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Short and long term results of anatomical reconstruction of perineal body and sphincter complex in obstetric anal sphincter injuries

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ABSTRACT

Objective: The effective way to reduce the risk of fecal incontinence (FI) in primary repaired obstetric anal sphincter injuries (OASIS) patients is to accurately detect the injury and provide complete anatomical reconstruction. The aim of the study was to evaluate the short-term and long-term results of OASIS cases that were diagnosed by an experienced surgical team and whose perineal body and anal sphincters were reconstructed separately.

Material and Methods: Sixteen patients that required consultations due to anal sphincter damage during vaginal delivery and underwent anatomical reconstruction due to Grade 3c and Grade 4 sphincter damage between 2007 and 2019 were included in the study. These cases were divided into three groups [Group 1 (≤12 months), Group 2 (12-60 months), Group 3 (≥60 months)] according to the time elapsed until anal manometry, and incontinence questionnaires were conducted in the postoperative period. Recto-anal inhibitory reflex (RAIR), mean resting (IB) and squeezing (SB) pressures were measured by anal manometry. Anal incontinence (AI) and FI rates were determined by questionnaires. Anal sphincter damage repair techniques (overlapping, end-to-end) were determined. These parameters were compared between the three groups.

Results: Mean age of the patients was 27.5 (16-35) years. Six (37.5%) patients had Grade 3c, while 10 (62.5%) had Grade 4 injury. The overall mean RP and SP were 35 (26-56) mmHg and 67 (31-100) mmHg, respectively. Mean RP and SP were 46/67 mmHg, 33.5/75.5 mmHg, and 37.5/70.5 mmHg in Groups 1, 2, and 3 respectively. There was no difference between the three groups in terms of mean RP and SP (p= 0.691, p= 0.673). The rate of AI and FI in all patients were 18.75% and 12.5%, respectively while the rate of severe AI incontinence was 6%. Severe AI was observed in 1 (16.7%) case in Group 1, mild AI was observed in 1 (25%) case in group 2, and in 1 (16.7%) case in Group 3. RAIR was positive in all patients. In Group 1, 5 (83.3%) patients underwent overlapping repair, and in Group 3, 6 (100%) patients underwent end-to-end repair. This difference was statistically significant (p= 0.011).

Conclusion: In vaginal births, evaluation of anal sphincter damage, determination of perineal body structures and anal sphincters separately and performing anatomical reconstruction when needed significantly reduce the rate of FI in the short and long term.

Keywords: Obstetric anal sphincter injuries, anal incontinence, fecal incontinence, perineal body, anal manometry, Wexner score

INTRODUCTION

Anal incontinence (AI) is a clinical manifestation of involuntary solid-liquid stool or gas leakage. Fecal incontinence (FI) is defined as the passive leakage of liquid and solid stool (1). Population-based studies have reported that obstetric anal sphincter injuries (OASIS) are responsible for 50% of AI cases (2). Symptoms of liquid-gas incontinence, fecal urgency, and passive FI can also be observed (3). Obstetric anal sphincter injuries is the most common cause of FI in young women. FI is a clinical condition that deeply affects self-confidence, social behavior, and mental state of patients (2). It is not a common manifestation. In a cohort-based study, it has been reported that Grade 3 OASIS was observed 3.3% and Grade 4 OASIS in 1.1% of vaginal deliveries (4). In another study, the rate of sphincter defect has been found to be 11% in the endoanal ultrasonography (EAUS) of patients with AI. The reason for this high rate is because sphincter damage is not noticed during vaginal delivery (3). One study has compared EAUS performed at the 4th week before delivery and at the 4th month postpartum and found that sphincter damage was missed at a rate of 23% (5).

Primary repair of OASIS injuries is the anatomic repair performed within 24 hours (3). Studies have shown that defect rates after primary repair vary between 16-

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90%. The variation in these rates could be due to the inability to detect sphincter damage or improper repair (6). The most common cause of FI developing after OASIS is reported to be failure in primary repair (7). Effective primary repair has been shown to improve anal sphincter functions (8).

The edematous and hemorrhagic tissue in OASIS makes it difficult to assess the damage. In addition, since this clinical manifestation is rare, delivery teams may not have adequate experience. Therefore, sphincter damage is often difficult to identify. Due to lack of effective reconstruction, high rates of FI may occur in the short and long term (3,4). In our study, we aimed to present the short and long-term results of anatomical reconstructions of the perineal body and sphincter complex applied to patients who developed anal sphincter damage during vaginal delivery.

MATERIAL and METHODS

Study Design

This research was conducted with the approval of the local ethics committee (decision no: 2019/18-14). The records of 19 patients that developed Grade 3c and 4 (9) (Figure 1) anal sphincter injuries during vaginal delivery based on the consultation of the experienced surgical team in a tertiary hospital between January 2007 and December 2019 were reviewed. Two patients were excluded from the study because one patient had missing data and one patient had a second birth. One of the 17 cases could not be reached for follow-up. Fourteen of the 16 patients that were called for examination came to the outpatient clinic for face-to-face assessments. Assessments of two cases that did not come to examination were done over the phone. Thus, a total of 16 patients who met the study criteria were included in the study. Demographic characteristics, clinical information, anal manometry results, and operation notes of these cases were analyzed from the hospital data entry system.

In the operation notes, external anal sphincter (EAS) injury accompanied by internal anal sphincter (IAS) injury was noted as Grade 1-4 (Table 1) (9). It was noted whether levator ani muscle examination was performed and there was laceration. The technique of suturing the anal sphincters (primary, overlapping) and whether or not the colostomy was opened were recorded from the operating notes.The degree of sphincter injury, repair technique, follow-up duration, anal manometry findings, Wexner incontinence score (WIS), and rapid assessment fecal incontinence score (RAFIS) questionnaire results of the patients from these groups were evaluated.

Application of Anal Incontinence Scoring Questionnaire and Determination of Groups

In the interviews, AI scoring questionnaires were applied. It was questioned whether the patients developed postoperative wound dehiscence, bleeding and wound infection. They were asked whether they received treatment support due to AI.

WIS and RAFIS questionnaires were used to evaluate AI and FI. In the WIS questionnaire, the results vary between 0, which is the best result and 20, which is the worst result (Table 2) (10,11). Values above the WIS cut-off of nine are considered as poor quality of life (12). In the RAFIS questionnaire, the results vary between 0, which is very good results and 10, which is very bad (Table 3) (13). This questionnaire was used to measure the patients' emotional state due to leakage.

Anal manometry and questionnaires were performed at the same time. Mean resting pressure (RP) and squeeze pressure (SP) of the cases were determined by anal manometry. The presence

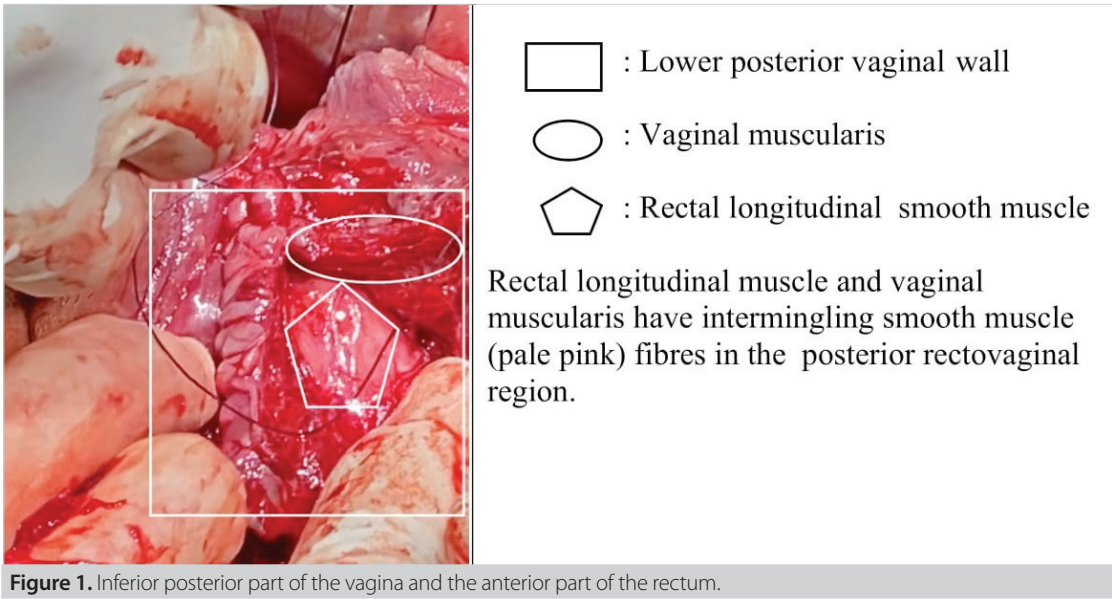

Figure 1. Inferior posterior part of the vagina and the anterior part of the rectum.

Table 1. Grading of the injury in obstetric anal sphincter injuries

First-degree tear: Injury to the perineal skin and/or vaginal mucosa.
Second-degree tear: Injury to the perineum involving perineal muscles but not involving the anal sphincter.
Third-degree tear: Injury to perineum involving the anal sphincter complex:
Grade 3a tear: Less than 50% of external anal sphincter (EAS) thickness torn.
Grade 3b tear: More than 50% of EAS thickness torn.
Grade 3c tear: Both EAS and internal anal sphincter (IAS) torn.
Fourth-degree tear: Injury to the perineum involving the anal sphincter complex (EAS and IAS) and anorectal mucosa.

Table 2. Wexner incontinence scoring system

	Frequency				
Type of incontinence	**Never**	**Rarely**	**Sometimes**	**Usually**	**Always**
Solid	0	1	2	3	4
Liquid	0	1	2	3	4
Gas	0	1	2	3	4
Wears pad	0	1	2	3	4
Lifestyle alteration	0	1	2	3	4

Never: 0; rarely: <1/month; sometimes: <1/week, >1/month; usually: <1/day, >1/week; always: >1/day; 0: Perfect; 20: Complete incontinence.

Table 3. Rapid assessment fecal incontinence score

According to the number of leaks I feel					
Very bad	Bad	Regular	Well	Very well	Excellent
10	8	6	4	2	0

Note down the frequency of leaks	
Several leaks daily	10
Several leaks weekly but not daily	8
Several leaks monthly but there was a week without leaks	6
Leaks from time to time, but there is a full month without leaks	4
Leaks occur rarely	2
No leaks	0

of AI and FI after more than one year following a primary repair was classified as long-term (14). The patients were divided into three groups according to the time elapsed until anal manometry, and incontinence questionnaires were performed after the operation. Cases with a follow-up period of one year or less were classified as Group 1 (n= 6), cases with a follow-up period of 1-5 years were in Group 2 (n= 4), and cases with a follow-up period of 5-12 years were in Group 3 (n= 6).

Rectal Manometer Application Method

Anal manometry was performed with the patient in the left lateral position. The catheter (Latitude Gım 6000A) of a diameter of eight Fr and a length of 60 cm with four pressure sensors arranged in four rows each (360° circumferential). There is a central lumen for inflation of a balloon 5 cm long (capacity of 400 mL). The manometric data are analyzed using the specific MMS-LABORIE analysis software (Laborie Medical Technologies, Canada, USA, and Europe). For each procedure, the parameters including the following were recorded: RP, SP, recto-anal inhibitory reflex (RAIR), and rectal sensitivity.

Determination of Anatomic Localization and Morphological Structures of Damaged Tissues After Oasis and Repair Type

Since OSIS injuries are acute, recognizing the perineal body and internal and external anal sphincter structures was only possible with clinical examination. Striated and smooth anal canal sphincters were determined with different morphological structures in their anatomical localizations. In our study, each of the structures in the damaged area was determined as indicated in the figure and figure descriptions.

The fibromuscular structure that connects the inferior posterior part of the vagina and the anterior part of the rectum is defined as the perineal body (Figure 1). In this structure, there are bulbosupongiosus and superficial transverse perineal muscles, and longitudinal and circular smooth muscles of the rectum. The smooth muscles are morphologically pale pink (Figure 2) (15,16). Each laceration of the lacerated structures in the perineal body was sutured one by one with 2/0 polyglactin. In the anterior anal canal is the EAS, which is composed of striated muscle that surrounds these smooth muscles (pale pink) like a band (Figure 3) (15,16). After the EAS had been determined, if the free muscle bundle was of sufficient length, it was sutured with 2/0

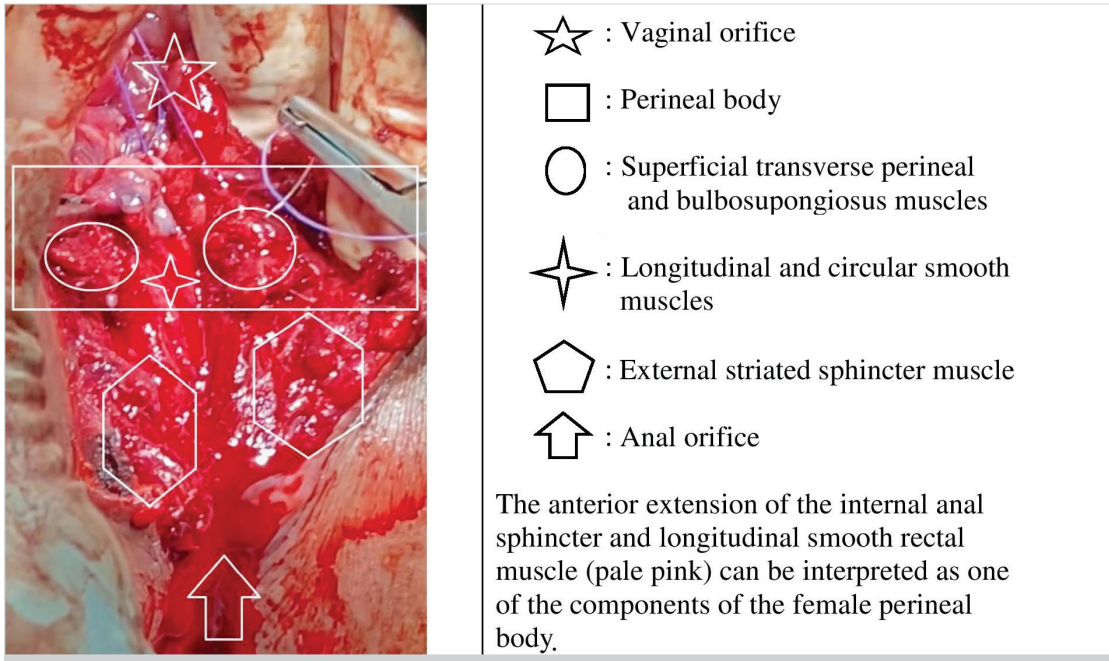

Figure 2. Bulbosupongiosus and superficial transverse perineal muscles, longitudinal and circular smooth muscles of the rectum.

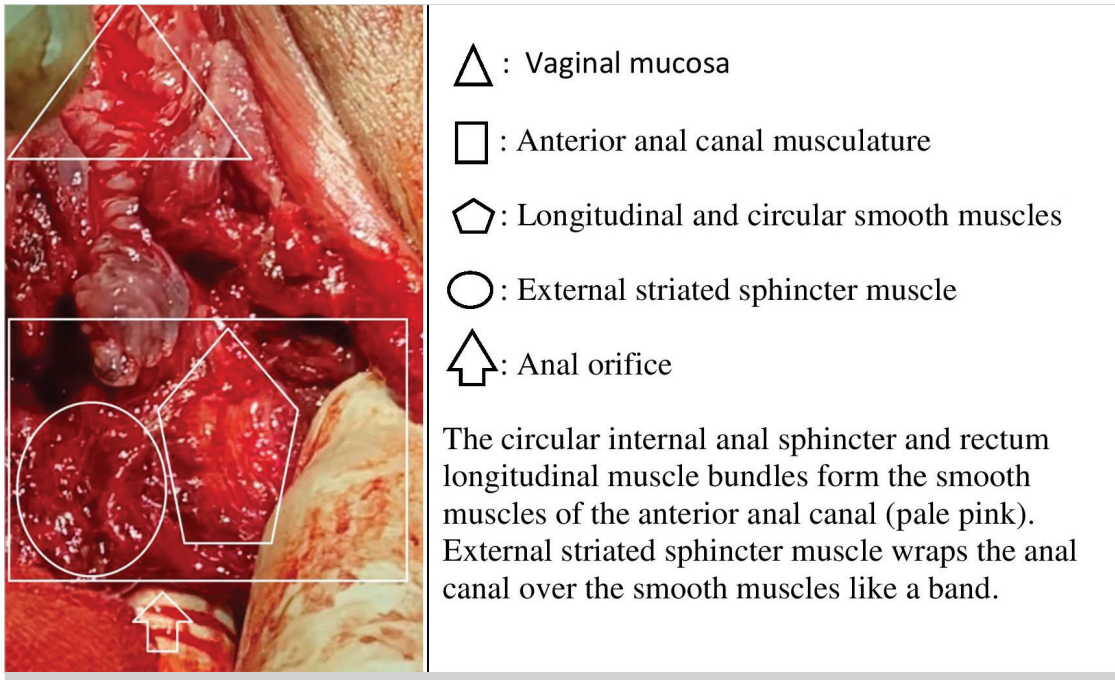

Figure 3. The anterior anal canal is the external anal sphincter, which is composed of striated muscle that surrounds these smooth muscles (pale pink).

polyglactin using the overlapping technique. The external muscle bundle which did not have sufficient length was sutured end-to-end with 2/0 polyglactin without being dissected from the surrounding tissues (in order not to disturb its blood supply and innervation by dissection).

In our study, lacerations were detected in the anterior anal canal and posterior vaginorectal region in the operation notes. Therefore, since the levator ani muscle is located on the right and left lateral of the tear region, no defect information was found.

Statistical analyses; SPSS 26.0 (IBM Corporation, Armonk, New York, United States) program was used in the analysis of the variables. While conformity of the data to normal distribution was evaluated with the Shapiro-Wilk test, the homogeneity of variance was evaluated with the Levene test. One-Way ANOVA (Robust Test: Brown-Forsythe) test with bootstrap results and Jonckheere-Terpstra test and Monte Carlo simulation technique were used in the comparison of quantitative data of more than two groups. Fisher Freeman Halton Test and Monte Carlo simulation results were used to compare categorical variables with each other. Column ratios were compared with each other. P-value with Benjamini-Hochberg correction was expressed according to the results. Spearman's rho test was used to examine the correlations of the variables with each other. Quantitative variables were expressed as mean (standard deviation) and median (minimum/maximum) in the tables. Categorical variables were shown as (%). Variables were analyzed at 95% confidence level, and p value less than 0.05 was considered significant.

RESULTS

Median age of the patients was 27.5 (16-35) years. Six patients (37.5%) had Grade 3c and 10 (62.5%) had Grade 4 sphincter injuries. There were 6 (37.5%) cases in Group 1, 4 (25%) cases in Group 2, and 6 (37.5%) cases in Group 3. Overlapping repair was performed in 6 (37.5%) cases, and end-to-end repair was performed in 10 (62.5%) cases. Median RP of all patients was 35 (26-56) mmHg, and median SP was 67 (31-100) mmHg. RAIR was positive in all patients in the rectal manometry report.

Mean WIS of the cases was 1.88. AI was detected in 3 (18.75%) of 16 patients. FI was detected in 2 (12.5%) of three patients with AI. Mean follow-up time of the patients after primary repair was 23 (2-144) months. The demographic, clinical and manometric findings of the patients are summarized in Table 4.

The groups had a high number of patients with WIS score of 0 (the best). WIS was 0 in 5 (83.3%) patients in Group 1, 3 (75.0%)

Table 4. Demographic, clinical and anal manometry findings of the patients

	n	Mean (SD)	Median (Min/Max)
Age	16	26.81 (5.08)	27.5 (16/35)
Follow-up time (months)	16	46.94 (49.12)	23 (2/144)
Resting pressure (mmHg)	13	38.85 (10.10)	35 (26/56)
Squeezing pressure (mmHg)	13	69.77 (18.23)	67 (31/100)
First sensation(mL)	13	89.23 (28.42)	100 (40/130)
Max-tolerable volume (mL)	13	218.46 (35.32)	230 (160/280)
Frequency of stool incontinence	16	0.88 (2.19)	0 (0/8)
Emotional state related to stool incontinence	16	1.50 (3.14)	0 (0/10)
Wexner incontinence score	16	1.88 (4.69)	0 (0/18)
		n	%
Follow-up time (months)			
≤12 (Group 1)		6	37.5%
(12-60) (Group 2)		4	25%
>60 (Group 3)		6	37.5%
Degree of injury			
3c		6	37.5%
4		10	62.5%
Repair type			
Overlapping repair		6	37.5%
End-to-end repair		10	62.5%

SD: Standard deviation.

patients in Group 2, and 5 (83.3%) patients in Group 3. It was determined that the complaint of severe FI started immediately in the postoperative period in 1 (16.7%) patient and its severity still continued. Anal manometry and face-to-face questionnaire were applied at postpartum 2nd month. A telephone questionnaire was administered 16 months later. In the questionnaires (2nd-16th months) performed in this case, it was determined that WIS (18 points at both time points) and mood score felt due to incontinence (10 points at both time points) did not change throughout time. WIS and RAFIS scores of 13 (81.25%) patients were 0. The RAFIS and WIS scores of the patients are summarized in Table 5. Median RP and SP of the groups were 46 (26-56)/67 (31-90) mmHg in Group 1, 33.5 (31-45)/75.5 (59-87) mmHg in Group 2, and 37.5 (26-52)/70.5 in Group 3 (50-100) mmHg. There was no difference between the three groups in terms of median RP and SP (p= 0.691, p= 0.673). Severe FI (WIS 18, emotional state score (ESS) 10) was observed in 1 (16.7) case in Group 1, mild FI was seen in 1 (25%) case in Group 2 (WIS 7, ESS 8), and mild AI (WIS 3, ESS 2) was observed 1 (16.7%) case in Group 3 (Table 2). There was no significant difference between the three groups in terms of WIDS and RAFIS scores (p= 0.855, p= 772) (Table 6).

When our groups were examined in terms of repair type, it was found that overlapping occurred in 5 (83.3%) patients in Group 1 and 1 (25%) patient in Group 2. End-to-end repair was performed in 1 (16.7%) patient in Group 1, 3 (75%) patients in Group 2, and 6 (100%) patients in Group 3. When repair type was compared between the groups, a statistical difference was observed between Group 1 and Group 3 (p= 0.011) (Table 6).

Except for 1 (6%) patient with severe AI, it was determined that other patients did not go to the doctor. Since the patient with severe AI was short-term (Group 1), it was determined that she was at the stage of patient evaluation and treatment plan.

None of the cases included in the study had a history of previous anal canal and rectal operations. There was no history of serious wound infection or wound dehiscence in any of the patient records and interviews. It was reported that a colostomy was opened in a patient with Grade 4 OASIS in Group 3 and this colostomy was closed six months later.

DISCUSSION

In cases of OASIS undergoing primary sphincter repair, the most common cause of FI is failure of the repair (7). The success rate in the treatment of FI is low (17). Therefore, the primary goal is to prevent the development of FI. Accurate determination of sphincter damage and providing appropriate anatomical reconstruction of the sphincters is crucial in the treatment of OASIS. Therefore, it is recommended that the sphincters be identified and repaired by experienced surgical teams (18). In our study, the perineal body structures and sphincters of patients that developed OASIS were repaired separately by experienced surgeons immediately after delivery. This approach led to low AI and FI rates in the short and long term.

Table 5. RAFIS and Wexner incontinence survey results of the patients according to the groups

	Follow-up time (months)		
	Group 1 n (%)	**Group 2 n (%)**	**Group 3 n (%)**
Stool incontinence score according to RAFIS			
0	5 (83.3)	3 (75.0)	5 (83.3)
2	0 (0.0)	0 (0.0)	1 (16.7)
4	0 (0.0)	1(25.0)	0 (0.0)
8	1 (16.7)	0 (0.0)	0 (0.0)
Incontinence-related emotional state score based on RAFIS			
0	5 (83.3)	3 (75.0)	5 (66.7)
2	0 (0.0)	0 (0.0)	1 (16.7)
8	0 (0.0)	1 (25.0)	0 (0.0)
10	1 (16.7)	0 (0.0)	0 (0.0)
Wexner incontinence score			
0	5 (83.3)	3 (75.0)	5 (83.3)
3	0 (0.0)	0 (0.0)	1 (16.7)
7	0 (0.0)	1 (25.0)	0 (0.0)
18	1 (16.7)	0 (0.0)	0 (0.0)

Group 1: Follow-up time ≤12 months; Group 2: Follow-up time 12-60 months; Group 3: Follow-up time >60 months; RAFIS: Rapid assessment fecal incontinence score.

Table 6. Comparison of the patients' anal manometry findings and incontinence questionnaire results

Follow-up time							
	Group 1		Group 2		Group 3		
	Mean (SD)	Median (Min/Max)	Mean (SD)	Median (Min/Max)	Mean (SD)	Median (Min/Max)	p
Resting pressure (mmHg)	**41.8 (12.40)**	46 (26/56)	**35.75 (6.40)**	33.5 (31/45)	**38.25 (11.56)**	37.5 (26/52)	0.691[a]
Squeezing pressure (mmHg)	**63.8 (21.32)**	67 (31/90)	**74.25 (13.89)**	75.5 (59/87)	**72.75 (20.77)**	70.5 (50/100)	0.673[a]
First sensation (mL)	**90.00 (26.46)**	100 (50/120)	**75.00 (28.87)**	75 (40/110)	**102.50 (30.96)**	110 (60/130)	0.437[a]
Max-tolerable volume (mL)	218.00 (48.17)	**230 (160/280)**	207.50 (34.03)	**215 (160/240)**	230.00 (20.00)	**240 (200/240)**	0.608[j]
Frequency of stool incontinence based on RAFIS	1.33 (3.27)	**0 (0/8)**	0.50 (1.00)	**0 (0/4)**	0.67 (1.63)	**0 (0/2)**	0.994[j]
Emotional state related to stool incontinence based on RAFIS	1.67 (4.08)	**0 (0/10)**	2.00 (4.00)	**0 (0/8)**	1.00 (1.67)	**0 (0/4)**	0.772[j]
Wexner incontinence score	3.00 (7.35)	**0 (0/18)**	2.25 (3.30)	**1 (0/7)**	0.50 (1.22)	**0 (0/3)**	0.855[j]
	n (%)		**n (%)**		**n (%)**		
Repair type							0.011[f]
Overlapping	5 (83.3)[C]		1 (25)		0 (0)		
End-to-end	1 (16.7)		3 (75)		6 (100)[A]		

[j] Jonckheere-Terpstra Test (Monte Carlo), [a] OneWay ANOVA (Robuts Statistic: Brown-Forsythe), [f] Fisher Freeman Halton Test (Monte Carlo), [A] Indicates significance according to the group with a follow-up period of ≤12, [C] Indicates significance according to the group with a follow-up period of >60, SD.: Standard deviation, group 1: follow-up time ≤12 months; group 2: follow-up time 12-60 months; group 3: follow-up time >60 months; RAFIS : Rapid assessment fecal incontinence score.

In our study, manometric measurements showed that median RP of the anal canal was 35 mmHg (normal range= 59-74 mmHg), while median SP was 67 mmHg (normal range= 88.5-111 mmHg). Both values were below normal limits. The rates of AI and FI were 18.75% and 12.5%, respectively, while the rate of severe incontinence was 6%. In their study with 372 cases, Turel et al. (6) have performed anal manometry in 13 of 19 patients with grade 3c/4 sphincter damage and reported RP of 14.7 mmHg and SP of 40.7 mmHg. They have reported FI rate of 12% and AI rate of 51% in those with grade 3c/4 type injuries. In this study, similar to our study, anal canal RP and SP were low, while FI rates were similar. IAS defect and levator avulsion have been found to be independent risk factors for AI. They have stated that the repair of the IAS and levator muscle defect is important. In their study involving 181 patients, Patton et al. (7) have reported Grade 4 injuries in 10 (6%) and Grade 3c injuries in 26 (14%) patients. FI rate has been found as 46% and more common in patients with low anal RP compared to those with normal RP. In addition, patients with low SP and normal SP did not differ significantly in terms of FI rates. This result emphasizes the importance of IAS repair. It has been noted that IAS anal sphincter injuries are often overlooked in OASIS. This was thought to be due to the fact that the IAS is thin and is located behind the larger EAS (3,7). In Gommesen et al.'s (2) study including 575 patients with sphincter injuries, it has been reported that 20 patients had Grade 3c and 15 patients had Grade 4 injuries. The rate of FI has been indicated as 35% in Grade 3c and 33.3% in Grade 4. In this large series study, the high rates of FI after primary repair have been attributed to two reasons: inadequate repair of the sphincters or recurrent injury to the sphincters (6). Anglim et al. (19) have reported major sphincter injury (Grade 4= 28, Grade 3c= 47) in 75 (17%) of 362 patients in their prospective study. The AI score in major sphincter injuries has been found low. The reason behind this low rate was that the degree of injury was determined well and the IAS was detected and repaired separately. Similarly, in our study, the low rate of FI compared to the literature may have been due to detecting and suturing the sphincters separately and careful reconstruction of the lacerated perineal body structures (puborectal muscle, perirectal and paravaginal fascia, bulbocavernosus muscle, superfacial transverse perineal muscle). Soerensen et al. (20) have found that short anterior sphincter length after primary repair correlated with FI. This result increases the importance of reconstruction of the lacerated area as a whole and supports our hypothesis. On the other hand, in our study, it was observed that the AI score of one case (6%) that developed severe AI remained the same in the postpartum short and long term (>1 year long term). The reason for occurrence of severe FI in the early postpartum period and its persistence in the long-term may be the failure of the primary repair.

In recent studies, it has been detected that levator ani muscle injuries are seen at a rate of 21% in OASIS. It has been determined that there is an independent risk factor for the development of AI (6). The levator ani muscle surrounds the rectum posteriorly and is located to the right and left of the rectovaginal region (21). Since the laceration was in the media line in our study, the attention of the repair team might have caused the levator muscle damage to be overlooked. Severe AI seen in 6% may have developed for this reason.

It has been reported in the literature that complications such as severe wound infection, bleeding and wound dehiscence develop after perianal reconstruction. For these reasons, it has been suggested that the primary repair is impaired and AI develops (22). In our study, however, no serious postoperative wound complication developed. This may be a supporting factor in the low rate of AI.

Anal manometry has low sensitivity in determining the degree of sphincter damage. However, it has been reported that the mean sphincter pressures (RP and SP) decreased as the degree of injury increased (23). In the study by Soerensen et al., anal sphincter pressures have been found low in patients who did not develop AI after primary repairs. On the other hand, it has also been determined that the rate of AI increased as the sphincter pressure decreased. However, no correlation has been found between low pressures and severe AI (20). In our study, sphincter pressures were lower than normal in the short and long terms. Pressures were not different between periods. Also, no difference was observed between anal sphincter pressures and AI score between periods. These results show that the pressures did not decrease over time and the anal functions did not deteriorate. Unlike our study, Mous et al. (24) have found that while the rate of incontinence was 38% in 15 years, this rate increased to 60% after five more years. Likewise, Fornell et al. (25) have shown that anal functions deteriorate over time. The reason why our results differed from aforementioned studies might be the prevention of retraction of the lacerated muscle ends with good primary repair.

In IRAIR, there is a sudden increase in pressure in the rectal wall with the accumulation of gas, fluid, and stool in the rectum. This change signals that defecation will begin. This stimulus is the sensorimotor mechanism that activates the mechanisms that help maintain continence or are effective in the realization of defecation (26). This reflex is negative in Hirschsprung's disease without rectal wall sensitivity, in spinal cord injuries, and causes AI to develop (27). Pudendal nerve neuropraxia may develop due to nerve traction during vaginal delivery. This can also cause temporary (28). However, AI due to pudendal nerve injury has not been elucidated in the majority of studies (29). In our study, RAIR positivity in all patients excludes serious nerve damage in our patients. This result indicates that the probability of developing this damage in OASIS may be below.

In their study of 1453 cases, Thomas et al. (17) have performed EAUS evaluations and reported the rate of normal sphincter function after primary repair as 3%, and sphincter defect in 53%. This study is also significant in terms of demonstrating the failure of primary repair. In a study evaluating the adequacy of the delivery team, it has been reported that 87% of midwives, 28% of newly trained doctors, 14% of trained doctors, and 1% of specially trained team overlooked sphincter injuries (30). Another study has compared the outcomes of primary sphincteroplasty repairs performed by surgeons in training and experienced surgeons and reported higher rates of significant sphincter defect in the training group (31). These results support the importance of having an experienced team when diagnosing and treating sphincter injuries. Therefore, having an experienced team was one of the strengths of our study.

In the literature, different results have been reported in overlapping and end-to-end repairs in sphincter repair. However, in the last randomized controlled study, it has been reported that there was no difference between the results of both methods (32). In our study, overlapping was preferred in Group 1 and end-to-end repair type was preferred in Group 3. However, they were cot comparable as follow-up times were different in both groups. In our study, it was the first preferred method if it was suitable for EAS overlapping.

Studies have reported that fecal diversion does not affect the results in Grade 3-4 OASIS injuries (29). In our study, colostomy was opened in 6% of the patients. In our study, it was determined that there were no serious problems in wound infection and stool control in patients who did not undergo fecal diversion. These results show that fecal diversion is not necessary for severe OASIS injuries.

There are serious long-term failures of secondary repair of sphincter insufficiency that develops after primary reconstruction. In secondary repairs, rectal manometric pressures increase at first, and although there are successful results in the short term, the failure rate is high in the long term (3). Barbosa et al. (12) have evaluated long term incontinence in 486 patients that underwent secondary sphincter repair and observed that 75% developed fluid and 54% developed solid incontinence. In another study of 191 cases undergoing secondary repair, complete continence has been achieved in 6% in 10-year follow-up, while 94% developed AI and 58% developed FI (33). According to these results, no matter how well the secondary sphincter repair is performed, the continence score will remain low. Therefore, meticulous primary repair is crucial.

Due to the low success of secondary repair in patients with FI, the preference for sacral nerve stimulation instead of surgery has increased in cases where primary repair was inadequate or sphincter defects was not detected in the initial assessment (12,14). Leo et al. (34) have reported that 381 patients with AI achieved 60% recovery with sacral nerve stimulation.

There are some limitations of our study. These are single center and retrospective design, small number of patients, and lack of EAUS in the follow-up of the patients.

In conclusion, the delivery team should carefully evaluate the injuries that occur in the perineal region. In case of suspected anal sphincter injury, an experienced surgical team (colorectal, gynecology) should be consulted, and primary reconstruction should be performed by an experienced surgical team. We believe that effective anatomical reconstruction of the anal sphincter and perineal body structures significantly reduces the rate of FI in the short and long term.

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ORİJİNAL ÇALIŞMA-ÖZET
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Obstetrik anal sfinkter yaralanmalarında perineal yapıların ve sfinkter kompleksinin anatomik rekonstrüksiyonun kısa ve uzun dönem sonuçları

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ÖZET

Giriş ve Amaç: Primer tamir edilen obstetrik anal sfinkter yaralanması (OASY) hastalarında fekal inkontinans (Fİ) riskini azaltmanın etkili yolu hasarı doğru tespit etmek ve tam anatomik rekonstrüksiyon sağlamaktır. Çalışmanın amacı deneyimli cerrahi ekip tarafından teşhisi yapılan, perineal body ve anal sfinkterlerin ayrı ayrı rekonstrüksiyonu sağlanan OASY olgularının kısa ve uzun dönem sonuçlarını değerlendirmektir.

Gereç ve Yöntem: 2007-2019 yılları arasında vajinal doğum sırasında anal sfinkter hasarı tespit edilmiş, konsültasyon istenmiş, Grade 3c ve Grade 4 sfinkter hasarı nedeniyle anatomik rekonstrüksiyon yapılan 16 hasta çalışmaya dahil edildi. Bu olgular, operasyondan sonra anal manometri ve inkontinas anketleri yapılana kadar geçen süreye göre üç gruba [Grup 1 (≤12 ay), Grup 2 (12-60 ay), Grup 3 (≥60 ay)] ayrıldı. Anal manometri ile rekto-anal inhibitor refleks (RAIR), ortalama istirahat (İB) ve sıkma (SB) basınçları ölçüldü. Anketler ile anal inkontinas (Aİ) ve Fİ oranları belirlendi. Anal sfinkter hasarı onarma teknikleri (overlapping, uç-uca) tespit edildi. Bu parametreler üç grup arasında karşılaştırıldı.

Bulgular: Hastaların yaş ortalaması 27,5 (16-35) yıl idi. Hastaların 6'sı (%37,5) Grade 3c, 10'u (%62,5) Grade 4 idi. Genel ortalama İB ve SB sırasıyla 35 (26-56) mmHg ve 67 (31-100) mmHg idi. Gruplarda ortalama İB ve SB sırasıyla; Grup 1'de 46/67 mmHg, Grup 2'de 33,5/75,5 mmHg, Grup 3'te ise 37,5/70,5 mmHg saptandı. Üç grup arasında ortalama İB ve SB açısından fark izlenmedi (p= 0,691, p= 0,673). Tüm olgularda Aİ oranı %18,75, Fİ oranı %12,5, şiddetli Aİ inkontinans oranı ise % 6 idi. Grup 1'de 1 (%16,7) olguda şiddetli Aİ, Grup 2'de 1 (%25) olguda hafif düzeyde Aİ ve Grup 3'te ise 1 (%16,7) olguda hafif düzeyde Aİ izlendi. Tüm hastalarda RAIR pozitifti. Grup 1'de 5 (%83,3) hastaya overlapping onarım, Grup 3'te ise 6 (%100) hastaya uç-uca onarım yapıldı. Bu fark istatistiksel olarak anlamlıydı (p= 0,011).

Sonuç: Vajinal doğumlarda; anal sfinkter hasarının değerlendirilmesi, perineal body yapıların ve anal sfinkterlerin ayrı ayrı belirlenip anatomik rekonstrüksiyonun yapılması kısa ve uzun dönemde fekal inkontinens oranını önemli oranda düşürmektedir.

Anahtar Kelimeler: Obstetrik anal sfinkter yaralanmaları, anal inkontinans, fekal inkontinans, perineal yapı, anal manometri, Wexner skoru

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