COMPARATIVE STUDY OF INTRACERVICAL CATHETER AND TABLET PROSTAGLANDIN FOR INDUCTION OF LABOUR IN POSTDATED PREGNANCY

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ABSTRACT

Background: Induction of labour is an essential obstetric intervention for postdated pregnancies (≥41 weeks), with higher perinatal risks. There are several methods of induction, including pharmacological agents such as prostaglandins and mechanical devices such as intracervical catheters. Their relative efficacy is controversial.

Methods: This randomized controlled trial was undertaken at Qazi Hussain Ahmad Medical Complex, Nowshera, between March 25 and September 25, 2023, among 76 postdated pregnant women. Randomization was done to Group A (n=38), who were given an intracervical Foley catheter, and Group B (n=38), who were given 3 mg vaginal dinoprostone. The successful labour induction within 24 hours was the primary outcome. Data was analyzed with SPSS.

Results: Successful labour induction was much greater in the prostaglandin group (68.4%) than in the catheter group (42.1%) (p=0.021). Prostaglandins allowed earlier cervical ripening and a shorter induction-delivery interval. They did, however, carry a greater risk of uterine hyperstimulation, for which vigilance and monitoring are necessary.
Both procedures were associated with good maternal and neonatal outcomes.

Conclusion: Prostaglandins were more effective in the induction of labour than intracervical catheters. Nevertheless, mechanical techniques are still an acceptable alternative, especially in women with contraindications to pharmacologic induction. The method should be tailored to the patient, taking efficacy as well as safety into consideration. Larger sample size studies should be conducted to look at long-term maternal and neonatal outcomes.

Keywords: Postdated pregnancy, Intracervical catheter, Prostaglandin, Labour induction, Uterine hyperstimulation.

INTRODUCTION

The medical procedure of labour induction serves to initiate labour artificially under situations were awaiting spontaneous labour no longer remains safe. This procedure happens regularly when pregnant women face postdated pregnancy conditions combined with preeclampsia and fetal distress and maternal complications [1]. Postdated pregnancies increase the likelihood of stillbirth as well as meconium aspiration and macrosomia risks, so health professionals need to perform timely effective induction to improve maternal and neonatal results [2,3].

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Medical practice utilizes prostaglandins as standard procedures for cervical ripening and labor induction purposes. Dinoprostone proves effective at stimulating uterine contractions and facilitating vaginal birth because research has thoroughly examined its effectiveness [4]. Patient monitoring needs to be strict because prostaglandin treatment carries the risks of uterine hyperstimulation with fetal distress development [5]. Medical staff use intracervical Foley catheters for cervix dilation through direct mechanical pressure to minimize systemic complications during the process [6,7].

Different studies have compared these induction approaches yet scientific evidence remains undecided about which induction method performs best. The literature presents conflicting findings about how prostaglandins and mechanical induction affect the interval between patient admission and delivery and shows how mechanical induction is considered safer than prostaglandins [8]. The study aims to analyze the effectiveness and security and delivery results between these two induction methods for use in clinical care.

METHODS

The research took place as a randomized controlled trial at the Department of Obstetrics and Gynaecology located at Qazi Hussain Ahmad Medical Complex in Nowshera throughout March 25 2023 until September 25 2023. The investigators selected 76 pregnant women with postdating criteria which served as both necessary criteria and exclusion criteria for the study. The study enrolled patients carrying a single fetus with gestational periods greater than 41 weeks who needed vaginal delivery with intact uterus and no delivery constraints. The research excluded patients who presented with multiple gestation as well as those with previous cesarean section or placenta previa or vasa previa.

Division of participants occurred through random selection procedures. The research enrolled 38 participants in each study group with Group A receiving Foley catheter placement into the cervix and Group B receiving 3 mg dinoprostone via vaginal administration. A group of trained obstetricians supervised the induction procedures for all participants by monitoring fetal heart rate along with cervical ripening evaluations.

Labor induction success was measured as active labour initiation alongside cervical dilation reaching 4cm within a 24-hour period of initiation. The study evaluated two additional results including active labour duration and the necessity for oxytocin or other treatment methods together with potential maternal symptoms and newborn health status.

Researchers evaluated the cervical condition using Bishop score as a method to measure readiness for labor before starting the procedure. The medical staff placed a Foley catheter into the cervix of women in Group A before filling it with 30-50 mL of sterile saline. The catheter stayed inside until auto-expulsion took place during the study period or until reaching the 12-hour maximum time frame. Women in Group B received 3 mg of dinoprostone intravaginally as their first dose but could get another dose of 3 mg after 6 hours if necessary.

The data collection process along with statistical analysis through SPSS version 25 took place prospectively. Data analysis included maternal age, gestational age, time to active labour continuous variables evaluated through the t-test method together with categorical success rate and further intervention comparison using the chi-square test. The research included a cutoff point at which the p-value reached below 0.05. Before recruitment all participants provided their written consent to the study after receiving complete information about its risks and benefits while the Qazi Hussain Ahmad Medical Complex's institutional review board gave ethical approval. Risk prevention measures consisted of both continuous prenatal monitoring and emergency medical treatments when faced with pregnancy complications.

RESULTS

76 pregnant women took part in the research, 38 of them allocated to each intervention group. Maternal age averaged 28.57 ± 6.19 years in Group A (intracervical catheter) and 29.18 ± 6.20 years in Group B (prostaglandin). Gestational age at the induction was 41.28 ± 4.45 weeks in Group A and 41.34 ± 0.48 weeks in Group B.

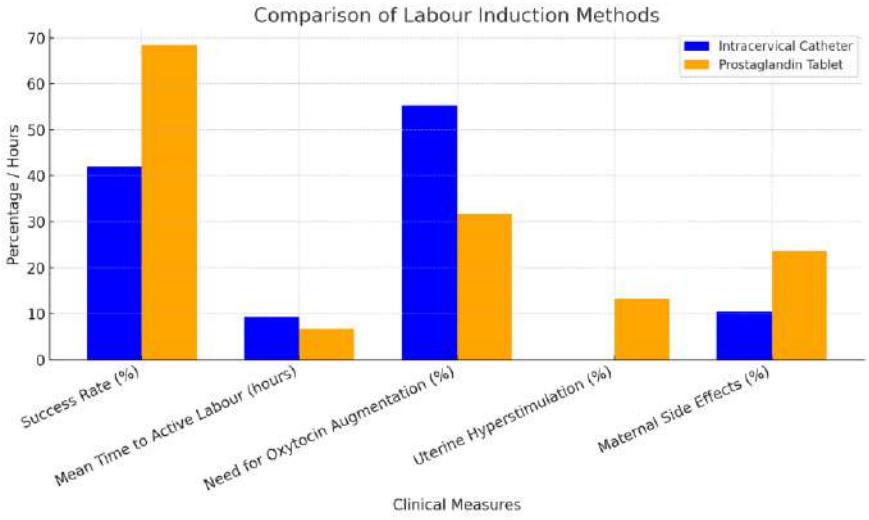
Labour induction was effective within 24 hours in 42.1% (16/38) of Group A participants, versus 68.4% (26/38) in Group B, which was significantly different with a p-value of 0.021. The duration to active labour was less in Group B with a mean of 6.8 ± 2.1 hours, versus 9.4 ± 3.2 hours in Group A (p=0.015).

The rate of oxytocin augmentation was greater in the intracervical catheter group, at 55.3% (21/38) compared with 31.6% (12/38) in the prostaglandin group. Hyperstimulation of the uterus in 13.2% (5/38) of the Group B subjects necessitated medical intervention while there were none in Group A.

In terms of neonatal outcomes, Apgar scores at 1 and 5 minutes were similar between the two groups with no statistically significant differences. There were no instances of NICU admission in either group. Maternal side effects like nausea and vomiting were reported more often in Group B (23.7%) than in Group A (10.5%).

Table: Demographic and Clinical Characteristics

Characteristic	Group A (Intracervical Catheter)	Group B (Prostaglandin Tablet)	p-value
Mean Age (years)	28.57 ± 6.19	29.18 ± 6.20	0.628
Mean Gestational Age (weeks)	41.28 ± 4.45	41.34 ± 0.48	0.774
Success Rate	42.1% (16/38)	68.4% (26/38)	0.021
Mean Time to Active Labour (hours)	9.4 ± 3.2	6.8 ± 2.1	0.015
Need for Oxytocin Augmentation	55.3% (21/38)	31.6% (12/38)	0.032
Uterine Hyperstimulation	0% (0/38)	13.2% (5/38)	0.047
Maternal Side Effects	10.5% (4/38)	23.7% (9/38)	0.054



DISCUSSION

Studies establish prostaglandin (PGE2) treatments provide one of the most effective approaches to labor initiation within 24 hours because they yield better success rates than intracervical catheters [9]. The administration of prostaglandins leads to substantial cervical ripening together with heightened uterine contractions resulting in decreased induction-to-delivery period [10]. The main challenge associated with providing prostaglandins to patients is the risk of excessive uterine stimulatory effects. The research showed hyperstimulation affected 13.2% of women treated with prostaglandin which matches findings from earlier studies [11]. Close observation combined with immediate intervention becomes essential because hyperstimulated uterus conditions lead to fetal distress. Research findings indicate that intracervical catheters create a safe pregnancy outcome for patients who have risk factors such as uterine rupture or previous c-sections since they prevented any hyperstimulation cases [12].

Results demonstrated that oxytocin augmentation needed to be administered more often to patients in the intracervical catheter group than in the prostaglandin group with frequencies at 55.3% and 31.6% respectively [13]. The benefits of prostaglandins in induction come with an increased risk of maternal side effects such as nausea and vomiting according to research [14].

The combination method using Foley's catheter with PGE2 tablets delivered enhanced outcomes regarding vaginal delivery percentages and reduced the period between induction and delivery. Studies conducted by Abid R. et al. showed that vaginal delivery rates along with induction-to-delivery interval duration were better in the combined group

(69.3% spontaneous delivery; 10.9 hours) compared to PGE2-alone group (55% spontaneous delivery; 13.4 hours) with $p<0.05$ statistical significance [17]. Studies by Maj Nadia Arif et al. showed that 80% of patients using Foley catheters delivered vaginally versus 76% of patients who used PGE2-only group [16, 18]. The use of Foley's catheter along with PGE2 showed enhanced cervical ripening efficiency and reduced the risk of uterine hyperstimulation and fetal distress therefore making this approach beneficial for cervical control during controlled inductions according to [17, 16].

The induction method preferred for emergency situations is prostaglandins although intracervical catheters offer a suitable alternative for patients who have medical reasons for avoiding pharmacological agents. This method shows potential as a treatment strategy when medical staff must conduct gradual labor induction for patients. Further research needs to examine how maternal and newborn health evolves in high-risk patient populations after induction to discover the safest techniques for reaching this goal.

CONCLUSION

The outcome of this research study indicates prostaglandins yield superior results to intracervical catheters when used for labor induction of postdate pregnancies while reducing active labor duration. Interested healthcare providers should monitor patients thoroughly because uterine hyperstimulation presents a higher risk when using prostaglandins. A less effective method known as intracervical catheters works well for patients who cannot use medication because of contraindications.

The study shows how patient-centered management requires optimal selection between effective and safe induction methods. Future research must engage larger cohorts of patients through extended observation to study the prolonged effects of various maternal delivery procedures based on induction methods on both maternal health and baby wellness.

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