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Research Article

2nd STAGE LABOR DYSTOCIA (RISK FACTORS AND COMPLICATIONS)

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A B S T R A C T

Background: Labor dystocia imposes life threatening complications which increases mortality and morbidity rates on both mother and fetus. This study aimed to determine risk factors, short term outcomes associated with second stage labor dystocia in both nulliparous and multiparous women admitted to King Abdulaziz Hospital, in Jeddah for delivery.

Method: This retrospective chart review was conducted during Jan 2014 – March 2016, 73 women presented for delivery at King Abdulaziz University hospital were enrolled.

Result: Seventy three women were diagnosed as a prolonged second stage of labor when they presented to king Abdul-Aziz University hospital for delivery, with the mean score of age 27.33±5.16, BMI 28.81±4.84, and GA 39.83±1.29, 54 (73.0%) participants were Primigravida and 40 (54.1%) reported C-section as mode of delivery, 48 (64.9%) had baby boys and 26 (35.1%) had girls (P=0.01), estimated mean score of birth weight was 3.33+.40.

Conclusion: The results of the current study addressed primigravida, increased maternal BMI, and male baby gender as some of the major risk factors for developing second stage labor dystocia, no major maternal or fetal complications detected in the current study. Further studies are needed to be conducted to address other major risks factor for developing dystocia.

INTRODUCTION

The second stage of labor is defined as the period from full cervical dilatation to delivery of the fetus [Murphy DJ 2001]. In general Dystocia is defined as "a slow, or abnormal progression of labor", [Gifford DS *et al* 2000, Murphy DJ 2001] on the other hand second stage labor dystocia is defined as labor lasting more than two hours without epidural anesthesia or more than three hours with epidural anesthesia in nulliparous women, and more than 2 hours with, or 1 hour without regional anesthesia in multiparous. [American College of Obstetrics and Gynecology Committee 2003, Cheng YW *et al* 2007, Hunt JC *et al* 2015] Dystocia is reported to be the single most common obstetric problem in nulliparous women with the incidence rate of 25-30 % accounting for most interventions during labor, including more than two third of all caesarean deliveries in the US [Gibbs RS *et al* 2008, Cunninham G *et al* 2010]. It is the result of abnormalities related to either the passenger; such as fetal malpresentation, the passage, as in cephalopelvic disproportion; or the power; such as insufficient uterine activity [American College of Obstetrics and Gynecology Committee 2003].

There are several identified factors that contribute to dystocia, some of these most common risk factors include: primigravida, high maternal age, short stature, post-term gestation, high birth weight and abnormal vertex presentation. It is also debated whether epidural analgesia itself may cause dystocia. [Sheiner E *et al* 2002, Selin L *et al* 2008]

Labor dystocia imposes life threatening complications which increases mortality and morbidity rates on both mother and fetus. It is estimated that 600,000 of maternal deaths occur due to pregnancy and delivery disorders each year worldwide, of which 95% is reported from developing countries. [Liselele HB *et al* 2000] More than 70% of these mortalities are only caused by the five following factors: (i) hemorrhage, (ii) infection, (iii) unsafe abortion, (iv) high blood pressure, and (v) dystocia, which all are considered to be preventable. [Eleje GU *et al* 2011] Neonatal complications include Musculoskel *et al* anomalies, nervous system injuries, newborn asphyxia, and low Apgar score. [Kimiai P *et al* 2002, Mehta SH *et al* 2006, Eleje GU *et al* 2011]

The studies on the causes and risk factors of dystocia, incidence rate, etiologies and outcomes in Kingdom of Saudi Arabia are extremely deficient. This study is set to determine risk factors, short term maternal and fetal outcomes associated with second stage labor dystocia in both nulliparous and

multiparous women admitted to King Abdulaziz Hospital, in Jeddah for delivery.

MATERIALS AND METHODS

This retrospective chart review study was conducted at king Abdul-Aziz University hospital situated in Jeddah starting from January 2014- until February 2016 (26 months). 123 women who presented to the ER department for delivery, were diagnosed as a prolonged second stage of labor .73 women were enrolled in the study who met the inclusion criteria of: delivering non-anomalous, term (≥ 36 weeks),cephalic, live singleton neonates weighting ≥ 2500 g, and no planned elective caesarean delivery. 50 cases were excluded: 1 preterm case (GA=35 weeks), and 49 cases with dilatation of less than 10 cm. Ethics committee approved this study and the ethical aspects were considered for all subjects. The presented data of the observed deliveries were collected by medical students supervised by an obstetrician using the hospital center peri-natal database , the included information were directly recorded by the attending midwife who registers information on labor induction and course of birth immediately after delivery using structured birth registration forms.

The following maternal clinical and demographic characteristics were evaluated: maternal age, obesity (defined as BMI ≥30 kg/m2), parity, gestational age. Obstetric risk factors were assessed including: recurrent miscarriages, previous labor dystocia, preeclampsia, gestational diabetes mellitus, and premature rupture of membranes.

Delivery characteristics, such as the fetal station, strength of maternal contraction at the time of diagnosis, labor duration, estimated blood loss, epidural analgesia, oxytocin for labor augmentation, hospitalization (calculation stared since admonition for delivery) and mode of delivery, were obtained from the partograph and standardized KAUH delivery records. Infant characteristics and complications such as sex, Apgar score, birth weight, meconium stained amniotic fluid, fetal resuscitation, and NICU admission were registered in the neonatal record.

Statistical analyseswas performed using SPSS statistical Software version 20. Parametric data are expressed as mean , standard deviations and range (minimum and maximum), and categorical data was expressed as number (percentage) , The comparison between groups were compared using Chi–square test for categorical variables and independent T-test for parametric variables , and considered significant (P) <0.05 .

RESULT

From 123 women who were diagnosed as a prolonged second stage of labor when they presented to the king Abdul-Aziz University hospital for delivery, only 73 cases (59.34%) were enrolled in the study, of which 50 (68.5%) were Saudi & 23 (31.5%) were non-Saudi, with the mean score of the following: age 27.33±5.16 range (17-44), BMI 28.81±4.84 range (19.40-39.8), and GA 39.83±1.29 range (36-42) . the majority of the participants were Primigravida (49-67.1%). Only 12 (17%) cases reported having a previous C/S for following causes: 2 (16.7%) malpresentation, 3 (25.0%) labor dystocia, and 5 (41.6%) fetal distress. (Table 1, Figures 1&2)

C-section was the mode of delivery among 39 (53.4%) of the participants. The mean score of labor duration was 11.98±3.72 range (4.75-23.17) hours. More than half (43-59.7%) recorded strong contraction with the mean score of contraction number per hour 3.74±0.67 rang (1.0-5.0), only 11(15.5%) received epidural with significant difference (P< 0.0001), less than third of the cases (17-23.3%) were reported as PROM, only 4 cases were complicated by: Valvar edema (1 case), and Hematuria (3 cases) (Table 2 , Figure 2)

Table 1 Demographic data & medical characteristics

Variables	N	%
Nationality		
Saudi	50	68.49
Non Saudi	23	31.5
P=0.003*		
Gravida groups		
1	49	67.1
2-5	20	27.4
more than 5	4	5.5
P<0.0001**		
Para groups		
Prime	53	72.6
Multiparous	20	27.4
P<0.0001**		
BMI groups		
Underweight	16	21.91
Normal	27	36.98
Overweight	22	30.13
Obese	8	10.95
P=0.01*		

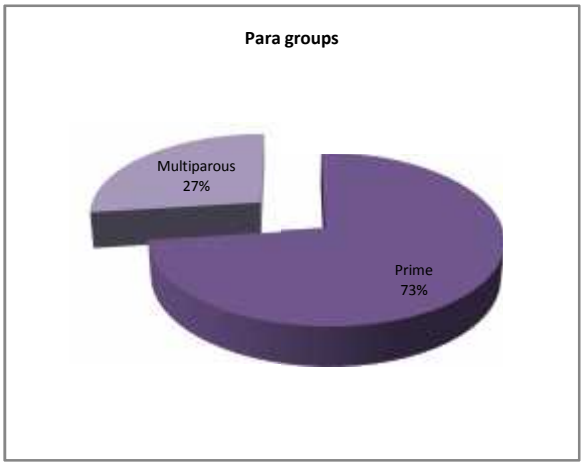

Figure 1 Para groups

Regarding neonate gender 48 (65.8%) were boys and 25 (34.2%) were girls (P=0.01) ,the mean score of birth weight was 3.33±0.40 (2.66-4.44), and the mean score of Apgar at 1 minute and 5 minutes were 8.00±1.00 range (1-9), and 9.00±1.00 range (2-10) respectively. The majority of neonates were admitted to the nursery (68-93.1%) (P<0.0001). Meconium stained liquor reported in 15 (20.5%) cases (P<0.0001), 12 (16.4%) cases required fetal resuscitation (P<0.0001). (Table 3, Figures 4 & 5)

The results of the comparison between the different modes of delivery regardless of parity showed that C/S recorded the highest mean scores than assisted delivery in several items although the results were in the normal ranges, labor duration (12.74±3.56 C/S vs 11.10±3.77assisted, P=0.04) , 2nd stage duration (3.03±0.9) C/S vs 2.3±0.8 assisted, P=0.009) , BMI (29.99±4.77 C/S vs 27.42±4.62 assisted, P=0. 02), blood loss (802.5±296.33 C/S vs 310.29±159.44assisted) . (Table 4)

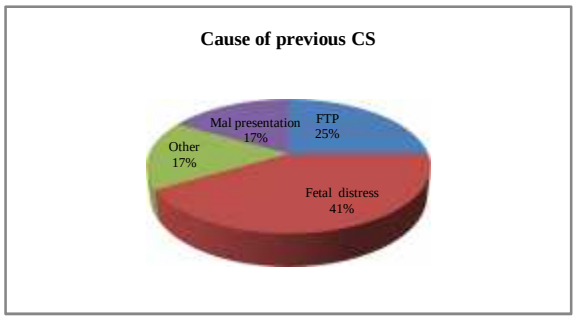

Figure 2 Cause of previous CS

Table 2 Labor characteristics & management regardless delivery mode

Variables	Mean +SD	Rang (Min-Max)
Number of contraction last Hour	3.74±0.67	(2.00-5.00)
cervical dilatation on admission	4.68±2.06	(1.00-10.00)
Labor duration	11.98±3.72	(4.75-23.17)
Second stage duration	2.7±0.9	(1.00-5.00)
Hospital stay	3.2±2.0	(1.00-12.00)
Variables	**N**	**%**
Strength of maternal contraction		
Mild	6	7.0
Moderate	24	33.3
Strong	43	59.7
Pain killer type		
Not applicable	31	42.3
Epidural	11	15.5
Analgesia	31	42.3
Delivery type		
C/S	39	53.4
Assisted	34	46.6
Amniotmy		
Spontaneous	37	50.7
Artificial	36	49.3
labor		
Spontaneous	42	57.5
Induced	31	42.5
PROM currant		
Yes	17	23.3
No	56	76.7

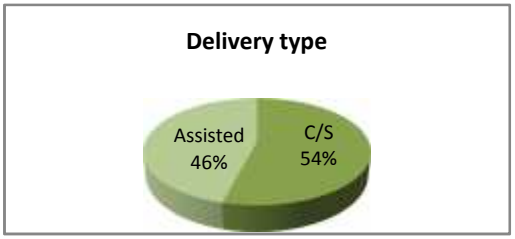

Figure 3 Delivery type

Table 3 Neonate outcomes

Variables	Mean +SD	Rang (Min/Max)	
Birth weight	3.33±0.40	(2.66-4.44)	
Abgar 1min	8±1	(1.00-9.00)	
Abgar 5min	9±1	(2.00-10.00)	
Variables	**N**	**%**	**P value**
Baby gender			
Boy	48	65.8	**0.01***
Girl	25	34.2	
Meconium			
Yes	15	21.1	**0.0001***
No	58	78.9	
Nursery			
Nursery	68	93.1	**0.0001***
NICU	4	5.6	
IUFD	1	1.4	
fetus resuscitation			
Yes	12	16.7	**0.0001***
No	61	83.3	

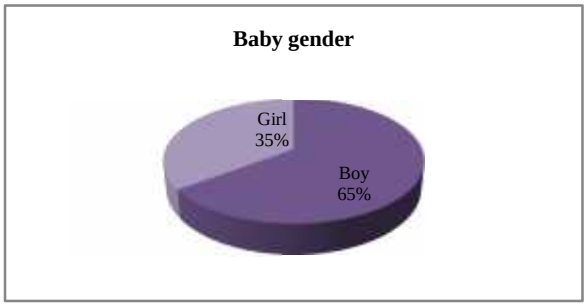

Figure 4 Baby gender

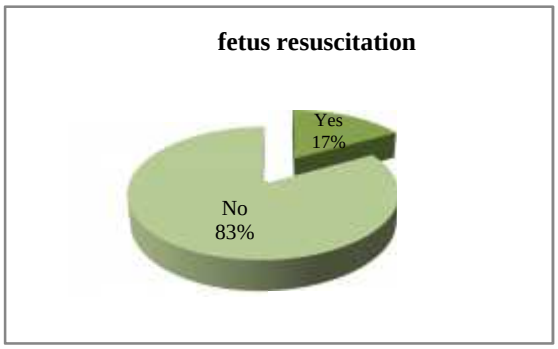

Figure 5 Fetus resuscitation

Table 4 Comparison between modes of delivery regardless of parity

Variables	Delivery type		P Value
	C/S	Assisted	
Labor duration	12.74±3.56	11.10±3.77	0.04*
BMI	29.99±4.77	27.42±4.62	0.02*
Blood loss	802.5±296.33	310.29±159.44	P <0.0001**
Hospital stay	4.20±2.06	1.911±1.13	P <0.0001**
5 minutes Apgar	8.0±1.0	9.0±1.0	P=0.02*

DISCUSSION

In consistent with many previous studies, the results of this study proved that primigravida is one of the most common risk factor for labor dystocia in which the majority of the participants were Primigravida (53- 72.6%). [Sheiner E *et al* 2002, American College of Obstetrics and Gynecology Committee 2003, Selin L *et al* 2008, Tobias T *et al* 2015]

The current study showed that more than half (54.1%) of the cases were delivered by C/S, which is consistent with several previous studies that 50% of non-elective C/S are contributed due to lack of progress, while in two different studies one in the US and the other one in Iraq that more than 65% of the unplanned C/S were due to lack of progress in latent phase and second stage. [Gifford DS *et al* 2000, American College of Obstetrics and Gynecology Committee 2003]

Many studies addressed the effect of epidural anesthesia on increasing the second stage labor duration by 3 hours for primigravida and 2 hours for multigravida, without affecting the rate of C/S section [Bofill JA *et al* 1997, Zhang J *et al* 2001, American College of Obstetrics and Gynecology Committee 2003, Selin L *et al* 2008] in this current study only 15.5 % of the patients received epidural anesthesia.

Increased maternal body mass index (BMI) is widely known as one of the common risk factor for developing labor dystocia and increasing the rate of C/S, in the present study 41.5% of the cases were considered as overweight and obese, in which the mean score of BMI in the C/S group was high

compared to the assisted delivery group, similar results were found in other studies done in Ireland and Iran. [Walsh J *et al* 2011, Alijahan R *et al* 2014, 20 Ghafarzadeh M *et al* 2015]

Increased maternal age is also considered as a leading risk factor for developing labor dystocia and increasing the rate of C/S, [Kimiai P *et al* 2002, Treacy A *et al* 2006] however the current study didn't show a significant relation between maternal age and dystocia.

Fetal risk factors for developing dystocia include: large birth weight of more than 4000 g and male baby gender, [Alijahan R *et al* 2014, Tobias T *et al* 2015] which is consistent with the results of this study in which the rate of male baby gender was higher than the rate of female baby gender, on the other hand there was no association between baby birth weight and dystocia as the majority of baby weights were average.

Contrary to previous study there was no major maternal complications such as increase blood loss detected in the current study. [Liselele HB *et al* 2000]

Low APGAR score, meconium stained liquor and admission to the NICU are known adverse outcomes of dystocia on fetus and were addressed on several studies, [Gifford DS *et al* 2000, Alijahan R *et al* 2014] In contrast the current study results showed no significant association between dystocia and the previous adverse outcomes, in which the majority of the cases had normal APGAR score, the majority of cases were admitted to nursery, and only 15 cases had meconium stained liquor.

Artificial rupture of membrane "amniotomy" was performed in about 50% of the cases, which is commonly used to facilitate the delivery as it decreases labor duration by 1-2 hours, which is consistent with a previous study done on Sweden which proved that delaying amniotomy is associated with increased dystocia occurrence, [Selin L *et al* 2008] similar results were found in a study done in Iran. [Ghafarzadeh M *et al* 2015]

Limitation

This study had few limitations such as: small sample size, short duration, and the fact that all the cases were from one health center which limited the ability of generalizing the findings of the results on the community.

CONCLUSION

The results of the current study addressed primigravida, increased maternal BMI, and male baby gender as some of the major risk factors for developing second stage labor dystocia. On the other hand there was no major maternal or fetal complications detected in the current study. Further studies are needed to be conducted in order to address other major risks factors for developing dystocia in Kingdom of Saudi Arabia.

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