



Anaesthesiology

EVALUATION OF CHANGE IN BLOOD PRESSURE IN REPOSITIONING FROM LITHOTOMY TO SUPINE POSITION IN PATIENTS UNDERGOING SURGERIES UNDER SUB-ARACHNOID BLOCK- AN OBSERVATIONAL STUDY

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ABSTRACT **Objective:** Spinal anaesthesia is associated with variety of hemodynamic alterations, because of sympathetic blockade. Hemodynamics are also affected by a variety of surgical techniques. The lithotomy posture and the effects of autotransfusion increases the Systolic Arterial Pressure in the sub-extremities. Study was designed to evaluate the changes in blood pressure in repositioning from lithotomy position to supine position in patients undergoing surgeries under sub-arachnoid block. **Methods:** This observational study was performed in 41 patients who underwent for elective/ emergency surgeries under subarachnoid block requiring lithotomy position. Demographic information such as age, height, weight, BMI, ASA grade, height of sensory block, quality of motor block and hemodynamics such as Heart Rate (HR), Pulse Oximetry (SpO₂), non invasive Blood Pressure (NIBP) during lithotomy position and repositioning to supine position were also recorded. **Results:** In this study there is no significant difference was observed in patients in repositioning from lithotomy position to supine position following sub-arachnoid block. There is slightly increased in Systolic blood pressure in patients in lithotomy position compared to supine position. **Conclusion:** This study was performed on 41 patients who underwent surgeries under subarachnoid block requiring lithotomy position and this study concluded that there is no difference was observed in patients in repositioning from lithotomy position to supine position. The purpose of the study is to take necessary precautions will be taken to prevent blood pressure changes intraoperatively. Spinal anaesthesia is most commonly used neuro-axial anaesthesia technique, where the local anaesthesia is directly injected into the intrathecal space (sub-arachnoid block). The fluid that surrounds the brain and spinal cord is called cerebro-spinal fluid, is present in the sub-arachnoid region (1). Spinal Anaesthesia is usually given in patients in lateral position or sitting position, Trendelenburg position will produce higher level of block as compared to supine position (2). The spinal anaesthesia was first performed in 1885 by Dr. James Corning of New York City. He used cocaine and the patient was a dog. However, August Bier performed the first sub-arachnoid block surgery in Germany in 1898. Sub-arachnoid block is the type of regional anaesthetic that was most frequently used for obstetrics and caesarean sections after the 1950s (3). Spinal anaesthesia is used in patients undergoing procedures: femur, ankle orthopaedic hip, tibia and knee surgery, including haemorrhoidectomy and leg vascular surgery, Endovascular aortic aneurysm repair, joint replacement, arthroplasty, Hernia (inguinal or epigastric), Combined general anaesthesia and cystectomy, nephrectomy, transurethral resection of bladder tumours, Transurethral excision of the prostate and Caesarean sections, various hysterectomy methods, cases of urology. By using spinal anaesthesia, a patient can avoid the hazards of a difficult airway, consciousness, and aspiration that come with general anaesthesia in pregnant patients. By using spinal anaesthesia, a patient can avoid the hazards of a difficult airway, consciousness, and aspiration that come with general anaesthesia in pregnant patients. (4). Hypotension is the most common complication of spinal anaesthesia, which is linked to a variety of haemodynamic abnormalities. The sympathetic blockade, which causes venous and arterial dilatation, are the primary mechanism (5). Total peripheral resistance reduces as a result of arterial dilatation, and cardiac output and venous return both decrease, which can result in severe hypotension (6). Hypotension do occur in almost all patients and significant hypotension (systolic BP)

KEYWORDS :

Lithotomy Position:

In the lithotomy position, the legs are raised, separated, and supported in a stirrup- or boot-style position, which is similar to the body's supine position when the patient is face up with arms at the sides. The following processes are typically done while in the lithotomy posture: Gynaecological, Urologic, Colorectal, Pelvic or perineal procedures. The knees are bent at a 70- to 90-degree angle and the legs are raised at the hips. (9).

Review Of Literature

1. Masayuki Miyabe et.al in 1995 Conducted study on the " Effects of lithotomy position on arterial blood pressure after spinal anaesthesia and found that the comparison to the horizontal group, the mean age in the lithotomy position was higher. In terms of mean weight, height, and cephalad spread of analgesia, there were no statistically significant differences between the horizontal and lithotomy groups. Before spinal blocks, both groups received a combined 50 ml of lactated Ringer's solution in each during the research, and 200 ml following blocks. 5 minutes after spinal block, the average SBP in both groups fell by 16% from the starting point. SBP jumped to 8% depression level in the lithotomy group and stayed there for the duration of the research at 8%-13% depression level. In contrast, the horizontal group's SBP dropped to a depressed level of 21% by 10 minutes after the block and stayed there for the remainder of the study. 2. Yoshiki Masuda et.al in 1993 conducted study on "The effects of lithotomy position on spinal anaesthesia with hyperbaric tetracaine and found that during spinal anaesthesia, it was discovered that there is no appreciable change in hemodynamics between lithotomy and horizontal supine position. Therefore, it is claimed that after hyperbaric spinal anaesthesia, auto-transfusion by lifting the legs does not improve or compensate cardiac

output. The anaesthetic level and hemodynamics are unaffected by the lithotomy position used during spinal anaesthesia with a hyperbaric solution. 3. John R Haliwill et al in 1998 conducted the study on "Effect of various lithotomy position on lower extremity blood pressure and found that although the mean systolic pressures in the lower extremities of young, healthy volunteers in different lithotomy positions correlated with predicted values, we also discovered that the lithotomy position was associated with an additional reduction in pressure. The lower extremities may be at risk for ischemia, according to these studies, which also indicate that lower-extremity systolic pressures may be dramatically lowered in some patients. The risk of compartment syndrome is likely increased by prolonged ischemia during surgical procedures done on patients in lithotomy positions. As a result of our findings, it is advised to limit the amount of time spent in the lithotomy position when it is only required for a brief period of a lengthy process. Planning well may enable the remaining steps of the method to be completed prior to establishing

AIMS AND OBJECTIVES

Aims: -

The aim of the study is to evaluate the change in Blood Pressure in repositioning from lithotomy position to supine position in patients undergoing surgeries under sub-arachnoid block.

OBJECTIVES: -

- The study's main purpose is to evaluate the change in blood pressure in repositioning the patient from lithotomy to supine position following surgery.
- The secondary objective is to evaluate the hemodynamics in lithotomy and supine position.

MATERIALS AND METHODS

Study design:

An observational study

Sample size:

Patients undergoing elective /emergency surgeries under Sub-arachnoid block requiring lithotomy position fulfilling the inclusion criteria in Department of Anaesthesiology, CHRI during the period of 5 months from March 2022 to July 2022.

Subject selection:

Patients undergoing elective /emergency surgeries under Sub-arachnoid block requiring lithotomy position.

Inclusion Criteria:

- Age group of >18 years
- ASA physical status I-III
- Patients undergoing elective /emergency surgeries under sub-arachnoid block requiring lithotomy position

Exclusion Criteria:

- Failed sub-arachnoid block converted to general anaesthesia.
- Patients not willing to take part in the study.

Study Procedure:

After obtaining institutional Human Ethics Committee approval Ref No: IHEC-I/0698/22 the study was conducted in the Department of Anaesthesiology, CHRI, Kelambakkam for a period of 5 months from March 2022 to July 2022. After obtaining the informed consent, the patient subjected for elective and emergency surgeries were studied. Standard monitoring of continuous electrocardiogram (ECG), non-invasive blood pressure (NIBP) and pulse oximetry (SpO2) was established and Spinal anaesthesia was performed by the anaesthesiologist at L3-L4 intervertebral disc space in patients in sitting position. The drug which is used for Spinal anaesthesia were Inj. Bupivacaine 0.5% (Heavy) with an adjuvant of Inj. Buprenorphine 60 mcg. Patients were placed in supine position and hemodynamics heart rate (HR), non-invasive blood pressure (NIBP), pulse oximetry (SpO2) was monitored by the observer doing the study. After checking the motor block by using the modified bromage score and sensory block by cold swab test. After the adequate sub-arachnoid blockade, the patient was placed in lithotomy position, then the heart rate (HR), non-invasive blood pressure (NIBP), pulse oximetry (SpO2) was monitored by the observer doing the study. The fall in blood pressure was managed by anaesthesiologist and details was recorded by the observer doing the study. After the procedure was completed the patients were repositioned to supine position and then the hemodynamic parameters was monitored by the observer doing the study.

Statistical Methods:

This study was done by using Descriptive statistics, Frequency and Independent samples test.

RESULTS

Descriptive statistics, Frequency and Independent sample test

Table 1: Demographic Details

DEMOGRAPHIC DATA	N	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
AGE	41	18	78	38.59	12.598
WEIGHT (KG)	41	43.0	117.0	69.012	15.5835
HEIGHT (CM)	41	135	184	160.32	10.219
BMI	41	16.0	52.0	27.885	6.8945

Table (1) describes the details of the patient with respect to age, weight, height and BMI in 41 patients.

The mean age was 38.59 years, mean weight was 69.01 kg, mean height was 160 cm and mean BMI was 27.88 kgm².

Table 2: Based On Asa Grade

ASA GRADE	FREQUENCY	PERCENT
ASA I	16	39.0
ASA II	19	46.3
ASA III	6	14.6
Total	41	100.0

Table (2) describes the grade of patient according to ASA. Among 41

patients, 16 (39.0) patients were ASA I, 19 (46.3) patients were ASA II, 6 (14.6) patients were ASA III.

Table 3: Height Of Sensory Block

HEIGHT OF SENSORY BLOCK	FREQUENCY	PERCENT
Saddle	8	19.5
T10	7	17.1
T12	5	12.2
T6	12	29.3
T8	9	22.0
Total	41	100.0

Table (3) describes the height of sensory block in 41 patients, 8 patients (19.5%) achieved saddle block, 7 patients (17.1%) T₁₀ level was achieved, 5 patients (12.2%) T₁₂ level was achieved, 12 patients (29.3%) T₆ level was achieved, 9 patients (22%) T₈ level was achieved.

Table 4: Quality Of Motor Block

QUALITY OF MOTOR BLOCK	FREQUENCY	PERCENT
3	1	2.4
2	3	7.3
4	37	90.2
Total	41	100.0

Table (4) describes the quality of motor block in 41 patients, 1 patient (2.4%) → level of motor block in bromage score was 3, 3 patients (7.3%) → level of motor block in bromage score was 2, 37 patients (90.2%) → level of motor block in bromage score was 4.

Table 5-T-test

	GROUP	N	MEAN	STANDARD DEVIATION	STANDARD ERROR MEAN
Heart Rate	Lithotomy	41	70.4769	9.19853	1.43657
Systolic Blood Pressure	Supine	41	69.8049	9.73709	1.52068
	Lithotomy	41	119.5844	15.11248	2.36017
Diastolic Blood Pressure	Supine	41	117.6341	19.81761	3.09499
	Lithotomy	41	74.5013	9.96913	1.55692
Mean Arterial Pressure	Supine	41	74.5366	12.21494	1.90765
	Lithotomy	41	87.1920	12.27008	1.91626
Pulse Oximetry	Supine	41	86.2927	14.17082	2.21311
	Lithotomy	41	100.0000	.00000a	.00000
	Supine	41	100.0000	.00000a	.00000

Table (5) describes that there is no significant changes in Heart Rate, Diastolic Blood Pressure, Mean Arterial Pressure and Pulse Oximetry with respect to change in position. There is a mild increase in Systolic Blood Pressure mean rank (119.5877) in lithotomy position in compared to repositioning to supine position (117.6341).

DISCUSSION

This study is based on the evaluation of changes in blood pressure in repositioning from lithotomy position to supine position in 41 patients undergoing surgeries under subarachnoid block. The result is based on the Frequency, Descriptive statistics and Independent samples test of Mann-Whitney Test. The Objective of this study is to evaluate the change in blood pressure in repositioning the patient from lithotomy position to supine position following surgery. Based on Mann-Whitney test of Independent samples test the correlation of hemodynamics changes between the lithotomy position and repositioning to supine position. It is concluded that there is no statistically difference was observed in patients in repositioning from lithotomy position to supine position undergoing surgeries under subarachnoid block. Patient's Systolic blood pressure slightly increased in the lithotomy position compared to the supine position.

In a study by Masayuki Miyabe et. al on based on the results of 28 female patients between the ages of 28 and 61 who underwent major elective gynaecologic surgery, he concluded that the lithotomy posture following spinal anaesthesia reduces the drop in blood pressure while having no impact on analgesic level. The mean age was higher in the horizontal group than it was in the lithotomy position. Between the lithotomy and horizontal groups, there was no statistically significant difference in mean weight, height, or cephalad spread of analgesia, compared with our study lithotomy posture following spinal anaesthesia neither reduces the blood pressure nor having an impact on analgesic level.

In a study by Dr. Arun Mathur et.al on 120 patients, aged 30-75, with an ASA1 or ASA2 status, weighing between 50 and 80 kg, and scheduled for TURP and hernia surgeries under spinal anaesthesia. He concluded that all the groups were comparable in terms of age, weight, height, and ASA status, as well as the characteristics of sensory and motor block. The supine position and the lithotomy position did not differ from one another. compared with our study, there is no significant differences in the blood pressure changes in between supine and lithotomy position.

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In a study by Masayuki Miyabe et.al on 34 full term parturients American Society of Anaesthesiologists physical status I, 25-37 years of age, who were undergoing elective caesarean delivery with spinal anaesthesia and concluded that age, weight, and height do not significantly differ with time. After spinal block, there was no difference in the mean amount of sensory analgesia across the groups. Additionally, there were no differences in the incidence of hypotension (defined as SBP less than 100 mm Hg), the total dose of ephedrine, or the total volume of fluids provided intravenously within 20 minutes of spinal block. After the spinal block, the systolic blood pressure dropped by around 20% at three minutes and recovered half of this drop in both groups. There was no difference in the change's trend between the groups. Compared with our study there is no significant drop in systolic blood pressure during repositioning and intra-operative period.

CONCLUSION

41 patients underwent surgeries under subarachnoid block requiring lithotomy position were included in the study. Based on the result we concluded that there is no significant difference was observed in patients in repositioning from lithotomy position to supine position. The purpose of the study is to take necessary precautions will be taken to prevent blood pressure changes intraoperatively.

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