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SHORT COMMUNICATION

Obstetric risk factors for early-onset anal incontinence

Kristina Drusany Starič[1] · Gregor Norčič[2]

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Abstract

Purpose The aim of the study was to identify primiparous pregnant women with a higher risk for early anal incontinence (AI) after labour.

Methods In the retrospective case control study, 133 primiparous women were questioned using the Wexner scoring system, and possible obstetric anal sphincter injuries (OASIS) were assessed using endoanal ultrasonography (EUS) 6–12 weeks after the labour. Obstetric characteristics (possible risk factors) for AI were collected from the maternal medical records. The univariate and multiple regression of maternal, neonatal and labour risk factors were calculated. Cut-off values were set to divide women into groups with higher and lower risk for AI.

Results The data of 30 primiparous women with and 103 without AI were analysed. Univariate logistic regression of obstetrics characteristics showed that stimulation of labour (RO [95% CI] 3.31 [1.07, 10.28]) and neonatal head circumference (RO [95% CI] 1.36 [1.03, 1.78]) are both associated with AI. With a neonatal head circumference of 34 cm or more (cut-off value), probability for AI was 33%, while below that value, it was just 2%. The incidence of AI was not significantly different between women with surgically repaired OASIS and women without anal sphincter injury.

Conclusion The findings can assist in the identification of pregnant women at higher risk of AI. The women at higher risk of AI should be given special attention during the labour and specific rehabilitation after the labour.

Keywords Faecal incontinence · OASIS · Labour · Neonatal head circumference · Oxytocin · Risk factors · Cut-off values

Introduction

Labour is one of the major causes of anal incontinence (AI) [1]. After labour, as many as 91% women find at least one symptom associated with an abnormal functioning of the anal sphincter [2]. It is very important to distinguish between the early onset of AI that occurs immediately after the labour and the one that occurs decades later.

The incidence of early onset AI after labour is more common than expected and is estimated at 13 to 25.5% [1]. The most likely cause of AI is injury of the pudendal nerve and its regional branches during labour due to the stretching and compression, as well as the injury of the pelvic floor [3]. The repeated longitudinal pull of the pudendal nerve leads to its permanent injury and scarring and to the denervation of the anal sphincter [4]. EMG of the women with AI after labour shows signs of denervation/re-innervation of the anal sphincter, something that is not observed in women with anal continence after the labour [5].

To avoid the AI caused by obstetrical anal sphincter injuries (OASIS), the primary repair of the injured anal sphincter should be performed [6]. Although some evidence suggests that overlap repair might be superior to end-to-end repair regarding anal continence at 12 months, no difference seems to exist between both techniques of repair after 36 months [7].

The late onset of AI is also associated with labour and OASIS, and it occurs several decades after the labour [8]. Ageing might play an important role in this type of AI for it is known that after the sixtieth year of age, the strength of the muscles decreases steadily by approximately 1–2% per year [9].

It has been proven that rehabilitation immediately after labour can reduce the incidence and the severity of the early onset AI [10].

✉ Gregor Norčič
gregor.norcic@kclj.si

[1] Division of Gynaecology and Obstetrics, University Medical Centre Ljubljana, Šlajmerjeva 3, 1000 Ljubljana, Slovenia

[2] Department of Abdominal Surgery, University Medical Centre Ljubljana, Zaloška cesta 7, 1000 Ljubljana, Slovenia

The aim of the study was to identify characteristics of primiparous pregnant women that are associated with a higher risk for AI after labour.

Methods

The retrospective case control study was conducted at the Division of Gynaecology and Obstetrics, University Medical Centre, Ljubljana, Slovenia. This study followed the institutional ethic requirements and was evaluated and approved by the Republic of Slovenia National Medical Ethics Committee (NMEC). Informed consent was signed by all participants in the study. The study took place from January 2010 to December 2015. We retrospectively analysed the data of 133 Caucasian primiparous women without AI before labour. The women came to the authors gynaecological office successively after delivery for various reasons. They were divided into two groups according to the ability of stool and gas continence after labour, using the Wexner scoring system (Cleveland Clinic, FL, USA). The women positive for AI had Wexner score more than 1. The selected obstetric characteristics (risk factors) for AI were collected from the medical records; those were maternal (age at labour, maternal height, weight, BMI), neonatal (length, weight, and head circumference) and labour (pregnancy duration, labour duration, episiotomy, stimulation with oxytocin, vacuum and OASIS) risk factors.

All the women in our hospital are routinely digitally checked immediately after the labour for OASIS. If the injury had been recognised, surgical repair was performed. In case of the external or internal anal sphincter injury, overlap suture and end to end suture were performed respectively.

For the study 6 weeks after the labour, the women were examined with a three-dimensional (3D) endo anal ultrasound (EUS) for confirmation or exclusion of OASIS using a 360°, multi frequency (6–16 MHz) BK 2050 probe (BK Medical, Sandhoften, Denmark).

Statistical analysis was carried out with the SPSS version 22.0 (IBM Corp., Armonk, NY, USA). A univariate and multiple logistic regression was used to study the correlation between the characteristics of the mother, the neonatus and the labour with AI. The statistical significance was set at $p < 0.05$. For statistically significant variables, cut-off values were calculated as

Table 1 Characteristics of primiparous women and neonatus according to anal incontinence (AI) described with univariate and multiple logistic regression (l. r)

	AI		Univariate l. r.		Multiple l. r.	
	No ($N = 103$)	Yes ($N = 30$)	RO (95% IZ)	*P*	RO (95% IZ)	*P*
Characteristics of primiparous women						
Age	30.7 (4.3)	31.6 (3)	1.29 (0.77; 2.15)	0.326	1.87 (0.92; 3.78)	0.083
Height	167.7 (6.4)	166 (4.8)	0.95 (0.89; 1.02)	0.189		
Weight	76 (12.7)	75.2 (11.5)	0.99 (0.96; 1.03)	0.77		
BMI	27 (4)	27.3 (4.1)	1.02 (0.92; 1.13)	0.71	0.95 (0.83; 1.10)	0.524
Characteristics of the labour						
Length of the pregnancy	39.7 (1.5)	39.6 (1.4)	0.94 (0.71; 1.24)	0.669	0.86 (0.01; 1.24)	0.428
Length of the labour	5.1 (2.3)	5.4 (2.8)	1.05 (0.89; 1.24)	0.544	0.98 (0.73; 1.31)	0.893
Episiotomy						
No	41 (39.8)	9 (30)				
Yes	62 (60.2)	21 (70)	1.54 (0.64; 3.7)	0.331	1.04 (0.34; 3.16)	0.943
Stimulation of the labour with oxytocin						
No	35 (34.7)	4 (13.8)				
Yes	66 (65.3)	25 (86.2)	3.31 (1.07; 10.28)	*0.038*	8.74 (1.03; 73.94)	*0.047*
OASIS						
No	47 (45.6)	8 (26.7)				
Yes	56 (54.4)	22 (73.3)	2.31 (0.94; 5.66)	0.068	1.91 (0.53; 6.88)	0.324
Characteristics of the neonatus						
Circumference of the head	34.9 (1.5)	35.6 (1.2)	1.36 (1.03; 1.78)	*0.03*	1.19 (0.76; 1.85)	0.449
Birthweight	3443 (451)	3531 (365)	1.05 (0.95; 1.15)	0.33	1.06 (0.90; 1.25)	0.497

P values < 0.05 were considered significant

suggested by Fayyad and Irani and described in our previous work [11, 12].

Results

The study group consisted of 30 women with AI and with a Wexner score more than 1. Twelve of the studied women had a Wexner score less than 3 (all of them with gas incontinence), 14 of them less than 5, (all of them with faecal incontinence) and 4 of them more than 5 (all of them with faecal incontinence). A control group consisted of 103 women without AI (Wexner score 0). The characteristics of the groups are described in Table 1.

Women with AI had neonates with larger circumferences of the head and had more often stimulation of labour with oxytocin than women without AI. For significant numerical parameter-neonatal head circumference, the cut-off value of 34 cm was calculated. Information gain for the parameter was 0.107. Below the cut-off value, the number of incontinent and continent patients were 1 (2%) and 42 (98%), respectively. At the cut-off value or more, the numbers of incontinent and continent patients were 29 (33%) and 60 (67%), respectively.

Discussion

The results of our study have shown that stimulation of labour with oxytocin (RO [95% CI] 3.31 [1.07, 10.28]) and neonatal head circumference (RO [95% CI] 1.36 [1.03, 1.78]) are both associated with AI after labour.

The head in the main insert enlarges the pathway at labour, which explains the statistically significant association ($p < 0.05$) of the larger neonatal head circumference with AI, as reported in study by Eason et al. [1]. The calculated cut-off value for neonatal head circumference 34 cm or more relates to 33% probability of AI. Under the cut-off value, the probability of AI is only 2%.

Multiple logistic regression has shown that the key factor for AI, while controlling the remaining independent variables in the model, is stimulated labour with oxytocin.

The incidence of AI was not significantly different between the women with and without OASIS. In our results, the difference was close to statistical significance ($p = 0.068$).

The AI can result from stimulation with oxytocin [4, 12] and neonatal head can influence [1]. The possible mechanisms behind these risk factors are more extensive stretching of the labour canal resulting in compression or stretching injury of pudendal nerve as well as OASIS.

All the other characteristics: maternal (age at labour, maternal height, weight, BMI), neonatal (length, weight) and labour (pregnancy duration, labour duration, episiotomy, vacuum) showed no correlation with AI.

All the women with AI or/and OASIS were referred to early rehabilitation, as suggested by Mathé et al. [10]. Only one patient included in our study had problems with AI on the check-up after 6 months.

Conclusion

Although most of the AI cases after labour resolve within 6 months, we observed that even shorter periods of AI can negatively affect the quality of life of a young mother.

Based on the results of our study, we conclude that the women who had stimulation of labour with oxytocin, and the women whose neonatal head circumferences were 34 cm or more, were significantly more at risk to develop AI and should be closely monitored in that regard after labour.

Because AI is still underreported due to social reasons, it is of great importance to identify risk factors leading to its development since it has been proven that early rehabilitation performed immediately after labour can reduce the AI later in life and possibly prevent it.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no competing interests.

Statement on human rights All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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