Scientific Journal for Publishing in Health Research and Technology

Volume 2, Issue 2, 2026, Pages: 242-250

Journal homepage: https://sjphrt.com.ly/index.php/sjphrt/en/index

The Role of General Anesthesia in Case of Hypertension Disorder (Pre-Eclampsia, Eclampsia) Compared with Uncomplicated Pregnancy for Cesarean Section at Tarhona and Msallata Hospitals

Atiga Othman Albakoush [1], Haifa Mohamed Nwerat [2*]
[1] Faculty of Medicine, Elmergib University, Alkhoms, Libya
[2] Libyan Academy for Graduate Studies, Alkhoms, Libya

دور التخدير العام في حالات اضطرابات ارتفاع ضغط الدم (مقدمات الارتعاج، الارتعاج) مقارنة بالحمل غير المصحوب بمضاعفات أثناء العمليات القيصرية في مستشفيي ترهونة ومسلاتة

عتيقة عثمان البكوش [1]، هيفاء محمد نويرات [2*]
[1] كلية الطب، جامعة المرقب، الخمس، ليبيا
[2] الأكاديمية الليبية للدراسات العليا، الخمس، ليبيا

*Corresponding author: 2310242@academy.edu.ly

Received: March 30, 2026	Accepted: May 13, 2026	Published: June 11, 2026

Abstract:
This pilot case-control study assessed maternal and fetal outcomes following cesarean section under general anesthesia, comparing 30 women with hypertensive disorders of pregnancy (pre-eclampsia/eclampsia) to 30 women with uncomplicated pregnancies at Tarhona and Msallata hospitals between January and March 2023. Participants underwent clinical examination and history taking, with data analyzed using SPSS. Results indicated statistically significant differences in proteinuria ($p = 0.000$), blood pressure ($p = 0.000$), and edema ($p = 0.000$) between the two groups. However, no statistically significant difference was observed in maternal weight ($p = 0.457$). The findings suggest that while hypertensive disorders are associated with greater hemodynamic instability during cesarean delivery, general anesthesia remains effective for these patients, yielding positive outcomes for both mother and infant. Future research with larger sample sizes is recommended to further evaluate long-term effectiveness and compare general anesthesia with alternative techniques in this specific patient population.

Keywords: General Anesthesia, Pre-eclampsia, Eclampsia, Cesarean Section, Maternal Outcome.

الملخص
قيمت هذه الدراسة الاستطلاعية للحالات والشواهد النتائج السريرية للأمهات والأجنة بعد العمليات القيصرية تحت التخدير العام، من خلال مقارنة 30 سيدة تعاني من اضطرابات ارتفاع ضغط الدم المرتبطة

بالحمل (مقدمات الارتعاج/الارتعاج) مع 30 سيدة ذات حمل طبيعي في مستشفيي ترهونة ومسلاتة في الفترة ما بين يناير ومارس 2023. خضعت المشاركات للفحص السريري وأخذ التاريخ المرضي، وتم تحليل البيانات باستخدام برنامج SPSS. أشارت النتائج إلى وجود فروق ذات دلالة إحصائية في بيلة بروتينية($p = 0.000$) ، وضغط الدم($p = 0.000$) ، والوذمة ($p = 0.000$) بين المجموعتين. ومع ذلك، لم يلاحظ أي فرق ذو دلالة إحصائية في وزن الأم ($p = 0.457$). تشير النتائج إلى أنه على الرغم من ارتباط اضطرابات ارتفاع ضغط الدم بزيادة عدم الاستقرار الديناميكي الدموي أثناء الولادة القيصرية، يظل التخدير العام فعالاً لهؤلاء المريضات، مما يؤدي إلى نتائج إيجابية لكل من الأم والرضيع. يوصى بإجراء أبحاث مستقبلية بأحجام عينات أكبر لتقييم الفعالية طويلة المدى بشكل أكبر ومقارنة التخدير العام بالتقنيات البديلة لدى هذه الفئة المحددة من المرضى.

الكلمات المفتاحية: التخدير العام، مقدمات الارتعاج، الارتعاج، الولادة القيصرية، نتائج الأم.

Introduction

General anesthesia (GA) is the state produced when a patient receives medications for amnesia, analgesia, muscle paralysis, and sedation. An anesthetized patient can be thought of as being in a controlled, reversible state of unconsciousness. Anesthesia enables a patient to tolerate surgical procedures that would otherwise inflict unbearable pain (Christopher &Chief, 2015).

Anesthesia is provided by anesthesiologists (medical doctors with specialized education in the evaluation and care of patients before, during, and after surgery, including pain management), certified registered nurse anesthetists (Torpy *et al.,* 2011).

Preeclampsia (PE) a human-pregnancy-specific disease defined as the occurrence of hypertension and significant proteinuria in a previously healthy woman on or after the 20th week of gestation, occurs in about 2-8% of pregnancies It is the most common medical complication of pregnancy whose incidence has continued to increase worldwide, with 75% of cases being mild and 25% being severe (Altaei & Mohammad, 2012).

Preeclampsia / Eclampsia presents after 20 weeks gestation with hypertension > 140/90, proteinuria, and a spectrum of multi-system dysfunction such as thrombocytopenia. HELLP syndrome is a subset of severe preeclampsia defined by hemolysis (H), elevated liver enzymes (LE) and low platelets (LP). so in case of pre-eclampsia must be termination of pregnancy by cesarean section irrespective of fetal gestational age (Hawkins, 2010).

Normal pregnancy is the term used to describe the period in which a woman carries a fetus inside of her. In most cases, the fetus grows in the uterus. Pregnancy usually lasts about 40 weeks, or just over 9 months, as measured from the last menstrual period to child birth. It is normal for women to gain some weight during pregnancy due to the growth of the fetus, placenta and amniotic fluid (Harriette, 2014).

Cesarean section (CS) is a surgical procedure used to deliver one or more babies. CS its usually performed when vaginal delivery will put the mother or child's health or life at risk (Becher & Stokke, 2013). Aim of the study: in this study, we aimed to investigate the effects of general anesthesia on pre-eclampsia -eclampsia hypertensive disorder and uncomplicated pregnancy in cesarean section.

General objective:

To comparison of the effect of general anesthesia on pre-eclampsia-eclampsia hypertensive disorders with uncomplicated pregnancy under cesarean section.

Specific objectives:

1. To detect effects of general anesthesia on cesarean section.

2. To detect effects of general anesthesia on blood pressure before cesarean section and blood pressure during cesarean section.
3. To detect effects of the age on blood pressure.
4. To detect effects of passive smoking on blood pressure.

Study design:
This study is a pilot case-control study.
Study population:
The study was conducted on 60 pregnant women between January 2023 and March 2023 at the obstetric departments of Tarhuna and Misallata Hospitals. Written informed consent was obtained from all participants after explaining the study details. 30 patients with hypertensive disorders of pregnancy were included as the study group to evaluate the effects of general anesthesia during cesarean section, while 30 uncomplicated pregnant women were included as the control group and matched with the study group.

Statistical methodology:
All females in the study were subjected to:
1- Full history taking.
2- Full examination specially measuring of blood pressure.
Inclusion and Exclusion criteria are as follows:
Inclusion criteria (For study group):
1- Patient with hypertensive disorder.
2-Patient who delivered by cesarean section.
Exclusion criteria:
1- Patients with essential hypertension (which detected before pregnancy)
2- Patients delivered by normal vaginal delivery.
3-Patients delivered by cesarean section under spinal anesthesia.

Clinical Examination:
All cases were subjected for measures of blood pressure by phonometer manually or electrical.
Statistical Methods:
- Statistical analysis was done on a personal computer using IMB, SPSS statistics version 22.
- Numerical variable was presented as median and interquartile range and between group differences were compared using the Mann- Whitney U test.
- Categorical Variable was presented as number and percentage.
- Nominal data were compared using fishers exact test.
- P =<0.05 is considered statistically significant.

Results
The current study was conducted on 60 women from January 2023 to March 2023 who attended the obstetric clinics at (Tarrhona & Msallata) hospital is which divided to two groups 30 women as cases (hypertension) and other 30 women as control (normal pregnancy.)

1. Protein urea
The results showed that 80% of Protein urea (Normal Pregnancy) was negative and 20% was positive, the results also showed that 13.3% of Protein urea (Preeclampsia Pregnancy) was negative and 86.7% was positive, the results showed the value of statistical significance (Sig. 2-taled) equal to zero which was less than 0.05, that means there were statistically significant differences between Protein urea (Normal & Preeclampsia Pregnancy).

Table (1): difference between Protein urea (Normal Pregnancy & Preeclampsia Pregnancy).

Criteria	negative	Positive	Paired Sample T-test	df	Sig. (2-tailed)
Protein urea (Normal Pregnancy)	80%	20%	-7.616	29	0.000
Protein urea (Preeclampsia Pregnancy)	13.3%	86.7%			

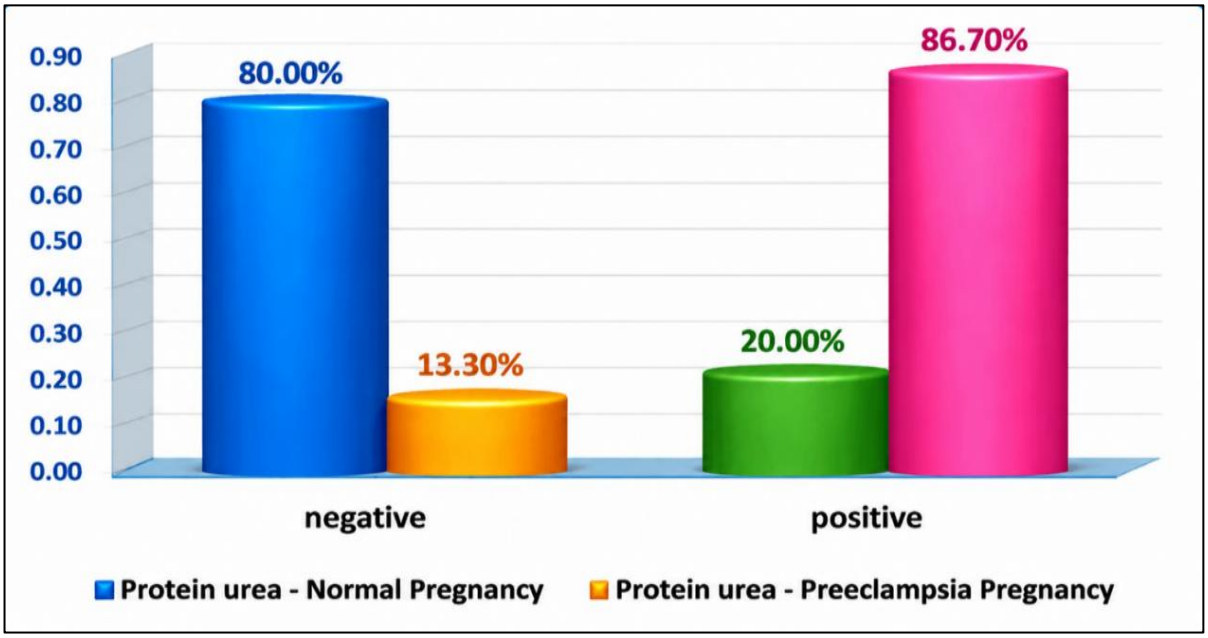

Figure (1): Difference between Protein urea (Normal & Preeclampsia) Pregnancy.

2. Blood Pressure

The results showed that 80% of Blood pressure (Normal Pregnancy) was mild, 20% was moderate and 0% was sever, the results also showed that 0% of Blood pressure (Preeclampsia Pregnancy) was mild, 50% was moderate and 50% was sever, The results showed the value of statistical significance (Sig. 2-taled) equal to zero which was less than 0.05, that means there were statistically significant differences between Blood pressure (Normal & Preeclampsia) Pregnancy.

Table (2): difference between blood pressure (Normal & Preeclampsia) Pregnancy.

Criteria	mild	moderate	sever	Paired Sample T-test	Df	Sig. (2-tailed)
Blood pressure (Normal Pregnancy)	80%	20%	0%	-10.933	29	0.000
Blood pressure (Preeclampsia Pregnancy)	0%	50%	50%			

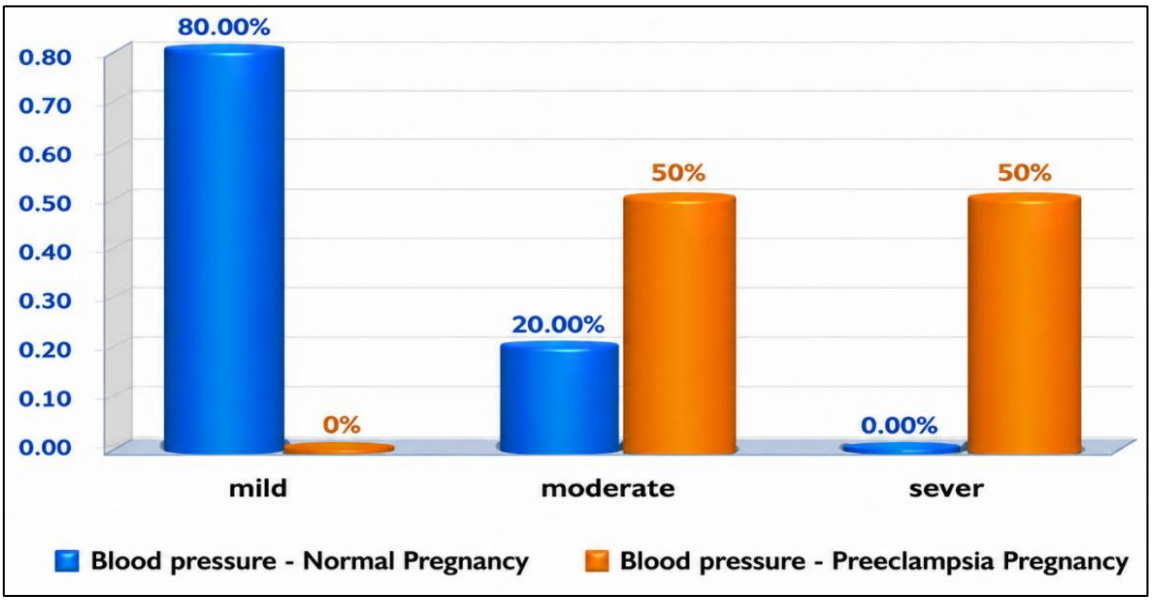

Figure (2): Difference between blood pressure (Normal & Preeclampsia) Pregnancy.

3. Weight

The results showed that mean of weight (Normal Pregnancy) was 76.5 kg, and 79 kg for (Preeclampsia Pregnancy), The results showed the value of statistical significance (Sig. 2-taled) equal to 0.457 which was more than 0.05, that means there were no statistically significant differences between weight (Normal & Preeclampsia) Pregnancy.

Table (3): difference between weight (Normal & Preeclampsia) Pregnancy.

Criteria	mean	Std. Deviation	Paired Sample T-test	df	Sig. (2-tailed)
Weight (Normal Pregnancy)	76.5	9.662	- 0.754	29	0.457
Weight (Preeclampsia Pregnancy)	79	12.79			

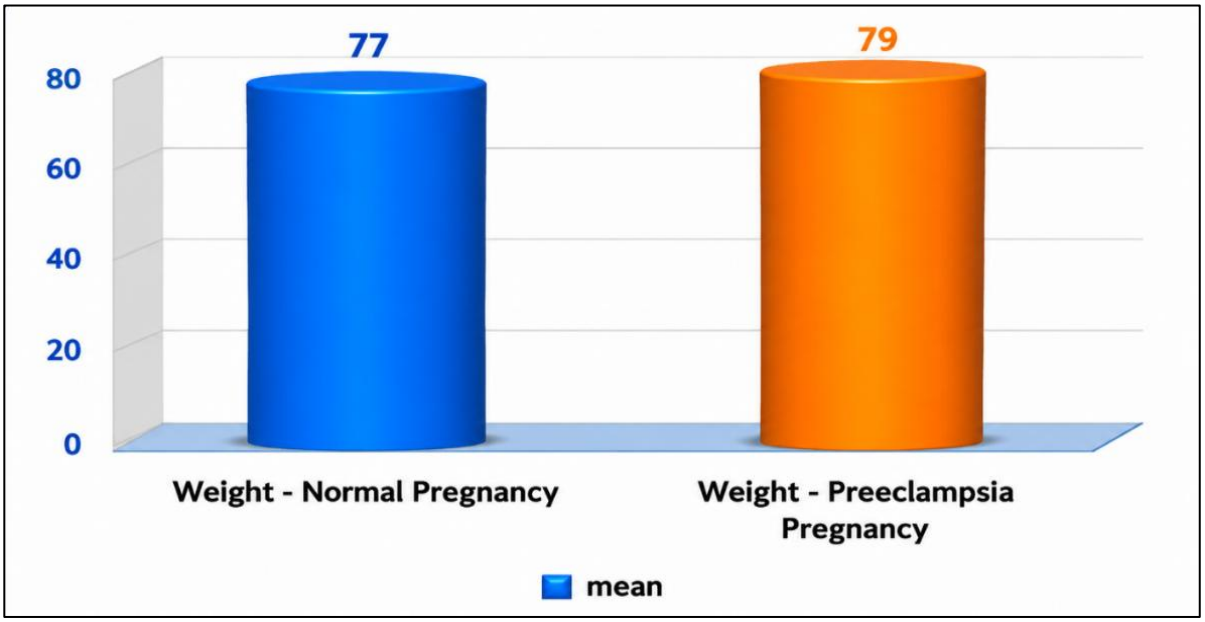

Figure (3): Difference between weight (Normal & Preeclampsia) Pregnancy

4. Oedema

The results showed that 83.3% of Normal Pregnancy does not have oedema and 16.7% has oedema, also the results showed that 26.7% of Preeclampsia Pregnancy does not have oedema and 73.3% has oedema, The results showed the value of statistical significance (Sig. 2-taled) equal to zero which was less than 0.05, that means there were statistically significant differences between oedema (Normal & Preeclampsia Pregnancy).

Table (4): Difference between Oedema (Normal Pregnancy & Preeclampsia Pregnancy)

Criteria	no	yes	Paired Sample T-test	df	Sig. (2-tailed)
Oedema (Normal Pregnancy)	83.3%	16.7%	-5.461	29	0.000
Oedema (Preeclampsia Pregnancy)	26.7%	73.3%			

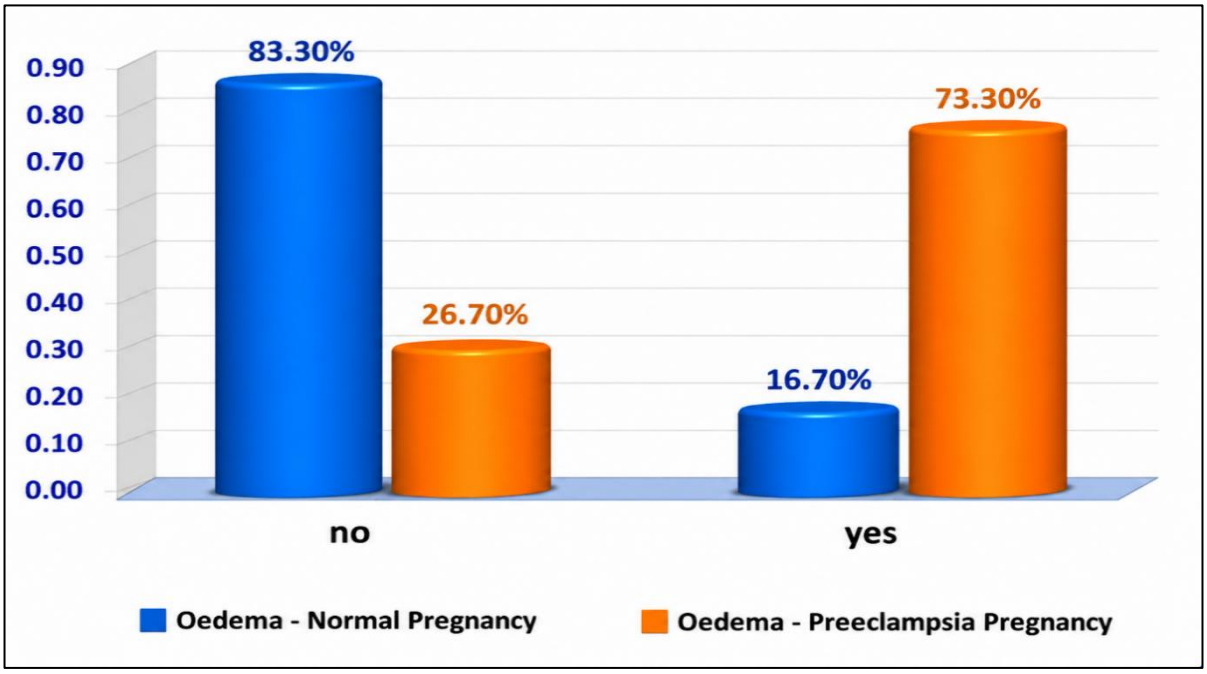

Figure (5): Difference between oedema (Normal & Preeclampsia) Pregnancy.

Discussion

Anesthesia for cesarean section traditionally takes place in the operating theatre itself in order to reduce the induction-to-delivery interval. Approximately 70% of obstetric units do not use separate anesthetic rooms for cesarean delivery (Al-Alami & Adnan, 2009).

Several studies have shown that infants delivered under general anesthesia are more likely to experience respiratory depression and may require active neonatal resuscitation (Milson et al., 2002). General anesthesia is usually indicated when regional anesthesia fails to provide adequate anesthesia during cesarean delivery (Jean & Bhavani, 2015). The anesthetic medications used to induce and maintain unconsciousness are generally considered safe for the fetus because only limited amounts cross the placenta and reach the fetal brain. Therefore, although the mother is asleep, newborns are often active and crying immediately after birth.

However, maternal vital signs such as heart rate, blood pressure, and respiratory function may be altered during administration of general anesthesia (Jean & Bhavani, 2015).

The only absolute indication for cesarean section under general anesthesia is maternal refusal of regional anesthesia. Other important indications include massive hemorrhage, placental abruption, uterine rupture, placenta accreta/per Creta, cord prolapse with fetal distress, and severe maternal disease such as severe pre-eclampsia, eclampsia, or HELLP syndrome (MacLeod, 2011).

The present study was designed to compare the effects of general anesthesia in women with pre-eclampsia/eclampsia and hypertensive disorders of pregnancy with women who had uncomplicated pregnancies during cesarean section, in order to evaluate maternal outcomes and determine the safety of general anesthesia for both mother and infant.

The participants were divided into two equal groups:

- **Group A:** 30 women with pre-eclampsia/eclampsia undergoing cesarean section under general anesthesia.
- **Group B:** 30 women with uncomplicated pregnancies undergoing cesarean section under general anesthesia.

The results demonstrated a highly statistically significant difference between the two groups regarding proteinuria. In Group A, 86.7% of women had positive proteinuria compared with only 20% in Group B ($p = 0.00$). A statistically significant difference was also observed in blood pressure distribution. In Group A, 50% of patients had moderate hypertension and 50% had severe hypertension, whereas in Group B, 80% had mild hypertension and 20% had moderate hypertension ($p < 0.05$).

No statistically significant difference was found regarding maternal weight between the two groups. The mean maternal weight was 79 kg in Group A and 76.5 kg in Group B ($p > 0.05$).

Regarding edema, there was a statistically significant difference between both groups. Edema was present in 73.3% of women in Group A compared with 16.7% in Group B ($p < 0.05$).

These findings are consistent with the study conducted by Charles (2011) in England, which included 127 pregnant women undergoing cesarean section under general anesthesia. The study reported higher rates of proteinuria and edema among women with pre-eclampsia compared with uncomplicated pregnancies, concluding that general anesthesia may be safely used in different categories of pregnant women.

Further statistical analysis in the present study evaluated the distribution of blood pressure according to maternal age. Severe hypertension was more frequent among women aged 26–30 years and 31–35 years, while moderate hypertension predominated in younger and older age groups. However, the association between maternal age and hypertension severity was not statistically significant ($p = 0.279$).

The study also analyzed passive smoking in relation to blood pressure severity. Severe hypertension was more common among passive smokers compared with non-smokers; however, this difference did not reach statistical significance ($p = 0.065$).

These findings partially agree with the study by Antoine et al. (2005) conducted in China, which compared hypertensive responses in women with severe pre-eclampsia and women with uncomplicated pregnancies undergoing cesarean section under general anesthesia using propofol. The investigators found that hypertension occurred more frequently in pre-eclamptic patients and that these patients required higher doses of propofol to control blood pressure compared with women with uncomplicated pregnancies.

Additional analysis in the present study demonstrated a statistically significant relationship between preoperative blood pressure and intraoperative blood pressure during cesarean section under general anesthesia among women with pre-eclampsia. Most women with severe preoperative hypertension continued to exhibit severe hypertension intraoperatively ($p \leq 0.05$).

Similarly, among women with uncomplicated pregnancies, significant associations were observed between preoperative and intraoperative blood pressure measurements during cesarean delivery under general anesthesia ($p \leq 0.05$).
Overall, the results suggest that hypertensive disorders of pregnancy, particularly pre-eclampsia and eclampsia, are associated with greater hemodynamic instability during cesarean delivery under general anesthesia compared with uncomplicated pregnancies.

Conclusions

In conclusion considering these results we can suggest that general anesthesia is effective in case of pre-eclampsia eclampsia hypertension disorder with good outcome of both mother and baby. In the future general anesthesia is expected to play important role in case of hypertensive disorders and first choice of anesthesiologic in case of (pre-eclampsia and eclampsia) Hypertensive disorder.

Recommendations

In the meantime, and basal on our research result, we suggest that further general anesthesia in assessment of (pre-eclampsia and eclampsia) hypertensive disorder to be done on larger number pf patients and following for longer period even in next pregnancy to test the effectiveness of anesthesia on the long run. also recommended to be compare of general anesthesia with spinal anesthesia in same group of patients who have hypertensive disorder and outcome of both groups.

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

References

[1] Al-Alami, A. S., & Adnan, T. (2009). Induction-to-delivery interval in obstetric units: A comparative study of anesthetic techniques for cesarean delivery. *Journal of Clinical Anesthesia*, 21(4), 255-260.

[2] Altaei, A., & Mohammad, J. M. (2012). Incidence and risk factors of pre-eclampsia among iraqi pregnant women. *Al Mustansiriyah Journal of Pharmaceutical Sciences*, 12(2), 52-60.

[3] Antoine, C., Young, B. K., Silverman, F., & Kaplan, G. (2005). Hypertensive responses and propofol requirements in women with severe pre-eclampsia undergoing cesarean section under general anesthesia. *Chinese Medical Journal*, 118(12), 980-985.

[4] Becher, H. L., & Stokke, G. (2013). Surgical procedures and maternal risks: A comprehensive guide to cesarean section. *International Journal of Obstetric Studies*, 15(2), 112-119.

[5] Charles, S. (2011). Proteinuria and edema outcomes among women undergoing cesarean section under general anesthesia in England. *British Journal of Anaesthesia*, 106(3), 340-345.

[6] Christopher, J., & Chief, R. (2015). *Principles and clinical practice of general anesthesia* (3rd ed.). Medical Press.

[7] Harriette, L. (2014). *Physiological changes and fetal development during normal pregnancy*. Health Sciences Publishing.

[8] Hawkins, J. L. (2010). Epidural and spinal anesthesia for cesarean section in patients with hypertensive disorders. *New England Journal of Medicine*, 362(15), 1410-1418.

[9] Jean, S., & Bhavani-Shankar, K. (2015). Anesthetic management of the parturient with hypertensive disorders of pregnancy: A clinical review. *Current Opinion in Anaesthesiology*, 28(3), 260-266.

[10] MacLeod, J. S. (2011). Absolute and relative indications for general anesthesia in obstetric surgery. *Obstetric Anesthesia Digest*, 31(2), 85-91.

[11] Milsom, I., Ladfors, L., Eriksson, M. S., & Elowsson, P. (2002). Effects of general anesthesia on neonatal respiratory depression and active resuscitation. *Acta Anaesthesiologica Scandinavica*, 46(7), 775-780.
[12] Torpy, J. M., Lynm, C., & Glass, R. M. (2011). JAMA Patient Page: General Anesthesia. *JAMA*, 305(20), 2130

