

Severe obstetric tears: a prospective observational study in an Italian referral unit

STEFANIA LIVIO¹, MARCO SOLIGO¹, ELENA DE PONTI², ILEANA SCEBBA¹, FEDERICA CARPENTIERI¹, ENRICO M. FERRAZZI¹

¹ Buzzi Children's Hospital, University of Milan - Obstetric and Gynecology Dept.

² AO San Gerardo, Monza - Medical Physics Dept.

Abstract: Vaginal birth can be accompanied by pelvic complications: vaginal tears, cervical and perineal lacerations, which are commonly classified in four categories with ano-rectal involvement starting from the IIIrd degree. The objective of this study is to analyze the incidence of severe perineal lacerations and to identify possible risk factors within an Italian Tertiary Referral Maternity Hospital. This is a prospective observational cohort study based on women ≥ 32 weeks gestational age who delivered between July 2014-December 2014. Univariate analysis for parameters in relation to severe perineal tears was first performed and then logistic stepwise multivariate analysis was used including all the risk factors significant at univariate analysis (using Stata 9.0, Texas, USA). A total of 1677 women delivered in the period considered: 430 women were excluded, due to gestational age < 32 weeks (6 women) or because of abdominal delivery in 424 cases; 1247 women were included in the study. Integrum perineum was found in 233 women (18.7%), while 676 (54.2%) sustained perineal tears and 338 (27.1%) had an episiotomy. Only 15 women (1.2%) had a severe laceration, among which one IVth degree. The risk factors for severe perineal lacerations emerging in this cohort are: ethnicity, younger age, nulliparity, oxytocin augmentation and orthostatic maternal position at delivery; maternal position is the only independent risk factor emerging as significant in our multivariate logistic stepwise analysis. Above all a 1.2% prevalence rate of severe perineal laceration has been observed in an Italian Tertiary Referral maternity Hospital.

Key words: Vaginal delivery; Severe perineal lacerations; Anal sphincter; Risk factors; Orthostatic position.

INTRODUCTION

Vaginal birth can be associated with pelvic complications such as vaginal tears, cervical lacerations and perineal lacerations. Perineal tears are commonly divided in four categories, between which IIIrd and IVth degree tears are commonly considered as severe: third degree lacerations involve anal sphincter complex, while fourth degree tears are extended to the rectal mucosa¹. The incidence of severe lacerations shows a wide variability in the literature, according to the different settings and populations, thus there is no consensus regarding preventive measures and clinical management of severe perineal tears.

Demography and obstetrical practice can differ from one context to another: this is why data analysis of risk factor for each particular setting is so important to drive clinical approach in this particular field^{2,3}.

Ethnicity⁴, nulliparity², maternal BMI⁵, fetal macrosomy⁶, previous history of fecal incontinence or severe perineal laceration in prior deliveries^{7,8} are the most frequently associated risk factors to this kind of lacerations in many retrospective studies in literature.

While concerning risk factors strictly related to labour and delivery the following are highlighted in many papers: operative delivery with vacuum or forceps⁹, persistent occiput posterior position of fetus¹⁰, prolonged second stage of labour¹¹, induction of labour¹² and epidural analgesia¹³.

As far as concerns different maternal positions during labour and delivery in relation to severe perineal lacerations the literature is controversial. Meyvis et al¹⁴ consider the lateral position as the most protective for perineum, while others disagree with this point of view^{15,16}. Water births, instead, are universally considered at low risk of perineal trauma^{17,18}.

As a general rule the management of pushing phase in labour has an essential role for preventing perianal trauma: if possible it is important to respect the correct timing for the tissue to stretch, slowly, gradually and less traumatically. Manual pressure on the uterus (Kristeller maneuver) is on the other hand associated with a major risk of severe perineal lacerations^{19,20}.

The most discussed factor related to perineal lacerations is episiotomy: routine use of episiotomy is associated with

an increased risk of anal sphincter complex damage²¹ and it increases morbidity in women that could otherwise deliver with integrum perineum or with minor lacerations²². In addition it seems that patients with episiotomy are at higher risk to have any perineal lacerations in further deliveries²³. Therefore to reduce iatrogenic severe perianal trauma episiotomy should be strictly performed under clear indications: fastening pushing phase because of non reassuring CTG trace, maternal pathology that contraindicate excessively prolonged second active phase of labor, treatment of shoulder dystocia². If needed a mediolateral episiotomy is preferable than a median one, being the last one at higher risk of extension to sphincter area²⁴.

In the light of improving postpartum pelvic functional outcomes great attention has been focused on the assistance immediately after baby delivery: to assess the perineum carefully, including rectal examination under optimal conditions (adequate lighting, lithotomic position with legs flexed on supports). Andrews et al. report doubling rate of prevalence of severe perineal trauma thanks to a deeper exam of perineum after delivery²⁵. Then perineal repair should be also performed under optimal conditions: epidural or general anaesthesia to obtain adequate muscle relaxation and appropriate pain control, wide spectrum antibiotic prophylaxis, vesical catheter for at least 24 hours and laxative for about ten days. Accurate layers repair should be performed and external anal sphincter reconstructed either with an overlapping or an end-to-end approach, being outcomes equivalent. Special attention has to be paid to the internal anal sphincter recognition and separate suture^{26,27}.

Patient with severe perineal trauma should be reevaluated in a dedicated clinic within two or three months after delivery, to consider the possibility of pelvic floor rehabilitation.

The objective of this study is to analyze the incidence of severe perineal lacerations and to identify possible risk factors within a Tertiary Obstetric Italian Referral Unit.

MATERIAL AND METHODS

This was a prospective observational cohort study based on women ≥ 32 weeks gestational age that delivered in an

TABLE 1. – Distribution of perineal laceration and episiotomy.

Parameter	1247 vaginal deliveries n (%)
Integrum perineum	233 (18.7%)
Episiotomy	338 (27.1%)
Median	12 (3.7%)
Mediolateral	326 (96.3%)
Spontaneous perineal laceration	
I st -II nd degree	661 (53%)
Severe degree	15 (1.2%)*

Italian Tertiary Referral Maternity Hospital between July 2014 and December 2014.

The Institutional Review Board has approved the protocol of the study and privacy law was strictly observed.

All the staff working in the Unit was involved in entering data concerning pregnancy history, labour and delivery in an electronic database. Relevant parameters were then anonymously extracted from the original database to build-up a specifically designed one for the study.

A univariate analysis for categorical and continuous parameters in relation to severe perineal tears was performed with exact Fisher and parametric *t-Student* tests respectively. A logistic stepwise multivariate analysis was then also performed including all the parameters that resulted significant at univariate analysis. A level of $p < 0.05$ was considered for significance and software Stata 9.0 was adopted (Stata Corporation, College Station, Texas, USA).

RESULTS

A total of 1677 women delivered in the six months-period considered: 430 women were excluded, due to gestational age < 32 weeks (6 women) or because of abdominal delivery (424 Caesarean Sections - 25% of all deliveries). Finally 1247 women were included in the study.

In table 1 the distribution of perineal lacerations and epi-

siotomy is reported: only 15 women (1.2%) had a severe laceration, among which one IV degree.

Nulliparous women significantly differed from multiparous for all parameters. As only one multiparous woman sustained a severe laceration, univariate statistical analysis was performed on all eligible women (table 2).

It's important to underline that 24% (120 nulliparous and 179 pluriparous) of our population have been managed under a special protocol for non complicated deliveries and labour (spontaneous onset of labour, no epidural anaesthesia, no meconium-stained amniotic fluid, no oxytocin augmentation, CTG classified as ACOG class I in labour [28] and Piquard class 0 [29] during pushing phase) and then were managed autonomously by midwives.

Unfortunately data on fetal position at delivery are scarcely recorded in our database, thus a statistical analysis on this parameter was impossible to be obtained.

Length of pushing second stage major than an hour is indicated considering all vaginal deliveries (spontaneous and operative ones): it is possible to distinguish between the two categories, with an average time for spontaneous deliveries of 28 minutes (SD ± 36.4 minutes) compared to 55 minutes of vacuum assisted deliveries (SD ± 40 minutes).

In table 2 the risk factors emerging from this group of patients can be observed. Significant factors were then tested with stepwise multivariate analysis to identify the independent ones; results are reported in table 3.

The only risk factor that resists as significant after this analysis is orthostatic position of the mother at delivery.

DISCUSSION

The extreme variability in the incidence of severe perineal tears after delivery is one of the most disappointing remark concerning this consistent body of literature.

Among possible explanations one is represented by substantial differences in obstetrical management within different context. It is therefore of extreme importance to contex-

TABLE 2. – Demographics and obstetrical parameter with univariate analysis.

Parameter		No perineal lacerations +I st and II nd degree (n=1232)	Severe perineal lacerations (\geq III rd degree) (n=15)	p-value
Ethnicity	Caucasian	979 (79.8%)	9 (60%)	0.048
	Asiatic	99 (8.1%)	5 (33.3%)	
	South American	81 (6.6%)	1 (6.7%)	
	Middle-Eastern	35 (2.9%)	0	
	African	33 (2.7%)	0	
Age	Average \pm SD	32.8 \pm 5.3	29.7 \pm 6.9	0.013 §
BMI	Average \pm SD	26.1 \pm 3.8	26.1 \pm 3.1	0.499 §
Nulliparity		694 (56.3%)	14 (93.3%)	0.002 *
Mode of Delivery	Vaginal	1022 (83.0%)	11 (73.3%)	0.248 *
	Vacuum extractor	210 (17.1%)	4 (26.7%)	
GA (weeks)	Average \pm SD	39.4 \pm 1.3	39.7 \pm 1.1	0.183 §
Onset of labour	Induction	354 (28.7%)	2 (13.3%)	0.152 *
	Spontaneous	878 (71.3%)	13 (86.7%)	
Length of induction (h)	≤ 24 h	277 (83.2%)	1 (50%)	0.312 *
	> 24 h	56 (16.8%)	1 (50%)	
Pushing second stage > 1h		216 (17.7%)	3 (20.0%)	0.514 *
Oxytocin augmentation		296 (24.0%)	7 (46.7%)	0.048 *
Epidural analgesia		462 (37.5%)	6 (40.0%)	0.519 *
Maternal position	Orthostatic	77 (7.6%)	3 (27.3%)	0.047 *
	Lithotomic	941 (92.4%)	8 (72.7%)	
Neonatal birth weight (g)	Average \pm SD	3333 \pm 437	3367 \pm 223	0.385 §

TABLE 3. – Results of multivariate logistic stepwise analysis.

Risk Factor	Univariate		Multivariate	
	OR (95% IC)	<i>p</i>	OR (95% IC)	<i>p</i>
Age	0.90 (0.83-0.99)	0.028	0.90 (0.81-1.01)	0.071
Mother's position at delivery	0.22 (0.06-0.84)	0.027	0.20 (0.05-0.79)	0.022
Nulliparity	0.09 (0.01-0.70)	0.021	0.16 (0.02-1.26)	0.082

tualize these data within every particular obstetrical management. As can be extracted from our data presentation we have a 25% caesarean section rate, 27% episiotomy rate (almost all mediolateral) and 17% operative deliveries with vacuum extractor (no forceps adoption). Under these conditions we observed a 1.2% rate of severe lacerations in our study, which is in accordance with the average values commonly observed. Nevertheless it can be considered a low incidence rate, and it could be possibly underestimated. In fact as Gurol-Urganci et al demonstrated in the United Kingdom³⁰ increasing awareness of the problem leads to a higher detection rate of severe perineal tears. The present study is part of an internal audit programme and is going to be accompanied by formal teaching practical hands-on courses on this topic to improve the perception of doctors and midwives on this clinical issue. We therefore expect, in the next future, an increase from the present 1.2% rate of severe perineal trauma in our unit.

Our risk factors analysis overlaps with that from several other authors, such as ethnicity⁴, younger age⁴, nulliparity², oxytocin augmentation¹¹ and orthostatic maternal position at delivery¹⁴. Data on maternal position at delivery are of interest from our study being the orthostatic position at higher risk for severe tears. This has to be cautiously considered due to the small number of severe lacerations that we detected and some missing data on maternal position in our sample size. In the literature both lithotomic and squatting position at birth are associated with an increased risk for severe lacerations and in our series squatting was included in the orthostatic group. Moreover this is the only independent risk factor emerging as significant in our multivariate logistic stepwise analysis, even though both younger age and nulliparity are close to significance, being therefore relevant in the prediction model. Further data are needed to clarify our results, since considering orthostatic maternal position at delivery as a risk factor would have an impact on midwifery practice.

REFERENCES

- Royal College of Obstetricians and Gynaecologists. (2015). The Management of Third- And Fourth-Degree Perineal Tears. London: RCOG.
- Pergialiotis V, Vlachos D, Protopapas A, Pappa K, Vlachos G Risk factors for severe perineal lacerations during childbirth. *Int J Gynaecol Obstet*. 2014 Apr; 125 (1): 6-14.
- Groutz A, Hasson J, Wengier A, Gold R, Skornick-Rapaport A, Lessing JB, Gordon D. Third- and fourth-degree perineal tears: prevalence and risk factors in the third millennium. *Am J Obstet Gynecol*. 2011 Apr; 204 (4): 347. e 1-4.
- Handa VL, Harris TA, Ostergard DR. Protecting the pelvic floor: obstetric management to prevent incontinence and pelvic organ prolapse. *Obstet Gynecol*. 1996 Sep; 88 (3): 470-8.
- Kabiru W, Raynor BD. Obstetric outcomes associated with increase in BMI category during pregnancy. *Am J Obstet Gynecol*. 2004 Sep; 191 (3): 928-32.
- Dupuis O, Madelenat P, Rudigoz RC. Fecal and urinary incontinence after delivery: risk factors and prevention. *Gynecol Obstet Fertil*. 2004 Jun; 32 (6): 540-8.
- Fynes M, Donnelly V, Behan M, O'Connell PR, O'Herlihy C. Effect of second vaginal delivery on anorectal physiology and faecal continence: a prospective study. *Lancet*. 1999 Sep 18; 354 (9183): 983-6.
- Elfaghi I, Johansson-Ernste B, Rydhstroem H. Rupture of the sphincter ani: the recurrence rate in second delivery. *BJOG*. 2004 Dec; 111 (12): 1361-4.
- Wu JM, Williams KS, Hundley AF, Connolly A, Visco AG. Occiput posterior fetal head position increases the risk of anal sphincter injury in vacuum-assisted deliveries. *Am J Obstet Gynecol*. 2005 Aug; 193 (2): 525-8.
- Benavides L, Wu JM, Hundley AF, Ivester TS, Visco AG. The impact of occiput posterior fetal head position on the risk of anal sphincter injury in forceps-assisted vaginal deliveries. *Am J Obstet Gynecol*. 2005 May; 192 (5): 1702-6.
- 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 Sep; 191 (3): 933-8.
- Simpson KR, Atterbury J. Trends and issues in labor induction in the United States: implications for clinical practice. *J Obstet Gynecol Neonatal Nurs*. 2003 Nov-Dec; 32 (6): 767-79.
- Bodner-Adler B, Bodner K, Kimberger O, Wagenbichler P, Kaider A, Husslein P, Mayerhofer K. The effect of epidural analgesia on the occurrence of obstetric lacerations and on the neonatal outcome during spontaneous vaginal delivery. *Arch Gynecol Obstet*. 2002 Dec; 267 (2): 81-4.
- Meyvis I, Van Rompaey B, Goormans K, Truijien S, Lambers S, Mestdagh E, Mistiaen W. Maternal position and other variables: effects on perineal outcomes in 557 births. *Birth*. 2012 Jun; 39 (2): 115-20.
- Lawrence A, Lewis L, Hofmeyr GJ, Styles C. Maternal positions and mobility during first stage labour. *Cochrane Database Syst Rev*. 2013 Oct 9; 10.
- Kemp E, Kingswood CJ, Kibuka M, Thornton J. Position in the second stage of labour for women with epidural anaesthesia. *Cochrane Database Syst Rev*. 2013 Jan.
- Cluett ER, Burns E. Immersion in water in labour and birth. *Cochrane Database Syst Rev*. 2009 Apr 15; (2).
- Otigbah CM, Dhanjal MK, Harmsworth G, Chard T. A retrospective comparison of water births and conventional vaginal deliveries. *Eur J Obstet Gynecol Reprod Biol*. 2000 Jul; 91 (1): 15-20.
- Simpson KR, Atterbury J. Trends and issues in labor induction in the United States: implications for clinical practice. *J Obstet Gynecol Neonatal Nurs*. 2003 Nov-Dec; 32 (6): 767-79.
- Merhi ZO, Awonuga AO. The role of uterine fundal pressure in the management of the second stage of labor: a reappraisal. *Obstet Gynecol Surv*. 2005 Sep; 60 (9): 599-603.
- Signorello LB, Harlow BL, Chekos AK, Repke JT. Midline episiotomy and anal incontinence: retrospective cohort study. *BMJ*. 2000 Jan 8; 320(7227): 86-90.
- Hartmann K, Viswanathan M, Palmieri R, Gartlehner G, Thorp J Jr, Lohr KN. Outcomes of routine episiotomy: a systematic review. *JAMA*. 2005 May 4; 293 (17): 2141-8.
- Manzanares S, Cobo D, Moreno-Martínez MD, Sánchez-Gila M, Pineda A. Risk of episiotomy and perineal lacerations recurring after first delivery. *Birth*. 2013 Dec; 40 (4): 307-11.
- Signorello LB, Harlow BL, Chekos AK, Repke JT. Midline episiotomy and anal incontinence: retrospective cohort study. *BMJ*. 2000 Jan 8; 320 (7227): 86-90.
- Andrews V, Sultan AH, Thakar R, Jones PW. Occult anal sphincter injuries-myth or reality? *BJOG*. 2006 Feb; 113 (2): 195-200.
- Farrell SA, Flowerdew G, Gilmour D, Turnbull GK, Schmidt MH, Baskett TF, Fanning CA. Overlapping compared with end-to-end repair of complete third-degree or fourth-degree obstetric tears: three-year follow-up of a randomized controlled trial. *Obstet Gynecol*. 2012 Oct; 120 (4): 803-8.
- Fernando R, Sultan AH, Kettle C, Thakar R, Radley S. Methods of repair for obstetric anal sphincter injury. *Cochrane Database Syst Rev*. 2006 Jul 19; (3).
- American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 106: Intrapartum fetal heart rate monitoring: nomenclature, interpretation, and general management principles. *Obstet Gynecol*. 2009 Jul; 114 (1): 192-202.

29. Piquard F, Hsiung R, Mettauer M, Schaefer A, Haberey P, Dellenbach P. The validity of fetal heart rate monitoring during the second stage of labor. *Obstet Gynecol.* 1988 Nov; 72 (5): 746-51.
30. Gurol-Urganci I, Cromwell DA, Edozien LC, Mahmood TA, Adams EJ, Richmond DH, Templeton A, van der Meulen JH. Third- and fourth-degree perineal tears among primiparous women in England between 2000 and 2012: time trends and risk factors. *BJOG.* 2013 Nov; 120 (12): 1516-25.

Correspondence to:

Stefania Livio - via Castelvetro 32 – Milan – Italy
E-mail: stefy.livio@libero.it

Multidisciplinary Uro-Gyne-Procto Editorial Comment

To improve the integration among the three segments of the pelvic floor, some of the articles published in *Pelvipерineology* are commented on by **Urologists, Gynecologists, Proctologists/Colo Rectal Surgeons or other Specialists**, with their critical opinion and a teaching purpose. Differences, similarities and possible relationships between the data presented and what is known in the three fields of competence are stressed, or the absence of any analogy is indicated. The discussion is not a peer review, it concerns concepts, ideas, theories, not the methodology of the presentation.

Uro... This prospective observational study by Livio et al. in 1247 women with deliveries investigated the birth trauma upon vaginal delivery. Interestingly only 18.7% of women had an intact perineum, whereas 27.1% needed an episotomy and 54.2% had a spontaneous perineal laceration with 1.2% of severe degree. These data clearly show that vaginal delivery results in a constant trauma of the perineal body and most probably of many other pelvic structures as well. Another interesting aspect was that the only risk factor for severe lacerations in the multivariate analysis was the mothers position at delivery, where orthostatic position showed a higher risk.

From an urological point of view, this study raises two important aspects:

1 - First the high percentage of birth trauma at least to the perineum calls for research also in the field of micturition and bladder emptying. Given the fact that according to the integral theory posterior defects also interfere with urinary continence, as well as bladder emptying, it is currently not clear what exact role the perineal body plays and what urinary symptoms a traumatic perineal body might cause.

2 - The fact that the mothers position at delivery was the only risk factor for severe laceration and apparently orthostatic position should be avoided, this could be translated also to other "evacuating manoeuvres" of the pelvis, such as bladder emptying. Perhaps an orthostatic position could be associated with a higher resistance power, whereas a sitting position might be preferable. Especially in men bladder emptying is frequently performed in the orthostatic position, in a less relaxed state of the pelvic floor.

In summary this study delivers good data with regards to the trauma associated in vaginal delivery. Certain impact to other disciplines active in the pelvic floor could be drawn with regards to prevention, diagnostics and perhaps treatment strategies, if the full role of the perineal body in the pelvic floor is elucidated.

F.M. WAGENLEHNER

Clinic of Urology, Pediatric Urology and Andrology, Justus-Liebig-University, Giessen, Germany
Florian.Wagenlehner@chiru.med.uni-giessen.de

Procto-Colorectal... This prospective observational study in an Italian referral unit looks at the incidence of severe obstetric tears. A very interesting data is the report of only 1,2% of post-delivery severe perineal trauma, though, as correctly commented by the Authors, this data could be underestimated. Colorectal surgeons' point of view basically concerns the importance of the trauma and its relationship between the degree of laceration and the functional as well as the anatomic damage. All the risk factors cited can be expected, so the warning is quite important. Often the reported degree of the perineal trauma does not seem to be related with to the lesion observed in a proctological setting. A follow-up observational study in this group of women could be very useful, finding out how many "ghost" lesions will appear in the long term also in the "other degree" groups, i.e. not related with the high degree post-delivery severe perineal trauma. Colo-rectal surgeon are often involved for an urgent or deferred intervention in different postpartum lesions besides anal sphincter rupture, such as recto-vaginal fistula or severe anal/rectal prolapse that may be seen even without a very important perineal trauma.

FILIPPO LA TORRE

Dpt of Surgery, University of Rome, Italy
filippo.latorre@uniroma1.it