Research Article

Prevalence and Predictors of Failed Induction

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ABSTRACT

Induction of labour is practiced widely as a routine procedure in every labour room. It is success and failure is difficult to predict before administration of the procedure. This study aimed to identify the predictors for failed induction by a one year observation of the procedure and it is effect on labour outcome. The sample were selected those were admitted in labour room in 1st stage of labour and induced by prostaglandin with indications of postdates, oligohydramnios, weak contraction, PROM and PIH. The study result shows a failure rate of 50.5% with cesarean section and the major reasons for cesarean section were poor progress, foetal distress, cephalo pelvic disproportion, oligohydramnios and meconeum staining. The predictors of failure were gravida, number of doses and bishop score. Through the prostaglandin is associated with success and failure but its' judicious use should be monitored and policy should be made to control the unopposed use in day today practice.

Keywords: Induction of Labour, failure of induction, prostaglandin, predictors of failed induction.

INTRODUCTION

The induction of labour is a common practice in every labour room which contributes significantly to all labour room procedures. The advent of inducing agents has eased the delivery process immensely by reducing the duration of labour. The practice of induction, its procedure, agents and indication have changed dramatically over the decade. The indication of induction has changed from foetal death to elective induction to meet the convenience of physician and parturient. The incidence of induction varies from setting to setting ranging from 5% to 22% of all labour room admissions[7,12,13] and depends upon the institutional protocol. In spite of many issues like proper indication, maternal and fetal hazards and increased incidence of cesarean section, the rate of induction is on rise.

Many studies are being taken up, to find out the efficacy of different inducing agents. It is not reported anywhere that it facilitate labour without any adverse outcome. Sometime it is successful with vaginal delivery and sometime it is a failure without any progress and resulting in c – section. Failure of induction is defined differently by different researcher. Some have defined it as failure to enter the active phase of labor even after 24 hours of use of inducing agent irrespective of use of oxytocin infusion.[1,2,4,5] Few studies have considered 12 hours as time limit to declare induction as failure, if the parturient dose not enter the active phase or there is no established contraction of 3 numbers in 10 minutes and sustained for 30-40 second with cervix dilated more than 4 cm.[10,11,14] Caughey justified the reasonable definition of failed induction by conceptualizing it as failure to achieve active labor and ultimate progress for successful delivery.[2] The definition of Caughey was supported by another study which shows increased rate of vaginal delivery among 67-86% of women who entered into active phase of labor within 12 hours of induction.[3] Others considered successful vaginal delivery as the primary outcome for success of an induction after entering into the active phase of labour.[4-7] Whereas Roman and Young viewed the induction as a failure when the parturient did not enter into active phase of labor with cervical dilatation < 5cm, despite regular uterine contaction.[8,9]

In spite of lots of issues associated with induction outcome, still there is rising rate of induction without proper justification. Till date no study has claimed that the induction of labour has only beneficial effect or detrimental effect on labour. Some time it reduce the rate of caesarean section and improve perinatal outcome.[20-24] In other studies it shows its' association with increased incidence of caesarean delivery with adverse foetal and maternal outcome.[6,17,18] Many RCT studies clarified that in comparison to induction, the expectant management results in higher rate of vaginal delivery and decreased perinatal mortality.[19,25,26,28,29,31] Whereas reverse result was revealed in the study of S Dublin.[30] But in same time similar rate of vaginal and caesarean delivery was reported in both the procedure by another study.[27]

Failed induction is associated with many factors that create adverse situations to achieve vaginal delivery. Corine J. identified important factors for increased risk of cesarean delivery as history of preterm delivery, lower

maternal height, and poor dilatation before induction of labor.[6] Osaheni L. L revealed the factors of failed induction as fetal distress, prolonged labor, cephalopelvic disproportion and cord prolapse.[7] Rayamajhi RT tried to identify the causes of failure and demonstrated that the higher rate being associated with multipara, elder age, overweight, low Bishop score of <5, preterm, post dated pregnancy, macrosomic babies and prolonged latent phase of labour.[12] Simillarly N Banos found cervical factors and achievement of active stage of labour to be the important influential predictors for successful outcome of induction.[13] Whereas NB khan et al commented in their report that not only the prolonged latent phase of labour is responsible for a failed induction, but other factors those are related to this are null parity and poor Bishop score.[5] Failed induction is a complex network of physiological and anatomical factors lying in mother and baby and causes of failure are many. The major foetal factors are preterm, macrosomia, foetal distress and cord prolapsed and maternal factors like null parity, advanced age, overweight, short stature and poor cervical dilatation before induction, pre gestational diabetes, prolonged latent phase, unfavourable cervix, CPD and post dated pregnancy.[8,9,14,15]

The induction of labour and its failure is a concern for all health care professional and accurate prediction of failure is still a difficult task for the obstetrician. Considering all these factors the study is aimed to examine the predicting factors associated with failed induction as this is a growing issue to be resolved in interest of public health care.

Method

The study was conducted at a tertiary care hospital of Bhubaneswar city of Odisha where parturient in all conditions from nearby and remote areas are cared by expert obstetricians and midwives round the clock. On an average every month about 240-300 women are admitted into the labour room. The induction rate is 12.5 % as surveyed by a retrospective study by retrieving data from one year record. The common inducing agents used are Oxytocin infusion, misoprostol tab and dinoprostone gel. In most of the cases oxytocin is used for acceleration of labour, when mother enters into latent stage of labour but delayed to enter into active stage. Misoprostol, and dinoprostone gel are used when cervical dilatation is very poor and there is weak contraction irrespective of obstetrical conditions except in few conditions. In many cases labour is accelerated by oxytocin drip with poor contraction after 6 hours of misoprostol use. Total cases of 462 were induced throughout the year at various gestational weeks with various reasons but the study included 200 cases those were induced only by misoprostol tab and dinoprostone gel (cerviprime) at term and beyond that without any severe complications of pregnancy like eclampsia, foetal distress, twins and IUD. A specific and separate format was used to collect information regarding obstetrical characteristics and outcome of labour. The major interest was to know maternal obstetrical parameters and pregnancy adverse conditions those contributed to failure of induction. All failed cases were defined as failure towards cervical dilatation or failed to progress even though there was good dilatation and contraction and either of which ended with caesarean section. Hospital ethical committee approved the proposal to conduct the study ahead. The data pertaining to obstetric history were gravida status, gestational week, pre pregnancy BMI, number of doses required, oxytocin acceleration, Bishop Score after use of prostaglandin and birth weight of baby. The indications those were very common for opting induction procedure were poor contraction, pre labour rupture of membrane, pregnancy induced hypertension, post term pregnancy and oligo hydramnious. The primary outcome considered was mode of delivery either vaginal or caesarean.

The deliveries were conducted by the obstetrician and the induction procedure was monitored by the resident doctors and skilled midwives. The basic data (obstetrical characteristics) and outcome were entered in constructed performa by the investigator besides their usual recording in clinical case file by concerned in-charge and staff. The investigators with permission from labour room in-charge and all concerned, noted the progress after induction with measurement and evaluation of each parameters (cervical dilatation and duration of labour). The fate of induction was decided by concerned obstetrician with vaginal or caesarean delivery by considering all the factors in order to save the mother and baby. The common confronted situations were foetal distress and unsatisfied progress. Statistical analysis was performed by using SPSS version 19.0.

RESULTS

The labour room statistics shows the total number of delivery for the year 2013-14 is about 1872. The number of cases those had induction of labour irrespective of gestational age and pregnancy conditions are 256. The incidence being 13.67 %.

(Table 1) The women were mostly between 20-30 years of age with mean age of 25.39±3.89. The primigravida women accounted for 74.5 % of total sample. This shows the labour room population being mostly the primi mothers which denotes the successful adoption of family planning methods. The gestational week at which most of the inductions (84.5%) were conducted is from 39-42 weeks. The cervical favourability was good in most (48%) of the cases. However this shows the prostaglandin as an effective drug bringing about cervical changes. The pre pregnant weight was considered for measuring the BMI status and this was found difficult in few cases as they had no idea of their body weight before they were pregnant.

Table 1: Characteristics of Study Population with Primary Outcome

Age in Year	Frequency	Percent	Vaginal (f)	Cesarean (f)	'P' Value
<20	13	6.50	8	5	
20-25	94	47.00	44	50	
26-30	78	39.00	38	40	0.635^{x2}
>30	15	7.50	9	6	
Mean (S.D) 25.39±3.89					
Gravida of the Women					
Primigravida	149	74.50	69	80	
Multigravida	51	25.50	30	21	0.024^{t}
Mean(S.D) 1.57±0.91					
Gestational age in week					
37 to <39 weeks	31	15.50	17	14	
39 to <40 weeks	84	42.00	38	46	0.566^{x2}
40 to 42 weeks	85	42.50	44	41	
Mean (S.D) 39.86±1.28					
No of Doses					
1	124	62.00	71	53	
2	59	29.50	26	33	0.001^{x2}
3	17	8.50	2	15	
Mean (S.D) 1.46±0.64					
Oxytocin Acceleration					
No	121	60.50	59	62	
Yes	79	39.50	40	39	0.796^{x2}
BMI					
Under weight	48	24.00	23	25	
Normal	113	56.50	54	59	0.188^{t}
Over weight	32	16.00	18	14	
Obese	7	3.50	4	3	
Mean (S.D) 22.47±4.21					
Birth Weight in Grams	26				
<2500		13.00	8	18	
2500 – 3000	71	35.50	38	33	0.118^{x2}
>3000	103	51.50	53	50	
Mean(S.D) 2.96±0.48					
Bishop Score					
Unfavourable	48	25.00	0	48	
Favourable	96	48.00	54	42	0.000^{x2}
Most favourable	56	22.50	45	11	
Mean (S.D) 7.16±2.99					

t-student t test; x^2-Chi-squared

Table 2

	f	%	vaginal	caesarean	x^2
Post dated Pregnancy	52	26	29	23	
Oligo hydramnios	55	27.5	19	36	
Failure to initiate pain or niggling pain	56	28	30	26	0.142
PROM	30	15	17	13	
Mild PIH	07	3.5	4	3	

Table 3

Failed induction	68	34
Foetal distress	46	23
CPD	32	16
Meconium staining	36	18
Oligohydramnios	10	5
PIH	08	4

Table 4: Regression analysis to show association between success of induction and other significant independent factors

Variables	B	S.E.	Wald	df	Sig.	OR	95% CI for OR	
							Lower	Upper
Gravida	-.365	.182	3.997	1	.046	.694	.486	.993
no of doses	.800	.243	10.839	1	.001	2.225	1.382	3.582
Bishop score	.119	.040	8.955	1	.003	1.126	1.042	1.217

So the weight at first booking and subtracting the assumed weight gain provided the picture of pre pregnancy body weight. It was noticed that half (56.5%) of them were of normally nourished and few had deviation from normal limit. One dose was required for 62% of women, but that does not indicate that with one dose they ended in vaginal delivery. After one dose due to on toward complications like foetal distress and failure to achieve desired contraction, next dose was not advised. The obstetrician decision was the final to proceed further for another dose or terminating with caesarean section. Two doses requirement was there in 29.5% of women and few had three doses.

The cross tabulation clarifies that, the higher the dose higher the cesarean rate, which indicates, the property of cervical collagen in few cases where they were not physiologically moulded by increasing the dose.

The oxytocin titration was advised in 39.5% of women. The oxytocin and failed labour when cross tabulated, it was found that the percentage of caesarean is more in oxytocin group than no oxytocin group which indicate the role of third party in resulting caesarean section as the oxytocin is necessarily a titrating agent to accelerate the labour contraction. The birth weight of baby is considered in dataset to find out the macrosomia status. About 51.5% babies were above 3 kilogram and 35.5% babies were from 2.5-3 kilogram. In Indian scenario the babies more than 3 kg might have played macrosomic role and obstructing the delivery route where poor cervical dilatation is another contributor.

Indication of Induction of Labour with Primary Outcome

The major indications were niggling pain, oligohydramnious and post dated pregnancy. The Post dates, poor contraction, PROM and PIH responded well to induction by resulting more numbers of vaginal deliveries. In case of oligo hydramnious the induction was less successful. But the indications not associated with outcomes of induction.

The Failure Rate of Induction

The criteria of failure is not standardised by anyone till date. In this study failure is considered from mode of delivery. The caesarean section percentage found in this study is 50.5%.

Reason for Failure after Induction

The Predictors of Caesarean Section after Induction

The caesarean section depends on many known and some unexplained factors. Accurate prediction is difficult due to complex mechanism that results in caesarean section.

From the binary regression analysis, this is somehow clear that the major predictors of caesarean section are gravida with an adjusted OR of 0.694 (95% CI.486 to.993), number of doses with OR of 2.225 (95% CI.1.382 to 3.582)

and Bishop score with OR of 1.126 (95% CI 1.042 to 1.217).

DISCUSSION

The induction is a common procedure in this hospital and decision is taken mostly when woman comes with poor contraction or poor dilatation. Misoprostol and cerviprime gel is widely used by all the obstetricians as a safe and effective drug. Oxytocin is administered at latent phase or after misoprostol/cerviprime administration to accelerate the process. The incidence found in this study is also high as par with other studies. The primigravidas were the major dominating population of the labour room. The misoprostol/cerviprime was used maximum upto three doses/times. In many cases oxytocin was administered to accelerate the labour. The bishop score measurement was based on subjective assessment after four hours of induction which has low credibility due to its inaccuracy in interpretation. Similarly Corin J V expressed their inability to collect the data regarding cervical position and consistency and calculating the bishop score for all patients.[6] This study did not consider the cervical dilatation before and after misoprostol administration, rather it considered the dilatation as a whole after misoprostol insertion. The major reasons for which induction was done were postdates, oligohydramnious and poor contraction. The drug was effective for cases of postdates, poor contraction, PROM and PIH. Oligohydramnious responded poorly to the procedure. Similarly Emilio reported oligohydramnious has poor prediction for successful vaginal delivery after induction of labour.[32] The failure rate is not measured here in terms of labour not achieved active stage which has been reported by many authors, rather by caesarean section.[1,2] The failure rate of 50.5 % in this study is supported by D J Rouse, who claimed 61% of caesarean delivery with latent phase duration of 12 hours after induction.[18] Similarly Rouse DJ and Hauth J s revealed 87% caesarean rate after induction compared to 41% in Simon and Grobmans' study.[3,33]

The major reason for caesarean were failed induction by non progress of labour, foetal distress, CPD and meconeum staining liquor. The other predicting factors for caesarean were gravida, number of doses and Bishop score. Whereas N B khan reported null parity, Bishop score, prolonged latent stage of labour as major factors for failed induction which is in line with our study result.[7] Induction though is effective in bringing good cervical dilatation, but some time it is failed to change the cervical consistency and results in poor Bishop score.

Many time poor uterine contraction, premature rupture of membrane, uterine inertia in postdates, IUD and oligohydramnious, other conditions like foetal jeopardy, poor cervical consistency, pelvic contraction, maternal distress in pre eclampsia remain as the factors for caesarean section, but difficult to identify as a single factor statistically.

The statistical data are not available to give the picture that, what proportion of caesarean is caused by prostaglandin alone and how many are due to other contributors.

Till now all the studies have accounted the prostaglandins as the responsible factor for resulting in caesarean section in association with certain demographic and obstetric characteristics. The present study found gravida, number of doses, Bishop score as the predictors of failed induction.

CONCLUSION

The failure rate of induction with caesarean section is rising day by day. But without proper sample selection and monitoring process for cervical dilatation, it is difficult to draw a conclusion. Though it is understood that the labour induction is not a definite cause of caesarean section still in this study it is predicted that the gravida status, number of doses and Bishop score have influence in success of labour. More intensive study with perspective observation with involvement of all demographic, obstetrical, foetal, cervical and pelvic factors, in a large sample may give a definite data to draw a conclusion for a cause and effect relationship with better analysis.

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