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Comparison of Surgical Outcomes of Obstetric Anal Sphincter Injury Repairs According to Surgeon Specialty: A Retrospective Cohort Study

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ABSTRACT

This study aimed to compare surgical outcomes, complication rates, and continence results of obstetric anal sphincter injury (OASIS) repairs performed by obstetricians-gynecologists and general surgeons.
In this retrospective cohort analysis, clinical data from 356 patients who underwent primary obstetric anal sphincter injury (OASIS) repair at a tertiary care center between May 2020 and October 2024 were evaluated. Patients were categorized into two groups according to the operating surgeon's specialty: obstetrician-gynecologists (n=272) and general surgeons (n=84). Demographic characteristics, obstetric variables, surgical repair techniques, postoperative complications, and continence outcomes were systematically compared between the groups. To determine the independent impact of surgeon specialty on postoperative complication risk, logistic regression analyses adjusted for patient age and body mass index (BMI) were conducted.
There were no statistically significant differences between the two groups regarding age, body mass index (BMI), gravidity, parity, neonatal birth weight, or the severity of perineal tear (p>0.05). However, the end-to-end repair technique was more commonly employed by general surgeons, whereas obstetrician-gynecologists predominantly favored the overlap method (p<0.05). The rates of postoperative infection and bleeding were significantly lower in the obstetrician-gynecologist group (p<0.05). Multivariate logistic regression analysis demonstrated that the likelihood of developing any postoperative complication was nearly four times greater when the repair was performed by general surgeons compared to obstetrician-gynecologists (odds ratio [OR]: 3.54; 95% confidence interval [CI]: 2.05–6.13; p<0.001).
Surgeon specialty significantly influences early postoperative complication rates in OASIS repair. Structured surgical training programs, simulation-based workshops, and multidisciplinary protocols are crucial to improve outcomes, especially for general surgeons involved in obstetric perineal trauma repair.

Keywords: OASIS, Obstetric Anal Sphincter Injury, Perineal Repair, Surgeon Specialty, Postoperative Complications, Continence Outcomes

Introduction

Obstetric anal sphincter injuries (OASIS) are reported to complicate approximately 0.5% to 9.0% of vaginal births, with recognized risk factors including primiparity, operative vaginal deliveries such as vacuum or forceps use, fetal macrosomia (≥4,000 g), episiotomy, and prolonged duration of the second stage of labor (1-3). In a retrospective cohort study focusing on pregnant adolescents in Türkiye, the incidence of third- and fourth-degree perineal tears was observed to be 5.8%, with nulliparity, increased neonatal birth weight, and labor induction identified as independent contributing factors (4).

These epidemiological findings demonstrate the prevalence of OASIS both clinically and through imaging modalities. OASIS leads to long-term morbidities such as fecal and gas incontinence, perineal pain, dyspareunia, and psychosocial disorders, thereby adversely affecting women's quality of life (5,6). Ultrasound-based studies report that the incidence of OASIS in women undergoing vaginal deliveries ranges from 21% to 30%, and approximately 38% of those affected develop anal incontinence subsequently (7). Consequently, structured postpartum perineal

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assessments, expert surgical intervention, and standardized management protocols are advocated in the care of third- and fourth-degree perineal tears, as recommended by the joint guidelines from German, Austrian, and Swiss gynecological societies (8).

Structured surgical training opportunities during residency are often insufficient, leading to a notable experience gap between obstetricians specialized in perineal trauma and general surgeons when performing obstetric anal sphincter injury repairs (9). A national survey conducted in the United States reported inconsistencies among obstetricians in accurately identifying and classifying perineal tears, with limited use of the Sultan classification and variability in episiotomy practices, potentially leading to diagnostic errors in obstetric quality research and pelvic floor studies (10). In the United Kingdom, only 50% of colorectal surgeons reported participating in fewer than one OASIS repair per year, while significant differences between gynecologists and general surgeons were noted in acute and long-term management approaches in France (11,12). These findings highlight that practitioner experience and specialty profile substantially impact patient outcomes. Moreover, a survey conducted among colorectal surgeons in Australia and New Zealand indicated that more than 60% had limited experience with OASIS repairs and only 44% reported the existence of a standard management protocol in delivery units, emphasizing the need for widespread implementation of multidisciplinary protocols (13).

This study aims to evaluate and compare the outcomes of obstetric anal sphincter injury repairs performed by obstetricians and general surgeons, with the objective of generating evidence-based recommendations on surgical success, complication rates, and continence outcomes. We hypothesize that obstetrician-performed repairs will demonstrate lower complication rates and better continence outcomes than those performed by general surgeons.

Materials and Methods

Study Design and Ethical Approval: Ethical approval for this retrospective observational study was obtained from the Institutional Review Board of Başakşehir Çam and Sakura City Hospital (Approval Number: KAEK/30.10.2024.266; Document Registration Number: E-96317027-514.10-260892863) on October 30, 2024. All data were anonymized and used solely for scientific purposes in accordance with the principles of the Declaration of Helsinki and the Personal Data Protection Law No. 6698.

Patient Selection and Inclusion/Exclusion Criteria: During the study period from May 21, 2020, to October 30, 2024, a total of 22,500 normal vaginal deliveries were performed at our center, and OASIS was diagnosed in 410 cases (1.82%).

Inclusion criteria: Female participants who were at least 18 years old, who underwent singleton, live vaginal delivery, were clinically diagnosed with a third- or fourth-degree OASIS, underwent surgical repair, and had complete surgical and postoperative follow-up data recorded.

Exclusion criteria: Cases with insufficient medical records (n=5), missing data (n=8), delivery at an external center (n=1), and loss to follow-up within the first 30 postoperative days (n=38; 29 from the Obstetrics and Gynecology group and 9 from the General Surgery group). After exclusions, 356 patients remained for final analysis (Figure 1).

Data Collection and Evaluated Parameters: Patient data were retrospectively collected from medical records and the hospital's electronic information system utilizing a standardized data collection form. The evaluated parameters included:

Demographic characteristic: Patient age, BMI, gravida, parity, and number of living children.

Obstetric Characteristics: Number of deliveries; birth weight (g); head circumference (cm); presence of macrosomia (≥4,000 g); presence of shoulder dystocia; and episiotomy status.

Surgical Data: Degree of perineal tear (IIIa, IIIb, IIIc, IV); type of repair technique (overlap, end-to-end); surgical specialty of the repairing physician (Obstetrician-Gynecologist or General Surgeon); resident experience (<2 years); fetal position (occiput posterior); duration of second stage (>2 hours); type of anesthesia; and operation time (minutes).

Laboratory and Postoperative Follow-up: Preoperative and postoperative (within 24 hours) hemoglobin levels; length of hospital stay (days); postoperative complications (infection, hematoma, wound dehiscence, gas/fecal incontinence); need for psychiatric support; and occurrence of colostomy. Follow-up data and postoperative complication records were collected through outpatient assessments conducted between 10 and 30 days after childbirth.

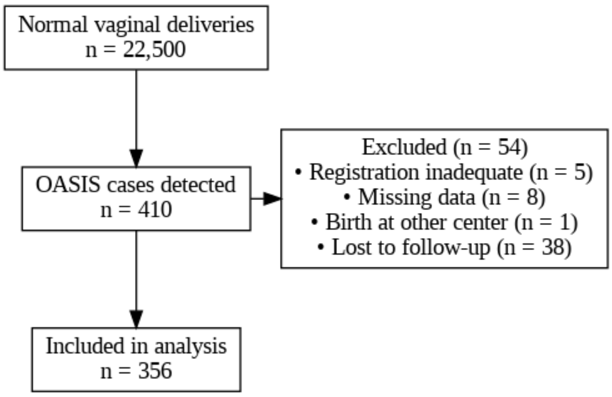

Fig. 2. Patient selection process illustrated through a flowchart

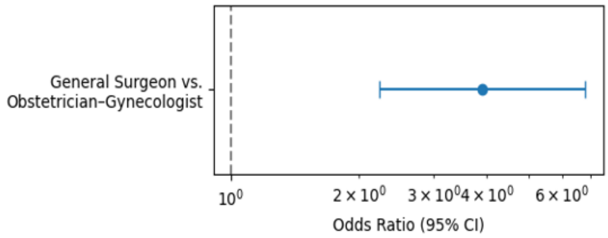

Fig. 2. Surgeon Profile and Complication Risk (Adjusted for Age and BMI)
Odds ratio for postoperative complications by surgeon profile, adjusted for age and BMI (OR = 3.54, 95% CI: 2.05–6.13; $p < 0.001$)

Surgical repairs were performed by two groups of physicians: Obstetrician-Gynecologists (n=272) and General Surgeons (n=84). Each repair was conducted by a single specialty group without multidisciplinary concurrent interventions.

Definitions

OASIS: Obstetric anal sphincter disruptions characterized by third- or fourth-degree perineal trauma.

Tear Grades:

- IIIa: Disruption involving less than 50% of the external anal sphincter.
- IIIb: Disruption affecting 50% or more of the external anal sphincter.
- IIIc: njury involving complete disruption of both the external and internal anal sphincters.
- IV: Complete rupture of the sphincter complex along with the rectal mucosa.

Repair Techniques:

- **End-to-End:** Approximation of sphincter ends by direct suturing
- **Overlap:** Overlapping of the sphincter ends followed by suturing

Other Terms: Episiotomy, labor induction, macrosomia, shoulder dystocia, occiput posterior fetal position, gas/fecal incontinence, colostomy.

Statistical Analysis: Continuous variables were summarized using mean ± SD or median (range) based on distribution. The Kolmogorov–Smirnov and Shapiro–Wilk tests were applied for normality assessment. Group comparisons utilized the independent t-test, Mann–Whitney U test, Chi-square test, or Fisher's Exact test as appropriate. Statistical analyses were performed using SPSS version 27.0, and significance was set at $p < 0.05$.

A post-hoc power analysis was performed using G*Power 3.1 software (Heinrich-Heine-Universität Düsseldorf) under the "z-tests: Difference between two independent proportions" module. Based on a one-tailed hypothesis ($p_2 > p_1$), at a significance level of 0.05, success rates of $p_1 = 0.066$ in the obstetrician group and $p_2 = 0.155$ in the general surgeon group, and sample sizes of $n_1 = 272$ and $n_2 = 84$, the calculated power (1–β) was 0.77 (critical z = 1.6449).

Results

Demographic and Obstetric Characteristics: The two groups showed comparable characteristics in terms of age, BMI, gravida, parity, live births, and abortions, with no statistically significant differences identified ($p > 0.05$). The grade distribution of perineal tears was also similar between groups ($p > 0.05$) (Table 1).

Obstetric and Intraoperative Parameters: No statistically significant differences were found between the groups in terms of birth weight, head circumference, or fetal position ($p > 0.05$). However, macrosomia and labor induction were observed significantly more frequently in the obstetrician group, while shoulder dystocia was more common in the general surgery group ($p < 0.05$). The rates of episiotomy and fetal position distribution were comparable between the groups ($p > 0.05$). In contrast, prolonged second-stage labor (≥ 2 hours) occurred significantly more often in the general surgery group ($p < 0.05$). Additionally, surgeries performed by resident physicians with less than two years of experience were significantly higher in the general surgery group ($p < 0.05$) (Table 2).

All OASIS repairs in our cohort were performed immediately after delivery. None of the patients underwent delayed repair, as every injury was identified and surgically corrected in the intrapartum or immediate postpartum period.

Table 1: Demographic and Obstetric Characteristics by Specialty Group

	Obstetrician Gynecologist Repairs (n=272)				General Surgeon Repairs (n=84)				p	
	Mean ± SD / n (%)			Median	Mean ± SD / n (%)			Median		
Age (Years)	27.7	±	5.9	28.0	27.4	±	5.9	27.0	0.693	m
Body Mass Index(kg/m²)	28.7	±	5.5	27.6	28.5	±	5.1	27.5	0.902	m
Number of Pregnancies (Gravida)	2.4	±	1.5	2.0	2.1	±	1.3	2.0	0.110	m
Number of Deliveries (Parity)	1.8	±	0.9	2.0	1.7	±	1.0	1.0	0.303	m
Number of Living Children	1.8	±	0.9	2.0	1.8	±	1.0	1.0	0.802	m
Number of Abortions	1.5	±	0.8	1.0	1.5	±	0.8	1.0	0.939	m

SD: standard deviation; χ^2: Chi-square test; m: Mann–Whitney U test (Fisher's exact test where required).

Table 2: Obstetric and Intraoperative Parameters by Specialty Group

		Obstetric Gynecologist Repairs (n:272)				General Surgeon Repairs (n=84)				p	
		Mean ± SD / n (%)			Median	Mean ± SD / n (%)			Median		
Birth Weight (g)		3187.6	±	467.4	3160.0	3157.9	±	444.0	3150.0	0.723	m
Neonatal Head Circumference(mm)		34.5	±	1.2	34.0	34.5	±	1.1	34.0	0.735	m
Macrosomia (>4000 g)		13		4.8%		0		0.0%		**0.041**	χ^2
Induction of labor		163		59.9%		29		34.5%		**0.000**	χ^2
Shoulder dystocia		8		2.9%		9		10.7%		**0.003**	χ^2
Fetal position: occiput posterior		43		15.8%		17		20.2%		0.343	χ^2
Episiotomy		189		69.5%		51		60.7%		0.134	χ^2
Second Stage of Labor Duration (>2 hours)		16		5.9%		25		29.8%		**0.000**	χ^2
Resident Surgeon Experience (<2 years)		99		36.4%		59		70.2%		**0.000**	χ^2
Degree of Perineal Tear	IIIA	92		33.8%		31		36.9%		0.899	χ^2
	IIIB	84		30.9%		20		23.8%			
	IIIC	65		23.9%		23		27.4%			
	IV	31		11.4%		10		11.9%			

SD: standard deviation; χ^2: Chi-square test; m: Mann–Whitney U test (Fisher's exact test where required)

Surgical Parameters: The general surgery group demonstrated significantly higher preoperative hemoglobin levels compared to the obstetrician group, although postoperative hemoglobin levels were similar between groups ($p > 0.05$). Regarding the surgical technique, overlap repair was utilized at comparable rates in both groups, while end-to-end repair was significantly more prevalent in the general surgery group ($p < 0.05$). Local anesthesia and sedo-analgesia usage rates were similar ($p > 0.05$), whereas spinal anesthesia was more frequently employed by obstetricians and general anesthesia was observed exclusively among patients operated on by general surgeons ($p < 0.05$). The mean operative duration showed no significant difference between groups ($p > 0.05$) (Table 3).

Postoperative Complications and Length of Hospital Stay: Postoperative infection and hemorrhage were significantly less frequent among

Table 3: Surgical Parameters by Specialty Group

		Obstetric–Gynecologist Repairs (n:272)				General Surgeon Repairs (n=84)				p	
		Mean ±SD/n (%)			Median	Mean±SD / n (%)			Median		
Preoperative Hemoglobin (g/dL)		11.4	±	1.3	11.3	11.9	±	1.3	12.0	0.002	m
Postoperative Hemoglobin (g/dL)		10.4	±	1.3	10.6	10.7	±	1.4	10.8	0.069	m
Repair technique	Overlap	161		59.2%		33		39.3%		0.001	X²
	End-to-End	111		40.8%		51		60.7%			
Type of Anesthesia											
Local Anesthesia		83		30.5%		18		21.4%		0.103	X²
Sedoanalgesia		88		32.4%		36		42.9%		0.077	X²
Spinal Anesthesia		101		37.1%		17		20.2%		0.004	X²
General Anesthesia		0		0.0%		13		15.5%		0.000	X²
Operation Time (minutes)		49.8	±	32.6	50.0	56.5	±	56.5	39.0	0.481	m

SD: standard deviation; χ^2: Chi-square test; m: Mann–Whitney U test (Fisher's exact test where required)

Table 4: Postoperative Complications and Length of Stay by Specialty Group

	Obstetric–Gynecologist Repairs (n:272)				General Surgeon Repairs (n=84)				p	
	Mean ±SD/n (%)			Median	Mean ±SD/n (%)			Median		
Postoperative Infection	18		6.6%		13		15.5%		***0.012***	X²
Postoperative Bleeding	12		4.4%		16		19.0%		***0.000***	X²
Wound Dehiscence	29		10.7%		10		11.9%		0.750	X²
Postoperative Hematoma	21		7.7%		10		11.9%		0.234	X²
Gas Incontinence	12		4.4%		6		7.1%		0.318	X²
Fecal Incontinence	4		1.5%		4		4.8%		0.093	X²
Colostomy	0		0.0%		3		3.6%		***0.013***	X²
Psychiatric Treatment	24		8.8%		12		14.3%		0.147	X²
Length of Hospital Stay (days)	4.9	±	3.1	4.0	5.8	±	4.6	4.0	0.316	m

SD: standard deviation; χ^2: Chi-square test; m: Mann–Whitney U test (Fisher's exact test where required)

patients operated on by obstetricians ($p < 0.05$). There were no significant differences between the groups in terms of wound dehiscence, incontinence (gas or fecal), or the need for psychiatric support ($p > 0.05$). Colostomy was observed solely in the general surgery group ($p < 0.05$). Length of hospital stay showed no statistically significant variation between the groups ($p > 0.05$) (Table 4).

Regression Analysis: In logistic regression analysis adjusted for age and BMI, the general surgery group exhibited a significantly higher risk of developing postoperative complications compared to the obstetrician-gynecologist group (OR ≈ 4.0; 95% CI ≈ 2.1–7.6). These results indicate that surgeon specialty is an independent risk factor for postoperative morbidity, consistent with findings from unadjusted models (Figure 2).

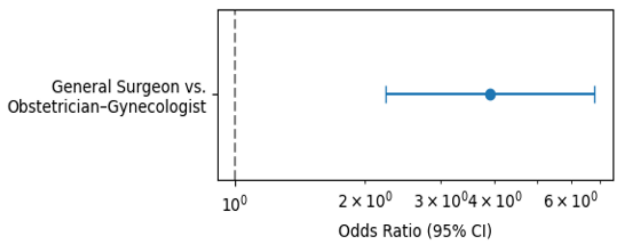

Fig. 2. Surgeon Profile and Complication Risk (Adjusted for Age and BMI)
Odds ratio for postoperative complications by surgeon profile, adjusted for age and BMI (OR = 3.54, 95% CI: 2.05–6.13; $p < 0.001$).

Discussion

In this retrospective cohort study, obstetrician-performed OASIS repairs were associated with significantly lower rates of early postoperative complications—specifically infection, wound dehiscence, and hematoma—compared to repairs performed by general surgeons. Nevertheless, continence outcomes and hospital stay durations did not differ significantly between the two groups. After adjusting for age and BMI, the risk of postoperative complications remained nearly four times higher in the general surgery group relative to the obstetrician-gynecology group (OR = 3.54; 95% CI: 2.05–6.13; $p < 0.001$).
Obstetrician-gynecologists predominantly preferred the overlap repair technique, whereas general surgeons tended to use the end-to-end approach. This difference reflects the inherent divergence in surgical approaches between specialties. The literature indicates no clear long-term advantage of one technique over the other in terms of continence outcomes (14,15). Therefore, the observed difference in complication rates in our study likely stems not only from the surgical technique employed but also from the surgeon's specialty profile, knowledge of perineal anatomy, and level of surgical experience.

The elevated rate of early complications observed in the general surgery group aligns with the results of a national survey from the United Kingdom, which indicated that 95.5% of general surgeons performed fewer than three OASIS repairs annually, and 57.6% reported low confidence in managing such cases (16). Similarly, Salim et al. demonstrated that OASIS repairs conducted by experienced obstetricians were associated with superior long-term continence outcomes (17).

The obstetrician-gynecologists' expertise in obstetric anatomy and layered reconstruction of perineal tissues, combined with effective hemostasis control, may have contributed to the lower rates of infection and hematoma. In order for general surgeons to achieve comparable outcomes, the integration of simulation-based surgical training and experienced mentorship programs is essential. A systematic review has shown that women with a history of OASIS commonly experience dyspareunia, reduced sexual satisfaction, and psychosexual disorders, underlining the importance of incorporating pelvic floor and sexual health considerations into surgical education programs (5).

Furthermore, a survey investigating multidisciplinary care bundles reported that structured protocols positively impact patient experience (18). These findings highlight the critical role of surgeon specialty, surgical technique selection, and standardized care protocols in enhancing patient safety and improving surgical outcomes in OASIS management.

The loss to follow-up of 38 patients (9.3%) within the first 30 days could have introduced systematic bias, as individuals who developed complications may have been less inclined to attend follow-up visits. To mitigate this limitation, the implementation of structured clinical care models involving multidisciplinary teams—comprising physical therapists, nurses, and other healthcare providers—is recommended. Such approaches facilitate the early detection of symptoms like incontinence and pain, enhance the quality of patient care, minimize missing data in retrospective studies, and strengthen comparability in prospective research designs (19).

Another study demonstrated that the integration of anorectal manometry findings with symptom scores provides more accurate prediction of long-term incontinence risk (20). In addition, meta-analyses have shown that complete sphincter tears are significantly associated with more severe incontinence symptoms (21,22). A multicenter quality improvement project reported that a four-component care bundle—including antenatal education, manual perineal protection, 60° mediolateral episiotomy when indicated, and systematic postpartum perineal examination—significantly reduced the incidence of OASIS (23). These findings support the implementation of structured clinical models incorporating simulation-based training, mentorship, and multidisciplinary protocols to optimize both short- and long-term functional outcomes in affected patients (24,25).

A narrative review further demonstrated that standardized care bundles implemented in specialized perineal trauma clinics improved complication management and optimized functional outcomes (26). International studies supporting evidence-based postpartum care have emphasized the importance of establishing dedicated OASIS clinics staffed by specialized teams and integrating simulation-based training and mentorship programs (27,28). These clinics have shown to markedly improve early morbidity and long-term outcomes through structured repair protocols and multidisciplinary approaches, ultimately enhancing patient satisfaction and quality of life (29,30). Additionally, they provide continuous mentorship and foster clinical competence through an educational cycle while serving as a hub for ongoing research and quality improvement initiatives (31).

The results of this study highlight the substantial impact of surgeon profile on the incidence of early postoperative complications after OASIS repair. Consequently, there is a pressing need to enhance surgical education for both obstetricians and general surgeons and to implement standardized multidisciplinary protocols to improve patient outcomes. Future prospective, multicenter studies are recommended to confirm these observations and guide updates to clinical practice guidelines in postpartum perineal trauma management.

Clinical Recommendations

- **Simulation-Based and Workshop Training**: Expanding structured training programs aimed at improving the practical application of perineal repair techniques may help reduce complication rates.
- **Multidisciplinary Approach**: It is recommended that the repair process be primarily led by obstetricians, with general surgeons participating in supportive roles when necessary (e.g., in procedures such as hypogastric artery ligation).
- **Standardized Protocols**: The adoption of "care bundle" approaches to create unified quality standards for both surgical groups would likely be beneficial.

Study Limitations: The post-hoc power analysis of this study, conducted using G*Power 3.1 software (one-tailed z-test; $\alpha = 0.05$; $p_1 = 0.066$, $p_2 = 0.155$; $n_1 = 272$, $n_2 = 84$), revealed a statistical power of 0.77. This indicates a 23% risk of Type II error and suggests that some non-significant results might actually reflect true differences. Therefore, larger, multicenter studies with sufficient sample sizes to achieve over 80% power are needed to more robustly evaluate similar effect sizes.

Additionally, 38 patients (9.3%) were excluded due to loss to follow-up within the first 30 postoperative days. If this loss to follow-up was systematic (e.g., patients who developed complications were less likely to return for follow-up), it could have introduced bias affecting the internal validity of our results. Future studies should aim to minimize such biases by implementing strict follow-up protocols and utilizing centralized data recording systems within multicenter study designs.

In conclusion, our findings demonstrate that surgeon specialty plays a decisive role in the early postoperative outcomes of OASIS repair. Obstetricians achieved significantly lower complication rates compared with general surgeons, highlighting the importance of structured surgical training and standardized perineal trauma management protocols. Strengthening multidisciplinary approaches and enhancing education for all providers involved in OASIS repair may improve both maternal safety and surgical quality. Future multicenter prospective studies are warranted to validate these results and guide clinical practice.

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