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Research article

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Management and outcomes of anal sphincter injuries: A retrospective cohort study

Esra Dişçi [1], Rıfat Peksöz [1], Metin Yıldız [1], Mehmet İlhan Yıldırgan [1], Yavuz Albayrak [1], Mesud Fakirullahoğlu [2], Enes Ağırman [1], Sabri Selçuk Atamanalp [1]

[1] Department of General Surgery, Atatürk University Faculty of Medicine, Erzurum, Turkey
[2] Department of General Surgery, Erzurum City Hospital, Erzurum, Turkey

ORCID ID of the author(s)
ED: 0000-0003-3657-3620
RP: 0000-0003-4658-5254
MY: 0000-0002-8180-2827
MİY: 0000-0002-9041-9352
YA: 0000-0002-2535-4329
MF: 0000-0002-5871-5688
EA: 0000-0002-0289-1252
SSA: 0000-0003-2561-6461

Corresponding Author
Rıfat Peksöz
Department of General Surgery, Atatürk University Faculty of Medicine, Erzurum/Turkey
E-mail: rifat-peksoz@hotmail.com

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The approval for the study was obtained from the Ethics Committee of Erzurum Atatürk University Faculty of Medicine (No:2021/11-8-22)
All procedures in this study involving human participants were performed in accordance with the 1964 Helsinki Declaration and its later amendments.

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No conflict of interest was declared by the authors.

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Abstract

Background/Aim: Anal sphincter injury (ASI) is a clinical condition that causes anal incontinence and can severely impair an individual's quality of life. Overlapping sphincteroplasty (OSP) is the most preferred surgical method for repairing ASI. The present study aimed to discuss the demographic and clinical characteristics of patients who underwent ASI surgical repair in light of the current literature.
Methods: Patients in two groups; males and females, who underwent an operation for grade 3-4 ASI in the General Surgery Clinic at Ataturk University between 2010 and 2021 were retrospectively analyzed. The severity of anal incontinence and quality of life post-operatively using the Wexner score were evaluated. For evaluating post-operative complications, the Clavien–Dindo Classification was used.
Results: Over 12 years, 34 adult patients with a mean age of 35.8 (22–66) years underwent ASI surgery, namely 23 (67.6%) women and 11 (32.4) men. Considering the patients' etiopathogenesis, obstetric injuries (55.9%) were the most common cause of ASI. All patients underwent overlapping sphincteroplasty (OSP), while 20.6% also underwent protective stoma. According to the Centers for Disease Control and Prevention (CDC), four patients were classified as Grade 1, four as Grade 2, seven as Grade 3 and one as Grade 5.
At a mean follow-up of 35.8 months, the mean Wexner score was 3.59 and the success rate was 88.2% (P=0.445). Males had a longer average hospital stay (P=0.021) and a higher Wexner score (P=0.445), whereas females had a greater complication rate (P=0.388). The quality of life was high, but the Wexner scores were low in all patients.
Conclusion: ASI most commonly occurs in women during childbirth. OSP has a high success rate, and opening a diverting ostomy when needed further increases this rate. The Wexner score is a simple and useful system for assessing anal incontinence.

Keywords: Anal sphincter injury, Anal incontinence, Overlapping sphincteroplasty, Wexner score system

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Introduction

Anal sphincter injury (ASI) is a clinical condition that causes anal incontinence and severely impairs an individual's quality of life. This trauma can lead to long-term psychological and physical problems. Hence, ASI has a significant effect on patients' lives [1, 2]. The overall spectrum of ASI patients ranges from mild isolated injury to severe injury with damage to the pelvic and abdominal organs, which can cause patients go into shock. ASI patients should be thoroughly examined, monitored, and followed [3].

The most common causes of fecal incontinence are damage to the anal sphincter due to obstetric injury, anorectal operations, or external trauma [3, 4]. These injuries are often managed in the acute phase by surgical units with no coloproctology experience. Coloproctological centers can perform scheduled sphincter repair procedures [3]. This injury needs to be treated without delay, and referral to experienced centers as soon as possible is crucial. This way, successful surgical repair of the anal sphincter can restore continence and improve quality of life [5].

Numerous surgical techniques for ASI exist; however, overlapping sphincteroplasty (OSP) is the most widely used method [2, 6]. The Wexner score (Cleveland Clinic Fecal Incontinence Severity Scoring System) is a system that can be easily applied easily, and it is the most frequently used system by colorectal surgeons to assess anal incontinence status and surgical success [7].

In the current study, the demographic and clinical characteristics and post-operative results of patients who underwent overlapping sphincteroplasty due to anal sphincter injury with consideration of the current literature are discussed.

Materials and methods

Approval for this study in accordance with Declaration of Helsinki was obtained from the Ethics Committee of Erzurum Atatürk University Faculty of Medicine (No:2021/11-8-22). Patients who underwent surgery for grade 3-4 anal sphincter injury in the general surgery unit of Atatürk University Research Hospital between January 2010 and December 2021 were retrospectively analyzed. Data were collected from the patients' files, hospital's electronic software system, and by contacting the patients via telephone.

Only grade 3-4 injuries were included because according to the perineal trauma classification, only these two grades involve anal sphincter injuries [8].

A vast majority of the patients had lacerations that occurred under emergency conditions, so the diagnosis was made by physical examination and the Wexner score. Computed tomography and magnetic resonance imaging (CT and MRI, respectively) were used only in a few patients. Given that anal manometry and endoanal ultrasound imaging (USG) were not available in our hospital, post-operative sphincter tone follow-ups were performed in other centers when needed.

Patients' demographic characteristics, complaints at admission, time of injury, anal sphincter laceration grade, previous operations, length of hospital stay, complications, and postoperative Wexner score were examined.

The post-operative severity of anal incontinence was evaluated using the Wexner score. The Wexner score includes questions about the frequency and type of incontinence or discomfort (solid stool, liquid stool, flatulence, use of diapers or pads, lifestyle changes) as shown in Table 1. A score of 0 corresponds to perfect continence and 20 to complete incontinence [7, 9]. We used the Clavien–Dindo (CD) classification of surgical complications to evaluate post-operative complications [10, 11].

Table 1: Anal incontinence score according to the Wexner score system [7, 9]

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
Wear Pad	0	1	2	3	4
Lifestyle Altered	0	1	2	3	4

Never: 0, Rarely: <1/ month, Sometimes: <1/ week, ≥1/ month , Usually: <1/ day, ≥1/ week, Always: ≥1/ day

Statistical analysis

Quantitative parameters were performed as arithmetic mean (standard deviation) and as number and percentages for the categorical variables. The distribution of the numerical data was evaluated using the Shapiro–Wilk and Kolmogorov–Smirnov tests and histogram graphs. The t-test was used to analyze the association between categorical covariates and postoperative results. A chi-square test was used to compare categorical data. Data were analyzed at a 95% confidence interval (CI), and *P*-value was accepted as <0.05, indicating statistical significance. SPSS version 23 software was used for statistical analysis.

Results

Over the 12-year period, 34 adult patients, consisting of 23 (67.6%) women and 11 (32.4%) men, underwent ASI surgery. These patients had a mean age of 35.8 (12.6) years (22–66). The mean age was 44.09 (13.43) years for males and 31.8 (10.2) years for females. A significant difference between the sexes in terms of mean age (P=0.012) was found.

Regarding patient etiopathogenesis, the most common causes of ASI were obstetric injuries (55.9%), cuts and puncture wounds (14.7%), traffic accidents (8.8%), iatrogenic injuries (8.8%), animal attacks (8.8%), and gunshot wounds (2.9%). Three of the obstetric injuries were of iatrogenic origin, so the iatrogenic injuries indicated in the table consist of those that occurred after colorectal surgery.

Most patients were admitted to the emergency unit; thus complete data for patients who were admitted under elective conditions could not be obtained. At admission, 79.4% of the patients had no anal tone, and 20.6% had decreased anal tone. Most (85.3%) of the patients presented with grade 3 ASI, and 14.7% presented with grade 4 ASI. Thirty-one patients underwent the operation under general anesthesia and three under regional anesthesia in the lithotomy position. Twenty-six patients (76.5%) had surgery on the day of admission. The patients who underwent surgery under emergency conditions were given ceftriaxone + metronidazole, which was continued post-operatively, and antithrombotic prophylaxis. Anal sphincter repairs were performed by three experienced colorectal surgeons under their supervision. All patients underwent OSP, while 20.6% of the patients also underwent protective stoma. For patients who underwent a colostomy, the etiological reason was external trauma. Temporary colostomy was performed in all

patients, and colostomy repair was performed after an average of five months.

The length of hospital stay was 21.9 (13.02) days for men and 15.3 (17.9) days for women with a statistically significant difference between the two groups (P=0.021).

Considering post-operative complications, 14.7% of the patients had wound infection, 8.8% had wound dehiscence, and 5.9% had urinary incontinence. Fecal incontinence, anal stricture, and rectovaginal fistula developed at a rate of 2.9%. One patient experienced mortality due to sudden cardiac arrest on the fifth post-operative day. Complications occurred in 36.4% of male patients and 52.2% of female patients. Despite the higher complication rate in females, no statistically significant difference between the sexes was observed (P=0.388).

Comparing the time of admission and complication rates, 14 of the 26 patients who underwent surgery on the day of admission developed no complications. Of the remaining 12 patients, three had CD 1 complications, three had CD 2, five had CD 3, and one had CD 5. For the patients who underwent surgery one day after admission, one had CD 1 complications, one had CD 2, and two had CD 3.

Anal function status was evaluated using the Wexner score. At a mean follow-up of 35.8 months, the mean Wexner score for the whole sample was 3.59 (3.32). The mean Wexner score was 3.39 (3.38) in females and 4 (3.31) in females. Despite the higher Wexner score among male patients, no statistically significant difference between the groups was found (P=0.445). In our sample, a Wexner score of 9 and above was observed in 11.8% of patients. It was determined that the overall quality of life was high even though Wexner scores were low.

Table 2 gives detailed information about the demographic and clinical characteristics of our patients.

Table 2: Demographic and clinical features of patients

Variable	Male	Female	Total	*P*-value
Age (mean (SD))	44.09 (13.43)	31.86 (10.29)	35.8 (12.6)	0.012*
Etyopathogenesis				
Obstetric trauma	-	19	19	
Stab and gunsut wounds	5	1	6	
Traffic accidents	2	1	3	
İatrojenik (colorectal surgery)	1	2	3	
Animal attack	3	-	3	
Hospital stay/days	21.9 (13.02)	15.3 (17.9)	17.44 (16.6)	0.0 21*
Complications rate	36.4%	52.2%	47%	0.388**
Wexner score	4 (3.31)	3.39 (3.38)	3.56 (3.34)	0.445*

SD: Standard deviation, *Independent-samples t test, ** Chi-square test

Discussion

The prevalence of anal incontinence ranges from 2% to 18% in the general population. Young female patients are at the greatest risk with obstetric injuries being the main cause [12, 13]. Research on non-obstetric injuries involving both sexes is very rare in the literature, and these studies describe 80.3%–84.6% female patients [12, 14]. In our study, the rate of male patients was 32.4%, which is higher than that in the literature. Almost all patients (11 of 12) who underwent surgery due to trauma (cuts and puncture wounds, animal attacks, traffic accidents) were male. Young male patients are exposed to trauma more frequently than young women [15]. This finding coincides with anal trauma. When considering the socio-economic structure of our region, it is expected that men would be more exposed to trauma, which could explain the high rate of male patients in this study.

A vast majority of ASI are related to obstetric injuries. Limited data on non-obstetric anal injuries are found in the literature. One study on all incontinence cases reported 72.3% obstetric causes, 13.8% fistulotomy, 9.2% nonspecific trauma, and 4.6% war injury. Some (18.5%) of these patients received stoma. In another study, 64.7% of the patients had obstetric ASI, 23.5% perineal trauma, and 11.7% iatrogenic injury [2]. Consistent with the literature, the most common cause of ASI in our study was related to obstetric injuries. However, in our research, animal attacks yielded an interesting rate of around 9%. In this regard, the literature includes only case reports, which are rare. Due to limited research on non-obstetric injuries, we believe that our study will make a significant contribution to the literature.

In the past, end-to-end sphincter repair was the most frequently used surgical technique. However, due to the high rate of failure, surgeons began to use the overlapping sphincteroplasty (OSP) technique that yielded a higher success rate in ASI cases [5, 16]. The end-to-end technique is still frequently used in milder ruptures, but the OSP is preferred, particularly for serious injuries [7]. OSP offers good and even excellent short-term results, but the long-term outcomes deteriorate over time [12]. According to previous studies, the success rate of OSP due to ASI ranges from 68% to 85% [2, 5, 17]. In our study, all patients underwent OSP, while approximately 20% also underwent protective ostomy. The success rate was very high and performing colostomy in external trauma cases led to a further increase in this rate. Accordingly, patients seem to derive many benefits from this operation.

Numerous scoring systems to determine anal incontinence status or quality of life exists; however, nowadays the Wexner score is used most frequently [7, 9, 14, 18]. The Wexner score is a very easy, well-established grading system, and unlike other quality of life scales, the result is not influenced by comorbid diseases [14]. The Wexner score accepts 9 as the threshold value for which a score of 9 or above indicates that fecal incontinence significantly impairs quality of life [19]. Moreover, Wexner scores appear to increase as the follow-up period gets longer [14]. In the present study, we used the Wexner score to evaluate the degree of anal incontinence and accepted the threshold value of 9. We found that our sample had a mean Wexner score of 3.58 at an average follow-up of 35.8 months. Despite the long follow-up period, our patients still had low Wexner scores. Thus, our results seem to be partially more successful than those reported in the literature [8, 12, 14].

Post-operative success can be affected by many factors, including the patient's age, the surgical technique, and other factors.

To improve long-term outcomes, some studies advocate the use of polydioxanone (PDS) or Prolene sutures rather than those made of vicryl or dexon due to their absorption time [20, 21]. Here, 3/0 PDS sutures in our surgeries were used. However, a control group was not included in this study, it cannot be argued that these sutures had an influence on success rates. One of the most important factors that affects treatment outcomes is the patient's age. The success rate is particularly higher in patients under 40 years of age. Again, the outcomes of iatrogenic sphincter injury are better than those of obstetric injury [12, 22].

Despite the limited number of studies involving male patients, the results in men are better than in women. However, this difference may stem from the fact that non-obstetric traumas are the main cause of injury in male patients [12].

The main reasons for our high success rate were the young ages of the patients and performance of the surgeries by three colorectal surgeons with colorectal experience. Again, 91% of our patients were admitted early, within two days at the latest, which could also be considered another factor for success.

In our sample, the most common complications were wound infection (14.7%), wound dehiscence (8.8%), and urinary incontinence (5.9%). Fecal incontinence, anal stricture, and rectovaginal fistula all developed at a rate of 2.9%. In the literature, complications, such as wound dehiscence, wound infection, colostomy-related complications, and perirectal abscess were observed at similar rates in patients who had surgery for obstetric reasons [23, 24]. Previous research reports pudendal neuropathy, traumatic cloaca, and rectovaginal fistula in patients who were admitted for external trauma [4]. Studies report complication rates ranging between 20.5% and 25% [5]. In our study, the complication rate was higher than in previous studies, but the success rate was high. This finding may stem from the high rate of low-severity complications in the CD1 and 2 classification.

For patients with poor outcomes, treatment modalities, such as post-operative sacral nerve stimulation and biofeedback should be recommended [14]. Our hospital did not have certain diagnostic methods, such as anorectal manometry and endoanal ultrasound, for evaluating anal sphincter function and anatomy, so a small number of patients were followed and treated in other centers.

Limitations

Our study had certain limitations and strengths. The main limitation was the retrospective design. Also, we only evaluated the results of emergency patients, so only data from a small number of patients who underwent surgery under elective conditions could be used. The main strength of this research was including non-obstetric injuries and contributing data in this regard to the limited literature.

Conclusion

Obstetric injuries are the most common cause of ASI. OSP has a high rate of success and patient satisfaction when performed by experienced colorectal surgeons. Diverting ostomy should be performed when necessary. The Wexner score is a useful system to determine the severity of anal incontinence. Very few articles have investigated non-obstetric ASI injuries. The need for further research on perineal injuries caused by non-obstetric reasons exists.

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