

Incidence and Risk Factors for Development of Third and Fourth Degree Perineal Tears: A Four Year Experience in a Single Saudi Center

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Abstract

Background: Vaginal delivery is a physiological process that holds multiple complications. Perineal trauma and vaginal laceration is considered a common complication associated with vaginal delivery. Well established risk factors, recognized by the Royal College of Obstetricians and Gynecologists, are ethnicity, birth weight over 4 kg, persistent occipital posterior position, nulliparity, induction of labor, shoulder dystocia, instrumental delivery. There are other risk factors that were suggested in the literature but data are conflicting, such as Prolonged second stage of labor, episiotomy and obesity

Objectives: This study aimed to evaluate third and fourth degree tears rates and the impact of related risk factors on perineal tears in a single Saudi center.

Study Design: A retrospective observational cohort study.

Methods: This retrospective cohort study analyzed all vaginal deliveries from January 2011 to December 2015 in Security Forces Hospital, Riyadh, Saudi Arabia. The Hospital has around 6000 deliveries per year. Data were extracted from dedicated database software for antenatal care through Hospital System (Medical Record Viewer-MRV) and from Midwife Head Nurse daily record system.

Results: During the period of interest 28325 records were identified. Caesarean section was performed in 7322 of them (25.8%). Of the remaining 21003 records, 20300 were included in the study according to the inclusion criteria mentioned above. 56 patients (0.28%) had a severe perineal tear because of delivery and were included in group A (Study Group). Group B (Control Group) consisted of remaining 20244 patients. Univariate analysis indicated the following as risk factors for severe perineal tears: gestational age >40 weeks, nulliparity, moderate/severe obesity, instrumental delivery, shoulder dystocia, pushing stage >90 min, birth weight >4 kg, head circumference at birth >34 cm and length at birth >50 cm. Risk factors still significant in the final multivariate model were moderate/severe obesity (OR=2.8, CI=1.3-6.1), instrumental delivery (OR=2.6, CI=1.2-5.6) and birth weight (OR=1.1/hg, CI=1.1-1.2).

Conclusions: Moderate/severe obesity, vacuum delivery and fetal weight resulted as independent risk factors for severe obstetrical tears.

Keywords: Perineal tears; Severity; Obesity; Pregnancy; Caesarean section

Introduction

Vaginal delivery is a physiological process that holds multiple complications. Perineal trauma and vaginal laceration is considered a common complication associated with vaginal delivery [1,2]. The most recognized classification of perineal tears by most obstetricians is the one adopted by Royal College of Obstetricians and Gynecologists (RCOG). They have classified perineal tears into four degrees; First degree: involving vaginal mucosa only; Second Degree: involving vaginal mucosa and perineal muscles; Third Degree involving anal sphincter; Fourth degree: involving the mucosa of the rectum. Third degree perineal is further subdivided into: 3A if less than 50% of the external anal sphincter is involved, 3B if more than 50% and 3C if the internal anal sphincter is involved [3].

First and second perineal tears are considered mild tears, however, third and fourth are severe tears [4]. Failure to distinguish between the degree of perineal tears will lead to deficient management and repair of that tear and hence jeopardize the patient's quality of life in the future. It is actually reported that up to 35% of severe tears are not recognized at delivery [4]. Prevalence varies from 0.6 to 8% between different population and many risk factors play role, starting from parity and ending with quality of obstetrical care [5]. Complications such as fecal incontinence, dyspareunia chronic perineal pain and fistula or abscess formation are all not uncommon post third and fourth perineal tear [1]. Multiple studies have taken place to identify the risk factors of severe perineal tears and to establish guidelines to prevent them and their sequel. Well established risk factors, recognized by the RCOG, are ethnicity, birth weight over 4 kg, persistent occipital posterior position, nulliparity, induction of labor, shoulder dystocia, instrumental delivery [3]. There are other risk factors that were suggested in the literature but data are conflicting, such as Prolonged second stage of labor,

episiotomy and obesity [6-15]. Some preventive measures were proposed but only limited measures have good evidence of a protective role for developing severe perineal tears such as positioning of warm packs on the perineum during the active phase of labor [16]. On the other hand, perineal massage nor vaginal devices meant to protect perineum have shown any efficacy in preventing severe tears [17,18]. This study aimed to evaluate III and IV degree tears rates and the impact of related risk factors on perineal tears in a single Saudi center.

Materials and Methods

Settings

This retrospective cohort study analyzed all vaginal deliveries from January 2011 to December 2015 in Security Forces Hospital, Riyadh, Saudi Arabia. The Hospital has around 6000 deliveries per year. Data were extracted from dedicated database software for antenatal care through Hospital System (Medical Record Viewer MRV) and from Midwife Head Nurse daily record system. The data used were already available for the analysis for all patients as part of the clinical report of the Obstetrics and Gynecology Department of Security Forces Hospital.

Subjects

There were a total of 28325 deliveries from January 2011 till December 2015. 7322 deliveries (25.8%) were cesarean deliveries and excluded from the study.

Inclusion criteria

Singleton pregnancy, cephalic presentation and vaginal delivery after 20 weeks of gestational age.

Exclusion criteria

Any delivery not meeting the inclusion criteria and any delivery with missing data. The study population included a total of 20300 delivery, 56 of them had severe perineal tears (Third or fourth degree tear).

Data regarding population characteristics, relevant pre-gestational disease such as diabetes and recourse to artificial reproductive technology were noted. Interventions such as analgesia and use of oxytocin were performed according to specific clinical protocols for delivery care. Partograms were routinely used to monitor labor, woman's position, fetal head degree of flexion, plotting first and second stage times. Instrumental delivery was reserved for usual indications, such as arrested progression or fetal distress. All operative deliveries

were carried out through vacuum extraction (in all cases Kiwi Omnicup according to manufacturer's instructions), without fundal pressure or forceps, by experienced and trained obstetricians. Great attention was paid after the delivery to assess the presence and the severity of obstetrical tears. Lacerations were classified into 1, 2, 3 or 4 according to RCOG. Patients who developed a severe perineal tear (third and fourth degree) were included in group A (Study group), otherwise in group B (control group).

Descriptive statistics about population characteristics, antenatal care, onset of labor, use of oxytocin, duration of second stage of labor, use of episiotomy, type of analgesia used and fetal parameters were calculated.

Statistical analysis

Statistical analyses were performed using the SPSS (Statistical Package for the Social Sciences) version 17.0 (Chicago, IL, USA) for Windows. Descriptive statistics are presented as the arithmetic mean standard deviation (SD). The Pearson chi-squared test was used for analysis of categorical variables. The Fisher exact and Student t-tests were used when applicable to compare continuous variables. Odds ratios (OR) and 95% confidence intervals (95% CI) were calculated. Odds ratios (OR) with 95% confidence intervals were computed to assess the overall association between each possible risk factor and the occurrence of severe perineal tear. The adjusted ORs were estimated using a multivariate logistic regression model. A value of $P < 0.05$ was considered significant.

Results

During the period of interest 28325 records were identified. Caesarean section was performed in 7322 of them (25.8%). Of the remaining 21003 records, 20300 were included in the study according to the inclusion criteria mentioned above. 56 patients (0.28%) had a severe perineal tear because of delivery and were included in group A (Study Group). Group B (Control Group) consisted of remaining 20244 patients. Univariate analysis is shown in Table 1.

Univariate analysis indicated the following as risk factors for severe perineal tears

Gestational age >40 weeks, nulliparity, moderate/severe obesity, instrumental delivery, shoulder dystocia, pushing stage >90 min, birth weight >4 kg, head circumference at birth >34 cm and length at birth >50 cm. Risk factors still significant in the final multivariate model were moderate/severe obesity (OR=2.8, CI=1.3-6.1), instrumental delivery (OR=2.6, CI=1.2-5.6) and birth weight (OR=1.1/hg, CI=1.1-1.2) (Table 2).

Factors	Study Group N=56	Control Group N=20244	OR (95% CI)	P-value
Age \geq 30 years	33 (58.9)	12632 (62.4)	0.694 (0.412, 1.17)	0.17
Gestational age >40 weeks	38 (67.8)	8300 (41)	1.791 (1.083, 2.964)	0.023
Nulliparity	40 (71.4)	17450 (86.2)	2.197 (1.278, 3.775)	0.004
Moderate/severe obesity BMI \geq 35	78 (12.5)	871 (4.3)	2.916 (1.38, 6.16)	0.005
Epidural analgesia	14 (25)	3928 (19.4)	1.375 (0.777, 2.434)	0.274

Vacuum delivery	8 (14.2)	851 (4.2)	3.656 (1.792, 7.458)	<0.001
Pushing stage ≥ 90 min	10 (17.8)	526 (5.2) N=10103	3.726 (1.632, 8.506)	0.002
Episiotomy	12 (21.4)	3603 (17.8)	1.127 (0.62, 2.047)	0.696
Birth weight >4 kg	7 (12.5)	1053 (5.2)	2.71 (1.28, 5.74)	0.009
Head circumference at birth >34 cm	29 (51.7)	9575 (47.3)	2.041 (1.155, 3.606)	0.014
Length at birth >50 cm	36 (64.2)	12106 (59.8)	2.209 (1.132, 4.311)	0.02

Table 1: Descriptive measures and univariate logistic regression (Absolute numbers and percentages or mean and standard deviations are shown) for variables with missing values, the total amount of available data in each group is also reported. ORs with 95% confidence interval are shown.

Factors	OR (95% CI)	P-value
Gestational age >40 weeks	1.245 (0.721; 2.151)	0.432
Nulliparity	1.974 (1.091; 3.573)	0.025
Moderate/severe obesity	2.844 (1.315; 6.149)	0.008
Vacuum delivery	2.587 (1.191; 5.619)	0.016
Birth weight >4 kg	1.122 (1.055; 1.194)	<0.001

Table 2: Multivariate Analysis-ORs with 95% confidence interval are shown.

Discussion

The long term consequences of severe perineal tear might cause great physical and psychological impact on patient's quality of life. Therefore, great effort was made in order to identify risk factors of severe perineal tears and establishing a guide for obstetricians in order to stratify those risk factors and choose the best plan suitable for those patients at risk.

Literature review revealed some conflicting data about some risk factors

In our study, severe perineal tears occurred with a low prevalence rate (0.28%). Univariate analysis confirmed that nulliparity, Birth weight >4 kg, vacuum delivery and prolonged second stage of labour as significant risk factors. Moreover, it suggested several emerging risk factors such as gestational age >40 weeks, moderate/severe obesity and increase fetal length and head circumference at birth. Episiotomy did not represent either a risk or a protective factor for perineal damage. In multivariate analysis only moderate/severe obesity, vacuum delivery and birth weight resulted as independent risk factors for severe obstetrical tears. Multivariate logistic regression was used to evaluate a predictive risk score for severe perineal tears with a fair accuracy.

A great variability in reported rates of severe perineal tears has been described in literature. Our results prevalence rate (0.28%) is positioned in the lower part of the reported ranges compared to reported ranges (0.1-7.3%) [11,12]. This might be explained as an effect of active perineum support. It is actually reported that countries in which a policy of active manual perineum protection is performed have lower rates of OASIS [13]. Another explanation can be the periodic training courses that are being carried out in the department

for identification and treatment of OASIS attended by the delivery room staff in our hospital. There is a great agreement between several studies that nulliparity, ethnicity, heavier birthweight, shoulder dystocia, persistent occipital-posterior position, instrumental delivery and prolonged second stage of labour are consistently found as significant risk factors [5].

Our univariate analysis suggested several emerging risk factors such as gestational age >40 weeks, moderate/severe obesity, and increased biometry at birth. It was reported that Gestational age might be directly related to perineal injuries with an increase in the risk of OASIS of 77% each week of gestation [17]. Labour augmentation, as well, shows to increase the probability of severe perineal tears in a meta-analysis of 22 studies and 651,934 patients [18]. Data regarding maternal position at delivery are limited. However, non-upright positions are related to anal sphincter injuries [19]. In particular lithotomy results into a twice risk of OASIS compared to sitting position [20]. On the fetal side, increased head circumference is associated with severe perineal tears, and some studies advocate a direct relationship between biparietal diameter and severe perineal tears [21-25]. Conversely, episiotomy did not show to be associated with severe perineal damage. This finding is reported in several studies and supports the restrictive use of episiotomy compared to routine use [9,26].

Our multivariate analysis showed moderate/severe obesity, vacuum delivery and heavier birthweight as independent risk factors for severe obstetrical tears. While heavier birthweight and instrumental delivery are well-established risk factors [5], obesity represents a recent identified factor for OASIS. It is true that most studies report no association between BMI and severe perineal tears [27], however, two papers suggest a protective effect of obesity on severe perineal tears [28,29]. One of them argued that this result is maybe due to the voluminous amount of fat tissue in the perineal region may make examination and identification more difficult and hence severe perineal tears diagnosis to be missed. [28,29]. On the other hand, another study shows an increasing risk of recurrent OASIS in obese women [30]. Moreover, it has already been demonstrated that moderate and severe obesity represent a risk factor for pelvic floor damage and related dysfunctions [31]. The study limitation is being a retrospective design which might affect the quality of data. As well as the low rate of anal sphincter injury. However, the strength of the study is our large study population in a single center.

Conclusion

To the best of our knowledge, this is the first work evaluating 3rd and 4th degree tears in a single Saudi center. In our study moderate/severe obesity, vacuum delivery and birth weight resulted as independent risk factors for severe obstetrical tears. Great care of evaluating the patient's risk factors of perineal tear should be employed to prevent the subsequent complications of perineal tears.

Ethical Approval

The management of each pregnancy was not modified by the study, so it was considered exempt from IRB approval. Department Approval was obtained prior to data collection process.

Authors' Contributions

Thamer Al-Ghamdi and Al-Hanouf Al-Thaydi drafted the manuscript. Ahmad Talal Chamsi and Elham El-Mardawi contributed to study conception and study design. Ahmed Talal Chamsi and Al-Hanouf Al-Thaydi contributed to literature review and data collection. Thamer Al-Ghamdi and Al-Hanouf Al-Thaydi contributed to data analysis and data presentation in tables and figures. All Authors reviewed manuscript for editorial and intellectual contents. All authors have read and approved the final draft of manuscript.

References

1. Sultan AH (1999) Obstetric perineal injury and anal incontinence. *Clin Risk* 5: 193-196.
2. Koelbl H, Igawa T, Salvatore S, Laterza RM, Lowry A, et al. (2013) Pathophysiology of urinary incontinence, faecal incontinence and pelvic organ prolapse. In: Abrams P, Cardozo L, Khoury S, Wein A (5th edtn.) *Incontinence* pp: 261-359.
3. The management of third- and fourth-degree perineal tears. Green-top guideline No. 29 (2015).
4. Sultan AH, Kamm MA, Hudson CN (1993) Anal sphincter disruption during vaginal delivery. *New Engl J Med* 329: 1905-1911.
5. Thiagamorthy G, Johnson A, Thakar R, Sultan AH (2014) National survey of perineal trauma and its subsequent management in the United Kingdom. *Int Urogynecol J* 25: 1621-1627.
6. Cheng YW, Hopkins LM, Caughey AB (2004) How long is too long: Does a prolonged second stage of labor in nulliparous women affect maternal and neonatal outcomes? *Am J Obstet Gynecol* 191: 933-938.
7. Lowder JL, Burrows LJ, Krohn MA, Weber AM (2007) Risk factors for primary and subsequent anal sphincter lacerations: A comparison of cohorts by parity and prior mode of delivery. *Am J Obstet Gynecol* 196: 344 e1-e5.
8. Wu JM, Williams KS, Hundley AF, Connolly A, Visco AG (2005) Occiput posterior fetal head position increases the risk of anal sphincter injury in vacuum-assisted deliveries. *Am J Obstet Gynecol* 193: 525-528.
9. Cheng YW, Hopkins LM, Laros RK, Caughey AB (2007) Duration of the second stage of labor in multiparous women: Maternal and neonatal outcomes. *Am J Obstet Gynecol* 196: 585 e1-585 e6.
10. Laughon SK, Berghella V, Reddy UM, Sundaram R, Lu Z, et al. (2014) Neonatal and maternal outcomes with prolonged second stage of labor. *Obstet Gynecol* 124: 57-67.
11. Allen VM, Baskett TF, O'Connell CM, McKeen D, Allen AC (2009) Maternal and perinatal outcomes with increasing duration of the second stage of labor. *Obstet Gynecol* 113: 1248-1258.
12. Janni W, Schiessl B, Peschers U, Huber S, Strobl B, et al. (2002) The prognostic impact of a prolonged second stage of labor on maternal and fetal outcome. *Acta Obstet Gynecol Scand* 81: 214-221.
13. Rouse DJ, Weiner SJ, Bloom SL, Varner MW, Spong CY, et al. (2009) Second-stage labor duration in nulliparous women: Relationship to maternal and perinatal outcomes. *Am J Obstet Gynecol* 201: 357e1-357e7.
14. Stephansson O, Sandstrom A, Petersson G, Wikstrom AK, Cnattingius S (2016) Prolonged second stage of labour, maternal infectious disease, urinary retention and other complications in the early postpartum period. *BJOG* 123: 608-616.
15. Dahlen HG, Homer CS, Cooke M, Upton AM, Nunn R, et al. (2007) Perineal outcomes and maternal comfort related to the application of perineal warm packs in the second stage of labor: A randomized controlled trial. *Birth* 34: 282-290.
16. Lavesson T, Griph ID, Skarvad A, Karlsson AS, Nilsson HB, et al. (2014) A perineal protection device designed to protect the perineum during labor: a multicenter randomized controlled trial. *Eur J Obstet Gynecol Reprod Biol* 181: 10-14.
17. Beckmann MM, Stock OM (2013) Antenatal perineal massage for reducing perineal trauma. *Cochrane Database Syst Rev* 30: CD005123.
18. Zetterstrom J, Lopez A, Anzen B, Norman M, Holmstrom B, et al. (1999) Anal sphincter tears at vaginal delivery: Risk factors and clinical outcome of primary repair. *Obstet Gynecol* 94: 21-28.
19. Gottvall K, Allebeck P, Ekeus C (2007) Risk factors for anal sphincter tears: The importance of maternal position at birth. *BJOG* 114: 1266-1272.
20. Hsieh WC, Liang CC, Wu D, Chang SD, Chueh HY, et al. (2014) Prevalence and contributing factors of severe perineal damage following episiotomy-assisted vaginal delivery. *Taiwan J Obstet Gynecol* 53: 481-485.
21. Aytan H, Tapisiz OL, Tuncay G, Avsar FA (2005) Severe perineal lacerations in nulliparous women and episiotomy type. *Eur J Obstet Gynecol Reprod Biol* 121: 46-50.
22. Melamed N, Yogev Y, Danon D, Mashlach R, Meizner I, et al. (2011) Sonographic estimation of fetal head circumference: How accurate are we? *Ultrasound Obstet Gynecol* 37: 65-71.
23. Rognant S, Benoist G, Creveuil C, Dreyfus M (2012) Obstetrical situations with a high risk of anal sphincter laceration in vacuum-assisted deliveries. *Acta Obstet Gynecol Scand* 91: 862-868.
24. Adler B, Bodner K, Kaider A, Wagenbichler P, Leodolter S, et al. (2001) Risk factors for third-degree perineal tears in vaginal delivery, with an analysis of episiotomy types. *J Reprod Med* 46: 752-756.
25. Sheiner E, Levy A, Walfisch A, Hallak M, Mazor M (2005) Third degree perineal tears in a university medical center where midline episiotomies are not performed. *Arch Gynecol Obstet* 271: 307-310.
26. Heslehurst N, Simpson H, Ells LJ, Rankin J, Wilkinson J, et al. (2008) The impact of maternal BMI status on pregnancy outcomes with immediate short-term obstetric resource implications: A meta-analysis. *Obes Rev* 9: 635-683.
27. Lindholm ES, Altman D (2013) Risk of obstetric anal sphincter lacerations among obese women. *BJOG* 120: 1110-1115.
28. Blomberg M (2014) Maternal body mass index and risk of obstetric anal sphincter injury. *Biomed Res Int* P: 395803.
29. Edwards H, Grotegut C, Harmanli OH, Rapkin D, Dandolu V (2006) Is severe perineal damage increased in women with prior anal sphincter injury? *J Matern Fetal Neonatal Med* 19: 723-727.
30. Altman D, Falconer C, Rossner S, Melin I (2007) The risk of anal incontinence in obese women. *Int Urogynecol J Pelvic Floor Dysfunct* 18: 1283-1289.
31. McPherson KC, Beggs AD, Sultan AH, Thakar R (2014) Can the risk of obstetric anal sphincter injuries (OASIs) be predicted using a risk-scoring system? *BMC Res Notes* 24: 471.