Original Article

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Study of Efficacy Analysis of Intravaginal Misoprostol and Intracervical Dinoprostone in Induction of Labor at a Tertiary Care Hospital in Central India

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Abstract

Background: Labor induction ranks among the most frequently performed procedures during pregnancy. the present study was conducted for efficacy analysis of intravaginal misoprostol and intracervical dinoprostone in induction of labor. **Materials & Methods:** A total of 40 women who were admitted to the labor ward beyond thirty-seven weeks of gestation and requiring induction of labor for obstetrical indications were enrolled. Complete demographic and clinical details of all the patients were obtained. All the patients were randomized into two study groups- Intravaginal misoprostol group and intracervical dinoprostone. Bishop scoring was done according to vaginal examination findings and those with Bishop score of six or less were included. Induction was done in both the study groups according to their respective protocols. Duration from time of induction to onset was noted. Need for oxytocin augmentation was recorded separately. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. **Results:** In the comparison of the two medications, the initial Bishop Score did not reveal any significant differences. However, the subsequent Bishop Score, measured 8 hours post-application of the drug, was notably higher in women who received misoprostol for induction. 12.5 percent of the patients of the intravaginal misoprostol group and 32.5 percent of the patients of the intracervical dinoprostone group need oxytocin augmentation. The mean duration of induction and delivery was significantly higher among patients of the intracervical dinoprostone group. **Conclusion:** Misoprostol has demonstrated superior efficacy in facilitating cervical modifications and in the induction of labor.

Keywords: Misoprostol, Intracervical, Dinoprostone.

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Introduction

Each year, approximately four million women in the United States give birth, with over 20 percent experiencing labor induction. Consequently, labor induction ranks among the most frequently performed procedures during pregnancy. However, the most rapid and effective technique for inducing labor remains unidentified.[1, 2] Labor induction employs both mechanical and pharmacological agents. When utilized separately, these agents have been shown to decrease the likelihood of cesarean delivery among women undergoing induction. It is conceivable that a combination of mechanical and pharmacological approaches could produce a synergistic effect in facilitating labor. Some research indicates that such combination methods may effectively shorten labor duration and lower the risk of cesarean delivery, while other studies have yielded inconclusive results.[3, 4]

The main problems experienced during induction of labour are ineffective labour, and excessive uterine activity which may cause fetal distress. Both problems may lead to an increased risk of caesarean section. Methods of induction of labour include administration of oxytocin, prostaglandins, prostaglandin analogues and smooth muscle stimulants such as herbs or castor oil, or mechanical methods such as digital stretching of the cervix and sweeping of the membranes, hygroscopic cervical dilators, extra-amniotic balloon catheters, artificial rupture of the membranes, and nipple stimulation. Sometimes it is necessary to bring on labour artificially because of safety concerns for the mother or baby. Misoprostol is a hormone given by insertion through the vagina or rectum, or by mouth to ripen the cervix and bring on labour.[4,5] Hence; the present study was conducted for efficacy analysis of intravaginal misoprostol and intracervical dinoprostone in induction of labor.

Subjects and Methods

The present study was conducted for comparing the efficacy analysis of intravaginal misoprostol and intracervical dinoprostone in induction of labor. A total of 40 women who

were admitted to the labor ward beyond thirty-seven weeks of gestation and requiring induction of labor for obstetrical indications were enrolled. Complete demographic and clinical details of all the patients were obtained. All the patients were randomized into two study groups- Intravaginal misoprostol group and intracervical dinoprostone. Bishop scoring was done according to vaginal examination findings and those with Bishop score of six or less were included. Induction was done in both the study groups according to their respective protocols. Duration from time of induction to onset was noted. Need for oxytocin augmentation was recorded separately. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

Results

The mean age of the patients of the Intravaginal misoprostol group and intracervical dinoprostone group was 26.8 years and 25.1 years respectively. The mean gestational age of the patients of the Intravaginal misoprostol group and Intracervical dinoprostone group was 38.9 weeks and 39.1 weeks respectively.

In the comparison of the two medications, the initial Bishop Score did not reveal any significant differences. However, the subsequent Bishop Score, measured 8 hours post-application of the drug, was notably higher in women who received misoprostol for induction. 12.5 percent of the patients of the intravaginal misoprostol group and 32.5 percent of the patients of the intracervical dinoprostone group need oxytocin augmentation.

The mean duration of induction and delivery was significantly higher among patients of the intracervical dinoprostone group.

Table 1: Demographic data

Variable	Intravaginal misoprostol	Intracervical dinoprostone
Mean age (years)	26.8	25.1
Mean period of gestation (wks)	38.9	39.1

Table 2: Need of oxytocin augmentation

Need for oxytocin augmentation	Intravaginal misoprostol	Intracervical dinoprostone
Number	5	13
Percentage	12.5	32.5
p-value	0.001 (Significant)	

Table 3: Duration between induction and delivery

Duration between induction and delivery (mins)	Intravaginal misoprostol	Intracervical dinoprostone
Mean	14.3	19.8
SD	3.5	3.1
p-value	0.001 (Significant)	

Discussion

Induction of labour is a common procedure in high income countries. It may be conducted for medical as well as non-medical reasons. Potential advantages and disadvantages, indications, risks, and methods are still researched and discussed. Induction from 37 weeks onwards is likely to decrease stillbirths in high risk pregnancies. Mishanina et al. (2014) found a reduced risk of fetal death in their subgroup meta-analysis regarding induction compared with expectant management. This result is available for 60 trials and does not provide information on gestational age (Mishanina et al., 2014). There are different means for induction of labour. Mechanical methods comprise stretching of the cervix via insertion of luminaria or balloons as well as digital manipulation ("sweeping") through the cervical os, and amniotomy. Complementary methods include homoeopathy, acupuncture, hypnosis and others. Medical induction of labour is a well-researched area.[6]

Misoprostol is a prostaglandin E1 methyl ester and is used orally for the prevention or treatment of peptic ulcer. Oral misoprostol with a rapid absorption is de-esterified to active misoprostol acid in the liver rapidly. Misoprostol acid has a half-life of between 20 and 40 minutes and is excreted in the urine. Misoprostol stimulates myometrial contractions in a pregnant uterus by selectively binding to EP2/EP3 prostanoid receptors. In 1992, misoprostol was first reported for the termination of a pregnancy with a live fetus.[7,8] Prostaglandins have been used for cervical ripening and induction of labour since the 1970s. The goal of the administration of prostaglandins in the process of induction of labour is to achieve cervical ripening before the onset of contractions. One of the routes of administration that was proposed is intracervical. Using this route, prostaglandins are less easy to administer and the need for exposing the cervix may cause discomfort to the woman.[8, 9] Hence; the present study was conducted for comparing the safety and efficacy of intravaginal misoprostol and intracervical dinoprostone in induction of labor.

Mean age of the patients of the Intravaginal misoprostol group and intracervical dinoprostone group was 26.8 years and 25.1 years respectively. The mean gestational age of the patients of the Intravaginal misoprostol group and Intracervical dinoprostone group was 38.9 weeks and 39.1 weeks respectively. In the comparison of the two medications, the initial Bishop Score did not reveal any significant differences. However, the subsequent Bishop Score, measured 8 hours post-application of the drug, was notably higher in women who received misoprostol for

induction. 12.5 percent of the patients of the intravaginal misoprostol group and 32.5 percent of the patients of the intracervical dinoprostone group need oxytocin augmentation. The mean duration of induction and delivery was significantly higher among patients of the intracervical dinoprostone group. Veena B et al compared the effectiveness of sublingual PGE1 with intracervical PGE2. Post-induction mean Bishop's score in PGE1 group was statistically significant ($t = 6.57$, $p < 0.05$). Failed induction rate and need for augmentation (46.3 vs 62.1 %) were lower with PGE1 than those with PGE2. Significant maternal and foetal outcomes like higher rate of NVD (35.8 vs 26 %), lower LSCS rate (15.8 vs 32.6 %), lower incidence of foetal complications (7.3 vs 21 %) was noted with PGE1. APGAR scores at 1 and 5 min were not significant. The mean cost of induction with PGE1 was 12.55+/4.15 INR and with PGE2 470.65+/126.5. Sublingual PGE1 is a better cervical ripening agent, faster and more effective, with a shorter induction-to-delivery interval as compared to intracervical PGE2.[9]

Denguezli W et al compare the efficacy and safety of intravaginal misoprostol versus dinoprostone cervical gel for cervical ripening and labour induction. An experimental clinical trial was conducted involving 130 consecutive patients undergoing cervical ripening, who were randomly assigned to one of two treatment groups: (1) intravaginal misoprostol and (2) intracervical dinoprostone gel. In the misoprostol group, 50 micrograms of the drug were administered in the posterior vaginal fornix every 6 hours for a maximum duration of 24 hours, while the dinoprostone group received 0.5 mg of dinoprostone in the uterine cervix at the same intervals. The primary outcome was the rate of women achieving vaginal delivery within 24 hours of initiating the treatment protocol. Of the 130 patients assessed, 65 were assigned to the misoprostol group and 65 to the dinoprostone group. The results indicated a significantly higher rate of vaginal delivery within 24 hours in the misoprostol group (75%) compared to the dinoprostone group (53.8%) (RR = 1.40, 95% CI [1.07-1.45], P = 0.02). However, there was no significant difference in the meantime to delivery between the two groups (14.9 hours for misoprostol versus 15.8 hours for dinoprostone) (P = 0.51). The Bishop score was notably higher in the misoprostol group at 6 hours post-treatment initiation (1.38; relative risk, 95% CI [1.02-1.85], P = 0.03). Additionally, the rate of Caesarean deliveries due to fetal distress was greater in the dinoprostone group (21% compared to 10.8%, P = 0.15). Although the rates of tachysystole (6.1% for misoprostol versus 4.6% for dinoprostone, relative risk 1.15, 95% CI [0.6-2.24]) and hyperstimulation syndrome (7.6% for misoprostol versus 4.6% for dinoprostone, relative risk 1.26, 95% CI [0.72-2.24]) were slightly elevated in the misoprostol group, these differences did not reach statistical significance. The findings suggest that misoprostol, as utilized in this study, is more effective than the application of cervical dinoprostone gel for cervical ripening and labor induction.[10]

Conclusion

Misoprostol has demonstrated superior efficacy in facilitating cervical modifications and in the induction of labor.

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