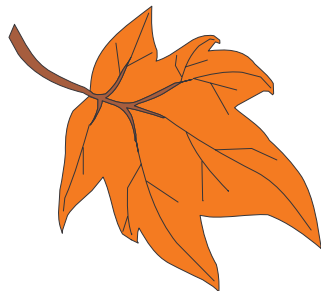




LSR:s sektion för
Kvinnors hälsa



Höstutskick 2009

Innehåll:

Ordföranden har ordet

Kurs i Oslo

Kommande riktlinjearbete

Utlysning av stipendium

Hej alla medlemmar i Kvinnors Hälsa.

Så har det blivit höst igen, den kommer alltid så plötsligt och det är åter dags för ett nytt utskick från sektionen.

Efter mycket diskuterande på vårt senaste styrelsemöte beslöt vi att alla utskick i fortsättningen kommer att ske elektroniskt. Detta är alltså sista gången som några medlemmar får utskicket i pappersform. Ni som har ändrad eller ny e-postadresser ombeds meddela detta till msc@akademikerservice.se. Vi uppmanar dem som ej har någon e-postadress att försöka ordna en sådan. Det sparar både tid och pengar för sektionen.

LSRs Sjukgymnastdagar gick ju av stapeln för några veckor sedan och var välbesökt- 1600 besökare! I år arrangerades SG-dagarna samtidigt med mässan Ett Bra Liv. På den mässan var det många sjukgymnaster som deltog med föredrag från olika områden. Från vårt intresseområde talade sjukgymnasten Kerstin Eliasson över ämnet – Läcker du? Du kan göra något åt det- . Sektionen Kvinnors Hälsa bemannade LSRs monter under två dagar där vi besvarade frågor som rör vår sektion.

På sjukgymnastdagarna höll Monika Fagevik-Olsén ett föredrag ” Utvärdering av modifierade test vid graviditetsrelaterad bäckensmärta”. En studie om självtester. Resultat visar att gravida kvinnor kan utföra självtest såsom modifierad 4P-test och bäckenlyft som en första indikation på smärta i bakre bäckenet.

Christina Olsson talade över ämnet ” Faktorer associerade med rädsla – undvikande tankar vid ländrygg/bäckensmärta under graviditet”.

Det har kommit en ny bok -Obstetrik - som vi kan rekommendera. En heltäckande bok som inte bara berör traditionella aspekter på ämnet utan har t.ex. kapitel om etik, psykologi, livsstilsfaktorer, omvårdnad under graviditet mm. Gå gärna in på www.studentlitteratur.se/obstetrik och läs mer.

Nu är det tid att söka stipendium från sektionen. Se separat skrivelse i detta utskick. Sista ansökningsdag är 091115.

Vi ser fram emot vår kurs –Graviditetsrelaterade bäckensmärta, klassifikation och behandling – med Britt Stuge och Annelie Gutke nu i oktober. Intresset har varit stort och tyvärr har alla ej kunnat beredas plats.

Ni är väl inne och tittar på vår hemsida på www.lsr.se ibland, under sektioner. Där finns våra namn och e-postadresser i styrelsen så att ni kan ställa frågor om

allt som rör vårt område. Vad gäller mig själv så är jag inte ”uppdaterad” ännu. Jag har gått i pension och har således ingen arbetsplats men väl en ny e-postadress eva.dahmen.janson@gmail.com.

Vi välkomnar Sanna Sawallies som är ny i styrelsen. Hon arbetar på Frölunda Specialistsjukhus och är specialiserad inom inkontinensområdet.

Vad gäller kommande kurser, fortbildning inom vår sektion är vi på planeringsstadiet. Ni får gärna höra av er om ni har några önskemål. Har ni gjort intressanta studier eller läst om några tar vi gärna del av det.

Om någon är intresserad av att läsa till uroterapeut beräknas en ny kurs starta våren-2011.

Vårterminen 2010 startar en fristående kurs – Inkontinens vid tarm och blåstömningsrubbnings samt tekniska hjälpmedel, 7,5 hp. En avgiftsfri kurs. Båda dessa kurser anordnas av Göteborgs Universitet.

På återhörande- ha en trevlig höst

Göteborg 091008

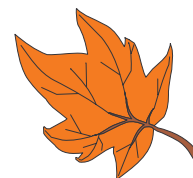
Eva Dahmén-Janson
Ordförande i sektionen Kvinnors Hälsa

Bra kurs i Oslo i juni

090623 arrangerade European Council of Sport Science ECSS en mycket prisvärd heldagskonferens (300Nkr) om träning för gravida. Den kallades "Exercise and pregnancy" och vi har gjort reklam för denna via sektionens hemsida. Ca 200 personer kom till Idrottshögskolan i Sognsvann utanför Oslo för att lyssna på internationella föreläsare som presenterade intressanta och kliniskt användbara fakta.

Föreläsare var Michelle Mottola, sjukgymnast och forskare från Canada, Wenche Nystad och Kari Bö sjukgymnaster och forskare från Norge och Wendy Brown sjukgymnast och forskare från Australien. Föreläsningarna handlade om fysiologiska förändringar under graviditet, potentiella risker med träning och med inaktivitet och träning vid rectusdiastas. Aktivitetsrestriktioner eller sängläge för gravida kvinnor med riskgraviditeter och de följer detta får samt hur ett enkelt träningsprogram för dessa kvinnor fungerat presenterades. "Fetal programmering" och risker för framtida övervikt och kroniska sjukdomar beroende på hur du har det som foster var en annan intressant programpunkt. Mycket av det som Michelle Mottola pratade om finns att hitta på nätet genom att googla på namnet och powerpointpresentation.

Karin Torell



Riktlinjearbete kring graviditetsrelaterade bäckenbesvär

Det pågår för närvarande flera arbeten med att få fram nationella riktlinjer inom olika ämnesområden. Ett område som vi känner är viktiga att skriva riktlinjer kring är graviditetsrelaterad bäckensmärta. Hittills är vi 4 personer som vill arbeta med att skriva dessa riktlinjer men vi behöver nu fler medarbetare. Skulle detta vara något för dig? Vi kommer att följa LSR:s handbok för riktlinjer och eftersom vi har europeiska riktlinjer och diverse artiklar att basera dem på hoppas vi att arbetet inte skall bli alltför långdraget. Är du intresserad och vill veta mer, kontakta mig på monika.fagevik-olsen@vgregion.se
/Monika F Olsén

LSR:s sektion för Kvinnors hälsa utlyser stipendium på 15.000 kr

Stipendierna avser fortbildning, utvecklingsarbete eller forskning inom som sektionens ämnesområden. Stipendierna kan tilldelas en medlem eller delas mellan flera sökande och kan sökas för:

Studieresor, studiebesök eller kongressbesök
Vetenskaplig och/eller klinisk utbildning
Kostnader i samband med forsknings- och utvecklingsarbete

Stipendierna kan inte sökas för förlorad arbetsförtjänst.

Stipendiemottagaren är skyldig att till sektionen inkomma med en kort skriftlig rapport senast ett år efter erhållet stipendium. Stipendiet utkvitteras i samband med genomförandet av aktiviteten. Om aktiviteten ej påbörjas inom ett år efter det att stipendiaterna tillkännagivits återgår pengarna till sektionen.

Ansökan formuleras fritt. Vid studiebesök, - resor, kongressbesök eller vetenskaplig/klinisk utbildning medsändes tydligt ändamål (gärna med hänvisning till hemsida), kostnads kalkyl samt i de fall det är aktuellt, ett abstrakt. Vid ansökningar rörande kostnader för forsknings- och utvecklingsarbeten medsändes projektplan (max 3 sidor), tidsplan, kostnads kalkyl samt, i aktuella fall, beslut från etikprövning. Till alla ansökningar skall vidare anges om den sökande har sökt/erhållet pengar för samma ändamål från annat håll. Dessutom skall meritförteckning (Max 2 sidor) inklusive tidigare erfarenhet inom ämnesområdet medsändas. Ofullständiga ansökningar kommer ej att beaktas.

Stipendiemottagaren utses av styrelsen, och beslutet kan inte överklagas.

Endast sektionens medlemmar är behöriga att söka stipendierna men det spelar ingen roll om du när nyutbildad /ny i sektionen eller om du är medlem sedan länge. Alla medlemmar har möjlighet att erhålla stipendiet.

Din ansökan skall vara oss tillhanda senast 091115 november. Ansökan skickas i ett original och 7 kopior till: LSR:s sektion för Kvinnors Hälsa, Eva Dahmén Jansson, Eneliden 13, 43364 SÄVEDALEN eller mailas til eva.dahmen.janson@gmail.com. Mailas ansökan in skall även en påskriften ansökan (utan bilagor) skicka per post till ovanstående adress. Vid frågor kontakta Monika F Olsén på monika.fagevik-olsen@vgregion.se

Välkommen med din ansökan!



Natural progression of anal incontinence after childbirth

Johan Nordenstam · Daniel Altman · Sophia Brismar ·
Jan Zetterström

Received: 15 September 2008 / Accepted: 21 April 2009 / Published online: 21 May 2009
© The International Urogynecological Association 2009

Abstract

Introduction and hypothesis The aim of work is to study the natural progression of anal incontinence (AI) in women 10 years after their first delivery and to identify risk factors associated with persistent AI.

Methods A prospective cohort study of 304 primiparous women with singleton, cephalic delivery giving vaginal childbirth in 1995. Questionnaires distributed and collected at delivery, 9 months, 5 years and 10 years after, assessing anorectal symptoms, subsequent treatment, and obstetrical events.

Results Women, 246 of 304, answered all questionnaires (81%). Thirty-five of 246 (14%) had a sphincter tear at the first delivery. One hundred ninety-six of 246 (80%) women

had additional vaginal deliveries and no caesarean sections. The prevalence of AI at 10 years after the first delivery was 57% in women with a sphincter tear and 28% in women, a nonsignificant increase compared to the 5-year follow-up. Women who sustained a sphincter tear at the first delivery had an increased risk of severe AI (RR 3.9, 95% CI 1.3–11.8). Neither age, nor subsequent deliveries added to the risk. Severe AI at baseline and 5 years after delivery were independently strong predictors of severe AI at 10 years (RR 12.6, CI 3.3–48.3, and RR 8.3, CI 3.9–17.8, respectively).

Conclusion Persistent anal incontinence 10 years after the first parturition is frequent and sometimes severe, especially if vaginal delivery was complicated by an anal sphincter disruption.

J. Nordenstam
Department of Surgery, Department of Clinical Sciences,
Karolinska Institutet Danderyd Hospital,
Stockholm, Sweden

J. Nordenstam
Department of Surgery, University of Minnesota,
Minneapolis, MN, USA

D. Altman · S. Brismar · J. Zetterström
Division of Obstetrics and Gynecology,
Department of Clinical Sciences,
Karolinska Institutet Danderyd Hospital,
Stockholm, Sweden

D. Altman
Department of Medical Epidemiology and Biostatistics,
Karolinska Institutet,
Stockholm, Sweden

J. Zetterström (✉)
Department of Obstetrics and Gynaecology, Danderyd Hospital,
S-182 88 Stockholm, Sweden
e-mail: jan.zetterstrom@ki.se

Keywords Anal incontinence · Childbirth · Progression

Introduction

The prevalence of anal incontinence range between 24% and 44% in population-based studies [1–3], occurring in all age strata of the adult female population. Anal incontinence is often associated with adverse effects on quality of life, with wide implications on everyday function including social interactions, personal hygiene, sexuality, and self-esteem [4–6].

Identified risk factors for anal incontinence in a general population include ageing, vaginal childbirth, pelvic surgery, as well as, neurological and degenerative disorders [7–10]. Vaginal childbirth is associated with anal incontinence by trauma to the pelvic floor, which may give rise to either a sphincter laceration, injury to the pudendal nerves, or both. Anal sphincter lacerations can be evident,

unrecognized, or occult and occurs in up to 25% of primiparous women [11]. Transient pudendal nerve affliction has been demonstrated after veritably all vaginal deliveries and persists in one third [12, 13].

About half of the women having had primary repair of anal sphincter lacerations report remaining symptoms of flatus or stool incontinence at short-term evaluations [14, 15]. However, the natural long-term history of anal incontinence after childbirth, and the interaction with potential risk factors, remains largely unknown. We have previously reported on the occurrence of anal incontinence 5 years after vaginal delivery [16] and now present longitudinal data with the aim of assessing the natural progression of anal incontinence 10 years after the first vaginal delivery.

Materials and methods

During a 10-week inclusion period starting in April 1995, 440 primiparous women were delivered at the Department of Obstetrics and Gynecology, Danderyd Hospital, Stockholm, Sweden. We excluded from the study patients scheduled for an elective cesarean section ($n=65$), women with inadequate knowledge of the Swedish language ($n=18$), duplex pregnancies ($n=8$), or primarily delivery by acute cesarean section ($n=45$). Adhering to the inclusion criteria, 349 women were eligible for participation. Women having had a subsequent cesarean section were excluded from that point in time.

Baseline data were collected while the patient was still in the hospital within 3 days of the index delivery, and follow-up was performed at 9 months, 5 years, and 10 years after first delivery. All patients received an identical self administered questionnaire at baseline and by postal mail at the time of follow-up. Prevalence of anal incontinence was determined using a bowel function questionnaire recommended by the Swedish Society of Colorectal Surgeons [17], and has been proven valid, reliable, sensitive to change, easily comprehensible, and simple to use in previous studies [18, 19]. The three questionnaire items specific for anal incontinence included: “Do you experience involuntary loss of intestinal gas?”; “Do you experience involuntary loss of stools?”; “Do you experience leakage of fluid around the anal opening?”. The questionnaire utilizes ordinal response alternatives to categorize frequency of symptoms as: no, less than or once per week; more than once per week; and daily. Obstetrical data were also prospectively collected from patient charts and cross-checked with obstetrical events reported in the questionnaires. Demographic characteristics were registered in a separate protocol using the self reported questionnaire. Responding to the questionnaire was considered informed consent to participate in the study.

Anal incontinence may include both unintentional loss of flatus and feces, whereas fecal incontinence specifically refers to the involuntary loss of solid or liquid stool. In the present study, subjects, reporting involuntary loss of flatus >1/week or daily, or loss of feces (with any frequency), were considered having severe anal incontinence, whereas involuntary loss of flatus \leq 1/week was considered as mild incontinence. Definitions of sphincter lacerations and perineal tears conform to the standards set by the World Health Organization (International Classification of Diseases 9 and 10, Geneva, Switzerland, 1992). Diagnosis of obstetrical tears at first delivery, and at subsequent deliveries, was performed immediately after parturition through clinical examination by the attending midwife (grades I–II lacerations) or the obstetrician on call (grade III–IV lacerations).

All data analyses were performed using STATISTICA® software (Statsoft, Tulsa, OK, USA). For intraindividual comparisons on symptom prevalence (ordinal data) at follow-up when compared to baseline, we used Wilcoxon signed rank test, and for comparisons between the different subgroups at the various times of assessment, we used Mann–Whitney U test. To evaluate the interaction between covariates and our primary outcome variable, we used a stepwise multivariate logistic regression model. P values <0.05 were considered significant. All subjects gave their informed consent to participate, and the study was approved by the Regional Research Ethics Board at Karolinska Institutet.

Results

Following the first vaginal delivery, 304 out of 309 primiparous eligible women entered the study (98%), and at the 10 year follow-up, 246 subjects (81%) agreed to participate. Thirty-five of the 246 women (14%) had a sphincter tear (partial or total, third or fourth degree) at their index delivery. Thirty-five (14%) of the 246 had no subsequent children, while 196 women (80%) reported only having had vaginal deliveries (Table 1). Eleven subjects were excluded from analysis due to cesarean deliveries prior to the 5 year follow-up, and another two subjects were excluded due to cesarean deliveries prior to the 10 year follow-up. Thus, 231 subjects with vaginal deliveries only were eligible for the final analysis.

Prior to delivery, 18 (7%) women reported some degree of anal incontinence compared to 62 women (27%) at 9 months, 65 women (33%) at 5 years, and 74 women (32%) at 10 years follow-up. There was a significant increase in the overall prevalence of severe anal incontinence at 10 years follow-up compared to the index delivery ($p<0.001$; Table 2). Women with a sphincter laceration at

Table 1 Obstetrical data in 246 women

	No sphincter tear (<i>n</i> =211)	Sphincter tear (<i>n</i> =35)	<i>p</i> Value
Age at index delivery (years±SD)	29±4	31±4	0.18
Gestational age (days±SD)	279±11	286±8	0.005
Maternal weight at delivery (kg±SD)	77±11	73±8	0.04
First stage of labor (hours±SD)	6.5±4.7	9.0±4.6	0.005
Second stage of labour (hours±SD)	1.35±1.1	1.6±1.4	0.20
Upright delivery position ^a <i>n</i> (%)	116 (55)	13 (37)	0.09
Episiotomy <i>n</i> (%)	8 (4)	4 (11)	0.47
External fundal pressure <i>n</i> (%)	61 (29)	19 (54)	0.01
Instrumental delivery ^b <i>n</i> (%)	19 (9)	8 (23)	0.19
Fetal birth weight (g±SD)	3,498±483	3,642±398	0.10
Obstetrical tears (<i>n</i>)			
No tear	27	–	
1st degree	68	–	
2nd degree	116	–	
3rd degree	–	34	
4th degree	–	1	
No subsequent delivery <i>n</i> (%)	31 (15)	4 (11)	0.42
Subsequent vaginal deliveries <i>n</i> (%)			
One	122 (58) ^c	22 (63)	0.36
Two	46 (22)	5 (14)	0.22
Three	5 (2)	0	0.46
Subsequent foetus >4000 g	31 (24)	6 (24)	1.0
Subsequent instrumental delivery	3 (2)	0	0.86
Subsequent caesarean deliveries <i>n</i> (%)			
One	10 (5) ^d	2 (6) ^e	0.53
Two	0	3 (9)	0.003

^a Kneeling or standing

^b All were vacuum extractions except one, which did not succeed and was delivered with forceps

^c One of these had a subsequent sphincter tear

^d Three of these also had one subsequent vaginal delivery

^e One of these also had one subsequent vaginal delivery

index delivery also had a higher frequency ($p=0.01$) of severe anal incontinence at 10 years follow-up compared to women without a sphincter laceration at index delivery (Table 2).

The overall prevalence of anal incontinence, 10 years after index delivery, was statistically unchanged, compared to 5 years after delivery, although there was a trend toward a decrease in the severity of anal incontinence. Thirteen of 21 women (62%) who had reported severe anal incontinence at 9 months did not report severe anal incontinence at 10 years, and 17 out of 31 women (56%) who had reported severe anal incontinence at 5 years after index delivery did not report this at 10 years. Twenty-four of 199 women (12%) who reported none or infrequent anal incontinence at 9 months after delivery reported frequent anal incontinence at 10 years and 15 out of 167 (9%) who reported none or infrequent anal incontinence at 5 years after delivery reported severe anal incontinence at 10 years after delivery.

Women who sustained a sphincter tear at the index delivery had a comparable number of subsequent vaginal deliveries and subsequent caesarean deliveries as women without a sphincter tear (Table 1). Anal incontinence was

more frequent at follow-up in women with sphincter tear who had subsequent vaginal deliveries (Table 3). At 10 years, 16 of 26 (62%) women with sphincter tear and subsequent vaginal delivery reported some degree of anal incontinence compared to 51 out of 169 (30%) of women without sphincter tear ($p=0.01$). There was no difference in anal incontinence prevalence at 10 year follow-up in women without subsequent delivery regardless of earlier sphincter tear (Table 3).

A grade III–IV anal sphincter laceration was associated with an increased risk of severe anal incontinence (RR 3.9, 95% CI 1.3–11.8). Severe anal incontinence prior to the first delivery was independently associated with severe anal incontinence at 10 years (RR 12.6, 95% CI 2.3–70.4). Symptoms of severe anal incontinence at 5 years after index delivery, increased the risk for severe anal incontinence at 10 years (RR 16.1, CI 4.3–59.8), regardless of diagnosis of a sphincter injury.

Sphincter injury (RR 2.9, 95% CI 1.1–7.7) and a second stage of labor longer than 2 h (RR 3.2, 95% CI 1.2–9.2) were associated with anal incontinence at any frequency at 10 years follow-up and were independent of instrumental or

Table 2 Prevalence of anal incontinence compared to index delivery

	No sphincter tear						
	Index <i>n</i> =207	9 months <i>n</i> =199	<i>P</i> value	5 years <i>n</i> =170	<i>P</i> value	10 years <i>n</i> =200	<i>P</i> value
No incontinence	192 (93)	153 (77)	0.004	121 (71) ^a	<0.001	143 (71) ^a	<0.001
Involuntary flatus							
≤1/week	4 (1.9)	29 (15)	<0.001	31 (18)	<0.001	36 (18)	<0.001
>1/week	5 (2.4)	14 (7.0)	0.03	14 (8.2)	0.01	14 (7.0)	0.03
Daily	5 (2.4)	3 (1.5)	0.5	3 (1.8)	0.7	5 (2.5)	1.0
Fecal incontinence							
≤1/week	1 (0.5)	1 (0.5)	1.0	6 (3.5)	0.03	8 (4.0)	0.02
>1/week	0	0	–	0	–	1 (0.5)	1.0
Daily	0	0	–	0	–	0	–
Anal incontinence	15 (7.3)	46 (23) ^a	<0.001	49 (29) ^a	<0.001	57 (29) ^a	<0.001
Severe anal incontinence	11 (5.3)	17 (8.5)	0.3	20 (12)	0.02	25 (13) ^a	0.01
Sphincter tear							
	Index <i>n</i> =35	9 months <i>n</i> =34	<i>P</i> value	5 years <i>n</i> =29	<i>P</i> value	10 years <i>n</i> =30	<i>P</i> value
No incontinence	32 (91)	18 (53)	<0.001	13 (45) ^a	<0.001	13 (43) ^a	<0.001
Involuntary flatus							
≤1/week	3 (8.6)	12 (35) ^a	0.007	7 (24) ^a	0.09	11 (37) ^a	0.006
>1/week	0	4 (12)	0.04	7 (24) ^a	0.002	5 (17) ^a	0.001
Daily	0	0	–	2 (6.9)	0.1	1 (3.3)	0.1
Fecal incontinence							
≤1/week	1 (2.9)	0	0.3	4 (14)	0.1	4 (13)	0.1
>1/week	0	0	–	0	–	0	–
Daily	0	0	–	0	–	0	–
Anal incontinence	3 (8.6)	16 (47) ^a	<0.001	16 (55) ^a	<0.001	17 (57) ^a	<0.001
Severe anal incontinence	1 (2.9)	4 (12)	0.2	11 (38) ^{a,b}	<0.001	9 (30) ^a	0.003

Data are presented as number of women (%)

Anal incontinence is defined as any degree of symptoms, whereas severe anal incontinence was defined as having symptoms loss of flatus >1/week or daily, or loss of feces at any frequency

upright delivery. We found no other predictors of anal incontinence at multivariate analysis including the following variates: age, subsequent deliveries, post-term pregnancy, instrumental delivery, upright delivery, or macrosomia (data available at request).

Discussion

Anal sphincter laceration at childbirth, with or without subsequent deliveries, is strongly associated with persistent long-term anal incontinence. Symptoms do, however, not necessarily deteriorate over time, as earlier medium- to long-term prospective studies have suggested [20–22].

Despite the fact that childbirth is a widely recognized risk factor for anal incontinence, little is known on the

natural progression of symptoms after vaginal birth [23]. In order to capture the subjective experience of symptoms associated with a disrupted anal sphincter complex, we chose to observe a group of nulliparous women giving birth to their first child in 1995. Repeat symptom assessments have made it possible to prospectively evaluate the development of anal incontinence during a 10-year observational period. Primiparous women have a low prevalence of anal incontinence prior to delivery, but have a higher risk of sustaining a sphincter tear compared to multiparous women [1]. Our study confirms that the risk of sphincter laceration is greatest at the first delivery and rare at subsequent deliveries.

Consistent with MacArthur et al. [21], we found that some women reported resolution of symptoms, whereas

Table 3 Anal incontinence and subsequent vaginal delivery

Symptoms	No sphincter tear		Sphincter tear	
	No subsequent delivery	Subsequent delivery	No subsequent delivery	Subsequent delivery
Anal incontinence				
Index	3/37 (8)	12/170 (7)	0/8	3/27 (11)
9 months	8/35 (23)	38/164 (23)	2/8 (25)	14/26 (54) ^a
5 years	6/24 (25)	43/146 (29)	0/4	16/25 (64) ^{a,b}
10 years	6/31 (19)	51/169 (30)	1/4 (25)	16/26 (62) ^a
Severe anal incontinence				
Index	2/37 (5)	9/170 (5)	0/8	1/27 (4)
9 months	3/35 (9)	14/164 (9)	0/8	4/26 (15)
5 years	2/24 (8)	18/146 (12)	0/4	11/25 (44) ^a
10 years	5/31 (16)	20/169 (12)	1/4 (25)	8/26 (31) ^c

Data are presented as number of women *n/w* (%)

^aSignificant difference from no sphincter tear with subsequent delivery

^bSignificant difference from sphincter tear without subsequent delivery

^c $p=0.12$ compared to no sphincter tear with subsequent delivery

others reported de novo onset or recurrence after a pause or remission. It is plausible that physiotherapy initiated after childbirth temporarily improved anal sphincter function [24–26]. Since we did not use any objective measurement of anal sphincter injury, it is also possible that some cases of anal sphincter disruption were undetected at delivery and thus misclassified. This may have given rise to the new onset of anal incontinence symptoms experienced by a few women at long-term follow-up, despite any known risk factors such as subsequent childbirth, pelvic surgery, neurological, or gastrointestinal disease [27].

Surprisingly, the majority of patients with severe symptoms at 5 years follow-up described a reduction of anal incontinence at the end of our observational period, despite the fact that none of the women with anal sphincter laceration and severe symptoms reported that they had received any subsequent therapy. It is possible that these women over time have changed their attitudes, as well as lifestyle and dietary habits as a result of their condition and therefore answer questions about their continence more conservatively. Another hypothesis could be that there is a slow neural regeneration or adaptation over a longer period of time. It has been suggested that neurological injury may be cumulative over time, notably after repeat vaginal delivery [28]. However, in our presumably premenopausal study population, women with a sphincter tear at index delivery generally improved between 5 and 10 years after index delivery. This effect was emphasized if they did not undergo any subsequent vaginal deliveries. In experimental studies, estrogen has been shown to enhance pudendal nerve regeneration [29, 30]. Estrogen deficiency may

counteract such a beneficial process, explaining the increased prevalence of anal incontinence in postmenopausal women [10].

In concurrence with previous short-term studies [3, 16], we found that severe anal incontinence prior to parturition, obstetrical sphincter injury, and symptoms of anal incontinence that does not resolve within 5 years after first delivery, was predictive of persistent anal incontinence. This is contrary to the findings of MacArthur et al. [21], who did not find any association between sphincter laceration and fecal incontinence at 6 years after delivery. In 2005, Damon et al. reported that 50% of women with an ultrasound-verified sphincter laceration at first delivery had anal incontinence at 6 years after delivery, compared with 8% of women without sphincter laceration [22]. Use of transanal ultrasound to define sphincter defects may increase the specificity of the control group, even though the numbers were small. In the present study, we used a clinical definition of sphincter laceration, which may have included occult sphincter damage in the control group and explain the higher prevalence of symptoms in this group.

Strengths of our study include the homogenous cohort of premenopausal women, the long-term prospective follow-up with repeat assessments, and the high response rates. We recognize that assessment by questionnaires can be difficult to quantify due to variation or erroneous interpretation of questions and sometimes answers. We tried to reduce this problem by providing standardized response alternatives. Validated questionnaires were not widely used at the time our study was initiated, but the

questionnaire has shown validity and sensitivity to changes in previous studies [17].

Most women react to a sphincter laceration with concerns about future continence, sexuality, and pregnancies [5, 6]. In addressing women's worry for future deliveries, we found some statistical evidence for an increased overall prevalence of anal incontinence after repeat vaginal deliveries. Furthermore, our data suggest that women with symptoms of anal incontinence prior to the first delivery, those with symptoms of severe anal incontinence at 5 years after index delivery, and women with a previous grade III–IV anal sphincter laceration, may be particularly predisposed to develop anal incontinence. In the absence of objective methods of evaluation and the lack of long-term prevalence data in women who have had subsequent or repeat caesarean sections, caution in forming definitive advice is advised. Further prospective studies are needed to elucidate this issue.

It is likely that an increasing frequency of symptoms causes more bother, but the impact of frequency on quality of life is uncertain. About half of the incontinent women in our study experienced occasions of fecal leakage, or leakage of gas more than weekly, which we considered as severe anal incontinence. Yet, it seems that many women actually experience a decrease of symptoms over a longer period of time.

Our main results are in agreement with a previous long-term study on the prevalence of anal incontinence 10 years after first delivery in which women with an anal sphincter laceration at index delivery had a more severe incontinence score for flatus and liquid stool at 10 years follow-up compared with women without sphincter laceration [20]. The consistency of these long-term studies strengthens the assumption that a thorough evaluation of anal continence function may be used in obstetrical decision making when guiding patients' choice of delivery mode.

Funding The study was supported by hospital-administered clinical research funds.

Conflicts of interest None.

References

- Zetterstrom J, Lopez A, Anzen B, Norman M, Holmstrom BAM (1999) Anal sphincter tears at vaginal delivery: risk factors and clinical outcome of primary repair. *Obstet Gynecol* 94:21–28
- MacArthur C, Glazener CMA, Wilson PD, Herbison GP, Gee H, Lang GD et al (2001) Obstetric practice and faecal incontinence three months after delivery. *BJOG* 108:678–683
- Hall W, McCracken K, Osterweil P, Guise J-M (2003) Frequency and predictors for postpartum fecal incontinence. *Am J Obstet Gynecol* 188:1205–1207
- Damon H, Dumas PFM (2004) Impact of anal incontinence and chronic constipation on quality of life. *Gastroenterol Clin Biol* 28:16–20
- Lewicky C, Valentin C, Saclarides T (2004) Sexual function following sphincteroplasty for women with third- and fourth-degree perineal tears. *Dis Colon Rectum* 47:1650–1654
- Williams A, Lavender T, Richmond DH, Tincello DG (2005) Women's experiences after a third degree obstetric anal sphincter tear: a qualitative study. *Birth* 32:129–136
- Nelson RL (2004) Epidemiology of fecal incontinence. *Gastroenterology* 126:S3–S7
- Lunniss PJ, Gladman MA, Hetzer FH, Williams NS, Scott SM (2004) Risk factors in acquired faecal incontinence. *J R Soc Med* 97:111–116
- Madoff RD, Parker SC, Varma MG, Lowry AC (2004) Faecal incontinence in adults. *Lancet* 364:621–632
- Abramov Y, Sand PK, Botros SM, Gandhi S, Miller J-JR, Nickolov A et al (2005) Risk factors for female anal incontinence: new insight through the Evanston–Northwestern twin sisters study. *Obstet Gynecol* 106:726–732
- Andrews V, Sultan AH, Thakar R, Jones PW (2006) Occult anal sphincter injuries; myth or reality? *BJOG* 113:195–200
- Allen RE, Hosker GL, Smith AR, Warrell DW (1990) Pelvic floor damage and childbirth: a neurophysiological study. *BJOG* 97:770–779
- Sultan AH, Kamm MA, Hudson CN (1994) Pudendal nerve damage during labour: prospective study before and after childbirth. *BJOG* 101:22–28
- Sultan AH, Kamm MA, Hudson CN, Bartram CI (1994) Third degree obstetric anal sphincter tears: risk factors and outcome of primary repair. *BMJ* 308:887–891
- Fitzpatrick M, Fynes M, Cassidy M, Behan M, Connell PR, O'Herlihy C (2000) Prospective study of the influence of parity and operative technique on the outcome of primary anal sphincter repair following obstetrical injury. *Eur J Obstet Gynecol Reprod Biol* 89:159–163
- Pollack J, Nordenstam J, Brismar S, Lopez A, Altman D, Zetterstrom J (2004) Anal incontinence after vaginal delivery: a five-year prospective cohort study. *Obstet Gynecol* 104:1397–1402
- Osterberg A, Graf W, Karlbom U, Pahlman L (1996) Evaluation of a questionnaire in the assessment of patients with faecal incontinence and constipation. *Scand J Gastroenterol*. 31:575–580
- Altman D, Zetterstrom J, Mellgren A, Gustafsson C, Anzen B, Lopez A (2006) A three-year prospective assessment of rectocele repair using porcine xenograft. *Obstet Gynecol* 107:59–65
- Forsgren C, Zetterstrom J, Lopez A, Nordenstam J, Anzen B, Altman D (2007) Effects of hysterectomy on bowel function: a three-year, prospective cohort study. *Dis Colon Rectum* 50:1139–1145
- Fornell EU, Matthiesen L, Sjudahl R, Berg G (2005) Obstetric anal sphincter injury ten years after: subjective and objective long term effects. *BJOG* 112:312–316
- MacArthur C, Glazener C, Lancashire R, Herbison P, Wilson D, Grant A (2005) Faecal incontinence and mode of first and subsequent delivery: a six-year longitudinal study. *BJOG* 112:1075–1082
- Damon H, Bretones S, Henry L, Mellier G, Mion F (2005) Long-term consequences of first vaginal delivery-induced anal sphincter defect. *Dis Colon Rectum* 48:1772–1776
- Rao S (2004) Pathophysiology of adult fecal incontinence. *Gastroenterology* 126:S14–S22
- Wilson PD, Herbison GP (1998) A randomized controlled trial of pelvic floor muscle exercises to treat postnatal urinary

- incontinence. *Int Urogynecol J Pelvic Floor Dysfunct* 9:257–264
25. Glazener CMA, Herbison GP, Wilson PD, MacArthur C, Lang GD, Gee H et al (2001) Conservative management of persistent postnatal urinary and faecal incontinence: randomised controlled trial. *BMJ* 323:593–596
26. Glazener CMA, Herbison GP, MacArthur C, Grant A, Wilson PD (2005) Randomised controlled trial of conservative management of postnatal urinary and faecal incontinence: six year follow up. *BMJ* 330:337–340
27. Oberwalder M, Dinnewitzer A, Khurram B, Thlaer T, Cotman K, Nougeras JJ et al (2004) The association between late-onset fecal incontinence and obstetric anal sphincter defects. *Arch Surg* 139:429–432
28. Snooks SJ, Swash M, Mathers SE, Henry MM (1990) Effect of vaginal delivery on the pelvic floor: a 5-year follow-up. *Br J Surg* 77:1358–1360
29. Kane DD, Kerns JM, Lin DL, Damaser MS (2004) Early structural effects of oestrogen on pudendal nerve regeneration in the rat. *BJU Int* 93:870–878
30. Ahmed Y, Lin DL, Ferguson C, Esparza N, Damaser MS (2006) Effect of estrogen on urethral function and nerve regeneration following pudendal nerve crush in the female rat. *J Urol* 175:1948–1952