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Risk factors for severe perineal trauma during vaginal childbirth: A Western Australian retrospective cohort study

Yvonne L. Hauck [a,b,1,*], Lucy Lewis [a,b], Elizabeth A. Nathan [c], Christine White [b], Dorota A. Doherty [c,d]

[a] School of Nursing and Midwifery, Curtin University, Australia
[b] King Edward Memorial Hospital, Australia
[c] Women and Infants Research Foundation, Australia
[d] School of Women's and Infants' Health, The University of Western Australia, Australia

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ABSTRACT

Aim: To determine rates and risk factors for third and fourth degree perineal tears (severe perineal trauma) in a Western Australian context.
Design and setting: A retrospective hospital-based cohort study was performed using computerised data for 10,408 singleton vaginal deliveries from 28 weeks gestation.
Methods: Women with severe perineal trauma were compared to those without. Logistic regression analysis, stratified by parity, was used to assess demographic and obstetric factors associated with perineal trauma.
Results: Severe perineal trauma incidence was 3% (338/10408), 5.4% (239/4405) for primiparas and 1.7% (99/5990) for multiparas ($p < 0.001$). Adjusted risk factors associated with trauma and common across parity included Asian or Indian ethnicity, shoulder dystocia and assisted delivery. Epidural analgesia (OR 0.72, 95% CI 0.54–0.96), preterm birth (OR 0.40, 95% CI 0.23–0.72) and episiotomy (OR 0.54, 95% CI 0.39–0.74) were protective in primiparas, while episiotomy was associated with increased risk in multiparas (OR 2.01, 95% CI 1.18–3.45). Additional factors among primiparas were occipito posterior (OP) delivery (OR 3.35, 95% CI 1.75–6.41) and prolonged second stage (OR 1.98, 95% CI 1.46–2.68), and among multiparas included gestational diabetes (OR 1.78, 95% CI 1.04–3.03) and birth weight >4000 g (OR 1.86, 95% CI 1.10–3.15).
Conclusion: Parity differences in risk factors such as episiotomy, infant weight, OP delivery, gestational diabetes and prolonged second stage warrant investigation into clinical management. Although rates differ internationally, and replication evidence has confirmed consistency for certain demographic and obstetric factors, the development of internationally endorsed clinical guidelines and further research around interventions to protect the perineum are recommended.

1. Introduction

Severe perineal trauma during childbirth involves a third or fourth degree tear.[1] The incidence of severe perineal trauma reported internationally varies, with rates from 0.1%[2] to 0.25% in Israel[3]; 1.58% in the United Kingdom[4]; 1.9%[5], 2.0%[6] and 2.9%[7] in Australia; and 2.9%[8] to 10.2%[9] in the United States. Severe perineal trauma contributes to maternal morbidity including perineal pain, urinary problems, faecal incontinence and dyspareunia.[10] In addition, primiparas who experience severe perineal trauma have been found to be at increased risk of requiring a related surgical procedure within 12 months following birth and were also less likely to have a subsequent baby.[11] Psychological consequences remain under explored and do require urgent attention by researchers.[11]

A systematic review highlighted risk factors for severe perineal trauma as including: instrumental delivery; a prolonged second

* Corresponding author at: School of Nursing and Midwifery, Curtin University, Perth, WA 6845, Australia. Tel.: +61 8 9340 1672; fax: +61 8 9388 7003.
E-mail addresses: y.hauck@curtin.edu.au, yvonne.hauck@health.wa.gov.au (Y.L. Hauck), lucy.lewis@health.wa.gov.au, lucy.lewis@curtin.edu.au (L. Lewis), liz.nathan@uwa.edu.au (E.A. Nathan), christine.white@health.wa.gov.au (C. White), dorota.doherty@uwa.edu.au (D.A. Doherty).
[1] Address: King Edward Memorial Hospital, Bagot Road, Subiaco, WA 6008, Australia.

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stage; birth weight >4000 g; delivery in an occipital posterior (OP) position and episiotomy.[12] International population based studies undertaken to identify risk factors for severe perineal trauma have produced varying results. Risk factors for Finish primiparas included: assisted delivery; birth weight >4000 g; OP position; and prolonged active second stage.[13] Swedish results supported assisted delivery and birth weight >4000 g, adding that women from Africa and Asia had pronounced risk.[14] However, British research found that being primipara and having an instrumental delivery for OP position were the only significant factors.[4] One Israeli study added mediolateral episiotomy as an independent risk factor[2] and another suggested Asian ethnicity and vacuum delivery, but not forceps delivery, as significant.[3] However, a Greek study found no difference between vacuum and forceps deliveries in terms of sustaining a third degree tear.[15] Finally, a recent Australian study found primiparity, being born in China or Vietnam, having an assisted delivery, birthing in a private hospital and having a male infant were at higher risk of severe perineal trauma compared to women with no or minor perineal trauma.[5] Only having a male infant remained significant when women with severe perineal trauma were compared to those without in the adjusted analysis.[5]

Differing severe perineal trauma rates and inconsistencies across international evidence around risk factors suggest that further investigation is warranted to compare rates and confirm consistency of demographic and obstetric risk factors. Reported severe perineal trauma rates for Australian women only include data from one eastern state. Therefore the aim of this study was to determine rates and risk factors for severe perineal trauma in the sole tertiary public maternity hospital in Western Australia (WA).

2. Methods

A retrospective hospital-based cohort study was performed using computerised perinatal data collected by the Obstetrics and Gynaecology Clinical Care Unit at the tertiary public hospital in Perth, WA. This computerised perinatal data collection system allows for recording of episiotomy alone or episiotomy in addition to 1st, 2nd, 3rd, or 4th degree tears enabling the accurate recording the extensions of an episiotomy. The study was approved by the hospital Human Ethics Committee (No. 316QK).

At the time of this study the hospital provided a variety of care models ranging from Family Birth Centre care, shared care, routine midwifery care, team midwifery, or medical care depending upon the woman's assessed risk. The Birth Centre accepts a limited number of low risk women within the Perth metropolitan area. However, other women with a low risk pregnancy wanting care from this hospital must live within the local area. Being the largest maternity hospital in Western Australia and the only tertiary referral centre means many women with high risk complex pregnancies attend the hospital. As such, specialist services include a Maternal Foetal Medicine Department and variety of antenatal clinics which target: adolescents; women with alcohol and drug dependency; women with a mental illness; women with diabetes; and women who have experienced a previous caesarean. Midwifery services for women of any risk include parent education classes, the Breastfeeding Centre, and the early discharge programme supported by the Visiting Midwifery Service.

A cohort of 10,408 singleton vaginal deliveries from 28 weeks gestation between January 2009 and December 2011 attending the hospital for intrapartum care were included. Women were grouped according to their perineal status; those who had severe perineal trauma and those who did not. Demographic factors included ethnicity, age and parity. Asian ethnicity comprised South East Asian countries such as China, Vietnam and Thailand, whereas women of Indian ethnicity were from the country of India. Antenatal factors considered included body mass index (BMI) at booking, presence of gestational diabetes mellitus (GDM) and antenatal complications (including: pre-eclampsia; antepartum haemorrhage; threatened preterm labour; premature rupture of membranes, oligohydramnios; placenta praevia; and urinary tract infection).

Intrapartum and delivery data included: epidural analgesia; delayed progress; foetal compromise (including thick meconium, abnormal cardiotocograph and abnormal foetal blood gas); length of second stage; birthing position; episiotomy; shoulder dystocia; delivery in an OP position; and assisted delivery. Primary accoucheur and time of delivery (midnight to 8 a.m., 8 a.m. to 4 p.m. or 4 p.m. to midnight) were examined for their contribution to severe perineal trauma prediction. The primary accoucheur recorded can be a midwife, student, obstetrician, other medical officer or self/no attendant. Perinatal outcomes included gestation at delivery and birth weight.

Categorical data were summarised using frequency distributions and comparisons between women with and without severe perineal trauma were made using Chi square tests. The risk of severe perineal trauma differed significantly between primiparous and multiparous women on many demographic, labour and birth characteristics, subsequently; the analysis was stratified by parity status. All characteristics with p-values <0.1 in univariable logistic regression analyses were considered as candidate predictors, and entered into the multivariable regression analysis along with known risk factors and interactions. The effects of risk factors on the likelihood of severe perineal trauma were summarised using odds ratios (OR) and their 95% confidence intervals (CI). IBM SPPS Version 20.0 statistical software (Armonk, NY) was used for data analysis. All hypothesis tests were two-sided, and p-values <0.05 were considered statistically significant. A p-value <0.1 was assigned as a cut off value in the univariate analysis of risk factors to ensure potential risk factors that approached significance ($0.05 < p < 0.1$) were further investigated in multivariable analysis. A p-value <0.1 is commonly used when investigating potential risk factors univariately, as the significance level can change once other factors are accounted for in multivariable modelling.

3. Results

The incidence of severe perineal trauma in this cohort of WA women was 3% (338/10408); 5.4% (239/4405) among primiparas and 1.7% (99/5990) among multiparas ($p < 0.001$). There were 117 women in the severe perineal trauma group who had an episiotomy and severe perineal trauma. Compared with women who did not sustain severe perineal trauma, those who did have severe perineal trauma were more likely to: report Asian or Indian ethnicity; have birthed in lithotomy position; experience labour complications such as delayed progress; have a second stage exceeding 1 h; experience shoulder dystocia and undergo an assisted delivery (Table 1). Obstetricians and registrars were more likely to be the primary accoucheur during deliveries with severe perineal trauma compared to other clinicians such as midwives or students (56% vs. 32%, $p < 0.001$). Preterm birth reduced the likelihood of severe perineal trauma. Due to 13 missing values for parity, maternal age and BMI, analysis was conducted on 10,395 women.

Primiparas >20 years and those who experienced OP deliveries had a higher incidence of severe perineal trauma, while multiparas with GDM, obstruction caused by malposition of foetus, foetal compromise, episiotomy and birth weight greater than 4000 g had a higher incidence of severe perineal trauma. Body mass index, epidural analgesia and time of delivery (midnight to 8 a.m., 8 a.m. to 4 p.m. or 4 p.m. to midnight) were not univariately associated with severe perineal trauma.