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Study the effect of prolonged duration of second stage of labor on maternal & perinatal outcome in a Tertiary Care Hospital, Dakshina Kannada district

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Abstract
Introduction: Optimal obstetric management of 2nd stage is an ongoing challenge to reduce rates of emergency cesarean deliveries & to avoid adverse maternal & neonatal outcomes. Objectives of the study are to estimate the incidence of vaginal deliveries with the duration of 2nd stage of labor & to assess the maternal and neonatal morbidities associated with it.
Methodology: In this retrospective study, 100 nulliparous women who were delivered vaginally at KVG MCH during the period September 2020 - February 2021 were selected randomly as study population. Data regarding time of full cervical dilatation to the time of delivery of the baby, Maternal complications like Perineal injury, Puerperal pyrexia & episiotomy infection & Neonatal complications like NICU admission for >24hrs, Birth asphyxia, APGAR score <7 at 5th min of delivery were collected from hospital records and discharge summaries. Percentage of all these complications are calculated for Duration of 2nd stage of labor ≤3hr & >3hr.
Results: When the duration of 2nd stage is >3hour, spontaneous vaginal delivery rates declined from 89% to 11% & Perineal injury, puerperal pyrexia, neonatal NICU admission (>24hours), birth asphyxia (Need for resuscitation) are statistically significant.
Conclusion: Rates of spontaneous vaginal birth significantly decreased for increasing 2nd stage duration >3hour. Risks of both maternal and perinatal adverse outcomes rise with increased duration of the 2nd stage, particularly for duration longer than 3 hours in nulliparous women.

Keywords: second stage of labour, maternal and neonatal morbidities, perineal injury, birth asphyxia, APGAR score

Introduction

Second stage of labor is defined as duration from fully dilated cervix until delivery of the infant. It includes the passive phase, with passive descent of the fetal head, and the active phase, also known as expulsive phase, bearing down or pushing. The active phase starts when contractions become expulsive or when the woman actively starts pushing [1]. Previously, the definition of prolonged second stage of labor in nulliparous women was >2hrs [2]. However, recent recommendations often include longer durations in some cases, that is, that management is individualized depending on progress of labor, epidural analgesia, fetal position and interventions [1-3]. Optimal obstetric management of second stage is an ongoing Challenge to reduce rates of emergency cesarean deliveries and to avoid adverse maternal and neonatal outcomes. [4] The concept of `normal duration of second stage' has greatly changed in obstetrical history, which has left unclear what upper limit should be considered optimal [5]. Although some studies have attempted to evaluate outcomes with varying Lengths of the second stage of labor, [6] the influence of progressive duration of the second stage remains unclear.
Prolonged second stage of labor beyond historical definitions is associated with high rates of successful vaginal birth but increased risks of maternal and neonatal morbidity. Specifically, prolonging the second stage of labor is associated with increased maternal morbidity including postpartum hemorrhage, maternal febrile morbidity, infection and perineal trauma. There is also increased neonatal morbidity including increased rates of 5 minute Apgar score <4, NICU admission, neonatal asphyxia in nulliparous women [7].
Clinical counselling and decision making requires weighing the likelihood of achieving vaginal birth with the risks of complications that can occur with increasing second stage duration. Information on the risks of specific durations for second stage of labor is currently lacking [8, 9].

Aims and objectives of study

- To Compare the incidence of vaginal deliveries with the duration of second stage of labor.

- To assess the maternal and neonatal morbidities associated with the duration of second stage of labor.

Materials and Methods

The present study was a hospital based retrospective study done for 6 months from September 2020 to February 2021 at KVG Medical College and Hospital, Sullia Patients who were admitted and delivered vaginally at KVG MCH during this study period were selected as study population. Data was collected from hospital records and discharge summaries after obtaining a written permission from the HOD, department of OBG. Randomly selected 100 Vaginal deliveries from September 2020 to February 2021, Fulfilling the inclusion criteria's, were included for the study.

Statistical Analysis

Data was checked, verified and entered in Microsoft office excel 2007. Analysis was done by using IBM SPSS version 21. A descriptive statistical analysis was done. Data was shown in the form of frequencies and percentages.

Inclusion Criteria

- All low risk nulliparous women, who delivered vaginally during study period.
- Singleton pregnancy, Live born fetus, Non-anomalous fetus.
- Cephalic presentation – Vertex.
- 37 to 40 weeks of gestational age

Exclusion Criteria

- Who underwent Cesarean Section.
- Who had an antepartum still Birth.
- Pre-existing or severe pregnancy-related medical disorders (Including Hypertension and Diabetes requiring therapeutic intervention)
- PROM (Pre-labor rupture of membrane), IUGR (Intra-uterine growth restriction) fetus.

Methodology

This study was conducted in the department of Obstetrics and Gynaecology at KVG Medical College and Hospital Sullia a tertiary care teaching hospital in Dakshina Kannada over a period of 6 months from September 2020 to February 2021. Patients who were admitted and delivered vaginally at KVG MCH for: 6 months (from September 2020 to February 2021), fulfilling the inclusion criteria, were selected as study population. Data was collected from hospital records and discharge summaries after obtaining a written permission from the HOD, department of OBG. All required information from the records was entered in the prepared proforma. Maternal and Neonatal complications during delivery, after delivery till discharge were noted. All relevant information was recorded systematically in the predesigned clinical data sheet.

Results

Number of Vaginal Deliveries for Duration of 2nd Stage of Labor

Table 1

Duration of 2nd stage of labor	Number of Patients	%
< 1 hour	7	7.0
1 to 2 hours	42	42.0
2 to 3 hours	40	40.0
> 3 hours	11	11.0
Total	100	100.0

Out of 100 study population, 89 of them delivered for duration of 2nd stage of labour ≤3 hours, 11 of them delivered for duration of 2nd stage of labour >3 hours.

Effect of Prolonged Duration of Second Stage of Labor on Maternal and Neonatal Outcomes

Table 2

Characteristic		Duration Of Second Stage Of Labor (in Hours)		Chi-square	P-value
		≤3 h (n=89)	> 3 h (n=11)		
Perineal Laceration	Yes	3 (3.3%)	2 (18.1%)	187.6	0.004

(3rd/4th degree)	No	86	9		Highly Significant
Puerperal Pyrexia	Yes	2 (2.2%)	1 (9%)	206.00	0.000 Highly Significant
	No	87	10		
Episiotomy Wound	Healthy	87	10	221.56	0.275 Not Significant
	Infected	2 (2.2%)	1 (9%)		
NICU Admission	Yes	4 (4.5%)	3 (27.3%)	192.34	0.002 Significant
	No	85	7		
Birth Asphyxia	Yes	2 (2.2%)	1 (9%)	179.177	0.014 Significant
	No	87	9		
Apgar Score at 5th minute	Depressed <7	1 (1.1%)	2 (18.1%)	343.13	0.512 Not significant
	Not Depressed ≥7	88	9		

The rate of third-degree perineal lacerations increased as the second stage lengthened. When the second stage was ≤3 hours, the rate of such tears was 3.3%, whereas it was 18.1% when the second stage lasted for >3 hours. The rate of puerperal pyrexia increased as the second stage lengthened. When the second stage was ≤3 hours, the rate of puerperal pyrexia was 2.2%, whereas it was 9% when the second stage lasted for >3 hours. Which are statistically significant. The rate of NICU admission increased as the second stage lengthened. When the second stage was ≤3 hours, the rate of NICU admission was 4.5%, whereas it was 27.3% when the second stage lasted for >3 hours. The rate of Birth asphyxia increased as the second stage lengthened. When the second stage was ≤3 hours, the rate of birth asphyxia was 2.2%, whereas it was 9% when the second stage lasted for >3 hours. Which are statistically significant.

Discussion

The recommendations for point at which to stop a second stage has changed over the recent years. Historically maternal and neonatal risks have been considered to increase with a second stage beyond 2 hours and have been described with increasing duration. An absolute maximum duration of second stage is unknown, the diagnosis of second stage arrest should not be made until as at least 3 hours of pushing in nulliparous women and allowing consideration of longer durations in women making progress to be determined on individual basis. The percentage of women having a spontaneous vaginal birth without serious maternal or neonatal morbidity steadily decreased regardless of parity for increasing second stage duration [11].

In our study 89 women delivered when 2nd stage duration was ≤3 hours and 11 women delivered after 3 hours. On increasing 2nd stage duration of >3 hours there is increased rates in Perineal laceration by 15%, Puerperal pyrexia by 7%, NICU admission by 22%, and Birth asphyxia by 7%, which are statistically significant.

Wolfgang Janni et al. [5] stated that, there is no evidence that prolonged second stage of labor is a serious disadvantage to the fetus, if adequate monitoring is provided. Because the increase of Maternal morbidity in patients with prolonged labor may be partially attributed to a higher rate of operative procedures in these patients, interventions should not be solely based on the elapsed time after full cervical dilatation.

Victoria M Allen et al. [13] stated that, risks of both maternal and perinatal adverse outcomes rise with increased duration of the second stage, particularly for duration longer than 3 hours in nulliparous women and longer than 2 hours in Multiparous women. Dwight J Rouse et al. [14] stated that, the second stage of labor does not need to be terminated for duration alone. S Katherine Laughon et al. [10] stated that, benefits of increased vaginal delivery should be weighed against potential small increases in maternal and neonatal risks with prolonged second stage.

Alexis C Gimovsky et al. [12] stated that, the chance of a vaginal delivery is high (over 80%) beyond 3 hours in the second stage. Maternal and neonatal risks need to be further explored by larger, better-designed retrospective reviews or trials.

Limitations

Limitations of the study include: retrospective study, small sample size, only vaginal deliveries are included in the study and not compared with abdominal deliveries.

Conclusion

Rates of spontaneous vaginal birth significantly decreased for increasing 2nd stage duration >3hour. Risks of both maternal and perinatal adverse outcomes rise with increased duration of the 2nd stage, particularly for duration longer than 3 hours in nulliparous women. In this study evaluating maternal and perinatal outcomes associated with prolonged second stage of labor, increasing duration of the second stage of labor is associated with increasing risks for both maternal and perinatal adverse outcomes among nulliparous women. Maternal, fetal and intrapartum characteristics must be considered in the management of the second stage of labor. Knowledge of increasing maternal and perinatal morbidity with prolongation may help to guide timely intervention when second stage dystocia is diagnosed.

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