen [16]. The choice of the anaesthetic technique used in spinal anaesthesia has its advantages and disadvantages. The choice of anaesthesia depends on the indication for surgery the degree of urgency (urgency).

Based on the description of the background above, the problems that can be formulated are: "What is the hemodynamic profile of female patients who underwent cesarean section and appendectomy with spinal anaesthesia at UKI General Hospital in 2016-2018?" This study aimed to determine the hemodynamic profile of female patients who underwent cesarean section and appendectomy with spinal anaesthesia at UKI General Hospital in 2016-2018.

Literature Review

Caesarean section surgery using spinal anaesthesia has side effects, one of which is the most common is hypotension due to sympathetic block from local anaesthetic drugs that act in the subarachnoid space. Before spinal anaesthesia, this hypotension can be prevented by preloading (giving fluids). Several previous studies have shown that the administration of colloid fluids is more effective than crystalloids in preventing and treating hypotension due to spinal anaesthesia. Colloids are fluids that can immediately fill the void of intravascular fluid and last longer than crystalloids [17].

This study was conducted to determine the effect of different types of colloidal Hydroxyethyl starch (HES), which have different molecular weights and degrees of substitution, namely HES 130/0.4 (6%) and HES 200/0.5 (6%) on blood pressure in sectio patients. Caesarean section under spinal anaesthesia. Rough estimation by measuring systolic blood pressure, diastolic, and mean arterial pressure (MAP) assessed in this study is expected to indirectly indicate the state of hemodynamic changes between the two groups [18].

Appendicitis is inflammation of the appendix. Appendicitis is the most common cause of acute inflammation in the right lower quadrant of the abdominal cavity for emergency abdominal surgery. Many research results from experts state that food mistakes can interfere with some of the body's work until finally, either directly or indirectly, in a certain period. It can cause various diseases, such as chronic diseases of the heart, lungs, high blood pressure (hypertension), diabetes, stomach and intestinal disease (peptic ulcer disease), obesity (obesity), depression, tumours, cancer, etc. It could be because humans eat too much, too much salt, too much sugar, too much fat and cholesterol, too many food additives, alcohol and smoking. The appendix is removed. If the appendix is perforated freely, the abdomen is washed with physiological saline and antibiotics. An appendicular abscess is treated with IV antibiotics, the mass may shrink, or the abscess may require drainage within a few days. Appendectomy is performed if the abscess is elective surgery after six weeks to 3 months [19].

Observation Vital signs to determine the occurrence of internal bleeding, shock, hyperthermia or respiratory problems: a) Lay the patient in a semi-Fowler's position; b) The patient is said to be good if within 12 hours there is no disturbance while the patient is fasting; c) If the operation is larger, for example in perforation, fasting is continued until bowel function returns to normal; d) Give drinking starting at 15 ml/hour for 4-5 hours then increase to 30 ml/hour. The next day give filtered food and the next day given soft food; e) One day after surgery, the patient is advised to sit upright in bed for 2x30 minutes; and f) On the second day, the patient can

stand and sit outside the room. On the seventh day, the stitches can be removed, and the patient is allowed to go home.

Appendectomy should be performed within a few hours of the diagnosis. If the appendix has perforated, especially with generalized peritonitis, adequate fluid resuscitation and broad-spectrum antibiotics may be required several hours before appendectomy. Nasogastric suction should be used if there is severe vomiting or flatulence [20]. Antibiotics should cover commonly found organisms (Bacteroides, Escherichia coli, Klebsiella, and pseudomonas species). The regimens often used intravenously are Ampicillin (100 mg/kg/24 hours), Gentamicin (5 mg/kg/24 hours), clindamycin (40 mg/kg/24 hours), or Metronidazole (30 mg/kg/24 hours). o'clock). Appendectomy is performed with or without peritoneal fluid drainage, and antibiotics are continued for 7-10 days [21]. Appendectomy is the best treatment for patients with appendicitis. There are two types of appendectomy procedures: open appendectomy and laparoscopic appendectomy. Open appendectomy is by slicing the skin of the McBurney area until it penetrates the peritoneum, while Laparoscopic Appendectomy is performed using a laparoscope inserted through a small hole in the abdominal wall.

The advantages of Laparoscopic Appendectomy are smaller abdominal wall wounds, faster length of stay, a faster recovery process, and less impact of surgical wound infection. If the appendectomy has no complications, the patient can be discharged the same day if the temperature is within normal limits and the operating area is comfortable. If complications aggravate the patient's condition, the client must be maintained in the hospital and monitored closely. Several possible complications that aggravate the postoperative condition of appendicitis are peritonitis, pelvic and lumbar abscesses, subphrenic abscesses (abscesses under the diaphragm), illeus (paralytic and mechanical) [22].

There is no standard incision for laparoscopic appendectomy. The appendix is a moving part and can be found in various areas in the right lower quadrant. The surgeon must determine the location of the appendix using several physical assessments to determine the ideal incision site. Laparotomy appendectomy is a conventional procedure by opening the abdominal wall. This action is also used to see if there are complications in the appendix tissue or around the appendix. Laparotomy is performed by removing the infected appendix through an incision in the lower right region of the abdomen with an incision width of about 3 inches [23]. After finding the infected appendix, the appendix was cut and removed from the abdomen.

Laparoscopic appendectomy is the most widely used minimally invasive surgical procedure in cases of acute appendicitis. The action of appendectomy using laparoscopy can reduce patient discomfort if using the open appendectomy method, and patients can carry out postoperative activities more effectively. Laparoscopic appendectomy is no longer necessary to dissect the patient's abdominal cavity. This method simply involves inserting a laparoscope into a small tube (called a trocar) inserted through the umbilicus and monitored through a monitor screen [24]. The next two trocars will act on cutting the appendix.

Good knowledge of the anatomy of the vertebral column is one of the success factors for spinal anaesthesia. In addition, knowledge of the local distribution of analgesics in the cerebrospinal fluid and the level of analgesia is required to maintain the safety of spinal anaesthesia. The vertebral column consists of 33 vertebral bodies: 7 cervical, 12 thoracics, five lumbar, five sacral and four coccygeal [25]. The vertebral column has four indentations: cervical lordosis, thoracic kyphosis, lumbar lordosis, and sacral kyphosis. The curvature of the vertebral column affects the spread of local analgesic drugs in the subarachnoid space. The highest point is on the third lumbar vertebra in the supine position, and the lowest is on the 5th thoracic. The layers that must be penetrated to reach the subarachnoid space from the outside are the skin, subcutis, supraspinous ligament, ligament flavum and dura mater. The arachnoid lies between the dura mater and pia mater and follows the brain to the spinal cord, and is attached to the dura mater. Between the arachnoid and pia mater, there is a subarachnoid space. The dura mater and arachnoid end as a tube at the second sacral vertebra so that below this boundary, there is no cerebrospinal fluid. The subarachnoid space is a cavity located along the spine containing cerebrospinal fluid, fatty tissue, blood vessels and spinal nerve fibres originating from the spinal cord. In adults, the spinal cord ends on the underside of the lumbar vertebrae.

Spinal anaesthesia is regional analgesia by blocking root nerve in the subarachnoid space with local anaesthetic drugs. This anaesthetic technique has become popular because it is considered simple and effective, safe for the nervous system. The drug concentration in plasma is not dangerous. It has several advantages, including a strong level of analgesia, the patient remains conscious, sufficient muscle relaxation, less surgical wound bleeding, the risk of aspiration in patients with a full stomach is less, and the recovery of gastrointestinal function is faster [26]. Spinal anaesthesia causes temporary obstruction of nerve transmission in the subarachnoid space due to injecting local anaesthetics into the cerebrospinal fluid. Several names for spinal anaesthesia have been introduced, including spinal analgesia, subarachnoid analgesia, spinal block, arachnoid block, subarachnoid and lumbar anaesthesia.

The indications that can be done are surgery on the lower extremities, pelvic area, perineum and lower abdomen. In addition, a Caesarean section can be performed. For contraindications that can appear are as follows: a) Infection at the puncture site; b) Sepsis or bacteremia; c) Shock or severe hypovolemia; d) Prior neurologic disease of the spinal cord; e) Increased intracranial pressure; f) Disorders of blood-clotting mechanisms, and g) Patients who refuse or patients who are not cooperative or with psychosis. The factors that influence the spread of local anaesthetics in the cerebrospinal fluid are age, height, weight, gender, intra-abdominal pressure, vertebral column anatomy, position, injection technique, and injection site. Preparation for spinal analgesia is like preparation for general anaesthesia. The area around the puncture site is examined whether it will cause

difficulties, for example, if there is an anatomical abnormality of the spine or the patient is so obese that the spinous process protrusion cannot be felt. In addition, it is necessary to pay attention to the following matters: informed consent, physical examination, recommended laboratory examinations. Complications of spinal anaesthesia are divided into early complications and delayed complications.

Research Method

This research is a retrospective analytic study with a research design using a cross-sectional research design by collecting data on research subjects in the form of samples obtained from the patient's medical record. The science scope includes Anesthesia, Obstetrics and Gynecology, carried out from July to December 2018 with the research location at UKI General Hospital. The research location will be conducted at UKI General Hospital in September 2018. The population in this study was 60 patients who underwent Caesarean section and Appendectomy surgery. The research sample is a subject from a population that meets the sample criteria. The sampling technique used in this study is one of the consecutive non-random sampling techniques. Data collection is collected through the patient's medical record. In processing and analyzing data, researchers will use the SPSS program. SPSS is one of the most frequently used program packages for "data entry". The data analysis of this research is a univariate analysis. This analysis is used to describe the distribution of the frequency and percentage of each variable studied to describe the characteristics of the research subjects in the form of Hemodynamic profile of patients undergoing Caesarean section and Appendectomy with Spinal Anesthesia. The percentage distribution of the frequency of each variable is calculated using the following formula:

$$f = \frac{x}{N} \text{ x } 100\ \%$$

Description

f= frequency
x= amount obtained (variable studied)
n= population

Result and Discussion

This section will describe the results of the study and discuss the hemodynamics profile of female patients who underwent cesarean section and appendectomy with spinal anaesthesia at UKI General Hospital in 2016-2018. Based on research obtained before spinal anaesthesia with a sample of 30 patients at Caesarean section, the average: consciousness: composmentis (fully conscious), blood pressure: 120/79 ± five mmHg, the pulse rate: 70 ± 6x/minute, respiratory rate: 18 ±2x/minute. Meanwhile, in appendectomy patients with a sample of 30 patients, the average consciousness was: composmentis (fully conscious), blood pressure: 115/83 ±4 mmHg, the pulse rate: 75 ±5x/minute respiratory rate: 20 ±2x/minute.

The univariate analysis results aimed to determine the frequency distribution of each variable studied after spinal anaesthesia was carried out, namely the variables of consciousness, blood pressure, Heart rate, and respiratory frequency. The number of respondents in each group was 30 respondents at the UKI General Hospital. The results of the univariate analysis in this study consist of:

Table 1: Profile of Conscious Levels of Female Patients Undergoing Caesarean section and Appendectomy after Spinal Anesthesia at UKI General Hospital 2016-2018

Variable	Frequency		%	
	Caesarean section **(n=30)**	***Appendectomy*** **(n=30)**	***Caesarean section*** **(n=30)**	***Appendectomy*** **(n=30)**
Composmentis Conscious Levels	30	30	100	100

Table 1 shows that female patients who underwent cesarean section and spinal appendectomy at UKI General Hospital had the majority of patient's level of consciousness in each composmentis group, namely 100% (30 respondents) for Caesarean section and 100% (30 respondents) appendectomy.

Table 2: Profile of Blood Pressure of Female Patients Undergoing Caesarean section and Appendectomy after Spinal Anesthesia at UKI General Hospital 2016-2018

Variable	Frequency		%	
	Caesarean section **(n=30)**	***Appendectomy*** **(n=30)**	***Caesarean section*** **(n=30)**	***Appendectomy*** **(n=30)**
Blood pressure				
a. <120/80	20	18	66,7	60,0
b. 120/80	3	1	10,0	3,3
c. >120/80	7	11	23,3	36,7

Based on the table above, it was found that most of the blood pressure of female patients who underwent cesarean section and appendectomy <120/80 mmHg, namely 66.7% (20 respondents) who underwent cesarean section and 60% (18 respondents) who underwent appendectomy. In comparison, respondents who had blood pressure > 120/80 mmHg were more than respondents who underwent appendectomy, which was 36.7% (11 respondents). In general, respondents who have normal blood pressure (120/80mmHg) are respondents who undergo Caesarean section, which is 10% (3 respondents).

Table 3: Profile of the Average Heart Rate of Female Patients Undergoing Caesarean section and Appendectomy after Spinal Anesthesia at UKI General Hospital 2016-2018

Groups	Variables	n	Mean	Standard deviation	Min-Max
Caesarean section	Heart Rate	30	82,63	10,040	64-100
Appendectomy	Heart Rate	30	85,00	14,589	60-129

Based on the table above, there are differences in the average Heart Rate of female patients who underwent cesarean section and appendectomy with spinal anaesthesia. In the section caesaria group, the average pulse rate was 82.63x/minute with a standard deviation of 10.040. The lowest pulse rate is 64x/minute, and the highest pulse rate is 100x/minute. Furthermore, the average pulse rate in the appendectomy group was 85x/minute with a standard deviation of 14,589, the lowest pulse rate was 60x/minute, and the highest Heart Rate was 129x/minute.

Table 4: Profile of the Average Respiratory Rate of Female Patients Undergoing Caesarean section and Appendictomy after Spinal Anesthesia at UKI General Hospital 2016-2018

Groups	Variables	n	Mean	Standard deviation	Min-Max
Caesarean section	Respiratory Rate	30	20,03	2,312	16-24
Appendectomy	Respiratory Rate	30	20,17	3,097	15-26

Based on the table above, there are differences in the average respiratory frequency of female patients who underwent cesarean section and appendectomy with spinal anaesthesia. In the section caesaria group, the average respiratory rate was 20.03x/minute with a standard deviation of 2,312. The lowest respiratory rate is 16x/minute, and the highest respiratory rate is 24x/minute. Furthermore, the average respiratory frequency in the appendectomy group was 20.17x/minute with a standard deviation of 3.097, the lowest respiratory frequency was 15x/minute, and the highest respiratory frequency was 26x/minute.

This study proves that there is a decrease in hemodynamics in female patients who undergo cesarean section and appendectomy with spinal anaesthesia. It is because spinal anaesthesia causes sympathetic block and vasodilation so that there is a decrease in hemodynamics. Most of the patients using spinal anaesthesia experienced a decrease in hemodynamics of about 80% compared to those who did not experience a decrease in hemodynamics. It can be seen from the results of the study that the decrease in blood pressure was greater in Caesarean section, namely 66.7% than an appendectomy, which was 60% of the total of each 30 samples due to blockage of impulse conduction from the sympathetic nerves which was characterized by vasodilation and decreased heart rate and accompanied by suppression. in the inferior vena cava and loss of tone in cesarean section. It can also be seen that the decrease in Heart Rate is greater in Caesarean section, which is an average of 82.63x/minute compared to appendectomy, which is an average of 85x/minute because of the body's ability to compensate for the decrease in blood pressure is not perfect.

Spinal anaesthesia will significantly decrease hemodynamics, especially blood pressure and pulse [27]. Bradycardia may occur due to reduced blood flow or the T1-4 sympathetic block. This situation can be overcome by giving atropine sulfate 0.25 mg intravenously. Hypotension after spinanaesthesia is caused by pharmacological denervation of the preganglionic sympathetic nerves, which can lead to a decrease in systemic vascular resistance.

Hypotension is caused by vasodilation and a functional decrease in effective circulating volume. There are three main mechanisms of hypotension after spinal anaesthesia, namely decreased venous return, vasodilation and decreased cardiac output. Hypotension usually occurs in the first 15 - 30 minutes after subarachnoid injection. If not done, prevention of hypotension due to spinal anaesthesia causes symptoms associated with tissue hypoxia, namely restlessness, dizziness, nausea, and then if not treated, it can cause a more severe effect, namely shock and even death.

During spinal anaesthesia, the important thing to do is monitor respiration, blood pressure, and pulse closely. Blood pressure can drop dramatically following the induction of spinal anaesthesia, especially in the elderly and those who have not had adequate fluid loading [28; 29; 30]. Warning signs of a drop in blood pressure include paleness, sweating, nausea, or feeling unwell. A reduction in systolic blood pressure to 80-90 mmHg in an older patient is acceptable, provided the patient looks and feels well and is adequately oxygenated. Therefore, in patients who have undergone spinal anaesthesia immediately after the action to prevent hemodynamic decline, this is done manually by tilting the operating table, then increasing the rate of intravenous infusion to reach until the blood pressure returns to normal, and positioning the patient in a head-up position of about 20 degrees. For other hemodynamic reductions, namely the pulse, we collaborate with medical personnel by giving intravenous atropine, and for blood pressure, if the action does not reach the maximum, vasopressor or ephedrine 5-10 mg

intravenously can be given. In Spinal Anesthesia Block, there is a significant decrease in hemodynamics, especially in blood pressure and pulse. Other acute complications are usually physiologic changes due to local anaesthetic agents to the cephalopod, including nausea, vomiting, bradycardia, and arrhythmias. This situation can be overcome by giving atropine sulfate 0.25 mg intravenously.

Conclusion

Based on the results of the study, conclusions can be drawn as follows: a) Female patients who underwent cesarean section and spinal appendectomy at UKI General Hospital had the majority of patients' conscious levels in each group, namely composmentis (fully aware); b) There is a greater reduction in blood pressure in cesarean section than an appendectomy due to blockage of impulse conduction from the sympathetic nerves characterized by vasodilation and decreased heart rate); c) There is a greater decrease in pulse rate in Caesarean section than appendectomy because the body's ability to compensate for the decrease in blood pressure is not perfect. The body can increase diastole but not match the increase in systole; and d) There is a decrease in the average respiratory rate in appendectomy patients, an average of 20.17x/minute compared to Caesarean section patients 20.03x/minute after spinal anaesthesia.

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