

Effect of Spinal Anesthesia on Hypotension in Obstetrics (Pregnant Women)

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Abstract: This study aims to investigate the effect of hypotension caused by spinal anaesthesia in pregnant patients. A cross-sectional study was conducted from different hospitals in Iraq to Patients suffering from hypertensive disorders during pregnancy, where 140 patients were collected, and the necessary and required analyses were conducted on them. 140 patients were collected and analysed using the statistical analysis program SPSS, where the patients' ages mean value was 29.5 ± 6.6 , and The results were found to agree with the desired goal for this study, where the value of MAP (mmHg) was 88.11 ± 12.2 Then it became 76.3 ± 7.2 , and the validity of these results was confirmed by analysing the relationship generated between the type of anaesthesia used during childbirth and the pressure imbalances, where a positive relationship was found, and this indicates a clear effect by the type of anaesthesia used on MAP.

Keywords: MAP, spinal, anaesthesia, BMI.

INTRODUCTION

Hypotension is a common adverse effect in obstetricians receiving neuralgic sedation, or anesthesia is more common in those requiring sedation for surgical procedures than in patients with neuralgia for labour due to the need for denser and more extensive blocks in the first group [Lo, J.O. *et al.*, 2013; Moodley, J, 2008].

Hemodynamic changes occur suddenly with spinal anesthesia compared to the epidural technique, resulting in clinical manifestations and maternal and fetal complications associated with the hypotension common with subarachnoid anaesthesia [Lemonnier, M. *et al.*, 2013; Ahmad, A.S. *et al.*, 2012; Molvarec, A. *et al.*, 2013].

Blood pressure is a sign of the health of the mother and child, so the normal pressure reading should be less than 120 mm Hg for systolic and 80 mm Hg for diastolic, but when the blood pressure of a pregnant woman during childbirth is low, the reading is often less than 60 / 90 mm Hg [Sibai, B.M. *et al.*, 1998; Seely, E.W. *et al.*, 2011; Van Scheltinga, J.A.T. *et al.*, 2013].

Blood pressure is a force that pushes blood against the walls of the arteries and often rises or falls at certain times of the day, but when the circulatory system expands rapidly, it can lead to low blood pressure [9,10].

Although there is variance in the definition of hypotension for patients' mothers with anaesthesia, most authors define it as a 20% to 30% reduction in systolic blood pressure when compared with

baseline values prior to placement of axonal drugs or absolute values of blood pressure Systolic blood between 100 mm Hg and 90 mm Hg. [Niesen, A.D. *et al.*, 2013; Deshpande, A.V. *et al.*, 2014; Dennis, A.T, 2012]

It should be borne in mind that blood pressure figures, like other hemodynamic and physiological variables, are constantly changing and adapting to various phenomena affecting homeostasis; [Epiu, I. *et al.*, 2017; Gibbs, M.W. *et al.*, 2018] They must be interpreted in the appropriate clinical context, so defining the breakpoints for the definition of hypotension should be a guide only and it is not appropriate to make the definition an extreme, as we explained earlier, with multiple versions and diversity in itself [Gutsche, B.B, 2004; Gynecologists, 2013; Kee, W.D.N, 2017].

MATERIAL AND METHOD

Patient Sample

A cross-sectional study was conducted from different hospitals in Iraq to Patients suffering from hypertensive disorders during pregnancy, where 140 patients were collected, and the necessary and required analyzes were conducted on them.

Study Design

A cross-sectional study was conducted on pregnant women with pressure problems and disorders. Hypotension due to spinal anaesthesia in pregnant patients undergoing caesarean section is the most common side effect of the anaesthesia technique

and is associated with negative outcomes for the mother and fetus.

Where the operation is done through the use of a thin needle, and anaesthetic drugs are placed in it that will be injected into the fluid that surrounds the spinal cord and nerves, and then a tape is placed on the back. The drug is injected into the cerebrospinal fluid; As a result, the lower half of the body is numbed.

The average age of the patients ranged from 25 to 40 years.

SPSS SOFT IBM statistical analysis program was used to analyse the data and demographic information collected from the electronic record in the hospital, where the data was analyzed, and the statistical value was found in addition to the MEAN VALUE and SD.

Study Period

The study period was a full year, ranging from 22-11-2019 to 12-10-2020.

Aim of Study

This study aims to investigate the effect of hypotension caused by spinal anaesthesia in pregnant patients.

RESULTS

140 patients were collected and analyzed using the statistical analysis program spss, where the patients' ages were divided into four groups.

The most frequent group was between 25-29 years old for 50 patients, with a rate of 35.7%, and in the second place, ages from 35-40 to 35 patients with 25%, then the age group from 20-24 years for 30 patients with 21.42%.

Table 1- Distribution of patient according to age

| Age | F | P% | Chi-square |
|-------|----|-------|------------|
| 20-24 | 30 | 21.42 | 3.45 |
| 25-29 | 50 | 35.7 | |
| 30-34 | 25 | 17.8 | |
| 35-40 | 35 | 25 | |

Table 2: Demographic results of patient

| P | Value |
|----------------------------|--------------|
| Age (Mean±SD) | 29.5±6.6 |
| BMI (Mean±SD) | 25.66 ± 3.33 |
| H (Mean±SD) | 160.22 ± 7.7 |
| W (Mean±SD) | 69.13 ± 7.7 |
| Gestational age (week) | 38.88 ± 1.88 |
| Previous cesarean section | |
| Yes | 51 |
| No | 89 |
| Education level (in years) | |
| School primary n (%) | 20 (14.2) |
| Secondary n (%) | 50 (35.7) |
| College n (%) | 45 (32.144) |
| High n (%) | 25 (17.86) |

Table 3: Baseline mean artificial pressure hemodynamic of characteristic of patients

| p | Before | After |
|------------------------------------|--------------|-------------|
| Baseline SBP (mmHg) | 138.8±10.14 | 117.9±8.9 |
| Baseline DBP (mmHg) | 86.15±5.5 | 76.4±7.3 |
| Baseline MAP (mmHg) | 88.11 ± 12.2 | 76.3±7.2 |
| Baseline heart rate (beats/minute) | 88.7 ± 12.1 | 97.4 ± 18.8 |

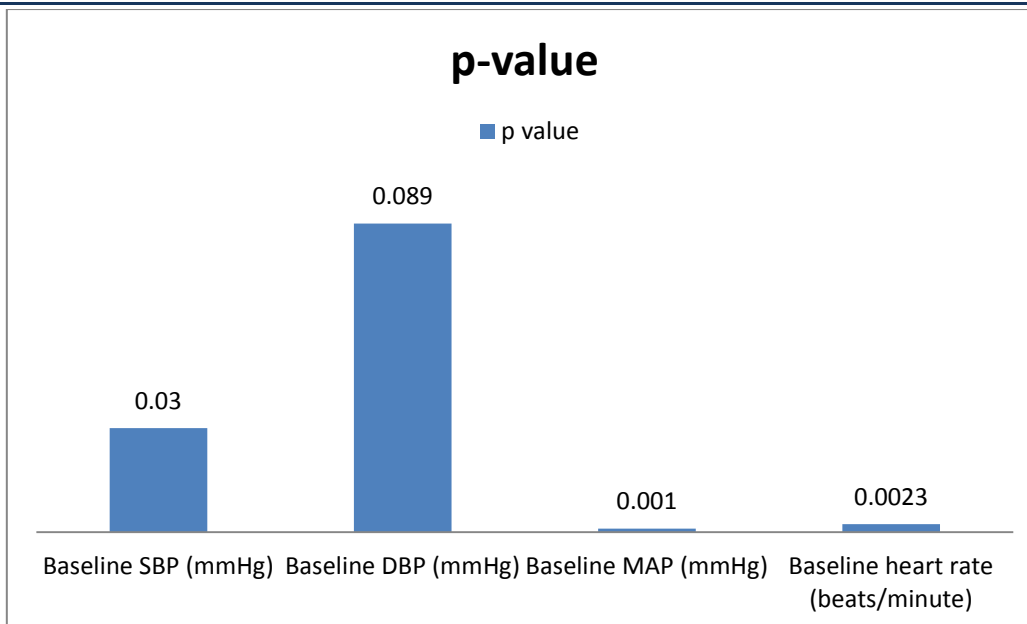


Fig 1: p-value of Baseline hemodynamic characteristic

Table 4: the relative risk of hypotension according to time and variable assessed

| P | (95% CI) |
|-----------|-------------|
| At 10 min | 41(35-49) % |
| At 20 min | 42(33-48) % |
| At 30 min | 40(37-43) % |
| At 40 min | 41(37-44) % |

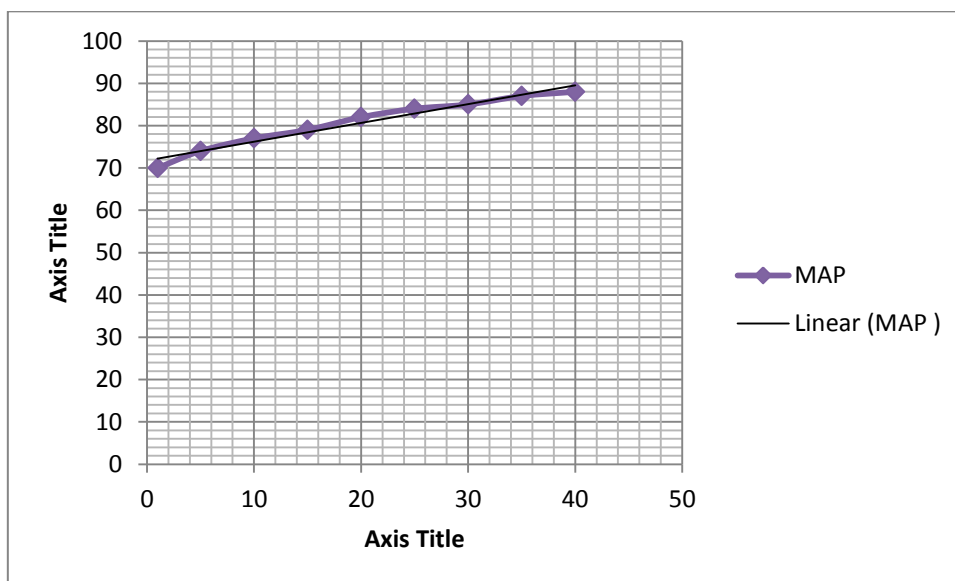


Fig 2: Trends of MAP change following spinal anesthesia

Table 5: correlation to the effect of SA on MAP, DBP, DBP

| | | Correlations | | |
|-----|---------------------|--------------|-------|-------|
| | | MAP | HR | DBP |
| MAP | Pearson Correlation | 1 | .907* | .621 |
| | Sig. (2-tailed) | | 0.002 | 0.089 |
| | N | 140 | 140 | 140 |
| HR | Pearson Correlation | .907* | 1 | .685 |
| | Sig. (2-tailed) | 0.002 | | 0.089 |
| | N | 140 | 140 | 140 |
| DBP | Pearson Correlation | .621 | .685 | 1 |
| | Sig. (2-tailed) | 0.089 | 0.002 | |
| | N | 140 | 140 | 140 |

*. Correlation is significant at the 0.05 level (2-tailed)

DISCUSSION

Spinal anesthesia is associated with a higher incidence and pronounced decrease in blood pressure compared with other regional techniques due to the earlier onset of sympathetic blockade. Arterial hypotension is one of the most common complications and can be dangerous for both the mother and the fetus. Its incidence in the caesarean section has been reported from 40 to 100% when preventive measures are not used.

There are several practical concepts for determining hypotension after spinal anesthesia in caesarean section. This is the number of investigations that have been found on this topic.

However, the consensus, according to the current reviews, takes basal systolic blood pressure as a specific substrate and therefore is defined as a decrease in this hemodynamic parameter, but is divided into two aspects: on the one hand, by 20-30% of its initial value and on the other hand, they take lower numbers from 100 mm Hg 8.

Determine that patient with an increase in the BRI and in systolic blood pressure have an increased risk of suffering from hypotension.

An association was found between increases in heart rate with an increased incidence of hypotension and ephedrine requirements. Patients with heart rates greater than 90 beats per minute showed a high probability of a significant decrease in blood pressure (a decrease in mean arterial pressure greater than 30%).

Several studies on the effect of spinal anesthesia in caesarean section, both in the prediction, management, and outcome of hypotension secondary to regional anesthesia, have been conducted with inconclusive result in determining the exact causes (pressure less than 60 mmHg.)

Anesthesia-induced hypotension in pregnant patients who will undergo an elective caesarean section is the most common adverse effect of this anesthesia technique and is associated with maternal and fetal effects.

For this reason, it is important to know the complications and approaches to treating maternal hypotension, which can lead to maternal and fetal morbidity and mortality.

Conclusion

It was concluded that maternal hypotension could cause a significant adverse effect on fetal well-being as several variables were studied in an attempt to find one or more predictive factors, among those with greater sensitivity and specificity, heart rate variability, and genetic variations. Although this technology is very encouraging, it will routinely take some time in obstetric operating rooms.

RECOMMENDATION

Adequate management of blood pressure before surgery to prevent the consequences it can cause in the mother's binomial fetus.

In general, low blood pressure during pregnancy is not a cause for concern unless some symptoms appear, and the most prominent complications that may occur are:

Organ damage due to a reduced amount of blood and nutrients being delivered to the body.

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Source of support: Nil; **Conflict of interest:** Nil.

Cite this article as:

Jawad, S.K., Ahmed, J.S. and Hamdan, H.A. "Effect of Spinal Anesthesia on Hypotension in Obstetrics (Pregnant Women)." *Sarcouncil Journal of Internal Medicine and Public Health* 1.1 (2022): pp 24-28