Research Article

Comparative study of manual uterine displacement and wedge under right hip in prevention of supine hypotension syndrome in caesarean section under spinal anesthesia

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Abstract

Introduction: Supine hypotension syndrome results in signs of shock, by decrease in maternal blood pressure. This may result in life threatening complications in mother and fetus. To reduce the incidence of supine hypotension syndrome, few practices were recommended by authors in maternal positioning during C-section. Here in this study we are comparing hemodynamic stability between manual uterine displacement and wedge under right hip. **Materials and Methods:** 30 parturients were studied by left ward Manual Uterine Displacement (MUD), assigned as Group MUD. Another 30 parturients were studied by placing a 12 cm wedge under right hip (which gives 15^0 left lateral tilt), assigned as Group Wedge. Hemodynamic stability was assessed in between MUD and Wedge groups. **Results:** Systolic blood pressure was lower with wedge under right buttock or hip than Manual Uterine Displacement and it is statistically insignificant. Diastolic Blood pressure fall was almost similar in both the groups. There is a gradual fall in Mean Arterial Pressure in both groups, which is not significant. Heart rate was lower in Wedge Group when compared to MUD group but it was statistically insignificant. **Conclusion:** There is no much difference in Hemodynamic changes either by Manual uterine displacement or Wedge under right hip. Surgeons and patients feel more comfortable with Manual uterine displacement than Wedge under right hip, but anesthetists feel better with wedge because there is no need to hold the uterus continuously till delivery of the baby, so anesthesiologist can engage in patient monitoring and treatment.

Key words: Hemodynamic changes, Manual Uterine Displacement, Wedge.

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Introduction

Caesarean section (CS) also known as C-section is a surgical procedure most commonly performing on women to deliver one or more babies and the rate is increasing dramatically in recent years. C-section is necessary to perform in critical conditions, where vaginal delivery would put the baby or mother's life or health at risk.

In few countries, caesarean sections were performing more frequently than necessary, whereas many governments and health organizations promote programs to reduce the use of C-section in favor of vaginal delivery [1]. Global estimates in 2012 indicates about 23 million C-sections were done [2]. Worldwide 15% of C-section rate was estimated and nearly 4% in Africa to 29% in Latin America and the Carribean [3].

The ideal caesarean section rate suggested by International healthcare community was 10 to 15% [4]. Placing parturient in a correct position over the table, may prevent aortocaval compression by tilting table or patient laterally towards left, can also reduce bowel descending towards operative field by tilting table head downwards [5]. Some anesthetists and Obstetricians also believe that changing the position of parturient can improve the outcome of both mother and fetus. Supine Hypotension syndrome develops in pregnant women

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near term. When pregnant women lie in supine position, gravid uterus causes compression of abdominal aorta or inferior vena cava, which in turn decreases venous return to the heart. This aortocaval compression syndrome is thought to be cause of supine hypotension syndrome.

Supine hypotension syndrome results in signs of shock, by decrease in maternal blood pressure. This may result in loss of consciousness and fetal demise in extreme circumstances [6, 7].

Spinal anesthesia or spinal block, subarachnoid block (SAB) and intrathecal block [8] is a form of regional anesthesia involving injection of a local anesthetic into the subarachnoid space, generally through a fine needle. Hypotension is one of the complications of spinal anesthesia, caused due to sympathetic nerve blockade.

During C-section aortocaval compression and spinal anesthesia may result in hypotension, which seems to be unexpectedly high despite preloading with crystalloids (47.4–83%) [9] or colloids (17–38%) [10] and the use of prophylactic vasoconstrictors (35–80%) [11].

To reduce the incidence of supine hypotension syndrome, few practices were recommended by authors in maternal positioning during C-section. The mother can be placed left laterally by keeping a wedge or cushion under the right hip [12] or by manual displacement of uterus [13] or by tilting the table towards left [14]. Here in this study we are comparing hemodynamic stability between manual uterine displacement and wedge under right hip. The aim of the present study is to compare hemodynamic stability during caesarean section between MUD and wedge under right hip under spinal anesthesia.

Materials and Methods

A prospective study was conducted in the year 2015 at Government General Hospital, Ananthapuramu after institutional approval. Informed consent has taken from all studied parturients. A Study was conducted over 60 Pregnant women presenting with full term pregnancy either primi or multi gravida.

Inclusion criteria: Pregnant women with ASA status 1 or 2 with full term pregnancy, were scheduled to undergo either elective or emergency LSCS.

Exclusion criteria: Pregnant women with any of these problems including preeclampsia, diabetes, anemia, renal or heart disease, hematological abnormalities, prematurity, obesity, fetal distress, IUGR were excluded from this study.

30 parturients were studied by left ward Manual Uterine Displacement (MUD), assigned as Group MUD. Another 30 parturients were studied by placing a 12 cm wedge under right hip (which gives 15^0 left lateral tilt), assigned as Group Wedge.

Before giving spinal anesthesia, pregnant women were pre medicated with Inj Ondansetron, Inj Ranitidine and preloaded with crystalloids. Spinal anesthesia was given using 25 gauze spinal needle with 1.8 ml of 0.5% of hyperbaric bupivacaine at L3-L4 interspace. After Spinal anesthesia among Group MUD parturient, Manual Uterine Displacement was done immediately after placing the pregnant women in supine position on O.T table.

Anesthestist holds the gravid uterus with both hands continuously, slightly lifting up and shifting it towards patients left shoulder by standing at the head end of the patient. Among Wedge Group, 12 cm wedge was placed under right hip after spinal anesthesia.

Immediately after spinal anesthesia, parturient were observed for Systolic Blood pressure, Diastolic Blood pressure, Mean Arterial pressure, SpO2, Heart rate at every minute until delivery of the baby. Maternal bradycardia and hypotension were treated with intravenous boluses of atropine and mephenteramine respectively. Intravenous fluids were given as per requirements.

All the details including age, weight, height, elective or emergency LSCS, indication for caesarean section, time between injection of SA and delivery, incision to delivery time, operation time, Systolic blood pressure, Diastolic blood pressure, Mean arterial pressure, Heart rate were entered into spread excel sheet and the results were analyzed.

Hemodynamic stability was assessed in between MUD and Wedge groups. Statistical significance was assessed by using Graph pad software, unpaired t test. The p value <0.05 were considered as significant. Statistics were represented in the form of percentages, line diagram.

Results

This is a Prospective study done among 60 patients attending GGH, Ananthapuramu. on total number of Among 60 patients 30 were grouped under manual uterine displacement (MUD) and 30 were grouped under wedge under right hip. Predominant indication of caesarean section was Cephalopelvic disproportion (Table No.1). Out of 60 pregnant women 23 were presented with Cephalopelvic disproportion, 17 were previous caesarean section, 14 were breech presentation, 3 were brow presentation, 3 were transverse lie presentations.

Table No 1: Various characteristics of studied population.

Characteristics	Group MUD (Mean±SD) (n=30)	Group Wedge (Mean±SD) (n=30)
Age in Years	23.6±2.3	23.4±4.2
Weight in kgs	56.3±3.5	57.6±2.8
Height in cms	149.8±6.05	152.4±5.3
Emergency LSCS	9	12
Indication for cesarean section		
Breech	6	8
Transverse lie	2	1
Brow presentation	1	2
Cephalopelvic disproportion	13	10
Previous caesarean section	8	9
Systolic Blood Pressure in mmHg	119.4±6.5	121.3±8.4
Diastolic Blood Pressure in mmHg	70.6±.4.05	72.2±6.3
Pulse rate beats/min	88.4±7.2	88.2±3.05
SpO2 %	98.6±3.4	97.6±2.6

The mean time of Spinal anesthesia (SA) to delivery was 7.2±6.8 minutes among group MUD and 7.3±8.5 among wedge under right hip group. Operation time and time taken between incision and delivery were tabulated in Table No.2.

Table No 2: Peri-operative parameters among group MUD and group Wedge.

Parameters	Group MUD (Mean±SD) (n=30)	Group Wedge (Mean±SD) (n=30)
Operation time in mins	46.5±3.4	48.3±2.6
Spinal anesthesia to delivery time in mins	7.2±6.8	7.3±8.5
Incision to delivery time in mins	3.1±1.3	3.4±2.6

Systolic Blood pressure, Diastolic Blood Pressure, Mean Arterial Pressure, Heart rate were measured every minute after spinal anesthesia until delivery of the baby. The Mean values of parameters was noted and represented in Table No.3 and the p value was assessed, which shown statistically insignificant.

Systolic blood pressure was lower in wedge group than MUD group and it is statistically insignificant (Fig No.1). There is a gradual fall in blood pressure from 1 min to 5 mins after spinal anesthesia. At 5th minute after subarachnoid block SBP is almost same in Group MUD and Group Wedge.

Table No 3: Mean and S.D values of various cardiovascular parameters.

Parameters	MUD (Mean±SD) (n=30)	Wedge (Mean±SD) (n=30)	p value	Significance
Systolic Blood Pressure (SBP)				
SBP at 1 minute	121.8±16.62	118.6±11.6	0.3907	NSS
SBP at 2 minutes	116.3±18.66	113.2±10.02	0.4260	NSS
SBP at 3 minutes	114.1±15.9	110.5±10.06	0.2990	NSS
SBP at 4 minutes	115.5±15.7	110.7±12.04	0.1891	NSS
SBP at 5 minutes	111.4±9.84	110.9±8.56	0.8344	NSS
Diastolic Blood Pressure (DBP)				
DBP at 1 minute	72.3±13.8	72±9.75	0.9229	NSS
DBP at 2 minutes	67.4±13.8	67.3±10.10	0.9568	NSS
DBP at 3 minutes	67.19±14.2	63.9±11.8	0.331	NSS
DBP at 4 minutes	66.47±12.5	65.3±11.7	0.7096	NSS
DBP at 5 minutes	61.19±10.08	64±9.53	0.2718	NSS
Mean Arterial Pressure (MAP)				
MAP at 1 minute	89.28±16.8	88.3±9.67	0.7828	NSS
MAP at 2 minutes	84.33±19.3	82.1±10.3	0.5788	NSS
MAP at 3 minutes	81.95±14.5	79.3±11.9	0.4422	NSS
MAP at 4 minutes	81.28±14.7	80.5±11.7	0.8209	NSS
MAP at 5 minutes	77.61±12.4	80.04±9.78	0.4028	NSS
Heart Rate (HR)				
HR at 1 minute	95.71±19.5	88.1±13.8	0.0863	NSS
HR at 2 minutes	96.28±20.3	88.08±14.4	0.0763	NSS
HR at 3 minutes	98.76±20.6	90.8±17.1	0.1088	NSS
HR at 4 minutes	96.90±14.8	91.1±14.2	0.1269	NSS
HR at 5 minutes	98.8±16.1	92.2±11.5	0.0728	NSS

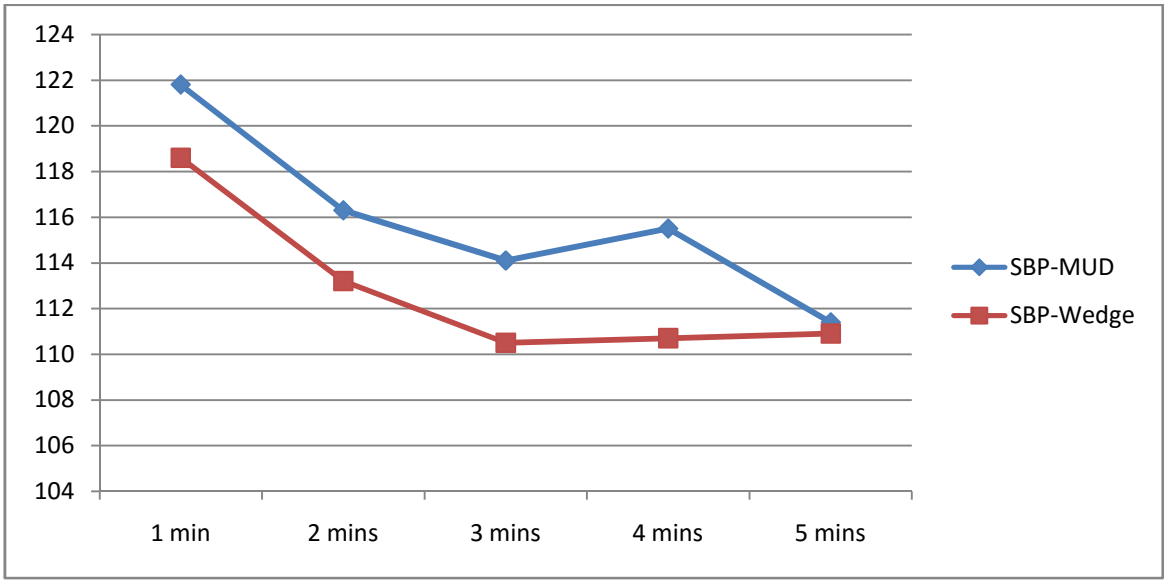

Fig No.-1: Assessment of Systolic Blood pressure in both Groups

Diastolic Blood pressure fall was almost similar in both the groups. DBP was maintained stable in Wedge group from 3rd min to 5th min, whereas in MUD group there is slight fall in BP. This difference shown no significance (Fig No.2).

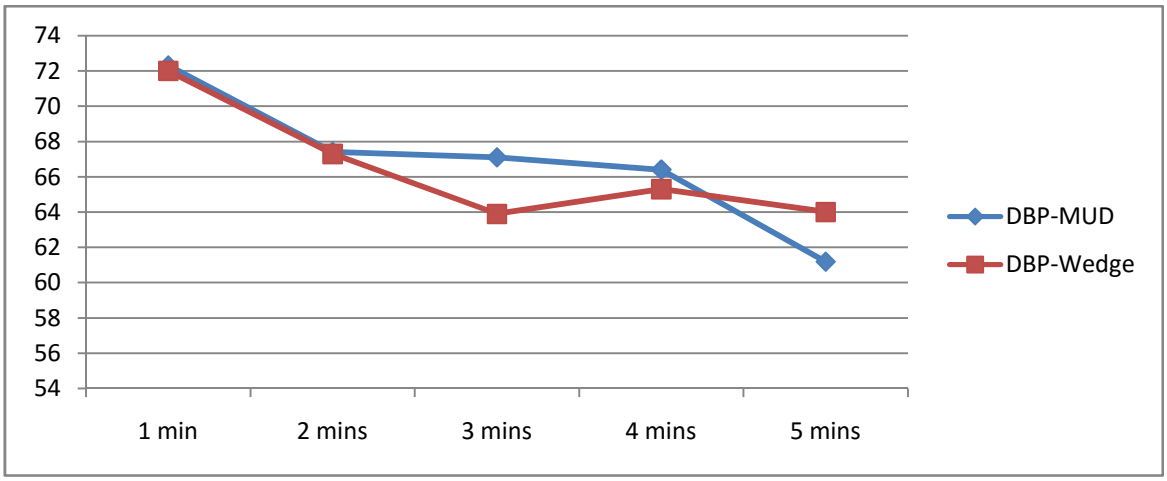

Fig No.-2:Assessment of Diastolic Blood pressure in both Groups

There is a gradual fall in Mean Arterial Pressure in both groups, which is not significant (Fig No.3)

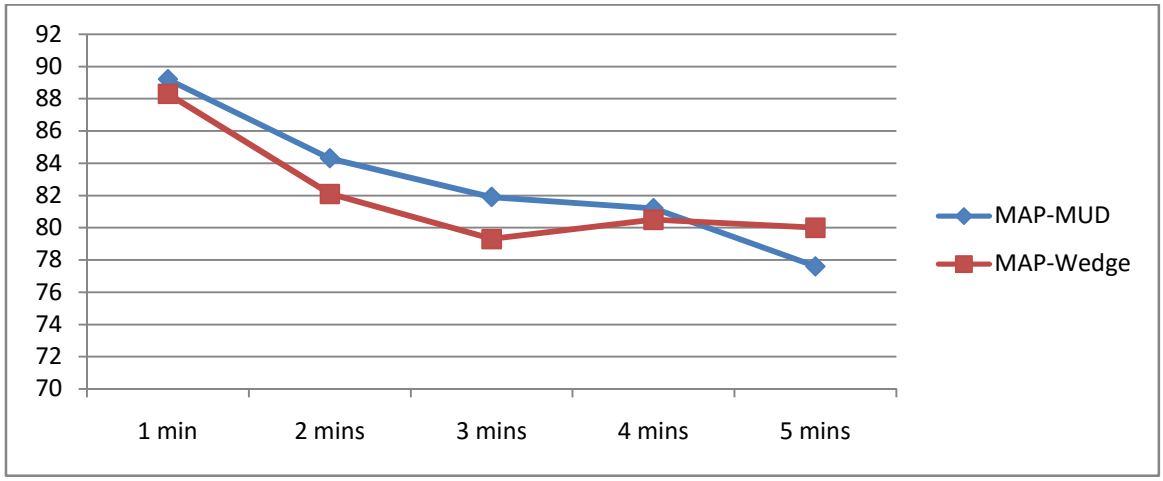

Fig No.-3: Assessment of Mean Arterial Pressure in both Groups

Heart rate was lower in Wedge Group when compared to MUD group but it was statistcially insignificant. There is a rise in heart rate and was stable (Fig No.4).

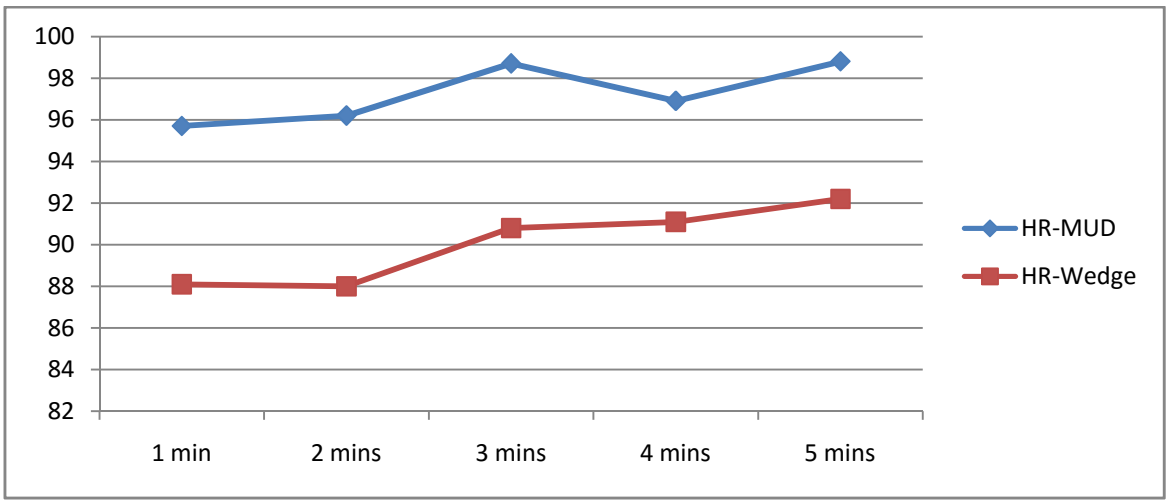

Fig No.-4: Assessment of Heart rate in both Groups.

Supine Hypotension syndrome was observed in both groups. 3 (10%) parturient went into Supine hypotension Syndrome in Wedge Group and 2 (6.66%) were in MUD group (p - 1.000).

Discussion

Supine hypotension syndrome results in severe adverse effects. Pressure of Gravid uterus over inferior vena cava results in decreased venous return and cardiac output causing syncope [15,16].

To alleviate supine hypotension syndrome different methods were tried, includes full lateral position, head tilt of operation table [17], placing water bags, rubber wedges, airbags, sand bags under the hip or flank, mechanical displacement [18]. Among these traditionally using methods are wedge under the right hip or left table tilt.

At present there is no ideal positioning for the mother during Cesarean section. Various studies are going on proper positioning of the mother during C-section to provide better outcome to mother and child and also to prevent supine hypotension syndrome. Here in this study we tried to determine the position of the mother during C-section with good cardiovascular stability and for avoiding supine hypotension syndrome.

Using 12 cm wedge under the right hip or buttock, left lateral tilt can give to mother up to 15^0. Crawford et al [19] used 15^0 tilt for positioning of pregnant women. Caval and aortic compression still evidenced in many studies whatever the degree of tilt is, even at 34^0 [20]. Caval compression can result up to 15^0 tilt and aortic compression up to 35^0 tilt. There are evidences that reversible reduce in lower limb arterial pressure [20] and improved cardiac output by tilt of mother during C-section either by manual uterine displacement [21] or by full lateral position reduce lower limb arterial pressure [22]. In Lesser degrees of tilt like 5^0, 10^0, 12.5^0 little changes occur in maternal cardiovascular changes even though caval compression is present [23], but women feels insecure in lesser degree. In higher degree like 30^0 patients may slide off the inclined plane [24].

Among indications for cesarean section, Out of 60 pregnant women 23 were presented with Cephalopelvic disproportion, 17 were previous caesarean section, 14 were breech presentation, 3 were brow presentation, 3 were transverse lie presentations.

In this study Systolic blood pressure was lower with wedge under right buttock or hip than Manual Uterine Displacement and it is statistically insignificant.

Diastolic Blood pressure fall was almost similar in both the groups. There is a gradual fall in Mean Arterial Pressure in both groups, which is not significant. Heart rate was lower in Wedge Group when compared to MUD group but it was statistically insignificant.

In similar to our study, Cluver C et al [5], Kundra et al [25] observed that reduced incidence of hypotensive events among pregnant women undergoing cesarean section with manual displacement when compared to Wedge under right hip respectively. In contrast with our study, as elevation of the hip is more effective than mechanical displacement for preventing supine hypotension syndrome [26].

Cluver C et al [5] has observed many positions of the mother during C-section to know the incidence of hypotensive events. Hypotensive events shown no difference in 20º left lateral tilt versus horizontal position, Full left lateral tilt versus a 15º left lateral tilt, Right lateral tilt versus horizontal position, Right lateral tilt versus left lateral tilt, 10º head down tilt versus horizontal position. They have observed lower incidence of hypotensive events in manual uterine displacement group when compared to 15^0 lateral tilt and also documented that fewer hypotensive events when using a 12 cm lumbar wedge compared to a 12 cm pelvic wedge. There were no maternal mortalities in either group.

In the present study, Supine Hypotension syndrome was observed in both groups, 3 (10%) parturients in Wedge Group and 2 (6.66%) were in MUD group. Brock-Utne et al [27] reported that four patients had severe hypotension during cesarean section. Kundra et al [25] were also assessed incidence of maternal hypotension among parturients during cesarean section by comparing MUD and 15^0 lateral tilt and they observed 3 maternal mortalities. To avoid maternal morbidity and mortality due to hypotensive attacks during cesarean section, proper management from the time of spinal anesthesia until recovery of mother is necessary, To prevent adverse effects during spinal anesthesia one should use appropriate drug dosage, technique, proper positioning and good patient monitoring is very much needed. Oxygen therapy and intravenous crystalloids as per the need.

Conclusion

From this study we conclude that there is no much difference in Hemodynamic changes either by Manual uterine displacement or Wedge (12 cm) under right hip.

Supine hypotension syndrome was noted lesser with MUD when compared to wedge under right hip (p-1.0000). Both methods are effective to prevent Supine hypotension syndrome for the parturients during caesarean section.

Surgeons and patients feel more comfortable with Manual uterine displacement than Wedge under right hip, but anesthetists feel better with wedge because there is no need to hold the uterus continuously till delivery of the baby, so anesthesiologist can engage in patient monitoring and treatment.

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