ORIGINAL ARTICLE

Prevention of Uterine Inversion by Using Ultrasonographic Confirmation During Placental Delivery in Dr. Ruth K.M Pfau Civil Hospital Karachi

Tahmina Shahid Abbasi[1], Kaneez Kubra[2], Tabassum Zarrar[1], Maria Tasneem[3], Pashmina Gul[1*]

ABSTRACT

Objective: To determine the prevention of uterine inversion by using ultrasonographic confirmation during placental delivery.

Study Design: Cross-sectional study.

Place and Duration of Study: The study was carried out at the Department of Gynecology Unit II, Dr. Ruth K.M Pfau Civil Hospital Karachi, Pakistan from June 2022 to June 2023.

Methods: In this research, the total of 180 patients were included with transvaginal deliveries. To prevent uterine inversion during placental delivery, regular ultrasonographic was implemented. The placental delivery was performed with ultrasonographic confirmed placental detachment. The frequency of uterine inversion during placental delivery was compared before and after the introduction of ultrasonographic images. In addition, a comparison was made between the ultrasonographic group and the non-ultrasonographic group regarding the amount of blood loss during transvaginal delivery and the length of the third stage of labor. The Descriptive statistics were applied to all parameters Using SPSS Version 26.

Results: A total of 180 patients who had transvaginal deliveries, mean age 29 ± 9 years. One hundred and eighty women had transvaginal deliveries before and after the introduction of ultrasonography. Following the ultrasonographic confirmation, there was a significant decrease in the frequency of uterine inversion when compared to the pre-introduction period (43.3% vs. 56.7%, p = 0.001). Due to a number of limitations, the actual rate of ultrasonography performed even after it was introduced ultrasonography was 46.1%.

Conclusion: In our investigation, we concluded that with the help of ultrasonographic confirmation of placental detachment uterine inversion may be prevented.

Keywords: *Prevention, Ultrasound, Uterine Inversion.*

How to cite this: *Abbasi TS, Kubra K, Zarrar T, Tasneem M, Gul P. Prevention of Uterine Inversion by Using Ultrasonographic Confirmation During Placental Delivery in Dr. Ruth K.M Pfau Civil Hospital Karachi. Life and Science. 2024; 5(2): 204-209. doi: http://doi.org/10.37185/LnS.1.1.563*

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International license. (https://creativecommons.org/licenses/by-nc/4.0/). Non-commercial uses of the work are permitted, provided the original work is properly cited.

[1]*Department of Obstetrics & Gynecology*
Civil Hospital Karachi, Pakistan
[2]*Department of Obstetrics & Gynecology*
Jinnah Postgraduate Medical Center Karachi, Pakistan
[3]*Department of Obstetrics & Gynecology*
Niazi Welfare Foundation Teaching Hospital, Lahore, Pakistan

Correspondence:
Dr. Pashmina Gul
Department of Obstetrics & Gynecology
Civil Hospital Karachi, Pakistan
E-mail: drpashmina00@gmail.com

Funding Source: NIL; Conflict of Interest: NIL
Received: Oct 24, 2023; Revised: Feb 27, 2024
Accepted: Mar 16, 2024

Introduction

The frequency of uterine inversion varies between 1 in 3500. This broad variation could be attributed to variations in postpartum care, patient groups, case ascertainment, standard obstetric techniques, and definition of inversion. Between 2004 and 2013, the frequency in the United States was 1 in 3500 deliveries.[1] Uterine inversion's etiology is not fully known. It has been linked to the third stage of labor's application of severe fundal pressure and cord traction, particularly when uterine atony and fundal placental implantation are present.[2] After a cesarean delivery, which involves inversion through the

hysterotomy incision, puerperal uterine inversion can occur.[3] The degree and timing of the inversion determine the clinical appearance. A few examples of signs and indicators are as follows: Vaginal hemorrhage, from mild to severe, mild to severe pain in the lower abdomen, and a spherical, smooth lump emerging from the vagina or cervix.[4]

The most typical symptom is severe postpartum haemorrhage, which frequently results in hypovolemic shock and complete or second-degree uterine inversion in which the fundus protrudes through the cervical.[5] Increased vagal tone from straining the pelvic parasympathetic neurons has also been linked to shock that is out of proportion to blood loss (a condition known as neurogenic shock).[6]

Upon vaginal examination, the vagina is filled with the inverted fundus. The uterine fundus is absent from its usual periumbilical position on transabdominal palpation, which may lead to initially misdiagnosing this condition as a projecting fibroid.[7]

With 3rd-degree (fundus to or beyond the introitus) and 4th-degree (uterus and vagina inverted) cases, the protruding uterus is grossly evident on inspection of the perineum.[8]

First-degree/incomplete uterine inversion is associated with more subtle findings. Blood loss may be minimal. A fundus, or mass, within the uterine cavity, may be discovered during examination through the dilated cervix. A cup-like deformity, also known as a fundal notch, may be palpable in the region of the typically globular fundus during an abdominal examination.[9]

The prevention of uterine inversion during placental delivery is an important aspect of obstetric care, and ultrasonographic confirmation can play a role in reducing the risk. A rare but dangerous side effect of childbirth is called uterine inversion, in which the uterine fundus descends into the vagina or the uterine cavity. Significant bleeding and other potentially fatal complications may result from this.[10]

During placental delivery, ultrasonographic confirmation can be helpful in a number of ways.

Before trying to remove the placenta, an ultrasound can verify that it has detached from the uterine wall. This is important because uterine inversion can occur if the placenta is attempted to be removed before full separation.

Ultrasonography can help to identify these conditions and guide management decisions accordingly. In case uterine inversion does occur, ultrasonography can be used for rapid diagnosis. Early recognition of uterine inversion is vital for prompt intervention and management to prevent further complications.[11]

Overall, the goal is to ensure a safe and controlled delivery of the placenta, with a focus on preventing uterine inversion and minimizing associated risks. When there are risk factors for uterine inversion, such as a history of previous uterine inversion or severe tension on the umbilical cord during placental delivery, this method may be very crucial.[12] The rationale for using ultrasonographic confirmation during placental delivery to prevent uterine inversion lies in the potential to enhance safety and reduce the risk of complications associated with this obstetric emergency. Uterine inversion is a rare but serious complication of childbirth where the uterus turns inside out, usually occurring immediately after delivery of the placenta.

Methods

This research was a hospital based cross-sectional study conducted at the Department of Gynecology Unit II, Dr. Ruth K.M Pfau Civil Hospital Karachi, Pakistan from June 2022 to June 2023 after the approval from the Ethical Review Committee of the hospital held on May 12, 2022, vide letter no: IRB-Gynae-389. After taking written informed consent, eighty patients diagnosed with uterine inversion by using ultrasonographic confirmation during placental delivery presented in the OPD of gynecology and obstetrics department meeting the eligibility criteria were included through a non-probability consecutive sampling approach. The sample size was calculated by usage of an open EPI sample calculator taking a proportion of uterine inversion confirmation on ultrasonography 6.4%, and 5% margin of errors,95% CI, and 180 total sample size by using the above parameters.[13] This study was conducted in a hospital setting with women who have transvaginal births. To avoid uterine inversion during placental delivery, we instituted routine transabdominal ultrasonography. We began the placental delivery operation after ultrasonography confirmed placental detachment. In addition, a

comparison was made between (the ultrasonographic group) and (the non-USG groups) regarding the amount of blood loss during transvaginal delivery and the length of the third stage of labor. The Descriptive statistics were applied on all parameters by using the statistical software SPSS Version 26.

Inclusion Criteria: Patients aged 20_35 years including females who had transvaginal deliveries were included in our study.

Exclusion Criteria: Patients aged greater than 35 years and females who have other delivery options (transvaginal deliveries) were excluded from the study. The patients who have Gestational diabetes, elevated blood pressure in pregnancy, and other systemic disease issues were excluded from the study.

Results

The mean age of the 180 patients who underwent transvaginal birth was 29 ± 9 years, ranging from 20 to 35 years, according to Table-1.

Before and after the introduction of ultrasonographics one hundred and eighty women who have transvaginal deliveries were included in the study. The frequency of uterine inversion was much lower than it was prior when the ultrasonography was introduced (43.3% vs. 56.7%, $p = 0.001$). Table-2.

Due to a number of limitations, the actual rate of ultrasonography performed even after it was introduced was only 53.9%. Table-3.

Duration of third stage labour in USG group 2(1.1%) subject were 5 minutes,16(8.9%) Subjects were 6 minutes in USG group,17(9.4%) subjects in USG group were 7 minutes, 53(29.4%) subjects in USG group were 8.4 minutes. The 54(30.0%) subjects were third stage labor duration was 4 minutes in Non USG group and 38(21.1%) subjects were 5 minutes duration of third stage labor in non USG group Table-4.

Descriptive Statistics of the Patients

Table -1: Age Distribution

	Frequency	Percent %
20-24 years	31	17.2
25 years -28 years	70	38.9
29-33 years	42	23.3
34-35 years	37	20.6
Total	180	100.0

Table -2: Frequency of Uterine Inversion

	Frequency	Percent %
After the introduction of Ultrasonography	78	43.3
Before the introduction of ultrasonography	102	56.7
Total	180	100.0

Table -3: Actual Rate of Performing Ultrasonography

	Frequency	Percent %
Performed Successfully	97	53.9
Not performed due to restrictions	83	46.1
Total	180	100.0

Discussion

One of the primary benefits of incorporating ultrasonographic confirmation is the ability to identify risk factors that predispose individuals to

Table -4: Duration Of Third Stage Labor

Time (minutes) in USG & Non USG Groups	Frequency	Percent %
USG group -5 mins	2	1.1
USG group 6 mins	16	8.9
USG group) 7 mins	17	9.4
USG group) 8.4 mins	53	29.4
Non USG Group 4 mins	54	30.0
Non USG Group 5 mins	38	21.1
Total	180	100.0

uterine inversion. These may include multiparity, precipitous labor, excessive traction during delivery, and abnormal placental adherence.[12] By recognizing these risk factors early on, healthcare providers can take appropriate precautions and closely monitor the delivery process to prevent uterine inversion.

Ultrasonography allows for real-time assessment of the placental delivery process, providing immediate feedback to healthcare providers.[13] This enables them to confirm the complete expulsion of the placenta and assess the integrity of the uterine cavity before proceeding with manual removal. Real-time visualization also helps in identifying any abnormalities or complications that may arise during placental delivery, allowing for timely intervention.[14]

In cases where manual removal of the placenta is necessary, ultrasonography can guide healthcare providers in performing the procedure safely and effectively. By visualizing the position of the placenta and the uterine cavity, providers can apply appropriate traction techniques and monitor for signs of uterine inversion. This guided approach reduces the risk of excessive force or trauma during placental removal, thereby minimizing the likelihood of uterine inversion.[15]

Despite preventive measures, uterine inversion may still occur in rare instances. However, with ultrasonographic confirmation, healthcare providers can promptly recognize the signs of uterine inversion and initiate appropriate management strategies.[16] This may include repositioning the uterus, administering tocolytic agents to relax uterine muscles, and providing supportive care to stabilize the patient. Early recognition and intervention are critical in preventing further complications and optimizing outcomes for both the mother and the newborn.[17]

Incorporating ultrasonographic confirmation into routine obstetric practice enhances patient safety and satisfaction. By minimizing the risk of uterine inversion and its associated complications, individuals can have greater confidence in the care they receive during childbirth.[18] Moreover, the use of ultrasonography allows for a more personalized and attentive approach to placental delivery, fostering a positive birthing experience for both patients and healthcare providers.[19]

In conclusion, the integration of ultrasonographic confirmation during placental delivery represents a valuable tool in the prevention of uterine inversion. By facilitating early identification of risk factors, real-time assessment of the delivery process, guided intervention during placental removal, and prompt recognition of complications, ultrasonography contributes to improved obstetric outcomes and patient satisfaction.[20] Continued research and education on the benefits of this approach are essential to further enhance its implementation and effectiveness in clinical practice.

Conclusion

In our investigation, we found that uterine inversion may be avoided with the help of ultrasonographic confirmation of placental detachment. In our investigation, we concluded that with the help of ultrasonographic confirmation of placental detachment uterine inversion may be prevented. Larger sample sizes and consideration of various treatment approaches are necessary in more organized multicenter trials.

Acknowledgment
We appreciate everyone who took part in the study and their participation.

REFERENCES

1. Nii M, Enomoto N, Takakura S, Maki S, Tanaka H, Ikeda T. Surgical technique for fertility preservation for placenta accreta spectrum without previa: Tourniquet, uterus inversion and placental dissection procedure. Journal of Obstetrics and Gynecology Research. 2023; 49: 2188-93. Doi: 10.1111/jog.15701
2. Sunjaya AP, Dewi AK. Total uterine inversion post-partum: case report and management strategies. Journal of family & Reproductive Health. 2018; 12: 223-5.
3. Garg P, Bansal R. Unusual and delayed presentation of chronic uterine inversion in a young woman as a result of negligence by an untrained birth attendant: a case report. Journal of Medical Case Reports. 2020; 14: 1-5. doi: 10.1186/s13256-020-02466-x
4. Tolcha FD, Dale TB, Anbessie TT. Chronic uterine inversion presenting with severe anemia 7 years after a home delivery and the subsequent successful pregnancy: a case report. Journal of Medical Case Reports. 2023; 17: 278. doi: 10.1186/s13256-023-04012-x
5. Kurniawati EM. Successful use of condom catheters for management of uterine inversion: Case report and literature review. International Journal of Surgery Case Reports. 2022; 94: 107076. doi: 10.1016/j.ijscr.2022.107076
6. Zhu X, Huang Q, Jiang L, Nguyen VT, Vu T, Devlin G, et al. Longitudinal intravital imaging of mouse placenta. Science Advances. 2024; 10: eadk1278. doi: 10.1126/sciadv.adk1278.
7. Leal RF, Luz RM, de Almeida JP, Duarte V, Matos I. Total and acute uterine inversion after delivery: a case report. Journal of medical case reports. 2014; 8: 1-4. doi: 10.1186/1752-1947-8-347
8. Hostetler DR, Bosworth MF. Uterine inversion: a life-threatening obstetric emergency. The Journal of the American Board of Family Practice. 2000; 13: 120-3. doi: 10.3122/15572625-13-2-120
9. Sun XM, Wang X, Meng JL. Acute uterine inversion at cesarean section: an emergency condition in obstetrics. TMR Clinical Research. 2020; 3: 126-30. doi: 10.12032/TMRCR20200602010
10. Nyeche S, Ubom AE. Acute Uterine Inversion Complicating Mid-Trimester Unsafe Abortion in a Teenage Nigerian Girl. Annals of Health Research. 2022; 8: 81-7. doi: 10.30442/ahr.0801-08-159
11. Yonetani N, Kaji T, Shirakawa A, Sogawa E, Yoshida A, Mineda A, et al. Sonographic confirmation of placental detachment during placental delivery for uterine inversion prevention. Journal of Obstetrics and Gynecology Research. 2023; 49: 2644-8. doi: 10.1111/jog.15763
12. Rahaoui M, Zizi H, Mamouni N, Errarhay S, Bouchikhi C, Banani A. Managing major postpartum haemorrhage following acute uterine inversion: a case report and literature review. Scholars International Journal of Obstetrics and Gynecology. 2020; 3: 110-3. doi: 10.36348/sijog.2020.v03i03.010.
13. Mittal P, Suri J. Inversion Uterus. Labour Room Emergencies. 2020: 381-6. doi: 10.1007/978-981-10-4953-8_39
14. Kaur A, Singh B. Acute uterine inversion–A complication revisited; a case series and review of literature. Case Reports in Perinatal Medicine. 2022; 11: 20200081. doi: 10.1515/crpm-2020-0081
15. Kanak L, Anita K. A Case Report on Near Miss Case of Acute Uterine Inversion after Delivery. IOSR Journal of Dental and Medical Sciences. 2018; 17: 59-91. doi: 10.9790/0853-1705078991
16. Wendel MP, Shnaekel KL, Magann EF. Uterine inversion: a review of a life-threatening obstetrical emergency. Obstetrical & gynecological survey. 2018; 73: 411-7. doi: 10.1097/OGX.0000000000000580
17. Menon A, Dugad M, Argade R. The Newsletter. 2021. Available at https://www.pogs.in/wp-content/uploads/2021/08/POGS-Issue-3_June-2021_.pdf
18. Nayak M. Retained placenta delivery using Windmill technique: A novel step towards solution with self-developed conceptual model. European Journal of Molecular & Clinical Medicine. 2020; 7: 1470-6.
19. Ling L, Xia D, Jin Y, Hong R, Wang J, Liang Y. Effect of follicle size on pregnancy outcomes in patients undergoing first letrozole-intrauterine insemination. European Journal of Medical Research. 2024; 29: 1-7. doi: 10.1186/s40001-024-01794-8.
20. Coad SL, Dahlgren LS, Hutcheon JA. Risks and consequences of puerperal uterine inversion in the United States, 2004 through 2013. American journal of obstetrics and gynecology. 2017; 217: 377-e1. doi: 10.1016/j.ajog.2017.05.018

Authors Contribution

TSA: Idea conception, study designing, data collection, data analysis, results and interpretation, manuscript writing, and proofreading
KK: Idea conception, study designing, data collection, manuscript writing, and proof reading
TZ: Study designing, data analysis, results and interpretation, manuscript writing, and proofreading
MT: Study designing, data analysis, results and interpretation, manuscript writing, and proofreading
PG: Idea conception, study designing, data collection, data analysis, results and interpretation