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A Retrospective Evaluation of Our Anesthesia Experience in Pediatric Pilonidal Sinus Surgery

Çocuk Cerrahisinde Pilonidal Sinüs Ameliyatlarında Anestezi Deneyimlerinin Retrospektif Değerlendirmesi

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ABSTRACT

Objective: Pilonidal sinus disease is a chronic inflammatory condition that also affects pediatric patients. This study evaluates anesthesia experiences in pediatric pilonidal sinus surgeries and examines factors influencing recurrence.

Methods: A retrospective analysis was conducted on 49 pediatric patients who underwent pilonidal sinus surgery at Aydın Adnan Menderes University Hospital between 2020 and 2025. Demographic data, type of anesthesia (spinal or general), postoperative pain scores, complications, and recurrence rates were analyzed.

Results: The median patient age was 15 years (range: 12-17), and 73.5% were male. Spinal anesthesia (SPA) was administered in 83.7% of cases, while 16.3% received general anesthesia (GA). Postoperative pain scores were significantly lower in the SPA group than in the GA group (p=0.019). Recurrence rates were 31.3% in the GA group and 9.1% in the SPA group, though the difference was not statistically significant (p=0.094). Anesthesia-related complications occurred in 10.2% of cases.

Conclusion: SPA effectively reduces postoperative pain in pediatric pilonidal sinus surgeries. Although recurrence rates did not differ significantly between anesthesia types, GA was associated with a higher rate in certain metrics. The presence of abscesses and the number of sinus tracts did not significantly affect recurrence. Anesthesia selection should be tailored to the patient's condition and the surgical team's expertise.

Keywords: Pilonidal sinus, spinal anesthesia, general anesthesia, pediatric surgery, recurrence

ÖZ

Amaç: Pilonidal sinüs hastalığı, pediatrik yaş grubunda da görülebilen kronik enflamatuvar bir hastalıktır. Bu çalışmada, çocuk cerrahisinde pilonidal sinüs ameliyatlarındaki anestezi deneyimleri ve hastalığın nüksü üzerine etkili olabilecek faktörleri değerlendirmek amaçlanmıştır.

Yöntem: 2020-2025 yılları arasında Aydın Adnan Menderes Üniversitesi Hastanesi'nde pilonidal sinüs nedeniyle ameliyat edilen 49 pediatrik hasta retrospektif olarak incelendi. Hastaların demografik verileri, uygulanan anestezi türü (spinal veya genel), postoperatif ağrı skorları, komplikasyonlar ve hastalığın nüks oranları analiz edildi.

Bulgular: Hastaların yaş ortancası 15 (12-17) yıl olup, %73,5'i erkekti. Olguların %83,7'sine spinal anestezi (SPA), %16,3'üne genel anestezi (GA) uygulandı. SPA grubunun postoperatif ağrı skorları, GA grubuna kıyasla anlamlı derecede düşük bulundu (p=0,019). Nüks oranı GA grubunda %31,3, SPA grubunda ise %9,1 olup istatistiksel olarak anlamlı fark saptanmadı (p=0,094). Olguların %10,2'sinde anestezi ilişkili komplikasyon gelişmiştir.

Sonuç: SPA, çocuklarda pilonidal sinüs ameliyatlarında postoperatif ağrıyı azaltmada etkili ve güvenilir bir yöntemdir. Nüks oranları açısından anestezi türü istatistiksel olarak anlamlı bir fark yaratmasa da, GA

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grubunda nüks oranlarının daha yüksek olduğu gözlemlenmiştir. Apse varlığı ve sinüs trakt sayısının nüks üzerinde belirgin bir etkisi saptanmamıştır. Ancak, anestezi seçimi hastanın durumu ve cerrahi ekibin deneyimi doğrultusunda bireyselleştirilmelidir.

Anahtar Kelimeler: Pilonidal sinüs, spinal anestezi, genel anestezi, pediatrik cerrahi, nüks

INTRODUCTION

Pilonidal sinus disease (PSD) is commonly seen in young adults but can also affect the pediatric age group.[1,2] It is mostly observed in children and adolescents between 12 and 17 years and is more frequently encountered in males.[3] The reported incidence of PSD, particularly in adolescents, is 0.12%.[4]

The etiology of PSD has not yet been fully determined. However, according to current theories, factors such as mechanical friction, hair cutting, or hair shedding are thought to play a role in its development.[5] Some researchers argue that hair accumulates in the gluteal sulcus, penetrating the subcutaneous tissue, and that the resulting keratin deposits trigger the disease. Although PSD was thought to have a congenital cause in the 20th century, it is today regarded as an acquired condition.[5]

Surgical intervention is usually required for the treatment of PSD. However, postoperative pain and the risk of recurrence are frequently encountered after such surgery. Recurrence rates vary between 0% and 25%, but tend to be higher in pediatric patients.[5,6] PSD can particularly affect patient comfort and quality of life due to lengthy healing processes and the need for repeated surgical interventions in cases of recurrence.

The healing process, recurrence, and postoperative pain are important factors in the selection of anesthesia techniques. Various anesthesia methods, including local, spinal, and general anesthesia (GA), can be used in PSD surgery.[7,8] Different centers prefer different anesthesia techniques, and no consensus has been achieved on the optimal method.[9] Akdeniz[10] argued that spinal anesthesia (SPA) is advantageous in PSD surgery in the pediatric age group. Schmittner et al.[11] examined the differences between spinal and GA in PSD surgery and concluded that SPA may be more advantageous. Those authors reported that patients who underwent SPA exhibited faster recovery, experienced fewer postoperative complications, and registered lower levels of postoperative pain. This study aims to clarify how the choice of anesthesia in PSD may influence important outcomes such as postoperative pain control, complication rates, and disease recurrence.

METHODS

Approval for this retrospective study was obtained from the Aydın Adnan Menderes University Rectorate Faculty of Medicine Dean's Office Non-Interventional Clinical Research Ethics Committee (approval no: 2025/99, date: 20/03/2025). Once ethical committee approval had been obtained, the medical records and anesthesia charts of 50 patients who underwent surgery for PSD at the Aydın Adnan Menderes University Faculty of Medicine Department of Pediatric Surgery between 2020 and 2025 were retrospectively reviewed. Patient data, which includes age, gender, body weight, comorbidities, anesthesia techniques applied, complications encountered during and after anesthesia, and postoperative analgesic medications, were recorded by reviewing the anesthesia charts. Postoperative pain scores at the 8th hour were routinely assessed using the numeric rating scale (NRS) for patients aged eight and above; these scores were retrieved from the patient records. The number of sinuses in PSD and the presence of pilonidal abscess were also recorded through a review of the patient files. Disease recurrence was determined through subsequent hospital visits by patients and telephone interviews with their relatives.

SPA is preferred as the primary approach in pilonidal sinus cases, unless contraindicated. The SPA procedure in our clinic is as follows: patients and their relatives are informed about the procedure, and then written informed consent is obtained. The patients are taken to the operating room, and routine monitoring is applied. Once appropriate intravenous (IV) access has been established, the patient is placed in a sitting position. The L4-5 or L5-S1 spinal space is accessed using a 25-gauge spinal needle; patients weighing over 20 kg receive 0.2 mg/kg of 0.5% hyperbaric bupivacaine. A saddle block is generally applied for anorectal surgeries. Patients are supported by an assistant and kept in a sitting position for 5 minutes before being placed in the prone position. The block level is assessed using a "pinprick" test with a blunt needle to determine whether sensory blockade is sufficient in the appropriate dermatomes. The operation commences once adequate analgesia for the procedure has been confirmed. GA is administered in cases in which the patient or their relatives do not consent to SPA, in the presence of any contraindication to SPA, or if SPA fails after two attempts. In GA administration, following induction with 2 mg/kg IV propofol and 1 mcg/kg IV fentanyl, sufficient muscle relaxation is achieved with 0.6 mg/kg IV rocuronium bromide. The patient is then intubated and placed in the prone position. Sevoflurane is used as an inhalation anesthetic for anesthesia maintenance.

Statistical Analysis

Data analysis was performed on SPSS version 26 software (Statistical Package for Social Sciences-IBM Corp., Armonk, NY, USA). The assumption of normal distribution for numerical variables was checked using the Kolmogorov-Smirnov test. Since the assumption of normal distribution was not met, descriptive statistics for numerical variables were presented as median (25^{th}-75^{th} percentile), while categorical variables were expressed as frequency (%) values. The Mann-Whitney U test was applied for comparisons between independent groups. The relationship between groups and categorical variables was analyzed using the chi-square test. A p value<0.05 was considered statistically significant.

RESULTS

Forty-nine cases were included in the study. The median age was 15.0 (14.0-16.0) years, ranging from 12 to 17 years. Girls constituted 26.5% of the patients, and boys 73.5% (Table 1).

A single operation was performed in 81.6% of cases, while 16.3% of the patients underwent two procedures, and 2.0% required three. Pilonidal sinus was associated with abscess in 61.2% of cases, while no abscess was observed in the remaining 38.8%. The median number of sinuses was 2.0. The disease recurrence rate was 32.7%, with no recurrence being observed in 67.3% of the cases. In terms of comorbidities, 73.5% of patients had no associated comorbid conditions. Obesity was present in 10.2% of the cases, and celiac disease, diabetes, and scoliosis were present in 2.0% each. SPA was administered to 83.7% of the patients, while 16.3% received GA. Paracetamol was the most commonly used postoperative analgesic in 79.6% of cases, followed by a combination of paracetamol and non-steroidal anti-inflammatory drugs (NSAIDs) in 18.4%, and NSAIDs alone in 2.0%. No anesthesia-related complications were observed in 79.6% of cases. However, vasovagal response occurred in 4% of the patients, post-spinal headache in 6.1%, and postoperative nausea and vomiting in 10.2% (Table 2).

When postoperative pain intensity was assessed using the NRS, the pain scores in the SPA group were significantly lower than in the GA group (p=0.019). Median NRS scores were 4.0 (3.0-5.0) in the SPA group and 5.5 (3.5-6.0) in the GA group (Table 3).

When evaluating disease recurrence in relation to the type of anesthesia employed, presence of abscess, and number of sinuses, recurrence was observed in 31.3% of the GA group compared to 9.1% of the SPA group . However, this difference was not statistically significant (p=0.094). The presence of an abscess was not significantly associated with recurrence (p=0.091). Additionally, no significant difference was observed between the recurrence and non-recurrence groups in terms of number of sinuses (p=0.549) (Table 4).

Table 1. Distributions of the cases' demographic characteristics

Age [median (25^{th}-75^{th} percentile)]	**15.0 (14.0-16.0)**
Gender [n (%)]	
Female	13 (26.5)
Male	36 (73.5)

Descriptive statistics are presented as median (25^{th}-75^{th} percentile) or frequency (%)

Table 2. Descriptive statistics for surgical and anesthetic factors

Number of operations [n (%)]	
1	40 (81.6)
2	8 (16.3)
3	1 (2.0)
Presence of abscess [n (%)]	
Yes	30 (61.2)
No	19 (38.8)
Number of sinuses [median ($25^{th}75^{th}$ percentile)]	2.0 (1.0-3.0)
Recurrence [n (%)]	
Yes	16 (32.7)
No	33 (67.3)
Comorbidity [n (%)]	
None	36 (73.5)
Celiac disease	1 (2.0)
Diabetes	1 (2.0)
Hemorrhoids	1 (2.0)
Hepatic steatosis	1 (2.0)
Kyphosis	1 (2.0)
Obesity	5 (10.2)
Epilepsy	1 (2.0)
Scoliosis	1 (2.0)
Cerebral palsy	1 (2.0)
Type of anesthesia [n (%)]	
General	8 (16.3)
Spinal	41 (83.7)
Postoperative analgesic used	
NSAID	1 (2.0)
Paracetamol	39 (79.6)
Paracetamol-NSAID	9 (18.4)
Anesthesia complications [n (%)]	
None	44 (89.7)
Vasovagal response	1 (2.0)
PSHA	2 (4.0)
PONV	2(4.0)

Descriptive statistics are presented as median (25^{th}-75^{th} percentile) or frequency (%), NSAID: Non-steroidal anti-inflammatory drug, PSHA: Post-spinal headache, PONV: Postoperative nausea and vomiting

DISCUSSION

According to the current literature, PSD is generally observed in young adults. Almost all the pediatric patients enrolled in the present study also included adolescents.[4,12,13] The 49 patients included in the present study were between 12 and 17 years old, with a median age of 15. Adult PSD is 3-4 times more common in men than in women. However, many studies have reported no gender difference in pediatric PSD.[12,13] Analysis of the demographic data of our cases revealed that 73.5% of the patients were male and 26.5% were female. Males thus outnumbered females approximately three-fold. This higher proportion of male patients compared to the equal sex distribution reported in the literature for pediatric patients may be due to the relatively small sample size; further larger-scale studies are now needed on this subject.

In addition, 73.5% of the cases in this study had no comorbidities, while obesity was present in 10.2% of the cases. Several studies have suggested a positive correlation between obesity and pilonidal sinus.[14,15] Bolandparvaz et al.[14] concluded that obesity increases the risk of PSD due to a deeper gluteal sulcus and greater frictional trauma to hair follicles in obese individuals. However, based on our results, we conclude there is no significant correlation between obesity and PSD. In terms of postoperative analgesic use, 79.6% of the SPA group required only paracetamol, while the GA group required more multimodal analgesic therapy. Additionally, and consistent with previous studies, postoperative pain scores were significantly lower in the SPA group compared to the GA group (p=0.019). These findings support the idea that SPA provides more effective pain control during the intraoperative and early postoperative periods. Schmittner et al.[11] reported that patients who received SPA registered lower postoperative pain levels and required fewer postoperative analgesics. This can be attributed to the continued analgesic effect of SPA in the postoperative period, ensuring early pain control. In terms of complications during and after anesthesia, No complications were observed in 89.7% of the cases in the present study. However, postoperative nausea and vomiting were observed in 4.0% of cases, post-spinal headache in 4.0%, and a vasovagal response during SPA in 2.0%. The incidence of post-anesthesia complications in pediatric patients in the current literature varies widely, from 5% to 20%.[16-18] Anesthesia-related complications were identified in 10.2% of cases in the current study, a finding consistent with the previous literature.

Studies have concluded that the type of anesthesia applied has no significant impact on recurrence.[19] In the present study, disease recurrence rates were 9.1% in the SPA group and 31.3% in the GA group. However, this difference was not statistically significant (p=0.094). PSD can recur many years, even after the initial treatment, and our study did not track recurrences occurring in adulthood. This is one of the limitations of this study, since the cases included were analyzed retrospectively over a five-year period.

Abscess was detected in 81.3% of the cases with recurrence, compared to 51.5% in those without recurrence. The presence of abscesses had no statistically significant effect on disease recurrence (p=0.091). However, the rate of chronic PSD development in the presence of an abscess in the literature ranges from 16% to 92.5%.[19,20] This suggests that the relationship between abscess and recurrence rates may be clinically significant, the presence of an abscess may adversely impact the course of the disease.

Table 3. A comparison of the anesthesia groups in terms of NRS pain scores

	Type of anesthesia		p
	Spinal	General	
NRS pain score [median (25^{th}-75^{th} percentile)]	4.0 (3.0-5.0)	5.5 (3.5-6.0)	**0.019**

Descriptive statistics are presented as median (25^{th}-75^{th} percentile), NRS: Numeric rating scale

Table 4. A comparison of cases with pilonidal sinus recurrence in terms of anesthesia type, abscess status, and number of sinuses

	Recurrence		p
	Yes	No	
Type of anesthesia n (%) General Spinal	 5 (31.3) 11 (68.7)	 3 (9.1) 30 (90.9)	0.094
Abscess n (%) Yes No	 13 (81.3) 3 (18.8)	 17 (51.5) 16 (48.5)	0.091
Number of sinuses [median (25^{th}-75^{th} percentile)]	2.0 (1.0-3.0)	2.0 (1.0-2.5)	0.549

Descriptive statistics are presented as median (25^{th}-75^{th} percentile) or frequency (%)

Examination of sinus tract numbers in the cases with and without recurrence revealed median figures of 2.0 (1.0-3.0) and 2.0 (1.0-2.5), respectively. This finding suggests that the number of sinus tracts has no significant effect on recurrence (p=0.549). However, some previous studies have reported that an increased number of sinus tracts is associated with a higher risk of recurrence.[20] Larger-scale studies are now needed to further evaluate the impact of sinus tract numbers on recurrence.

Study Limitations

This study has a number of limitations. In particular, its retrospective and single-center nature may limit the generalizability of the results. Additionally, the limited sample size makes it difficult to apply the findings to a broader population. Furthermore, our inability to assess long-term recurrence rates, due to its, represents another significant limitation.

CONCLUSION

In conclusion, the study findings show that SPA is beneficial in terms of postoperative pain control but has no significant impact on recurrence rates. However, potential complications such as hemodynamic changes and vasovagal responses should be considered during technique selection. SPA can be regarded as a safe and effective option with appropriate patient selection in pediatric cases. The choice of anesthesia should be individualized based on patient characteristics and the surgical team's experience.

Ethics

Ethics Committee Approval: Approval for this retrospective study was obtained from the Aydın Adnan Menderes University Rectorate Faculty of Medicine Dean's Office Non-Interventional Clinical Research Ethics Committee (approval no: 2025/99, date: 20/03/2025).

Informed Consent: Consent form was filled out by all participants.

Footnotes

Authorship Contributions

Surgical and Medical Practices: G.B.Ön., D.K., G.B.Ö., Concept: G.B.Ön., D.K., G.B.Ö., Design: G.B.Ön., D.K., G.B.Ö., F.G., Data Collection or Processing: G.B.Ön., D.K., G.B.Ö., Analysis or Interpretation: G.B.Ön., D.K., Literature Search: G.B.Ön., D.K., Writing: G.B.Ön.

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