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Original Research Article

Stepwise surgical repair of complete perineal tear (OASIS): a 20-year retrospective study of 200 referred cases at a tertiary care centre in Bundelkhand region

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ABSTRACT

Background: Obstetric anal sphincter injuries (OASIS), comprising third- and fourth-degree perineal tears, are severe obstetric complications leading to significant maternal morbidity including fecal incontinence, perineal pain, wound dehiscence, dyspareunia, rectovaginal fistula formation, and psychological distress. This study aimed to evaluate demographic and obstetric characteristics of referred complete perineal tear cases managed at a tertiary care centre and to describe a standardized stepwise surgical repair protocol with functional and cosmetic outcomes.
Methods: A retrospective observational study was conducted in the Department of Obstetrics and Gynaecology, Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India, from January 2005 to December 2025. A total of 200 referred cases of complete perineal tear were included. Surgical repair was performed after 24 hours of delivery.
Results: Among 200 patients, 50% were aged >25 years and 70% were primigravida. Post-term deliveries accounted for 55% of cases. Birth weight was >3 kg in 50% of cases. Episiotomy was not given in 85% of cases. Saddle anaesthesia was used in 75% patients. Hospital stay was 14 days in 55% of patients.
Conclusions: Complete perineal tears were more frequent among primigravida and post-term deliveries, especially with neonatal birth weight >3 kg. Delayed repair following a standardized stepwise anatomical reconstruction protocol resulted in satisfactory functional and cosmetic outcomes.

Keywords: Complete perineal tear, End-to-end sphincter repair, Fourth-degree tear, OASIS, Obstetric anal sphincter injury, Rectal mucosal repair

INTRODUCTION

Perineal trauma affects a substantial proportion of women undergoing vaginal birth, with severe perineal tears accounting for significant maternal morbidity worldwide.[1] Obstetric anal sphincter injuries (OASIS) encompass third- and fourth-degree perineal tears involving the external anal sphincter (EAS), internal anal sphincter (IAS), and, in fourth-degree tears, the anorectal mucosa.[2]

The growing emphasis on maternal pelvic floor health and quality of life has highlighted the importance of OASIS as a major obstetric complication. Women experiencing OASIS may develop long-term complications including fecal incontinence, urgency, chronic perineal pain, sexual dysfunction, and psychological distress.[3] Early diagnosis and appropriate repair are therefore critical to prevent long-term sequelae.[4]

Despite advances in obstetric care, OASIS continues to pose clinical challenges due to variations in diagnosis,

repair techniques, and postpartum follow-up practices. Several international organizations, including the Royal College of Obstetricians and Gynaecologists (RCOG), American College of Obstetricians and Gynecologists (ACOG), and Society of Obstetricians and Gynaecologists of Canada (SOGC), have published evidence-based recommendations for prevention and management.[2,5,6]

In resource-limited settings, delayed recognition and inadequate primary repair at peripheral centres often leads to referral with failed or inadequate repairs, posing additional challenges for the managing surgeon.

This study evaluates the demographic and obstetric profile of referred cases of complete perineal tear at a tertiary care centre in the Bundelkhand region of Uttar Pradesh and describes a stepwise surgical repair technique practiced over two decades.

Classification

The RCOG classification system remains the most widely accepted method for categorizing OASIS.[2]

Third-degree tears - Grade 3a: Less than 50% of EAS thickness torn. Grade 3b: More than 50% of EAS thickness torn. Grade 3c: Both EAS and IAS torn. Fourth-degree tears - Disruption of EAS, IAS, and anorectal mucosa. Accurate classification is essential for selecting the appropriate repair technique and predicting outcomes.[2]

Epidemiology: The incidence of OASIS varies considerably worldwide, ranging from approximately 1% to 11% of vaginal births.[7] Differences in incidence are attributed to variations in obstetric practice, parity, fetal characteristics, and diagnostic expertise. Improved training and awareness have contributed to increasing reported rates in several countries.[8] Primiparous women experience a significantly higher risk than multiparous women. Operative vaginal deliveries, particularly forceps-assisted births, account for a substantial proportion of cases.[9]

Risk Factors -Maternal Factors: Nulliparity is one of the strongest predictors of OASIS.[10] Additional maternal factors include advanced maternal age, Asian ethnicity, previous OASIS, and short perineal body length.[11]

Fetal Factors: Fetal macrosomia, especially birth weight greater than 4000 g, significantly increases risk. Persistent occipitoposterior position, shoulder dystocia, and larger head circumference have also been implicated.[12]

Intrapartum Factors: Operative vaginal delivery, prolonged second stage of labor, oxytocin augmentation, and midline episiotomy have been associated with increased risk.[13] Forceps delivery carries a greater risk than vacuum-assisted birth.[9]

Pathophysiology: The anal continence mechanism depends upon the coordinated function of the EAS, IAS, pelvic floor muscles, rectal compliance, and neural pathways. Childbirth-related trauma may cause direct sphincter disruption, nerve injury, or both.[14] Mechanical damage to the sphincter complex can result in impaired resting and squeeze pressures, leading to varying degrees of fecal and flatal incontinence. Concomitant pudendal neuropathy may further exacerbate symptoms.[15]

Diagnosis: Accurate diagnosis requires thorough examination immediately after delivery. Visual inspection should be supplemented with vaginal and rectal examination.[2] Missed injuries remain a major concern, with studies suggesting that a significant proportion of sphincter defects are not recognized at the time of birth.[4] Endoanal ultrasonography remains the gold standard for identifying occult sphincter defects and evaluating symptomatic women postpartum.[16] Anorectal manometry provides additional functional assessment.[17]

Prevention: Prevention of OASIS has become an important component of modern obstetric practice. Perineal Support Techniques -Manual perineal support during crowning and controlled delivery of the fetal head have been associated with reduced rates of severe perineal trauma.[18] Episiotomy - Routine episiotomy is not recommended. However, mediolateral episiotomy may reduce the risk of OASIS during operative vaginal delivery and selected high-risk situations.[19] Midline episiotomy should generally be avoided due to its association with increased risk of sphincter injury.[13] Operative Vaginal Delivery - Careful patient selection, operator training, and appropriate use of instruments may reduce OASIS incidence. Forceps deliveries should be performed only when clearly indicated.[9] OASIS Care Bundles - Implementation of structured OASIS prevention programs has demonstrated reductions in severe perineal trauma through standardized training and evidence-based practices.[20]

METHODS

Study design and setting

This retrospective observational study was conducted in the Department of Obstetrics and Gynaecology, Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India.

Study duration

This retrospective observational study was conducted from January 2005 to December 2025.

Study population

A total of 200 referred cases of complete perineal tear were included.

Inclusion criteria

Referred cases of complete perineal tear (fourth-degree tear/OASIS) managed surgically at the study centre were included.

Exclusion criteria

Incomplete medical records and partial perineal tears not involving the anal sphincter complex were excluded.

Data collection

Data were collected from admission records, operative notes, and discharge summaries. Variables included maternal age, parity, gestational age, episiotomy status, neonatal birth weight, type of anaesthesia used, and duration of hospital stay. Surgical technique: Stepwise repair protocol

All repairs were performed after 24 hours of delivery. The stepwise protocol comprised the following: Step 1: Rectal mucosal repair using interrupted Vicryl 3-0 sutures with continuous submucosal reinforcement, Step 2: Identification of torn sphincter ends and grasping with Allis forceps, Step 3: End-to-end approximation of external anal sphincter, Step 4: Perineal body reconstruction in layers using Vicryl 1-0, Step 5: Vaginal wall repair with absorbable sutures, Step 6: Perineal skin closure with interrupted sutures, Step 7: Restoration of hymenal ring for cosmetic outcome.

Statistical analysis

Data were expressed as frequency and percentages. All statistical analyses were performed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY, USA).

RESULTS

A total of 200 cases underwent delayed repair after referral. The demographic and obstetric characteristics are summarized in Tables 1-7 below.

A total of 200 women were included in the study. The majority of participants were aged more than 25 years (50%), followed by 20-25 years (35%), while 15% were younger than 20 years (Table 1).

Regarding parity, primigravidae constituted the majority of the study population, accounting for 70% of cases, whereas multigravidae comprised 30% (Table 2).

Most women delivered in the post-term period (55%), followed by term deliveries (40%). Preterm deliveries accounted for only 5% of cases (Table 3).

Table 1: Maternal age distribution.

Age group (years)	Number (n=200)	Percentage
<20	30	15
20-25	70	35
>25	100	50

Table 2: Parity distribution.

Parity	Number	Percentage
Primigravida	140	70
Multigravida	60	30

Table 3: Gestational age distribution.

Gestational age	Number	Percentage
Preterm	10	5
Term	80	40
Post-term	110	55

Episiotomy was performed in 15% of women, while the remaining 85% did not require an episiotomy (Table 4).

Table 4: Episiotomy status.

Episiotomy	Number	Percentage
Given	30	15
Not given	170	85

Analysis of neonatal birth weight revealed that 50% of neonates weighed more than 3 kg, 45% weighed between 2 and 3 kg, and only 5% weighed less than 2 kg (Table 5).

Table 5: Neonatal birth weight distribution.

Birth weight	Number	Percentage
<2 kg	10	5
2-3 kg	90	45
>3 kg	100	50

Saddle anaesthesia was the preferred mode of anaesthesia and was administered in 75% of cases, whereas general anaesthesia was used in 25% of patients (Table 6).

Table 6: Type of anaesthesia used.

Anaesthesia	Number	Percentage
Saddle	150	75
General	50	25

Table 7: Duration of hospital stay.

Hospital stay	Number	Percentage
7 days	90	45
14 days	110	55

The duration of hospital stay was 14 days in 55% of women and 7 days in 45%, indicating that a slightly higher proportion required prolonged hospitalization (Table 7).

Figure 1 demonstrates a complete perineal tear extending from the posterior vaginal wall through the perineal body and anal sphincter complex with disruption of the anorectal mucosa. A Foley catheter is in situ.

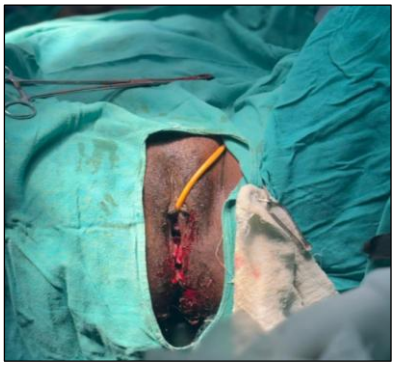

Figure 1: Pre-operative image of fourth-degree perineal tear (OASIS).

Figure 2: Post-operative image after stepwise anatomical repair.

Figure 2 showed post-operative image after stepwise anatomical repair showing satisfactory reconstruction including rectal mucosal closure, end-to-end approximation of the external anal sphincter, restoration of the perineal body, and vaginal mucosal repair.

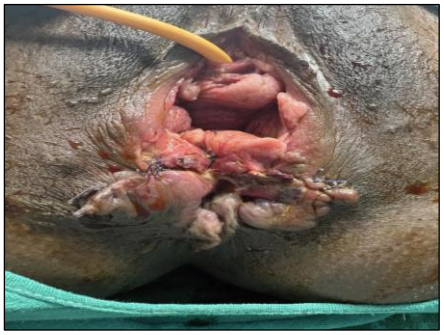

Figure 3: Referred patient received with prior sutures in situ and associated external hemorrhoids.

Figure 3 showed referred patient received with prior sutures in situ and associated external hemorrhoids. The wound appears inadequately approximated with distorted perineal anatomy, highlighting the need for systematic stepwise repair.

Figure 4 showed post-operative appearance after stepwise repair of fourth-degree perineal tear (OASIS) in a referred case. Anatomical reconstruction of the perineal body with satisfactory approximation of tissues is seen, with restoration of normal perineal architecture.

Figure 4: Post-operative appearance after stepwise repair of fourth-degree perineal tear (OASIS) in a referred case.

Postoperative care

Appropriate postoperative care is essential for optimal healing following obstetric anal sphincter injury repair. Key measures include administration of broad-spectrum antibiotics to reduce infection risk, use of stool softeners and laxatives to prevent constipation, adequate analgesia for pain control, and pelvic floor physiotherapy to support functional recovery. Follow-up evaluation at 6-12 weeks postpartum is recommended to assess healing and identify any persistent symptoms. Antibiotic prophylaxis has been shown to reduce wound complications and infection rates.

DISCUSSION

Obstetric anal sphincter injuries represent one of the most significant causes of maternal morbidity following vaginal delivery. The present study evaluated 200 referred cases of complete perineal tear (OASIS) managed at a tertiary care centre in the Bundelkhand region over a 20-year period, providing valuable insights into the demographic profile and outcomes of delayed surgical repair in a resource-limited setting. In the present study, the majority of patients were primigravida (70%), consistent with the well-established association between nulliparity and increased risk of OASIS. Andrews et al. reported that nulliparity was among the strongest independent risk factors for obstetric anal sphincter injury, a finding corroborated by large epidemiological studies.[1] Similarly, Gurol-Urganci et al observed in a national cohort study that primiparous women faced a substantially elevated risk

of third- and fourth-degree perineal tears compared to multiparous women.[8] The biological explanation relates to the reduced elasticity and adaptability of the perineum in nulliparous women during the second stage of labour, rendering the sphincter complex more susceptible to disruption. Post-term pregnancy constituted 55% of cases in our series. Prolonged gestation is associated with increased fetal weight, reduced amniotic fluid, and decreased fetal skull moulding capacity, all of which predispose to perineal trauma. This finding aligns with the observations of Dandolu et al, who identified post-term delivery as a significant obstetric risk factor contributing to severe perineal lacerations.[12] Macrosomia was evident in 50% of neonates (birth weight >3 kg) in our cohort. Fetal macrosomia, particularly birth weight exceeding 4000 g, has been consistently identified as a risk factor for OASIS in multiple studies. Jango et al demonstrated that large-for-gestational-age neonates significantly increase the mechanical forces exerted on the maternal perineum during the second stage of labour, predisposing to sphincter injury.[11] Episiotomy was absent in 85% of cases in our series, suggesting that uncontrolled perineal stretching in the absence of a directed incision may contribute to complete perineal rupture at peripheral centres. Mediolateral episiotomy has been advocated by some authors as a protective measure against OASIS, particularly during instrumental deliveries. Stedenfeldt et al demonstrated that a mediolateral episiotomy angle of 40-60 degrees from the midline was associated with a significantly lower incidence of OASIS.[19] Räisänen et al similarly confirmed that midline episiotomy markedly increased the odds of OASIS compared to mediolateral episiotomy.[13] However, the RCOG and ACOG do not recommend routine episiotomy, advocating instead for its selective use in high-risk situations such as instrumental delivery.[2,5] The high proportion of cases without episiotomy in our series reflects common practice at peripheral centres in the Bundelkhand region, where episiotomy may be underutilised or improperly performed, and where trained personnel may be unavailable to conduct mediolateral cuts appropriately. Despite delayed repair after referral, satisfactory cosmetic and functional outcomes were achieved in this series through meticulous stepwise anatomical reconstruction. Repair of rectal mucosa with submucosal reinforcement, proper identification and end-to-end approximation of sphincter ends, layered reconstruction of the perineal body, vaginal wall closure, and restoration of the hymenal ring were the key steps contributing to improved outcomes. The end-to-end repair technique used in this series has been widely described in the literature and is associated with acceptable continence rates. Sultan et al initially described the systematic approach to sphincter repair and reported satisfactory continence outcomes in women undergoing careful anatomical reconstruction.[4] Pergialiotis et al, in a comprehensive review of OASIS management, confirmed that end-to-end repair remains the preferred technique at most centres, yielding functional outcomes comparable to overlap repair at long-term follow-up.[7] Delayed repair, performed after adequate bowel preparation, antibiotic cover, and optimal tissue conditioning, can yield results comparable to immediate repair in experienced hands. The 24-hour delay adopted in this protocol allowed resolution of acute oedema and tissue fragility, facilitating better tissue identification and suture placement. This approach is supported by the observations of Laine et al, who demonstrated that outcomes after delayed repair at experienced centres were not significantly inferior to primary repair when standardised protocols were followed.[10] Hals et al further emphasised that systematic training and adherence to structured repair protocols are key determinants of postoperative continence.[18] Antibiotic prophylaxis, pelvic floor physiotherapy, and postoperative stool softeners, as advocated by RCOG guidelines, were integral components of postoperative management in our series.[2] Saddle (spinal saddle block) anaesthesia was the predominant mode of anaesthesia used in 75% of patients in the present study. This choice reflects both the logistical constraints in resource-limited settings and the adequacy of saddle block for perineal surgical procedures, providing effective regional anaesthesia with minimal systemic effects. Chronic perineal pain, urgency, and pelvic floor weakness may persist despite successful repair, and women should be counselled accordingly at follow-up.[15] Snooks et al. demonstrated that pudendal neuropathy resulting from childbirth trauma contributes significantly to long-term continence problems even following anatomically successful repairs.[15] The implementation of OASIS care bundles, as described by Gurol-Urganci et al, has been shown to significantly reduce severe perineal trauma rates through structured training, systematic intrapartum support, and standardised repair protocols.[20] Application of similar structured programmes at the peripheral centre level in resource-limited regions such as Bundelkhand could help reduce the burden of referred OASIS cases at tertiary centres. Women who remain asymptomatic with normal endoanal ultrasonography and manometry findings may be offered vaginal birth in subsequent pregnancies.[2] Women with persistent fecal incontinence, significant sphincter defects, or abnormal anorectal investigations should be counselled regarding elective caesarean delivery.[16] Shared decision-making remains essential in determining the optimal mode of delivery in subsequent pregnancies.

CONCLUSION

Complete perineal tears (OASIS) were more common among primigravida and post-term pregnancies, particularly when neonatal birth weight exceeded 3 kg. Delayed surgical repair can still achieve satisfactory functional and cosmetic outcomes when a standardized stepwise anatomical reconstruction technique is followed. Training of peripheral healthcare providers in recognising and appropriately managing OASIS, along with timely referral, remains essential to reduce long-term maternal morbidity.

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