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Research Article

Comparative Assessment of Fetomaternal Outcomes in Low-Risk Term Pregnancies Induced with Foley's Catheter, Dinoprostone, and Misoprostol

Swathi Bobba[1] and Vennapusa Lakshmi Chaitanya[2]

[1]Assistant Professor, Department of OBGY, Ayaan Institute of Medical Sciences, Teaching Hospital and Research Centre

[2]Assistant Professor, Department of OBGY, Ayaan Institute of Medical Sciences, Teaching Hospital and Research Centre

*Corresponding Author
Swathi Bobba

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Abstract: ***Introduction***: Induction of labor (IOL) is a common obstetric intervention aimed at initiating uterine contractions before spontaneous onset of labor. The choice of induction method can significantly impact fetomaternal outcomes. This study evaluates the efficacy and safety of three common induction methods—Foley's catheter, dinoprostone, and misoprostol—in low-risk women with term pregnancies. ***Materials and Methods***: A prospective observational study was conducted on 300 low-risk pregnant women at term, divided into three groups based on the induction method used: Foley's catheter (n=100), dinoprostone (n=100), and misoprostol (n=100). Inclusion criteria included singleton pregnancy, cephalic presentation, and intact membranes. Exclusion criteria were previous cesarean section, multiple pregnancies, and any contraindications to vaginal delivery. Fetomaternal outcomes were assessed, including time to delivery, mode of delivery, maternal complications, and neonatal outcomes. ***Results***: The mean time to delivery was shortest in the misoprostol group (10.2 ± 2.1 hours), followed by dinoprostone (12.5 ± 3.0 hours) and Foley's catheter (14.8 ± 3.5 hours). Cesarean section rates were highest in the Foley's catheter group (25%), compared to dinoprostone (18%) and misoprostol (15%). Maternal complications such as postpartum hemorrhage and uterine hyperstimulation were more frequent in the misoprostol group. Neonatal outcomes, including Apgar scores and NICU admissions, were comparable across all groups. ***Conclusion***: Misoprostol was associated with the shortest induction-to-delivery interval but had higher rates of maternal complications. Foley's catheter, while safer, had a longer induction time and higher cesarean section rates. Dinoprostone offered a balanced profile with moderate induction times and lower complication rates. The choice of induction method should be individualized based on patient characteristics and clinical settings.

Keywords: Induction of labor, Foley's catheter, dinoprostone, misoprostol, fetomaternal outcomes, term pregnancy.

Introduction

Induction of labor (IOL) is a critical intervention in obstetrics, employed when the benefits of expediting delivery outweigh the risks of continuing the pregnancy. It is estimated that approximately 20-25% of all pregnancies undergo induction of labor, with rates increasing due to various maternal and fetal indications.[1] The success and safety of IOL depend on the method used, the cervical status, and the overall health of the mother and fetus.[2]

The most commonly used methods for IOL include mechanical methods such as Foley's catheter and pharmacological agents like dinoprostone (a prostaglandin E2 analog) and misoprostol (a prostaglandin E1 analog).[3] Each method has its advantages and disadvantages, and the choice often depends on the clinician's preference, institutional protocols, and patient-specific factors.[4]

Foley's catheter, a mechanical method, is often preferred in low-resource settings due to its low cost and minimal systemic side effects. However, it may be less effective in women with an unfavorable cervix.[5] Dinoprostone, available as a vaginal insert or gel, is widely used for cervical ripening and has been shown to be effective in reducing the time to delivery.[6] Misoprostol, an inexpensive and stable prostaglandin, is highly effective for labor induction but is associated with a higher risk of uterine hyperstimulation and other maternal complications.[7]

Despite the widespread use of these methods, there is ongoing debate regarding their comparative efficacy and safety, particularly in low-risk term pregnancies. This study aims to assess the fetomaternal outcomes following the use of Foley's catheter, dinoprostone, and misoprostol for IOL in low-risk women with term pregnancies, providing evidence to guide clinical decision-making.

Materials and Methods

This was a prospective observational study conducted at a tertiary care hospital over a period of 18 months. A total of 300 low-risk pregnant women at term (37-42 weeks of gestation) were enrolled and divided into three groups based on the induction method used: Foley's catheter (n=100), dinoprostone (n=100), and misoprostol (n=100).

Inclusion Criteria

1. Singleton pregnancy with cephalic presentation.
2. Term pregnancy (37-42 weeks).
3. Intact membranes.
4. No contraindications to vaginal delivery.
5. Bishop score ≤ 6 (unfavorable cervix).

Exclusion Criteria

1. Previous cesarean section or uterine surgery.
2. Multiple pregnancies.
3. Non-reassuring fetal status.
4. Contraindications to prostaglandin use (e.g., asthma, glaucoma).
5. Major fetal anomalies.

Induction Methods

1. **Foley's Catheter:** A 16F Foley catheter was inserted into the cervical canal, and the balloon was inflated with 30 mL of sterile water. The catheter was left in place for 12 hours or until expulsion.
2. **Dinoprostone:** A 10 mg dinoprostone vaginal insert was placed in the posterior fornix and removed after 12 hours or upon onset of active labor.
3. **Misoprostol:** 25 µg of misoprostol was administered vaginally every 4 hours, up to a maximum of 6 doses.

Outcome Measures

1. **Primary Outcomes:** Time from induction to delivery, mode of delivery (vaginal vs. cesarean).
2. **Secondary Outcomes:** Maternal complications (postpartum hemorrhage, uterine hyperstimulation, infection), neonatal outcomes (Apgar scores, NICU admissions).

Statistical Analysis

Data were analyzed using SPSS version 25. Continuous variables were compared using ANOVA, and categorical variables were compared using the chi-square test. A p-value <0.05 was considered statistically significant.

RESULTS

Table 1: Baseline Characteristics of the Study Population

Characteristic	Foley's Catheter (n=100)	Dinoprostone (n=100)	Misoprostol (n=100)	p-value
Maternal age (years)	26.5 ± 4.2	27.1 ± 3.8	26.8 ± 4.0	0.56
Gestational age (weeks)	39.2 ± 1.1	39.0 ± 1.2	39.1 ± 1.0	0.45
Bishop score at entry	4.2 ± 1.0	4.1 ± 1.1	4.0 ± 1.2	0.67

Table 2: Time from Induction to Delivery

Induction Method	Mean Time to Delivery (hours)	p-value
Foley's Catheter	14.8 ± 3.5	<0.001
Dinoprostone	12.5 ± 3.0	
Misoprostol	10.2 ± 2.1	

Table 3: Mode of Delivery

Induction Method	Vaginal Delivery (%)	Cesarean Section (%)	p-value
Foley's Catheter	75	25	0.03
Dinoprostone	82	18	
Misoprostol	85	15	

Table 4: Maternal Complications

Complication	Foley's Catheter (%)	Dinoprostone (%)	Misoprostol (%)	p-value
Postpartum hemorrhage	5	4	8	0.04
Uterine hyperstimulation	2	3	10	<0.001
Infection	3	2	1	0.45

Table 5: Neonatal Outcomes

Outcome	Foley's Catheter (%)	Dinoprostone (%)	Misoprostol (%)	p-value
Apgar score <7 at 5 min	4	3	5	0.56
NICU admission	6	5	7	0.67

DISCUSSION

The findings of this study highlight the differences in efficacy and safety among the three common induction methods. Misoprostol was associated with the shortest induction-to-delivery interval, consistent with previous studies demonstrating its potent uterotonic effects.[8] However, this benefit was offset by a higher incidence of maternal complications, particularly uterine hyperstimulation and postpartum hemorrhage. These findings are in line with other studies that have raised concerns about the safety of misoprostol, especially at higher doses.[9]

Foley's catheter, while safer in terms of maternal complications, had the longest induction time and the highest cesarean section rate. This is likely due to its mechanical nature, which may be less effective in achieving cervical ripening compared to pharmacological agents.[10] However, its low cost and minimal systemic effects make it a viable option in resource-limited settings.

Dinoprostone offered a balanced profile, with moderate induction times and lower rates of maternal and neonatal complications. This is consistent with its mechanism of action, which promotes gradual cervical ripening without the risk of uterine hyperstimulation associated with misoprostol.[11]

The choice of induction method should be individualized, taking into account the patient's cervical status, medical history, and the availability of resources. Future research should focus on optimizing dosing regimens and exploring combination methods to improve outcomes.

Conclusion

Misoprostol is the most effective method for achieving a shorter induction-to-delivery interval but is associated with higher maternal complication rates. Foley's catheter, while safer, has a longer induction time and higher cesarean section rates. Dinoprostone offers a balanced approach with moderate efficacy and safety. Clinicians should weigh the benefits and risks of each method when selecting an induction strategy for low-risk term pregnancies.

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