

Retained placenta delivery using Windmill technique: A novel step towards solution with self-developed conceptual model

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Abstract: *Placental retention is seen in 2% of women post-delivery which accounts for around 10% of the maternal deaths worldwide. This is mostly seen in developing countries with inadequate access to medical services & lack of facility for management of emergency obstetrical cases. The conventional treatment method for retained placenta was always to be the manual removal of retained placenta (MROP) till the present. Out of many complications of MROP, the major complications were severe postpartum hemorrhage, puerperal sepsis, perforations of uterus and uterine inversion. Placenta is said to be retained if it is not able to deliver spontaneously even after 30 min of the birth of the baby. There are so many traditional methods like the use of syntocinon, umbilical injection of oxytocin, use of relaxants like nitroglycerine, controlled cord traction (CCT), massaging of uterus and acupuncture are there but have no substantial evidence of hundred percent effectiveness. There is a lack of consensus on the optimal strategy to manage MROP and reduce maternal mortality and morbidity. Additionally MROP is also not complication-free which can be solely trusted as a single management strategy. Henceforth in a Hospital at Berlin, a new technique has developed by using an existing concept of operation of the windmill for the delivery of retained placenta, which was found out to be effective for now. This technique follows the theory of vector principle for application. For this paper, the researcher has also developed a conceptual model by using the concept of 3 number of theories named Engel's biopsychosocial model, Jane Watson's theory of human caring & Pender's health promotion model*

Keywords: *Windmill Technique, Retained Placenta.*

Introduction

Placental retention is seen in 2% of women post-delivery which accounts for around 10% of the maternal deaths worldwide^{1,2} This is mostly seen in developing countries with inadequate access to medical services & lack of facility for management of emergency obstetrical cases.^{3,4} The conventional treatment method for retained placenta was always to be the manual removal of retained placenta (MROP) till the present. Out of many complications of MROP, the major complications were severe postpartum hemorrhage, puerperal sepsis, perforations of uterus and uterine inversion.⁴⁻⁶ Placenta is said to be retained if it is not able to deliver spontaneously even after 30 min of the birth of the baby.⁷ There are so many traditional methods like the use of syntocinon, umbilical injection of oxytocin, use of relaxants like nitroglycerine, controlled cord traction (CCT), massaging of uterus and acupuncture are there but have no substantial evidence of hundred percent effectiveness.⁸⁻¹² There is a lack of consensus on the optimal strategy to manage MROP and reduce maternal mortality and morbidity. Additionally MROP is also not complication-free which can be solely trusted as single management strategy.¹³⁻¹⁴ Henceforth in a Hospital at Berlin, they

have developed & tried a newer technique by using an existing concept of operation of a windmill for the delivery of retained placenta, which was found out to be effective for now.²²

Aim

- The primary aim is the reduction in manual removal of the placenta among mothers with placental retention post vaginal delivery.
- secondly it aimed at reducing the incidence of PPH, anemia after delivery, the time duration of placental delivery, intubation requirement, the prevalence of use of general anesthesia, antibiotic use and the length of stay in hospital.

Theory of the windmill technique

- Windmill technique entails the continuous application of 360° umbilical cord rotation and traction perpendicularly to the direction of the birth canal at the level of the introitus, similar to the movement of a windmill sail.
- This technique follows the principle of 3D vector force of physics which has magnitude, direction and a point of application. (Fig-1)
- Every force has components of vector forces which acts in two or three- dimensional planes.¹⁸
- Here umbilical cord acts as a plane for vector where forces were to be applied in the form of constant traction & rotation by health care provider regardless of placental location in the uterus. Hence the point of action will be the bed of placenta & the ultimate result will be the separation of the placenta.

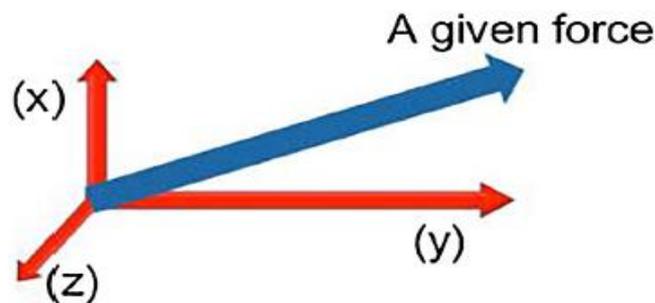


Figure 1. Any force such as pulling on the umbilical cord of the placenta is composed of component vector forces with magnitudes and direction in 3 planes²²

Procedure flow chart of placenta delivery

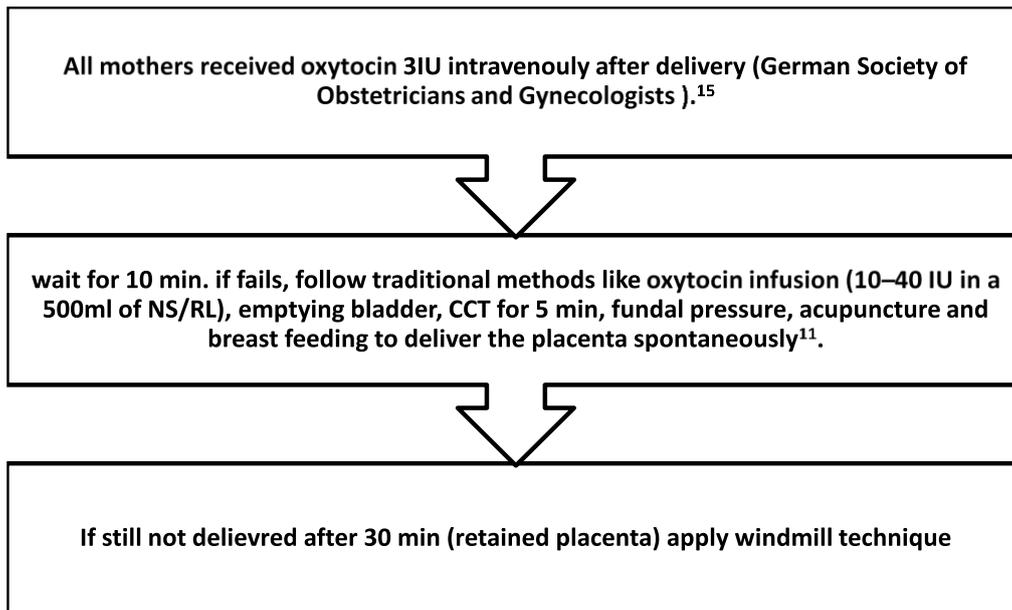


Figure 2: Procedure flow chart of placenta delivery

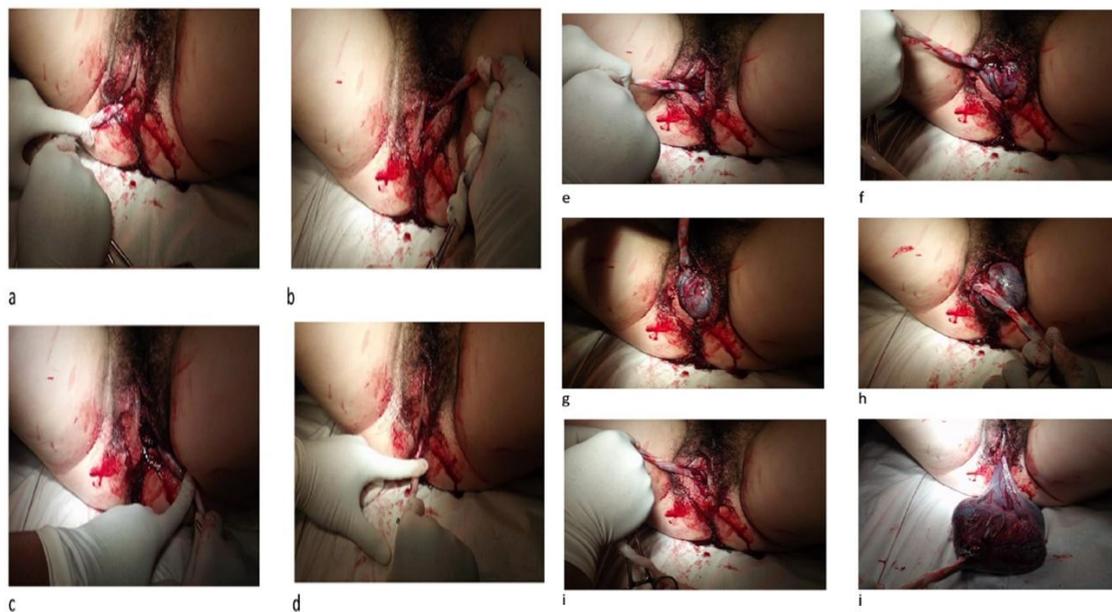


Figure 3. Steps of windmill technique application²²



Figure 4. USG finding of placenta separation²²

Steps of procedure

The usual protocol of placenta delivery to be followed first (figure 2) that is giving uterotonic drugs like oxytocin infusion, controlled cord traction & uterine massage, until this technique fails to deliver the placenta after 30min of baby delivery & you confirm the diagnosis of retained placenta.

Once the diagnosis is confirmed, the researchers of Berlin University Hospital applied this novel windmill technique of 360 degrees of placenta rotation. With this the traction force is applied to the bed of the placenta, as shown in the vector force theory and the ultimate result is the delivery of the placenta.

The effectiveness of the technique is observed by lengthening of the umbilical cord which can be further confirmed with USG finding. (Fig-4). During this procedure counter traction is applied to the uterus as like conventional method to facilitate the delivery of the placenta in a controlled way. The procedure will be stopped immediately if there is no evidence of umbilical cord lengthening, postpartum bleeding or cord rupture.

Benefits

- It is a simple and easy method of placental delivery & is perfect for application by midwives.
- Reduces the incidence of unnecessary invasive manual method of placenta delivery in operating theatre

- Promotes good mother & child bonding.¹⁶⁻¹⁷
- The chances of bleeding, operative inference, exposure to general anesthesia & cost of treatment were reduced to a greater extent.
- This can be easily employed in low resource areas where little or no access to operative services, antibiotic coverage and anesthesia is available.

Conceptual model development

The researcher has developed a conceptual model for stating the whole process of management of retained placenta by using windmill technique. The novelty in this model is that the researcher has added the nursing management and care for retained placenta mothers. Here the researcher has taken ideation from 3 theories namely Engel's biopsychosocial model¹⁹ (it uses 3 criteria like biological, psychological & social aspect for explaining wellbeing & disability), Jane Watson's theory of human caring²⁰ (it has 3 major elements like carative factor, transpersonal caring relationship & caring moment) and Pender's health promotion model²¹ (it says about input, process & output). In the first half of the model the researcher described the problems faced by the mother in the retained placenta in the form of Biological, psychological & social aspects. Next to this is the management i.e windmill technique which is the core concept of this & the most essential nursing management & role of nurse (forgiveness, compassion & love) by using carative factor and transpersonal factor which emphasizes on the interpersonal relationship between the health care provider and mother leading to improved healing process. Lastly the care outcome was described by using Pender's health promotion model. Because solely medical management for retained placenta is not sufficient to deal with the retained placenta as this condition can lead to lots of anxiety & depression among mothers. Which ultimately affects the health status of the baby.

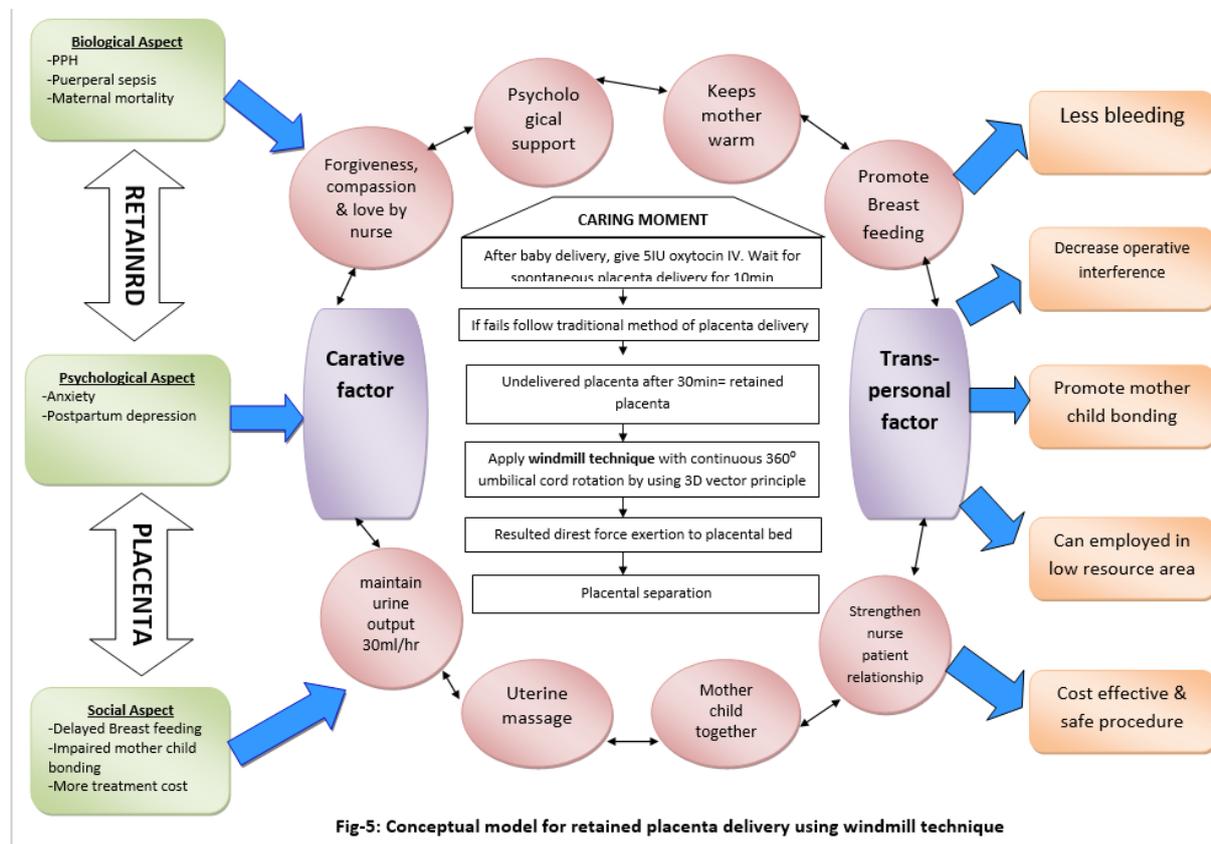


Fig-5: Conceptual model for retained placenta delivery using windmill technique

Conclusion

Thus Windmill technique was found out to be a simple, safe, effective and easy to use technique for placenta delivery which reduces the conventional invasive procedure of manual removal of the placenta. Use of this method benefits in many ways like reduction in PPH occurrence, enhances early spontaneous placental delivery, lessens the incidence of unnecessary operative interference, anesthesia and antibiotic use. Furthermore this improves the mother & child bonding & initiation of exclusive breastfeeding & skin to skin contact. Adding to the benefits it, therefore, reduces the length of the hospital, ultimately reducing the cost of treatment. One of the biggest advantages of this lifesaving technique is that this can easily be used in low resource health care facilities by the birth attendants & midwives.

Conflict of interest: None

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Ethical Permission: Approved

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