

**Full Length Research Paper**

# Internal Iliac Artery Ligation versus Local Injection of Vasopressin in Placental site in Placenta Previa during Cesarean section to Reduce Blood Loss

**Amr Warda**

Obstetrics and Gynecology Department- Damietta Specialized Hospital, Egypt.

**Article history**

Received: 25-07-2017

Revised: 05-08-2017

Accepted: 10-08-2017

**Corresponding Author:**

**Amr Warda**

Obstetrics and Gynecology  
Department- Damietta  
Specialized Hospital,  
Egypt.

**Abstract**

With the increasing rates of Cesarean deliveries, the incidence of placenta previa has progressively increased over the past few decades. Bleeding placenta during cesarean section is an inevitable problem that should be managed vigorously. Vasopressin is a potent vaso-constrictive agent that might help control bleeding in such condition; while bilateral internal iliac artery ligation (IIAL) is still the main practice used for bleeding control in several countries. The present study was designed to evaluate the effect of local injection of vasopressin versus internal iliac artery ligation on blood loss and its impact on complications during cesarean section in cases of placenta previa. The study included 30 patients diagnosed with placenta previa prepared for elective cesarean delivery. Patients in the study were randomly allocated into one of the three groups: group A) 10 patients who had vasopressin injection (4 U in 20 mL of saline), group B) 10 patients who had bilateral IIAL, and group C) 10 patients without IIAL or vasopressin (control group). The mean age of studied cases was  $32.6 \pm 5.5$  years. The majorities of patients were Multipara (84%), had previous cesarean sections (82%), with no significant difference between groups as regard these parameters. Estimated blood loss was significantly reduced among interventional groups than control group, with no significant difference between the other groups. No significant difference between the 3 groups as regard blood transfusion, heart rate or blood pressure. There were no significant complications among the studied groups. Injection of vasopressin at placental site seems to be a good for reducing blood loss during cesarean delivery for placenta previa. The use of internal iliac artery ligation (IIAL) did not result in significant reduction of blood loss.

**Keywords:** vasopressin, int. iliac artery, ligation.

**Introduction**

Placenta previa is characterized by the abnormal placenta overlying the endocervical os, and it is known as one of the most feared adverse maternal and fetal-neonatal complications in obstetrics<sup>(1)</sup>. The incidence of placenta previa has been recently increased over the past few decades, correlating with the elevated caesarean section rate<sup>(2)</sup>. For management of pregnant women with placenta previa, cesarean section is recommended as the mode of delivery<sup>(3)</sup>. Placenta previa is a well-known cause of massive intrapartum hemorrhage that is associated with high mortality and morbidity for both the mother and the neonate<sup>(4)</sup>. For bleeding from the placental separation surface, various hemostatic approaches have been proposed and put into practice<sup>(5)</sup>. Many of the techniques that have been developed to minimize intraoperative blood loss have focused on reducing pelvic circulation by bilateral ligation of internal iliac arteries or their branches<sup>(6)</sup>. Many gynecological surgeons use a local injection of vasopressin, which is a known peripheral vasoconstrictor, at the time of laparoscopic myomectomy to decrease blood loss. In addition, the useful role for local infiltration of vasopressin to arrest hemorrhage from the placental bed has been demonstrated in several obstetrical case reports<sup>(7)</sup>.

So, the aim of our study was to evaluate the effect of local injection of vasopressin versus internal iliac artery ligation on blood loss and its impact on complications during cesarean section in cases of placenta previa.

**Materials and methods***Patients and methods*

The study included 30 patients diagnosed with placenta previa prepared for elective cesarean delivery. Patients in the study were randomly allocated into one of the three groups:

- 1- **Group A (vasopressin):** 10 patients who had vasopressin injection at placental site during cesarean section.
- 2- **Group B (IIAL):** 10 patients who had bilateral internal artery ligation during cesarean section.
- 3- **Group C (control):** 10 patients who had cesarean section without internal iliac artery ligation or local injection of vasopressin (control group).

All patient are subjected to, detailed history including personal history: age, parity, duration of marriage, frequency of intercourse/week, menstrual history. Complete clinical examination: included general and full gynecological examination. Investigations: Semen analysis for exclusion of male factor, hormonal profile, Hysterosalpingography, Pelvic ultrasound and diagnostic laparoscopy.

*Ethical consent:* The study was approved by the Hospital Ethics Committee in accordance with local research governance requirements, and it was explained to the prospective participants. All participating patients signed an informed consent form.

*Statistical analysis:* The collected data were organized, tabulated and statistically analyzed using statistical package for social sciences (SPSS) version 19 (SPSS Inc, Chicago, USA), running on IBM compatible computer. Quantitative data were expressed as the mean  $\pm$  standard deviation (SD). For comparison between numerical groups, student (t) test was used for parametric or Mann-Whitney test for non-parametric variables. Qualitative data were presented as relative frequency and percent distribution. For comparison between categorical groups, the Chi square (X<sup>2</sup>) or Fisher's exact tests were used. Pearson correlation co-efficient (r-test) was used for correlating different numerical variables. For all tests, P values < 0.05 were considered significant. For all tests, P values > 0.05 were considered insignificant.

## Results

Operative assessment of the studied patients showed that there was significant difference between groups as regard estimated blood loss. Control group had more amounts of blood loss and increased frequency of excess blood loss than other groups. The least group was those had vasopressin injection and bilateral IAL. In contrast, IAL was significantly associated with prolonged operating time. There was no significant difference as regard tachycardia, hypotension or the units of blood transfusion.

Regarding postoperative assessment, the frequency of ICU admission and interventions after Cs sections were relatively common among control patients, but with no significant difference. In contrast, hemoglobin and hematocrite declined significantly among control than other groups (Table I)

**Table (I):** Comparison of surgical data between the studied groups

Variables	Group A (vasopressin)	Group B (IAL)	Group C (control)	P
Estimated blood loss (mL)	1123 $\pm$ 489	1076 $\pm$ 545	1664 $\pm$ 647	<0.001
Blood loss > 2000 mL (n)	1 (5%)	1 (5%)	5 (25%)	0.026
Operating time (min)	65.3 $\pm$ 24.4	92.5 $\pm$ 35.8	62.3 $\pm$ 19.6	<0.001
Blood transfusion (units)	1 (5%)	2 (10%)	4 (20%)	0.13
Tachycardia	3 (15%)	4 (20%)	6 (30%)	0.41
Hypotension	2 (10%)	3 (15%)	5 (25%)	0.5
Transfer to ICU	0 (0%)	1 (5%)	2 (10%)	0.28
<b>Interventions after Cs</b>				
Uterine tamponade	2 (10%)	3 (15%)	5 (25%)	0.29
Hysterectomy	0 (0%)	0 (0%)	1 (5%)	0.38
Blood transfusion (units)	2 (10%)	2 (10%)	3 (15%)	0.39
Hemoglobin (g/dl)	8.92 $\pm$ 2.23	9.24 $\pm$ 1.79	7.81 $\pm$ 2.49	0.023
Hematocrite (%)	23.2 $\pm$ 5.4	24.2 $\pm$ 5.1	20.4 $\pm$ 6.2	0.006

\*: significant at  $p < 0.05$ ;

## Discussion

According to the best of our knowledge, this is the second randomized trial evaluating the efficacy of vasopressin injection at placental site during cesarean section. A previous study by Kato et al. <sup>(11)</sup> retrospectively reviewed the medical records of all patients diagnosed with placenta previa over a period of time. They compared two groups; group A as a control group, and group B were vasopressin group. In their study, the estimated blood loss was significantly decreased in the vasopressin group compared with the control group ( $P < 0.05$ ).

Lurie et al. <sup>(9)</sup> reported six patients with uncontrollable hemorrhage caused by obstetrical complications at the time of cesarean section in which they successfully controlled the bleeding and salvaged the uterus using vasopressin injected sub-endometrially at the same concentration that we used. Zaki and Bahar <sup>(12)</sup> reported a case of placenta previa accreta in which they used vasopressin to arrest hemorrhage from the placental bed at similar concentration as we used (5 units in 20 ml of saline). In the present study, the injection of diluted vasopressin into the placental implantation site significantly reduced the blood loss without any adverse effects. Based on these results, IAL is better preserved for severe cases with placental invasion. Rauf et al. <sup>(13)</sup> demonstrated 38 patients who were managed conservatively with hypogastric artery ligation and endo-uterine hemostatic suture to control post-partum hemorrhage secondary to placenta previa-accreta. Of these patients, 55.2% were between 25 and 35 years old; 97.5% were multiparous. Women with placenta accreta had estimated blood loss between 150-2500 ml; 57.8% of patients had blood transfusion (mean intraoperative transfusion, 2 units of packed red blood cells; range, 0-9 units). Median duration of operation was 112.5 min (range, 45-305 min) and 32 patients (84.3%) with placenta accreta did not undergo cesarean hysterectomy. In the last study, with quite similar rate of blood transfusion. They used more extensive and aggressive management with similar outcome. Thus, it is better to delay these vigorous approaches to the more severe cases. The use of vasopressin in our study yielded approximate results to other new techniques performed in similar communities. Maher and Abdelaziz <sup>(14)</sup> compared two management protocols for post-partum hemorrhage during cesarean section (CS) in placenta previa, using the Bakri balloon versus non-balloon protocols. The balloon alone was successful in achieving hemostasis in 87.5% of cases. When analyzed specifically, balloon success was associated with the absence of accreta (odds ratio 0.001) and short operation duration.

In the present study, there was low frequency of ICU transfer, postoperative blood transfusion and the need for hysterectomy were minimal among interventional groups. The present study demonstrated that bilateral hypogastric artery ligation after delivery, and conservative

managements associated with decreased intraoperative blood loss and, in parallel with this finding, decreased need for preoperative and postoperative blood products transfusion.

### Conclusion

injection of vasopressin at placental site seems to be a good for reducing blood loss during cesarean delivery for placenta previa. The use of internal iliac artery ligation (IIAL) did not result in significant reduction of blood loss.

### Recommendation

Further large scale randomized double-blinded controlled trials comparing blood loss during cesarean section in cases of placenta previa to spotlight on that issue..

### References

1. Fan D, Xia Q, Liu L, Wu S, Tian G, et al. The Incidence of Postpartum Hemorrhage in Pregnant Women with Placenta Previa: A Systematic Review and Meta-Analysis. *PLoS One*. 2017;12(1):e0170194.
2. Prasanth S, Mehta P, Rajeshwari KS. Maternal and fetal outcome of placenta previa in a tertiary care institute: a prospective two year study. *India J Obstet Gynecol Res*. 2016;3(3):274-8.
3. Cresswell JA, Ronsmans C, Calvert C, Filippi V. Prevalence of placenta praevia by world region: a systematic review and meta- analysis. *Trop Med Int Health*. 2013;18(6):712-24.
4. Soyama H, Miyamoto M, Ishibashi H, Takano M, Sasa H, Furuya K. Relation between Birth Weight and Intraoperative Hemorrhage during Cesarean Section in Pregnancy with Placenta Previa. *PLoS one*. 2016;11(11):e0167332.
5. Allahdin S, Voigt S, Htwe TT. Management of placenta praevia and accreta. *J Obstet Gynaecol*. 2011;31(1):1-6.
6. Kidney DD, Nguyen AM, Ahdoot D, Bickmore D, Deutsch LS, Majors C. Prophylactic perioperative hypogastric artery balloon occlusion in abnormal placentation. *AJR Am J Roentgenol*. 2001;176(6):1521-4.
7. Takayama T, Minakami H, Koike T, Watanabe T, Sato I. Risks associated with cesarean sections in women with placenta previa. *J Obstet Gynaecol Res*. 1997;23:375-9.
8. O'Callaghan DJ, Gordon AC. What's new in vasopressin? *Intensive Care Med*. 2015;41(12):2177-9.
9. Lurie S, Appleman Z, Katz Z. Subendometrial vasopressin to control intractable placental bleeding. *Lancet*. 1997;349:698.
10. Refaie W, Fawzy M, Shabana A. Prophylactic bilateral internal iliac artery ligation for management of lowlying placenta accreta: A prospective study. *Tanta Med J*. 2014;42(4):146-50.
11. Kato S, Tanabe A, Kanki K, Suzuki Y, Sano T, et al. Local injection of vasopressin reduces the blood loss during cesarean section in placenta previa. *J Obstet Gynaecol Res*. 2014;40(5):1249-56.
12. Zaki ZM, Bahar AM. Massive haemorrhage due to placenta praevia accreta: A useful role for vasopressin. *J Obstet Gynaecol*. 1997;17:486-7.
13. Rauf M, Ebru C, Sevil E, Selim B. Conservative management of post-partum hemorrhage secondary to placenta previa-accreta with hypogastric artery ligation and endo-uterine hemostatic suture. *J Obstet Gynaecol Res*. 2017;43(2):265-71.
14. Maher MA, Abdelaziz A. Comparison between two management protocols for postpartum hemorrhage during cesarean section in placenta previa: Balloon protocol versus non-balloon protocol. *J Obstet Gynaecol Res*. 2017;43(3):447-55.
15. Fitzpatrick KE, Sellers S, Spark P, Kurinczuk JJ, Brocklehurst P, Knight M. The management and outcomes of placenta accreta, increta, and percreta in the UK: a population- based descriptive study. *BJOG*. 2014;121(1):62-71.
16. Joshi VM, Otiv SR, Majumder R, Nikam YA, Shrivastava M. Internal iliac artery ligation for arresting postpartum haemorrhage. *BJOG*. 2007;114:356-61.
17. Shih JC, Liu KL, Shyu MK. Temporary balloon occlusion of the common iliac artery: New approach to bleeding control during cesarean hysterectomy for placenta percreta. *Am J Obstet Gynecol*. 2005;193:1756-8.