DOI: https://doi.org/10.53350/pjmhs20221612545

ORIGINAL ARTICLE

Comparison of Different Methods of Induction of Labour Methods; Khyber Pakhtunkhwa Perspective

MAHNAZ RAEES[1], FARNAZ ZAHOOR[2]
[1]MBBS, FCPS, MHPE, Assistant Professor, Department of Gynecology, Lady Reading Hospital Peshawar, KPK
[2]MBBS, FCPS, Assistant Professor, Department of Gynecology, Lady Reading Hospital Peshawar, KPK
Corresponding author: Farnaz Zahoor, Email: farnazzahoor_1410@hotmail.com

ABSTRACTS

Objectives: to compare the mechanical, pharmacological or combination of both in induction of labour.

Methods: This comparative observational study was conducted in Department of Obs and Gynae, Lady Reading Hospital, from January 2019 to December 2019. In this study all women presenting to labor room with singleton pregnancy and gestational age > 37 weeks and admitted for induction of labor were included. All those women with multiple pregnancies, premature rupture of membrane, malpresentation, and prior Cesareans section were excluded. Total 300 patients were included in the study period, Patients were divided into 4 groups, Group A (mechanical methods), Group B (prostaglandin E2), Group C (mechanical + PGE2), Group D (misoprostol). Data were analyzed using IBM SPSS Statistics for Windows, Version 23.0 (IBM Corp., Armonk, NY).

Results: In this study 300 patients were included, in mean age of 24.54±12 years, with age range of 16- 40 years. Majority were Primi gravida (167 (55.7%), and 99.7 had poor bishop score. Indication for induction of 109(36.3%) was due to eclampsia / pre-eclampsia, followed by postdate pregnancy 98(32.7%). In majority of cases 123(41%) time from induction to labour was 6-12 hours. prostaglandin group showed good success rate in term of normal vaginal delivery and low adverse effects and good maternal and neonatal outcomes, followed by misoprostol, lowest success rate was recorded in mechanical only group . ($p<0.001$)

Conclusion: Our study concludes that among different methods available for induction of labour, PGE2 is safe, effective and have goof maternal and fetal outcomes

Keywords: induction, labour, PGE2, misoprostol

INTRODUCTION

The most common indication for induction of labor is prolong pregnancy. The risk of maternal and fetal complications increases with increase in gestation age beyond 41 weeks, in such cases induction of labor is preferred to benefit the health of the mother and fetus (1, 2). However, labor induction has many risk which includes fetal distress, infections, uterine rupture, and need of c-section.(3) the bishop score before induction of labor is important, induction is more likely be successful if cervix is ripe.(4)

Different methods for induction have been used which includes pharmacological, mechanical, and sometime combination of both. Pharmacological includes prostaglandins (PGE2, Misoprostol) among which oral misoprostol is proven effective and superior to PGE2.(5) several studies shows a higher efficacy of vaginal misoprostol compared to vaginal PGE2 (6, 7). A review of 45 RCTs showed that misoprostol is highly effective than PGE2 but associated with increased risk of uterine hyperstimulation and fetal distress (8) The Balloon catheter is used as mechanical method for induction, which include single and double balloon catheters. Foley's catheter is cheaper and readily available in most situations. the use of mechanical method is associated with lower rate of uterine over stimulation, and uterine rupture. (9)

In combine methods, both agents act independently. Prostaglandin is more effective in improving cervical length score, while catheter is better in cervical os dilation; thus both improve different parameters. Combine approach ,may lead to lower dose of prostaglandin and thus minimize its side effects. A meta-analysis showed that the combine use of PG and foley's catheter resulted in shorter induction to delivery interval and less uterine stimulation as compared to PG alone.(10) in a recent study by Husain et al. (11) showed that combine foley's and misoprostol reduces the failure rate and decrease the induction to delivery time.

There is no agreement on the best method of induction. Many combinations have been proposed as they affect the cervix differently. Thus, the present study was planned to compare different methods of induction of labour (mechanical, pharmacological, or combination of both) in our setup in term of maternal and fetal outcomes. The results of this study will provide us with local statistics, and this will open a window for further research.

MATERIAL AND METHODS

This comparative observational study was conducted in department of Obs and Gyne, Lady Reading Hospital, Peshawar, from January 2019 to December 2019. In this study all women presenting to labor room with singleton pregnancy and gestational age > 37 weeks and admitted for induction of labor were included. All those women with multiple pregnancies, premature rupture of membrane, malpresentation, and prior Cesareans section were excluded.

Approval was received from the hospital's ethical and research board prior to the study. A written, informed consent was also obtained for all the couples involved in the study. Patients fulfilling the inclusion criteria were admitted in the ward. A detailed history of each patient was taken, and a thorough clinical examination of all women was done to identify the gestational age of the fetus, placental localization and uterine abnormalities. As per Antenatal protocols, routine laboratory investigations were performed.

Total 300 patients were included in the study period, Patients were divided into 4 groups, Group A (mechanical methods), Group B (prostaglandin E2), Group C (mechanical + PGE2), Group D (misoprostol). Each woman underwent cervical assessment before induction to determine the Bishop score. The cervix was cleaned in a lithotomy position by using Cusco's speculum, Foley catheter with 24 French sizes was inserted in the cervix and the balloon was inflated with 60 ml normal saline. The device was left for a maximum period of 24 hours and the patient's activity was not restricted. Once labor was established, patients were managed according to intrapartum care guidelines. misoprostol group received oral misoprostol (50-µg). PGE2 group received (dose) and combine (mechanical +PGE2) received (dose). The primary target parameter was the rate of failed labour inductions, defined as "no birth within 48hours. The indications for CS were failed induction of labor, failure to progress non-reassuring fetal heart rate as assessed by continuous electronic fetal monitoring by the doctor attending the parturient. The primary outcome was rate of failure to achieve vaginal delivery after 24 h. Secondary outcomes were induction-to-delivery interval, mode of delivery, reason for CS.

Data were analyzed using IBM SPSS Statistics for Windows, Version 23.0 (IBM Corp., Armonk, NY). Continuous variables (age,

gestational age, parity, Bishop score, induction-to-delivery interval) were reported as mean and standard deviation and categorical variables (maternal and fetal complications, outcomes) as number (percent). Fischer's exact test and Pearson's correlation test were applied. The level of significance was set at $P < 0.05$.

RESULTS

In this study 300 patients were included, in mean age of 24.54±12 years, with age range of 16- 40 years. majority of the women 197(65.7%) were in age group of 16-30 years. majority were Primi gravida (167 (55.7%), and 99.7 had poor bishop score. Indication for induction of 109(36.3%) was due to eclampsia / pre-eclampsia, followed by postdate pregnancy 98(32.7%). Table 1 showing details of demographic data.

Table 1: Demographic characteristics of the study population. (n=300)

Variable	Frequency	Percentage
Age:		
16-30 years	197	65.7%
31-35 years	93	31%
36-40 years	10	3.3%
Parity		
Primi	167	55.7%
1-4	70	23.3%
5-8	58	19.3%
>8	5	1.7%
Bishop Score		
Poor	299	99.7%
Good	01	0.3%
Indication for induction		
Eclampsia/ Pre-eclampsia	109	36.3%
Postdates	98	32.7%
PROM	57	19.0%
Congenital anomalies	03	1%
IUD	10	3.3%
Twin pregnancy	02	0.7%
Oligohydramnios	12	04%
Previous C-section	07	2.3%
GDM	02	0.7%

Various methods were used for induction of delivery, in which majority of cases 115(38.3%) used prostaglandin E2, followed by misoprostol use 110(36.7%). In majority of cases 123(41%) time from induction to labour was 6-12 hours. Maternal and fetal outcomes are given in table 2.

prostaglandin group showed success rate in term of normal vaginal delivery and low adverse effects, followed by misoprostol, lowest success rate was recorded in mechanical only group . ($p<0.001$). Table 3 showing comparison of different induction methods with maternal and fetal outcomes.

Table 2: Different methods of induction with maternal and neonates' outcomes. (n=300)

Variables	Frequency	Percentage
Methods of induction		
Mechanical	39	13.0%
Prostaglandin E2	115	38.3%
Mechanical +prostaglandin E2	36	12%
Misoprostol	110	36.7%
Time from induction to labor		
<6 hours	68	22.7%
6-12 hours	123	41%
13-24 hours	54	18%
>24 hours	55	18.3%
Maternal outcomes		
NVD	236	78.7%
Vacuum delivery	10	3.3%
Emergency CS	53	17.7%
Rupture uterus	1	0.3%
APGAR at 5 minutes		
0	2	0.7%
<7	279	93.0%
>7	19	6.3%
Meconium staining		
Grade II	09	3%
Grade III	06	2%
No staining	285	95%

Table 3: Comparison of different induction methods with maternal and fetal outcomes.

variables	Mechanical (n=39)	Prostaglandin E2 (n=115)	Mechanical + prostaglandin E2 (n=36)	Misoprostol (n=110)	P Value
Induction to labour time					
Within 6 hours	1(2.56%)	17(14.78%)	2(5.55%)	48(45.45%)	0.001
6-12 hours	7(17.94%)	52(45.21%)	14(38.88%)	50(28.18%)	
13-24 hours	12(39.76%)	29(25.21%)	12(33.33%)	01(0.90%)	
>24	19(48.71%)	17(14.78%)	08(22.22%)	11(10%)	
Maternal outcomes					
NVD	21(53.84%)	95(83.47%)	29(80.55%)	91(82.72%)	0.001
Vacuum delivery	2(5.12%)	6(5.21%)	01(2.77%)	01(0.90%)	
Emergency CS	16(41.02%)	14(12.17%)	6(16.66%)	17(15.45%)	
Rupture uterus	0	0	0	01(0.90%)	
NICU admission					
Yes	3(7.69%)	0	01(2.77%)	8(7.27%)	0.24
No	36(92.30%)	115(100%)	35(97.22%)	102(92.72%)	
APGAR 5 min					
0	1(2.56%)	1(0.86%)	0	0	0.007
<07	3(7.69%)	7(6.08%)	03(8.33%)	5(4.54%)	
>07	35(89.74%)	107(93.04%)	33(91.66%)	105(95.45%)	
Meconium staining					
No MSL	35(89.74%)	113(98.36%)	34(94.44%)	103(93.63%)	0.390
Grade II	1(2.56%)	2(1.73%)	25.55%)	4(3.63%)	
Grade III	3(7.69%)	0	0	3(2.72%)	

DISCUSSION

In the maternity practice induction of labour is the most important part and is often keep in the favors of mother and the fetus. Induction with unfavorable cervix is related to increase risk of prolong labour and increase the occurrence of CS. however, the use of cervical ripening agents is a standard practice. Till date different methods for induction are used, however, inconsistent results are reported regarding the efficacy and safety of the induction methods. Thus in this study we compare all the methods

of induction of labour and maternal and fetal outcomes were observed.

Our study showed that mechanical and PGE2 group showed highest success rate as compared to other group, followed by misoprostol group. Our results showed that induction to delivery time was significantly lower in group of patients in which misoprostol was given as compared to other groups. (p=0.001) this finding were supported by similar several studies. (12, 13). The shorter induction to delivery interval in misoprostol could be due to greater effect of medicine on uterus due to direct access to myometrium by cervical canal. Moreover, some studies showed that there is no effect on induction to delivery time by comparing misoprostol with foleys catheter. (14) In study by Prager et al.(15) showed in his study that induction to delivery time was shorter in patients with Foleys catheter group as compared to misoprostol and PGE2. This could be due to the dose of misoprostol that was used in his study.

In this study, those cases who failed to deliver via any of the study methods, alternative method was used. In such cases CS was done in majority of cases, and mostly this was observed in patients in which mechanical methods was used for induction of labour. In this study good maternal outcomes in term of labour success were observed in PGE2 group followed by misoprostol group. It is evident form other studies that PGE2 when used for cervical ripening improve the vaginal delivery and decrease the risk of cesarean section (16). This findings were supported by other studies as well (17). local study by Faiza et al. (18) showed in her study that prostaglandin is safe effective and acceptable method for cervical ripening. Amna et al.(19) showed similar labour success as ours by using misoprostol for induction of labour. However uterine rupture was observed while induction with misoprostol in one patient. In literature there are many case reported of uterine rupture with misoprostol induction. (20) the risk of uterine rupture increases in women with previous CS and who had labour induced with misoprostol. A uterine rupture rate of 6% was reported in patients with previous CS. (21) In term of neonatal outcomes in our study PGE2 group showed higher success rate in term of APGAR score, MSL and NICU admission. no admission was done in PGE2 group.

In our study Pharmaceutical method was superior than mechanical methods and this is supported by other reports. PGE2 is the most widely used agent for induction of labour, and it is superior to placebo in many studies. (22) Data from worldwide prospective investigations suggest that PGE2 therapy has few maternal side effects and favorable neonatal outcomes. In our study the adverse effects were negligible and neonatal outcomes were excellent.

CONCLUSION

Our study concludes that among different methods available for induction of labour, PGE2 is safe, effective and have good maternal and fetal outcomes. It was associated with shorter induction to delivery time, and greater number of normal vaginal delivery.

REFERENCES

1. Hilder L, Costeloe K, Thilaganathan B. Prolonged pregnancy: evaluating gestation-specific risks of fetal and infant mortality. Br J Obstet Gynaecol. 1998;105(2):169-173. 10.1111/j.1471-0528.1998.tb10047.x
2. Ayaz A, Shaukat S, Farooq MU, Mehmood K, Ahmad I, Bahoo MLA. Induction of Labor: A Comparative Study of Intravaginal Misoprostol and Dinoprostone. Taiwanese Journal of Obstetrics and Gynecology. 2010;49(2):151-155. https://doi.org/10.1016/S1028-4559(10)60032-0
3. Obstetricians RCo, Unit GJCES. Induction of labour. Evidence-based Clinical Guideline Number 9. 2001.
4. Abbassi RM, Sirichand P, Rizvi S. Safety and efficacy of oral versus vaginal misoprostol use for induction of labour at term. J Coll Physicians Surg Pak. 2008;18(10):625-629. 10.2008/jcpsp.625629
5. Patro-Małysza J, Marciniak B, Leszczyńska-Gorzelak B, Bartosiewicz J, Oleszczuk J. [Effectiveness of intracervical catheter as a labor preinduction method]. Ginekol Pol. 2010;81(1):31-36.
6. le Roux PA, Olarogun JO, Penny J, Anthony J. Oral and vaginal misoprostol compared with dinoprostone for induction of labor: a randomized controlled trial. Obstet Gynecol. 2002;99(2):201-205. 10.1016/s0029-7844(01)01681-7
7. Prins RP, Neilson DR, Bolton RN, Mark C, Watson P. Preinduction cervical ripening with sequential use of prostaglandin E2 gel. American journal of obstetrics and gynecology. 1986;154(6):1275-1279. 10.1016/0002-9378(86)90712-x
8. Hofmeyr GJ, Gülmezoglu AM. Vaginal misoprostol for cervical ripening and induction of labour. Cochrane Database Syst Rev. 2003(1):Cd000941. 10.1002/14651858.Cd000941
9. Mei-Dan E, Walfisch A, Suarez-Easton S, Hallak M. Comparison of two mechanical devices for cervical ripening: a prospective quasi-randomized trial. J Matern Fetal Neonatal Med. 2012;25(6):723-727. 10.3109/14767058.2011.591459
10. Chen W, Xue J, Gaudet L, Walker M, Wen SW. Meta-analysis of Foley catheter plus misoprostol versus misoprostol alone for cervical ripening. Int J Gynaecol Obstet. 2015;129(3):193-198. 10.1016/j.ijgo.2015.01.005
11. Husain S, Husain S, Izhar R. Oral misoprostol alone versus oral misoprostol and Foley's catheter for induction of labor: A randomized controlled trial. J Obstet Gynaecol Res. 2017;43(8):1270-1277. 10.1111/jog.13354
12. Promila J, Kaur GB, Bala TJJOO, INDIA GO. A comparison of vaginal misoprostol versus Foley's catheter with oxytocin for induction of labor. 2007;57(1):42-47.
13. Sheikher C, Suri N, Kholi UJJs. Comparative evaluation of oral misoprostol, vaginal misoprostol and intracervical Folley's catheter for induction of labour at term. 2009;11(2):75-77.
14. ADEMJI A, Olayemi O, Odukogbe AJljog, obstetrics. Intravaginal misoprostol versus transcervical Foley catheter in pre-induction cervical ripening. 2006;92(2):130-132.
15. Prager M, Eneroth-Grimfors E, Edlund M, Marions LJBAIJoO, Gynaecology. A randomised controlled trial of intravaginal dinoprostone, intravaginal misoprostol and transcervical balloon catheter for labour induction. 2008;115(11):1443-1450.
16. Keirse MJ. Prostaglandins in preinduction cervical ripening. Meta-analysis of worldwide clinical experience. J Reprod Med. 1993;38(1 Suppl):89-100.
17. Thomas J, Fairclough A, Kavanagh J, Kelly AJ. Vaginal prostaglandin (PGE2 and PGF2a) for induction of labour at term. Cochrane Database of Systematic Reviews. 2014(6). 10.1002/14651858.CD003101.pub3
18. Raza F, Majeed SJPJOMS. Intra cervical PGE~ 2 gel for cervical ripening and induction of Labour. 2008;24(2):241.
19. Memon A, Sikandar RJJ. Misoprostol for induction of labour: the Hyderabad experience. 2007.
20. Daponte A, Nzewenga G, Dimopoulos KD, Guidozzi FJC. The use of vaginal misoprostol for second-trimester pregnancy termination in women with previous single cesarean section. 2006;74(4):324-327.
21. Teixeira E, Pinho MDL, Sarmento R, Marques I, Lopes APJEJoO, Gynecology, et al. Uterine rupture following misoprostol improper use. 2019;234:e63-e64.
22. Alsaif M, Helmy N, Almuallem F, Almagboul S, Almtrafi H, Matouq B, et al. Pharmaceutical versus mechanical induction of labor. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2018. 10.18203/2320-1770.ijrcog20183871