



ORIGINAL RESEARCH PAPER

Obstetrics & Gynaecology

AN ANALYSIS OF THE COST-EFFECTIVENESS OF LABOR INDUCING AGENTS

KEY WORDS:

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ABSTRACT

The objective of this study is to assess the economic consequences of labor induction with Misoprostol compared to Cerviprime gel.

Design: Economic evaluation alongside a randomized controlled trial.

Setting: Obstetrics department of Dr. Rajendra Prasad Medical College & Hospital. Population: Women scheduled for labor induction with a singleton pregnancy without a previous cesarean section in a cephalic presentation at term, intact membranes, and an unfavorable cervix.

Methods: Cost-effectiveness analysis from a hospital perspective.

Main outcome measures: We estimated direct medical costs associated with healthcare utilization from randomization to six weeks postpartum.

Results: Mean costs per woman in the Misoprostol group (n=60) and the Cerviprime gel group (n= 60) were rupees 26 versus rupees 250, respectively, with an average difference of rupees 224. The cost of induction of labor was much less in the Misoprostol group compared with the Cerviprime group.

Conclusion: Misoprostol appears to be a more economical alternative to Cerviprime in terms of the cost of labor induction.

INTRODUCTION

Induction of labor is considered when the benefits of induction outweigh the risks of continuing pregnancy. It aims to achieve vaginal delivery, avoid the risk of fetal compromise, and deliver a healthy baby with minimal discomfort to the mother.

The history of induction of labor can be traced back to Hippocrates' descriptions of mammary stimulation and mechanical dilation of the cervical canal.¹ Induction of labor is perhaps unique in medicine because it seeks to advance a process which in the natural course of events is inevitable unless the pregnancy is terminated by cesarean section.

Nowadays, there is a growing trend towards artificially inducing labor pains. In the United States, an increase in induction of labor was noted from 9.5% in 1990 to 22.1% in 2004.² In high-income countries, following induction of labor, the number of infants delivered at term can be as high as one in four births; however, in low and middle-income countries, the rates of artificial induction are generally lower, barring few exceptions where the rate of artificial induction can be as high as those observed in high-income countries. Concomitantly the rates of cesarean sections have increased as well. This inflation necessitates the development of safe, cost-effective, and more efficient means of induction.

There are various nonpharmacological and pharmacological options available for induction of labor. Nonpharmacological approaches include natural modalities like herbal supplements, breast stimulation, membrane stripping, amniotomy, and mechanical modalities. Popular mechanical methods include amniotomy, balloon-tipped catheters, and natural and synthetic laminaria tents. Mechanical methods, although mainly effective in only causing cervical dilation, have been used for many years to induce labor.³ A number of pharmacologic agents have been used to ripen the cervix before labor induction, including oxytocin, prostaglandins (PGs), estrogen gels, and relaxin. Different methods also have different direct costs, and some methods require continuous monitoring of the woman throughout labor. Consequently, the choice of induction method may have significant implications for the national resources, especially if the method is known to increase the risk of complications requiring a cesarean section.

Prostaglandins are used widely for the induction of labor. However, there is widespread controversy among clinicians surrounding the safety, efficacy, and preference in using Misoprostol and Cerviprime for cervical ripening. One clinician may follow a particular method, while a colleague may refuse to use it because of its cost, risk/benefit profile, time, or personal experience. The objective of the present study is to compare the cost of labor induction with Misoprostol and Cerviprime.

MATERIAL AND METHODS

This study was conducted in the obstetrics department of Dr. Rajendra Prasad Medical College & Hospital. The population under study were women with a singleton pregnancy without previous cesarean section scheduled for labor induction, in cephalic presentation, at term, intact membranes, and an unfavorable cervix. Cost-effectiveness analysis of Misoprostol and Cerviprime was done.

Written informed consent was taken from the eligible women. Patients were randomly assigned to receive 0.5 mg Cerviprime gel six-hourly up to a maximum of three doses or 25 micrograms tablet Misoprostol four-hourly up to a maximum of four doses, or till the patient entered the active stage of labor, whichever was earlier.

We estimated the number of doses of each drug required for induction of labor and the direct medical costs associated with each method of induction of labor. Appropriate tests for statistical analysis were used.

RESULTS:

The results observed were subjected to statistical analysis by students t-test, Chi-square test, and Mann-Whitney test. A p-value of <0.05 was taken as significant.

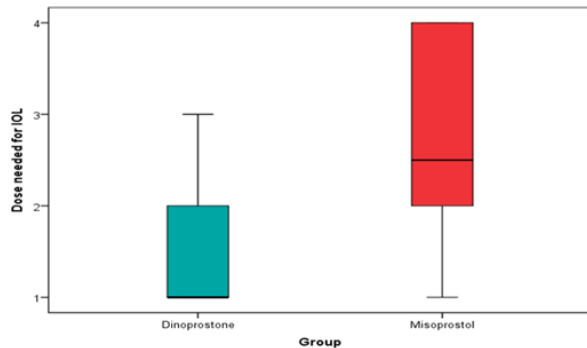
**The following observations were made:-
Table 1 Distribution Of Cases According To Total Number Of Doses Needed For Induction Of Labor**

Total Dosage	Cerviprime (n=60)	Misoprostol (n=60)	P-value
1	41 (68.3%)	12 (20.0%)	0.0001
2	18 (30.0%)	18 (30.0%)	1.0000
3	1 (1.7%)	13 (21.7%)	0.0018
4	0	17 (28.3%)	0.0001
Total	60 (100.0%)	60 (100.0%)	

The number of women receiving one dose was significantly higher in the Cerviprime group than in the Misoprostol group ($P=0.0001$). We also observed that number of women receiving a total of three doses ($P=0.0018$) was significantly lower in the Cerviprime group in comparison to the Misoprostol group.

In the Cerviprime group, the median number of doses needed for induction of labor was 1, while in the Misoprostol group median number of doses needed for induction of labor was 3. The difference in the median number of doses required for induction was statistically significant in the two groups, with a p-value of <0.0001 (calculated using the Mann-Whitney U test).

Figure 1 Median Number Of Doses Of Drug Needed For Induction Of Labor



Mean costs per woman in the Misoprostol group ($n=60$) and in the Cerviprime gel group ($n=60$), were rupees 18 versus rupees 230, respectively, with an average difference of rupees 212. The cost of induction of labor was much less in the Misoprostol group compared with the Cerviprime group.

DISCUSSION

Induction of labor is done in conditions where the continuation of the pregnancy may be hazardous to the mother or fetus. Fetal death was the only indication for induction of labor centuries ago, but it has been taken over by prolonged pregnancy and hypertensive disorders in the past 50–60 years. Planned induction of labor has become an accepted procedure in modern obstetrics practice. Given that a growing percentage of women undergo induction of labor, it is crucial to determine the best method for this process.⁴

The ideal agent for induction of labor should be non-invasive, effective, economical, rapid in action, and safe to both mother and fetus. None of the methods or agents currently available fulfill all these criteria, but prostaglandins are one of the most effective means of achieving cervical ripening and induction of labor, providing good clinical efficacy and patient satisfaction.

Cost of labor induction becomes an important factor for consideration, especially in resource-poor countries. In the present study, we have compared the cost-effectiveness of two popular agents, Cerviprime and Misoprostol, for induction of labor.

In the Cerviprime group, the median number of doses of drug required was one, while the median number of doses of drug required in the Misoprostol group was three. The difference in the median number of doses needed for induction of labor was statistically significant. This is contrary to the observation made by Chuck⁵, where a higher number of doses of Cerviprime compared to Misoprostol was required for induction.

Despite the significantly higher number of doses of drug

required in the Misoprostol group, the overall cost of induction with Misoprostol was lower than Cerviprime. A single tablet of Misoprostol costs around six rupees, while a single dose of Cerviprime insert costs around two hundred thirty rupees. So Misoprostol is a more economical alternative than Cerviprime for induction of labor.

Misoprostol is stable at room temperature and does not require refrigeration, whereas Cerviprime has to be stored between 2 to 8 degrees celsius. So Misoprostol does not require maintenance of cold chain for transportation and can be provided readily in peripheral areas. This becomes even more important in a tropical country like India, where high ambient temperatures may compromise the efficacy of Cerviprime if there is a break in cold chain.

CONCLUSION

Misoprostol appears to be more economical than Cerviprime in terms of the cost of labor induction. Also, it does not require maintenance of cold chain for transportation and can be provided readily in peripheral areas. So it can be used as a cheaper, easily available alternative to Cerviprime, especially in resource-poor countries.

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