Maternal and Neonatal Complications With Prolonged Second Stage of Labor

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ABSTRACT

Objective — *To find out the maternal and neonatal complications in prolonged second stage of labor.*

Study design — *Cross sectional study.*

Place & Duration of study — *Department of Obstetrics & Gynecology, Jinnah Postgraduate Medical Centre (JPMC) Karachi, from August 2022 to February 2023.*

Methods — *Women with a singleton pregnancy, of 37-weeks or more gestation period, fetus in cephalic presentation and active phase of labor, were included. Data of maternal outcomes like postpartum hemorrhage (PPH), chorioamnionitis, perineal laceration, and fetal outcomes like low Apgar score, birth asphyxia and admission to NICU, were recorded. Data were analyzed using SPSS Version 20. Chi-square or Fischer exact tests were applied post-stratification to find out the statistical significance between the stage of labor and complications.*

Results — *A total of 151 patients were included by non-probability consecutive sampling technique. Maternal complications found PPH in 15 (10%), chorioamnionitis in 30 (20%), and perineal lacerations occurred in 35 (23%) women. Low Agar score at birth was noted five (3%), birth asphyxia in four (2.9%) newborns and 16 (11%) babies were admitted to the NICU.*

Conclusion — *Increased duration of labor in the second stage was found to be associated with number of adverse maternal and perinatal outcomes. However, these were easily managed.*

Key words — *Second stage of labor, Maternal outcomes, Perinatal outcomes, Postpartum hemorrhage, NICU admission.*

INTRODUCTION:

The second stage of labor is the time period between complete cervical dilation and birth. There are two major phases in this stage; the passive phase when head of the fetus starts to descent without any maternal effort due to uterine contractions and the active phase during which maternal efforts in the form of voluntary expulsive efforts are also involved.[1]

The second stage of labor for nulliparous women with no epidural analgesia and controlled labor with epidural analgesia is considered prolonged when it exceeds two and three hours respectively.[2] Factors like application of epidural analgesia along-with the position of the fetus are important for the progress of labor.[1,3] Multiple studies have investigated the association between the second stage of labor and neonatal morbidity with variable results.

In some studies, there was no significant correlation between the prolonged second stage of labor and any adverse neonatal outcomes, while other studies reported number of risks to mother and newborns.[4,5] With the increasing duration of the second stage of labor, successful vaginal delivery becomes less likely. Increasingly prolonged labor is often accompanied by greater fetal distress and ineffective uterine contractions, or maternal tiredness.

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Interventions are needed to facilitate the delivery that may lead to number of maternal complications, and to fetus and the newborns. The risk of birth injuries and hypoxic encephalopathy are reported in literature.[6,7] As of now, there is no established time frame during labor that categorically identifies when maternal or neonatal complications may arise in women with a prolonged second stage of labor. A careful approach with quick and effective interventions are therefore to be excericed.[8] The objective of this study was to collect data and find out a link between an extended second stage of labor and maternal and perinatal complications from a developing country in a public sector hospital.

METHODS:

Study design, place & duration: This cross sectional study was conducted in the Department of Obstetrics and Gynecology, Jinnah Postgraduate Medical Centre Karachi, from August 2022 to February 2023.

Ethical considerations: The study was approved by ethical review board (letter No.F-2-81/2023.GENL/08/JPMC dated 13-02-2023) and informed consent was taken.

Inclusion criteria and exclusion criteria: Pregnant women in the second stage of labor, with a gestational age of >37 weeks (confirmed by LMP or dating scan), parity and gravida >1, singleton pregnancy and cephalic presentation confirmed by ultrasound, and aged between 20 to 45-years were included. Women with antepartum stillbirth before the onset of labor and uterine scar were excluded. Additionally, patients carrying fetuses with congenital anomalies or those with underlying medical conditions, such as diabetes mellitus, cardiac, respiratory and renal diseases, were excluded. Obstetrical complications, including a history of poor obstetric outcomes, preterm premature rupture of membranes and women with the presence of placenta previa, were not enrolled.

Sample size estimation: The sample size was determined by using the WHO software. With confidence level of 95% and a 5% margin of error the required sample size was 151 taking study by Laughon SK et al as parent study.[7]

Study protocol: Pregnant patients were enrolled by using non probability consecutive sampling technique. All patients experiencing a prolonged second stage of labor were assessed for both maternal outcomes such as PPH, chorioamnionitis and perineal laceration and fetal outcomes including low Apgar scores, birth asphyxia and NICU admission.

Statistical analysis: The findings of continuous and categorical variables were recorded on a specialized form. Data were analyzed using SPSS Version 20. Mean and standard deviations were calculated for normally distributed variables. Frequencies and percentages were calculated for qualitative variables. Stratification was applied to control the effect modifiers. Chi-square or Fischer exact tests were used post-stratification. A p-value of < 0.05 was considered as statistically significant.

RESULTS:

The mean maternal age was 27.34±2.94 years, with 51% aged 27 or younger. The mean gestational age was 39.17±0.91 weeks, with 72% of the women having a gestational age of 39-weeks or less. The majority were from urban areas (58%). There were 52% primipara with 63% gravida <3. Of the total, 67% were booked cases. Details are given in table I. Maternal outcomes included PPH (n=15 - 10%), chorioamnionitis (n=30 - 20%), and perineal laceration (n=35 - 23%). Fetal outcomes included low Apgar scores (n=5 - 3%), birth asphyxia (n=4 – 4.9%), and NICU admission (n=16 - 11%). A comparison of general characteristics with maternal and fetal outcomes is presented in tables II and III.

DISCUSSION:

This study found number of adverse maternal and perinatal outcomes among women with prolonged second stage of labor. However, the frequency of complications was not different from other pregnancy related conditions. Prolonged second stage labor did not contribute to the adverse maternal and perinatal outcomes that were the focus of the study.

In most of the women with a prolonged second stage of labor vaginal delivery can occur without major complications for them and their newborns. However, in some studies these complications were more frequently observed.[9-11] Some women may need admission to the intensive care unit depending upon the severity and type of the adverse event like postpartum hemorrhage. Episiotomy is required to facilitate delivery. Third or fourth degree perineal lacerations are other dangers as observed in our study. Chorioamnionitis and endometritis are other complications reported in the literature.[12,13] Similarly neonatal risks are also increased. Neonatal sepsis and seizures are documented complications.[9,10,14]

The results of our study are in line with findings from prior research. Laughon et al reported similar

Table I: Characteristics of the Patients

Characteristics	Frequency	Percentage (%)
Age (years)		
< 27	77	51
> 27	74	49
Mean age	27.34±2.94	-
Gestational age (weeks)		
< 39	108	72
> 39	43	28
Mean gestational age	39.17±0.91	–
Place of residence		
Urban	88	58
Rural	63	42
Parity		
Primipara	79	52
Multipara	72	48
Gravida		
< 3	95	63
> 3	56	37
Monthly income (Rs)		
< 50,000	67	44
> 50,000	84	56
Employment status		
Employed	77	40
Unemployed	74	60
Booking status		
Booked	101	67
Unbooked	50	33

maternal and fetal outcomes, with PPH occurring in 5.9%, chorioamnionitis in 11.1%, perineal lacerations in 10.1%, low Apgar scores in 0.2%, birth asphyxia in 0.3%, and NICU admission in 8.2% of children with prolonged second-stage labor.[7] These results underscore the necessity of proper management during labor and after birth.[15] This study added evidence based data from a developing country that contribute towards understanding the adverse maternal and perinatal outcomes with prolonged second-stage labor.

Limitations of the study: This was an observational study with a fairly modest sample size carried out in one tertiary care facility. The study did not address the management strategies of such pregnancies. The long-term outcomes of mother and neonates were also not studied.

CONCLUSION:

The prolonged second stage of labor led to number of unfavorable maternal or perinatal consequences.

REFERENCES:

1. NICE Guidelines: Intrapartum care. NG235. 2023 Sept 29. [Internet] Available from URL: https://www.nice.org.uk/guidance/ng235/chapter/Recommendations accessed in March 2025.

2. American College of Obstetrics and Gynecology Committee on Practice Bulletins-Obstetrics. ACOG Practice Bulletin Number 49, December 2003: Dystocia and augmentation of labor. Obstet Gynecol. 2003;102(6):1445-54. doi: 10.1016/j.obstetgynecol.2003.10.011.

Table II: Maternal Outcomes Based on General Characteristics

Characteristics		Complications					
		PPH	p value	Chorioa-mnionitis	p value	Perineal Laceration	p value
Age (years)	< 27	02	0.002	16	0.775	17	0.744
	> 27	13		14		18	
Gestational age (weeks)	< 39	10	0.764	24	0.250	26	0.679
	> 39	05		06		09	
Place of residence	Urban	05	0.488	12	0.831	20	0.035*
	Rural	10		18		15	
Parity	Primipara	04	0.036	16	0.901	20	0.514
	Multipara	11		14		15	
Gravidity	< 3	05	0.751	16	0.225	20	0.420
	> 3	10		14		15	
Monthly income (Rs)	< 50,000	07	0.462	04	<0.001*	15	0.837
	> 50,000	08		26		20	
Employment status	Employed	03	0.11	18	0.011	10	0.124
	Unemployed	12		12		25	
Booking status	Booked	09	0.571	25	0.033	06	<0.001*
	Unbooked	06		05		29	

Table III: Fetal Outcomes Based on General Characteristics

Characteristics		Complications					
		Low Apgar Score	p value	Birth Asphyxia	p value	NICU Admission	p value
Age (years)	< 27	05	0.059	00	0.055	03	0.008
	> 27	00		04		13	
Gestational age (weeks)	< 39	05	0.322	00	0.578	08	0.074
	> 39	00		04		08	
Place of residence	Urban	01	0.401	01	0.641	10	0.107
	Rural	04		03		06	
Parity	Primipara	03	0.727	02	>0.999	08	>0.999
	Multipara	02		02		08	
Gravidity	< 3	03	0.891	04	0.297	08	0.258
	> 3	02		00		08	
Monthly income (Rs)	< 50,000	00	0.066	04	0.037	09	0.312
	> 50,000	05		00		07	
Employment status	Employed	02	>0.999	01	>0.999	05	0.463
	Unemployed	03		03		11	
Booking status	Booked	05	0.171	02	0.601	11	0.867
	Unbooked	00		02		05	

3. American College of Obstetricians and Gynecologists (College); Society for Maternal-Fetal Medicine; Caughey AB, Cahill AG, Guise JM, Rouse DJ. Safe prevention of the primary cesarean delivery. Am J Obstet Gynecol. 2014 ;210(3):179-93. doi: 10.1016/j.ajog.2014.01.026.

4. Janni W, Schiessl B, Peschers U, Huber S, Strobl B, Hantschmann P, et al. The

prognostic impact of a prolonged second stage of labor on maternal and fetal outcome. Acta Obstet Gynecol Scand. 2002;81(3):214-21. https://doi.org/10.1034/j.1600-0412.2002.810305.x

5. Cheng YW, Hopkins LM, Caughey AB. How long is too long: does a prolonged second stage of labor in nulliparous women affect maternal and neonatal outcomes? Am J Obstet Gynecol. 2004;191(3):933-8. doi: 10.1016/j.ajog.2004.05.044.

6. Rouse DJ, Weiner SJ, Bloom SL, Varner MW, Spong CY, Ramin SM, et al. Second-stage labor duration in nulliparous women: relationship to maternal and perinatal outcomes. Am J Obstet Gynecol. 2009;201(4):357-e1-7. doi: 10.1016/j.ajog.2009.08.003.

7. Laughon SK, Berghella V, Reddy UM, Sundaram R, Lu Z, Hoffman MK. Neonatal and maternal outcomes with prolonged second stage of labor. Obstet Gynecol. 2014;124(1):57-67. doi: 10.1097/AOG.0000000000000278.

8. Caughey AB. Is Zhang the new Friedman: How should we evaluate the first stage of labor? Semin Perinatol. 2020;44(2):151215. doi: 10.1016/j.semperi.2019.151215.

9. Cheng YW, Caughey AB. Second stage of labor. Clin Obstet Gynecol. 2015;58(2):227-40. doi: 10.1097/GRF.0000000000000113.

10. Grobman WA, Bailit J, Lai Y, Reddy UM, Wapner RJ, Varner MW, et al. Association of the duration of active pushing with obstetric outcomes. Obstet Gynecol. 2016;127(4):667-73. doi: 10.1097/AOG.0000000000001354.

11. Leveno KJ, Nelson DB, McIntire DD. Second-stage labor: how long is too long? Am J Obstet Gynecol. 2016;214(4):484-9. doi: 10.1016/j.ajog.2015.10.926.

12. Altman MR, Lydon-Rochelle MT. Prolonged second stage of labor and risk of adverse maternal and perinatal outcomes: a systematic review. Birth. 2006;33(4):315-22. doi: 10.1111/j.1523-536X.2006.00129.x.

13. Stephansson O, Sandström A, Petersson G, Wikström AK, Cnattingius S. Prolonged second stage of labour, maternal infectious disease, urinary retention and other complications in the early postpartum period. Int J Obstet Gynaecol. 2016;123(4):608-16. doi: 10.1111/1471-0528.13287.

14. Altman M, Sandström A, Petersson G, Frisell T, Cnattingius S, Stephansson O. Prolonged second stage of labor is associated with low Apgar score. Eur J Epidemiol. 2015;30:1209-15. doi: 10.1007/s10654-015-0043-4.

15. Aimagambetova G, Bapayeva G, Sakhipova G, Terzic M. Management of postpartum hemorrhage in low- and middle-income countries: Emergency need for updated approach due to specific circumstances, resources, and availabilities. J Clin Med. 2024 ;13(23):7387. doi: 10.3390/jcm13237387.

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