Original Article

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Subclinical Anal Sphincter Injuries Following Instrumental Delivery–A Physiological Analysis: A Pilot Study

Internal Medicine Section

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ABSTRACT

Introduction: Obstetric Anal Sphincter Injuries (OASIS) has been reported in up to 25% patients and occult OASIS has been reported in up to 1.2%. Instrumental delivery has been considered a risk factor for OASIS.

Aim: To compare the anal sphincter functions as assessed by Anorectal Manometry (ARM) in asymptomatic patients following instrument delivery with those of patients who underwent Lower Segment Caesarian Section (LSCS) after six months of delivery.

Materials and Methods: Seventeen women who had instrumental delivery and thirteen who underwent elective cesarean section were recruited. Evaluation included a detailed history and physical examination, administration of the Cleveland Clinic Questionnaire and ARM to record the basal pressure, squeeze pressure, anorectal sensation and balloon expulsion time. Categorical variables were compared using the Chi-square test. All calculations were done using the software SPSS 21.0.

Results: We found statistically significant lower basal (34 ± 3.4 vs 60±2.3 mm hg, $p<0.05$) and squeeze pressures (56±4.1 vs 76±5.2 mm hg, $p<0.05$), and higher balloon expulsion time (58±2.9 s vs 19±1.8 seconds, $p<0.05$) in women with instrument delivery compared to LSCS. The rectal sensation was comparable in both the groups.

Conclusion: Persistent subtle anal sphincter dysfunctions are common following instrument delivery compared to LSCS. The role of identifying these and preventing future incontinence in such women needs to be assessed in future studies.

Keywords: Anorectal manometry, Instrumental delivery, Lower segment caesarean section, Obstetric anal sphincter injuries

INTRODUCTION

Damage to anal sphincter not apparent on routine clinical examination following childbirth is referred to as Occult Obstetric Anal Sphincter Injury (OASIS). OASIS has been reported in up to 25% patients and occult OASIS has been reported in up to 1.2% [1]. Instrumental delivery is a known risk factor for OASIS. If untreated OASIS may cause perineal pain, anal incontinence, dyspareunia, fecal urgency and impaired quality of life [2]. Patients with symptoms suggestive of OASIS are routinely evaluated by clinical examination and endo-anal ultrasound.

Most studies [3,4] have compared the anal sphincter functions in symptomatic patients who have undergone vaginal delivery by forceps or vacuum, with caesarian section and have potentially suffered damage to the sphincter. Even though around 30% of patients with OASIS are symptomatic initially, the rest become symptomatic and develop incontinence later [5]. Many studies, who compared Instrument delivery with caesarian section at six weeks post-delivery showed higher dysfunction in the instrument delivery group [6,7]. It may take up to six months for the reversal of anal sphincter and pelvic floor functions following delivery [8].

We compared the anal sphincter functions in primiparous asymptomatic women following instrumental delivery with those of women who had undergone LSCS after six months of delivery, to know the persistent subclinical damage to anal sphincter or pelvic floor by Anorectal Manometry.

MATERIALS AND METHODS

This is a prospective, non-randomized study. The study subjects were drawn from the women who attended the postnatal clinic of the Department of Obstetrics and Gynecology, Kasturba Medical College, Manipal from July to December 2014. The study was approved by the institutional ethical review board (IERB) of Kasturba Hospital Manipal, Karnataka, India (IEC 350/2014). A written informed consent was taken from all the participants.

Asymptomatic primiparous women who either had an instrumental delivery or underwent an elective caesarean, 6 to 18 months prior to the start of the study were identified. As this is a Pilot study, twenty women in each group were recruited and were contacted telephonically. A total of 17 who underwent instrumental delivery and 13 who underwent elective caesarean section agreed to participate in the study. Patients with medical comorbidities and those who had previous pelvic surgery were excluded. All patients underwent a detailed history and physical examination. Anal continence was evaluated clinically using the Cleveland Clinic Incontinence Score which assessed minimal unreported symptoms including passage of flatus, liquid, and solid stools as well as the impact of these symptoms on the quality of life on a scale of 0 to 20 [9].

All patients underwent Anorectal manometry using a 16 channel water perfused system combined with color topography (Trace Preamp Version 4.0, Royal Melbourne Hospital, Australia). After evacuating the bowel following a phosphate enema, the women were placed comfortably in the left lateral position and the manometry catheter was passed in to the rectum 5-7 cm above the anal canal. The mean basal pressure was recorded for about 2 minutes. To record the squeeze pressures the women were asked to squeeze the anal sphincter for 5-10 seconds and then relax. The average of three such recordings was obtained per patient.

The sensory function test was done by incrementally inflating the balloon with 10 ml of water till the patient had the first sensation of the balloon, an initial urge to defecate and an intolerable urgency to defecate. The balloon expulsion test was performed by inflating the balloon with 50 ml of water and the time taken to expel the balloon was recorded. The data were analyzed by the Trace! 1.2. 1 Copyright G.S Hebbard, software.

STATISTICAL ANALYSIS

All calculations were done using the software SPSS 21.0. Categorical variables were compared using the Chi square test and significance was set at a p-value <0.05.

RESULTS

The patients in the two groups were comparable in their demographic details [Table/Fig-1]. Of the 17 women who had undergone instrument delivery, fifteen women were delivered with vacuum assistance while 2 were delivered with outlet forceps. None of the women were found to have OASIS by physical examination or complete perineal tear following the delivery.

The comparison of the Cleveland clinic score and the results of ARM between the groups is shown in [Table/Fig-2]. The Cleveland Clinic Incontinence scores were significantly higher in the instrument delivery group compared to the LSCS group (5±0.1 versus 0 ±0.0 p <0.05). The patients who underwent instrumental delivery had significantly lower basal (34±3.4 versus 60±2.3 mm hg, p <0.05), squeeze pressures (56±4.1 versus 76±5.2 mm hg, p <0.05) and higher balloon expulsion time (58±2.9 versus 19±1.8 seconds, p <0.05) compared to those who had LSCS. The first sensation of balloon, initial urge to defecate and urgency to defecate were similar in both the groups. The normal values for ARM in the Indian population are shown in [Table/Fig-3] [10].

Demographic Parameters	Instrument delivery (n=17) 15 Vacuum 02 Forceps	LSCS (n=13)	p-value
Mean age in years ±SD	26.1±3.1	28.5±2.9	>0.1
Mean gestational age in weeks ±SD	39.0±0.4	38.0±0.3	>0.1
Mean birth weight in kg ±SD	3.2±0.2	3.1±0.1	>0.1

[Table/Fig-1]: Demographic details of the patients studied.

Parameters	Instrument delivery (n=17)	LSCS (n=13)	p-value
Mean Basal Pressure (mm hg) ± SD	34±3.4	60±2.3	<0.05
Mean Squeeze Pressure (mm hg) ± SD	56±4.1	76±5.2	<0.05
Mean Balloon Expulsion time (Seconds) ± SD	58±2.9	19±1.8	<0.05
Test for rectal sensation			
Sensation of Balloon(ml of water) ± SD	56±2.2	60±1.8	>0.1
Urge to defecate (ml of water) ± SD	69±1.8	72±1.5	>0.1
Urgency to defecate (ml of water) ± SD	110±2.1	112±1.9	>0.1
Mean Cleveland clinic score ± SD	5±0.1	0±0.0	<0.05

[Table/Fig-2]: Comparing ARM finding and Cleveland clinic score between the groups.

Parameters	Women	Men
Basal anal pressures (mm Hg)	50 ± 13	63 ± 12
Squeeze Pressures(mm Hg)	100-134	126-200
First sensation of balloon (ml of water)	16-24	11-29
Urge to defecate (ml of water)	85-127	78 -140
Urgency to defecate (ml of water)	156-200	139 -231
Balloon expulsion time	< 3 minutes	< 3 minutes

[Table/Fig-3]: Normal ARM values in Indian population.

DISCUSSION

The risk factors for OASIS include first vaginal delivery, instrumental delivery, prolonged second stage of labour, epidural anesthesia, persistent occipito-posterior position, macrosomia, shoulder dystocia, previous third degree perineal tear, and midline episiotomy [11-13]. Clinical examination is the cornerstone of detecting OASIS. Clinical examination by trained doctor and repeat examination increased its detection rate by 11% to 24% [1].

There is a debate whether these occult injuries are really occult or missed by clinical examination. A study by Andrews V et al., concluded that the occult injuries are missed injuries and can be detected by endoanal ultrasound in most of the cases [1]. In an earlier study by Sultan AH et al., who has done multimodality assessment of sphincter function by using endo-anal ultrasound, manometry, perineometry and motor terminal latency of pudendal nerve, it was found that most but not all injuries were detected by endo-anal ultrasound. Higher motor terminal latency of the pudendal nerve showed higher association for future development of sphincter dysfunction [7]. The relative contribution of neuronal damage and the stretching of anal sphincter without tear in the future development incontinence is not known.

Most studies were done on symptomatic patients who underwent instrument delivery with LSCS [3,4]. Study by Cornes H et al., have shown that it may take approximately six months for the reversal of anal functions post-delivery [8].

We have shown that women who underwent instrument delivery had statistically significant lower basal and squeeze pressures than who underwent LSCS suggesting more physiological damage to sphincter in this group compared to those who underwent LSCS despite the fact that both the groups were asymptomatic after six months. Even though all the patients were asymptomatic, the Cleveland Clinic Incontinence score showed a mean higher score in instrument delivery compared to zero in LSCS, indicating subclinical abnormalities of sphincter function in these groups of patients. We could not compare our data, as studies on asymptomatic women six months post-delivery comparing the above groups are lacking.

The sensory function in both the groups was comparable. Even though there was no statistically significant difference between the groups, both the groups required higher balloon volume to detect its presence in rectum compared to healthy individuals. This could possibly be explained by the fact that the Indian normal reference values were obtained from healthy men and women and not just from puerperal women.

The balloon expulsion test is considered a screening test for defecatory disorders, more specifically for dyssynergic defecation. The balloon expulsion time was significantly higher in women with instrument delivery than LSCS. This might indicate a subtle form of dyssynergia of the defecatory apparatus that is as yet asymptomatic.

The causes of Dyssynergia are multimodal, which involve tone of muscles forming pelvic floor, anal sphincter tone and ligament laxity. Muscles forming the pelvic floor are weakened due to stretching by the gravid uterus and neuronal compression of the pelvic nerves. Constipation and difficulty in evacuation of stool are quite common in pregnancy which extend up to variable time post parturition [14,15]. In a study by Shafik A et al., who compared pelvic floor muscle dysfunction between multiparous women and primiparous women with nulliparous controls, the pelvic floor muscle tone was lesser in multiparous and primiparous than nulliparous controls. Among the former two groups, those with who had prolonged second stage of labour were found to have lower tone than women without second stage prolongation [16]. The lower pelvic floor muscle tone caused higher anal sphincter pressures on stimulated contraction due to abnormal dissipation of transmitted pressures, which cause constipation. The higher balloon expulsion time in instrument delivery compared to those who underwent LSCS in our study is in keeping with this and can be explained by pelvis muscle weakness and neuronal compression. Even though these pelvic floor abnormalities theoretically unmask the incontinence by causing

dyssynergic defecation, being subclinical, the clinical relevance of this finding over time needs to be evaluated further.

LIMITATION

The small number of patients included is an obvious limitation of this pilot study. A larger study with more subjects along with follow up anal sphincter pressure measurement by ARM is needed to understand the long term implications of our findings.

If found, such future abnormalities of continent function and dyssynergic defecation can possibly be prevented or treated with appropriate pelvic floor muscle training.

CONCLUSION

Persistent physiologic subclinical anal sphincter abnormalities are higher following instrument delivery compared to LSCS. This is important to identify and direct these women for pelvic floor muscle training to prevent future incontinence.

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