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# Evaluation of the Effectiveness of Local Anesthesia and Patient Tolerance in Penile Prosthesis Implantation

## Penil Protez İmplantasyonunda Lokal Anestezinin Etkinliğinin ve Hasta Toleransının Değerlendirilmesi

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***ABSTRACT***

**Objective:** This study aims to evaluate the effectiveness, safety, and patient tolerance of penile prosthesis implantation (PPI) performed under local anesthesia (LA). The study investigates its impact on perioperative pain management, postoperative recovery, and overall patient satisfaction.

**Material and Methods:** This prospective study included 26 male patients who underwent PPI under LA between January 2024 and December 2024. Ethical approval was obtained from the Ethics Committee Antalya Training and Research Hospital No: 2/24, Date: 30.01.2025). Pain intensity was assessed using the Visual Analog Scale (VAS), while patient stability and intraoperative parameters were monitored. The American Society of Anesthesiologists (ASA) classification system was used for anesthesia risk assessment.

**Results:** The mean age of the patients was 67.25 ± 11.48 years. Diabetes mellitus and hypertension were present in 75% and 62.5% of patients, respectively. According to ASA classification, 46.2% were classified as ASA-II, while 53.8% were ASA-III. The mean intraoperative VAS score was 1.8 (mild pain), while the mean postoperative VAS score was 4.6 (mild-to-moderate pain). No patients required additional sedation or conversion to general anesthesia. No major intraoperative complications or postoperative prosthesis-related complications were observed.

**Conclusion:** Local anesthesia is a feasible and effective alternative for penile prosthesis implantation, offering benefits such as minimal intraoperative discomfort, avoidance of systemic anesthetic complications, and a favorable recovery profile. Further studies with larger cohorts are needed to optimize pain management strategies and evaluate long-term functional outcomes.

**Keywords:** penile prosthesis implantation, local anesthesia, erectile dysfunction, pain management

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## ÖZET

**Amaç:** Bu çalışmanın amacı, lokal anestezi altında gerçekleştirilen penis protezi implantasyonunun (PPI) etkinliğini, güvenliğini ve hasta toleransını değerlendirmektir. Çalışma, perioperatif ağrı yönetimi, postoperatif iyileşme süreci ve genel hasta memnuniyeti üzerindeki etkilerini araştırmaktadır.

**Gereç ve Yöntemler:** Bu prospektif çalışmaya, Ocak 2024 ile Aralık 2024 tarihleri arasında lokal anestezi altında PPI uygulanan 26 erkek hasta dahil edildi. Çalışma için etik onay, Antalya Eğitim ve Araştırma Hastanesi Etik Kurulu'ndan alındı (Karar No: 2/24, Tarih: 30.01.2025). Ağrı şiddeti Görsel Analog Skalası (VAS) kullanılarak değerlendirildi ve intraoperatif parametreler ile hasta stabilitesi takip edildi. Anestezi riski değerlendirmesinde Amerikan Anesteziyologlar Derneği (ASA) sınıflandırma sistemi kullanıldı.

**Bulgular:** Hastaların ortalama yaşı 67,25 ± 11,48 yıl olup, %75'inde diyabetes mellitus, %62,5'inde hipertansiyon mevcuttu. ASA sınıflandırmasına göre hastaların %46,2'si ASA-II, %53,8'i ASA-III kategorisinde yer aldı. Ortalama intraoperatif VAS skoru 1,8 (hafif ağrı), ortalama postoperatif VAS skoru ise 4,6 (hafif-orta şiddette ağrı) olarak ölçüldü. Hiçbir hastada ek sedasyon gereksinimi ya da genel anesteziye geçiş ihtiyacı oluşmadı. Ayrıca, intraoperatif veya erken postoperatif dönemde ciddi komplikasyon veya protezle ilişkili olumsuz durum gözlenmedi.

**Sonuç:** Lokal anestezi, penis protezi implantasyonu için güvenilir ve etkili bir alternatif olup, minimal intraoperatif rahatsızlık, sistemik anestezik komplikasyonlardan kaçınma ve avantajlı bir iyileşme süreci sunmaktadır. Daha geniş hasta gruplarında yapılacak ileri çalışmalar, ağrı yönetimi stratejilerinin optimize edilmesi ve uzun dönem fonksiyonel sonuçların değerlendirilmesi açısından gereklidir.

**Anahtar Kelimeler:** Penis protezi implantasyonu, Lokal anestezi, Erektil disfonksiyon, Ağrı yönetimi, Postoperatif iyileşme

## INTRODUCTION

Erectile dysfunction (ED) is a prevalent and multifactorial condition characterized by the inability to achieve or maintain sufficient penile rigidity to engage in satisfactory sexual intercourse (1). ED represents a significant burden on both individual well-being and public health. Its prevalence increases progressively with age and is closely associated with common comorbidities such as diabetes mellitus, cardiovascular diseases, and metabolic syndrome. Recent epidemiological data from multi-country population studies confirm that the global incidence of ED continues to rise in parallel with aging populations and lifestyle-related health conditions (2,3).

The therapeutic landscape for ED is diverse, encompassing pharmacological agents, behavioral and psychological interventions, and surgical modalities. While oral phosphodiesterase type 5 (PDE5) inhibitors and intracavernosal injections remain the mainstay of pharmacotherapy, a subset of patients with severe or refractory ED fails to achieve satisfactory outcomes with these conservative approaches. In such cases, penile prosthesis implantation (PPI) emerges as a definitive treatment option, providing a highly effective and durable solution for restoring sexual function (4).

Traditionally, PPI has been performed under general or regional (spinal) anesthesia, ensuring optimal surgical conditions and patient comfort. However, there has been a growing interest in recent years in the utilization of local anesthesia (LA) for this procedure. The potential benefits of local anesthesia include a reduced perioperative risk profile, avoidance of systemic anesthetic complications, shorter hospitalization durations, and a faster recovery trajectory. Additionally, local anesthesia may provide an alternative for patients with contraindications to general or regional anesthesia. Despite these advantages, concerns persist regarding the adequacy of analgesia, intraoperative patient experience, and the potential impact on complication rates (5).

Given the increasing emphasis on minimally invasive techniques and enhanced recovery protocols in surgical practice, evaluating the feasibility of PPI under local anesthesia is of paramount importance. This study aims to assess the efficacy, safety, and patient tolerance of penile prosthesis implantation performed under local anesthesia. Furthermore, it seeks to elucidate its impact on perioperative pain management, postoperative recovery, and overall patient satisfaction. By addressing these key parameters, this study endeavors to contribute valuable insights into the optimization of anesthesia protocols for PPI, thereby enhancing patient-centered surgical care.

## MATERIAL AND METHODS

### Study Design and Patient Selection

This retrospective study included 26 male patients who underwent penile prosthesis implantation under local anesthesia between January 2024 and December 2024. Ethical approval for the study was obtained from the Ethics Committee of Antalya Training and Research Hospital (Decision No: 2/24, Date: 30.01.2025). Data were collected from patient medical records and surgical reports. The inclusion criteria encompassed male patients diagnosed with severe erectile dysfunction unresponsive to pharmacological interventions and considered suitable candidates for penile prosthesis implantation. Exclusion criteria included a history of significant bleeding disorders, known hypersensitivity to local anesthetic agents, and severe psychiatric conditions that could interfere with pain perception and procedural compliance. Additionally, four patients who initially consented to participate later withdrew and were consequently excluded from the final analysis. Importantly, all procedures in this study were primary (de-novo) implantations, and no revision or replacement surgeries were performed.

### Anesthetic Technique

Local anesthesia was administered using a mixture of 0.5% bupivacaine (Marcaine®) and 0.5% lidocaine, without adrenaline, in a 25:75 ratio. A 23-gauge, 1.5-inch needle was used for precise infiltration. The anesthetic solution was injected into the peno-scrotal region following a stepwise approach, which involved superficial infiltration first, followed by deeper tissue injection to achieve comprehensive regional anesthesia. This technique aimed to optimize pain control, enhance patient comfort, and ensure optimal surgical conditions. Similar field block and regional infiltration techniques for penile prosthesis surgery have been described in recent literature, showing satisfactory analgesic outcomes and patient tolerability (6).

### Surgical Procedure

The surgical procedure was performed using the peno-scrotal approach in all cases. A midline scrotal incision was made to expose the corpora cavernosa. After careful dilatation, three-piece inflatable penile prostheses (Rigicon®) were bilaterally positioned within the corpora cavernosa. The reservoir component was placed in the retropubic space via the external inguinal ring. Meticulous hemostasis was maintained throughout the procedure, and the surgical site was closed using absorbable sutures. Postoperative antibiotic prophylaxis was administered according to institutional protocols to minimize the risk of infection. Notably, no patients reported intraoperative or early postoperative abdominal pain or discomfort related to reservoir placement.

### Pain Assessment and Perioperative Monitoring

Pain intensity was evaluated using the Visual Analog Scale (VAS), with a score ranging from 0 to 10, where 0 represented no pain and 10 indicated the worst possible pain. Pain severity was categorized into three levels: mild pain (<3), mild-to-moderate pain (3–6), and moderate-to-severe pain (>6). Throughout the procedure, hemodynamic parameters, including blood pressure, heart rate, and oxygen saturation, were continuously monitored to ensure patient stability and optimal intraoperative comfort.

### Anesthesia Risk Assessment

The American Society of Anesthesiologists (ASA) physical status classification system was employed to assess preoperative anesthesia risk. Patients were categorized as ASA I (healthy individuals with no systemic disease), ASA II (patients with mild systemic disease, such as controlled hypertension or diabetes), and ASA III (patients with severe systemic disease, such as significant cardiovascular pathology). No patients classified as ASA IV or higher were included in this study (7).

### Postoperative Care and Follow-Up

Patients were observed in the postoperative care unit for an initial recovery assessment. Analgesic requirements, early complications, and patient-reported satisfaction were meticulously documented. Discharge was determined based on postoperative recovery and pain management, with most patients being discharged on the same day or within 24 hours.

### Statistical Analysis

Descriptive statistics were employed in this study. Continuous variables are presented as mean ± standard deviation and range (minimum–maximum), while categorical variables are expressed as absolute numbers and percentages. All calculations were performed using Microsoft Excel (Microsoft Corp., Redmond, WA, USA). No inferential statistical analyses were conducted.

## RESULTS

The study included 26 male patients with a mean age of 67.25 ± 11.48 years (range: 48–92 years). Among these, 75% (19 patients) had diabetes mellitus, and 62.5% (16 patients) had hypertension. Additionally, 18.75% (4 patients) had a history of radical prostatectomy, and 30.8% (8 patients) had cardiovascular disease. According to the ASA classification, 46.2% (12 patients) were classified as ASA-II, while 53.8% (14 patients) were classified as ASA-III. The mean intraoperative VAS score was 1.8, indicating mild pain, whereas the mean postoperative VAS score was 4.6, corresponding to mild-to-moderate pain. No patients required additional sedation during the procedure. There were no major intraoperative complications, and no patients required conversion to general anesthesia. Additionally, no severe postoperative complications, such as prosthesis infection or mechanical failure, were observed within the immediate postoperative period (Table 1).

**Table 1.** Patient Demographics, Clinical Characteristics, and Outcomes

| Parameter | Value (%, n) or Mean ± SD |
|---|---|
| Number of Patients, n | 26 |
| Mean Age (years) | 67.25 ± 11.48 (range: 48–92) |
| Diabetes Mellitus, % (n) | 75% (19 patients) |
| Hypertension, % (n) | 62.5% (16 patients) |
| History of Radical Prostatectomy, % (n) | 18.75% (4 patients) |
| ASA-II, % (n) | 46.2% (12 patients) |
| ASA-III, % (n) | 53.8% (14 patients) |
| Mean Intraoperative VAS Score | 1.8 ± 0.6 (mild pain) |
| Mean Postoperative VAS Score | 4.6 ± 1.2 (mild-to-moderate pain) |
| Major Complications | None |

Continuous variables are presented as mean ± standard deviation and range. Categorical variables are expressed as number (percentage). ASA: American Society of Anesthesiologists, VAS: Visual Analog Scale.

## DISCUSSION

The findings of this study contribute to the growing body of evidence supporting the feasibility and safety of penile prosthesis implantation under local anesthesia. By evaluating perioperative outcomes, pain control, and patient experience, this study provides an in-depth analysis of the potential advantages and challenges associated with this approach.

Consistent with prior research, our results indicate that local anesthesia is an effective alternative to general or spinal anesthesia, offering significant benefits in terms of reduced systemic anesthetic risks and accelerated recovery (3). The observed intraoperative VAS scores (mean 1.8) align with previous studies reporting minimal discomfort during surgery (4). Additionally, the postoperative VAS score (mean 4.6) suggests that while local anesthesia provides sufficient analgesia intraoperatively, postoperative pain management strategies may require further optimization. A recent multi-institutional study demonstrated that multimodal analgesia protocols can significantly reduce early postoperative pain and narcotic requirements in patients undergoing penile prosthesis implantation (7).

A notable difference between our study and existing literature lies in the variability of postoperative pain scores. While some studies report lower pain levels following local anesthesia, our findings suggest that patient-reported pain perception may vary due to factors such as individual pain thresholds, procedural duration, and intraoperative

anxiety (8,9). This discrepancy underscores the importance of individualized pain management strategies and the potential role of adjunctive analgesic techniques to enhance patient comfort. Furthermore, unlike certain reports indicating a need for intraoperative sedation, our study found no such requirement, supporting the effectiveness of our anesthetic protocol in maintaining procedural tolerance (10).

Despite the advantages of local anesthesia, challenges remain in ensuring optimal patient comfort and minimizing anxiety. Recent studies emphasize the role of preoperative psychological preparation and intraoperative communication in mitigating anxiety-related discomfort (11,12). Additionally, optimizing the local anesthetic mixture and refining injection techniques may further enhance intraoperative analgesia and postoperative recovery (13,14) These refinements could be instrumental in improving overall patient satisfaction and procedural outcomes.

Furthermore, the long-term implications of local anesthesia in penile prosthesis implantation remain an area of ongoing investigation. While immediate postoperative outcomes are promising, further research is required to determine the impact of local anesthesia on long-term prosthesis functionality, patient-reported sexual satisfaction, and potential late-onset complications (15). Studies have suggested that intraoperative pain perception and overall procedural experience may be influenced by factors such as surgical duration and psychological state, necessitating a more tailored approach to pain and anxiety management (16). Additionally, refining multimodal analgesia strategies, including the potential use of regional nerve blocks in conjunction with local infiltration, may optimize perioperative analgesia and enhance recovery (17). In addition, broader implementation of local anesthesia protocols aligns with current efforts to minimize opioid usage and enhance patient-centered recovery pathways, especially in outpatient prosthetic surgery settings (17). Recent studies have also emphasized the importance of comprehensive strategies to improve patient satisfaction, surgical success rates, and long-term functional outcomes in penile prosthesis implantation, further supporting the integration of minimally invasive and patient-tailored anesthetic approaches (18).

This study has several limitations. First, the relatively small sample size limits the external validity of our findings. Larger, multi-center trials are needed to validate these results and explore potential patient subgroups who may benefit the most from local anesthesia. Second, long-term functional outcomes and prosthesis durability were not assessed, highlighting the need for extended follow-up studies. Finally, while this study systematically evaluated intraoperative and immediate postoperative pain, additional parameters such as long-term patient satisfaction and sexual function recovery should be incorporated into future research.

## CONCLUSION

In conclusion, local anesthesia represents a viable and potentially superior alternative for penile prosthesis implantation, demonstrating favorable safety and recovery profiles. However, continuous evaluation and refinement of anesthetic protocols are essential to optimize patient outcomes and enhance surgical experiences. Future research should focus on long-term functional outcomes and the integration of multimodal analgesia strategies to further improve postoperative care.

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## REFERENCES

1. Haensch, C. A., Hilz, M., Jost, W., Kaufmann, A., Kessler, T., & Lahrmann, H. (2019). S1-Leitlinie Diagnostik und Therapie der erektilen Dysfunktion [S1-Guideline for Diagnosis and Treatment of Erectile Dysfunction]. Fortschritte der Neurologie · Psychiatrie, 87(4), 225-233. https://doi.org/10.1055/a-0747-5892
2. Goldstein, I., Goren, A., Li, V. W., Tang, W. Y., & Hassan, T. A. (2020). Epidemiology Update of Erectile Dysfunction in Eight Countries with High Burden. Sexual medicine reviews, 8(1), 48–58. https://doi.org/10.1016/j.sxmr.2019.06.008
3. Kessler, A., Sollie, S., Challacombe, B., Briggs, K., & Van Hemelrijck, M. (2019). The global prevalence of erectile dysfunction: a review. BJU international, 124(4), 587–599. https://doi.org/10.1111/bju.14813
4. Porst, H., Burnett, A., Brock, G., Ghanem, H., Giuliano, F., Glina, S., Hellstrom, W., Martin-Morales, A., Salonia, A., & Sharlip, I. (2013). SOP conservative (medical and mechanical) treatment of erectile dysfunction. Journal of Sexual Medicine, 10(1), 130-171. https://doi.org/10.1111/jsm.12023
5. Fidel, M. G., Shah, J., Bal, D. S., Roque, C., Ko, Y., Dhillon, H., Bard, R., Pandian, A., Nayak, J. G., & Patel, P. (2024). Inflatable penile prosthesis implantation in the outpatient setting is safe and feasible: a prospective, singe center study. International journal of impotence research, 10.1038/s41443-024-01004-3. Advance online publication. https://doi.org/10.1038/s41443-024-01004-3
6. Elatreisy, A., Ahmed, Y., Elgarhy, A., Hindawy, M., Abouelgreed, T., Ahmed, I., et al.(2024). Comparative study between intrathecal fentanyl and dorsal penile nerve block for controlling postoperative pain after inflatable penile prosthesis implantation. Archivio italiano di urologia, andrologia : organo ufficiale [di] Societa italiana di ecografia urologica e nefrologica, 96(4), 12951. https://doi.org/10.4081/aiua.2024.12951
7. Lucas, J., Gross, M., Yafi, F., DeLay, K., Christianson, S., El-Khatib, F. M., Osman, M., & Simhan, J. (2020). A Multi-institutional Assessment of Multimodal Analgesia in Penile Implant Recipients Demonstrates Dramatic Reduction in Pain Scores and Narcotic Usage. The journal of sexual medicine, 17(3), 518–525. https://doi.org/10.1016/j.jsxm.2019.11.267
8. Klimek, L., Bergmann, K. C., Biedermann, T., Bousquet, J., Hellings, P., Jung, K., Merk, H., Olze, H., Schlenter, W., Stock, P., Ring, J., Wagenmann, M., Wehrmann, W., Mösges, R., & Pfaar, O. (2017). Visual analogue scales (VAS): Measuring instruments for the documentation of symptoms and therapy monitoring in cases of allergic rhinitis in everyday health care. Allergo Journal International, 26(1), 16-24. https://doi.org/10.1007/s40629-016-0006-7
9. American Society of Anesthesiologists. (2014). ASA Physical Status Classification System. Retrieved from https://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system
10. American Society of Anesthesiologists. (2012). Practice Guidelines for Preoperative Assessment. Anesthesiology.
11. Cherobin, A. C. F. P., & Tavares, G. T. (2020). Safety of local anesthetics. Anais Brasileiros de Dermatologia, 95(1), 82-90. https://doi.org/10.1016/j.abd.2019.09.025
12. Schnabl, S. M., Herrmann, N., Wilder, D., Breuninger, H., & Häfner, H. M. (2014). Clinical results for use of local anesthesia with epinephrine in penile nerve block. Journal of the German Society of Dermatology, 12(4), 332-339. https://doi.org/10.1111/ddg.12287
13. Hsu GL, Hsieh CH, Chen HS, Ling PY, Wen HS, Liu LJ, Chen CW, Chua C. The advancement of pure local anesthesia for penile surgeries: can an outpatient basis be sustainable? J Androl. 2007 Jan-Feb;28(1):200-5. https://doi.org/10.2164/jandrol.106.000679. Epub 2006 Sep 20. PMID: 16988329.
14. Althof, S. E., et al. (2014). An update of the International Society of Sexual Medicine's guidelines for the diagnosis and treatment of premature ejaculation (PE). The Journal of Sexual Medicine, 11(6), 1392-1422.
15. Brennan, F., Carr, D. B., & Cousins, M. (2007). Pain management: A fundamental human right. Anesthesia & Analgesia, 105(1), 205-221. https://doi.org/10.1213/01.ane.0000268145.52345.55
16. Altieri, V. M., Saldutto, P., Verratti, V., La Rocca, R., Di Mauro, E., Celentano, G., Capece, M., Morgera, V., Cacace, G., Vena, W., Mastrangelo, F., Napolitano, L., & Iacono, F. (2024). Altieri modified Nesbit corporoplasty for the

treatment of penile curvature: Comparison of local anesthesia vs loco-regional anesthesia on the clinical outcomes. Archivio Italiano di Urologia e Andrologia, 96(4), 12957. https://doi.org/10.4081/aiua.2024.12957

17. Reinstatler, L., Shee, K., & Gross, M. S. (2018). Pain management in penile prosthetic surgery: A review of the literature. Sexual Medicine Reviews, 6(1), 162-169. https://doi.org/10.1016/j.sxmr.2017.05.005
18. Hellstrom W. J. G. (2025). Advances in penile prosthetics: current trends and future directions in erectile dysfunction treatment. International journal of impotence research, 37(1), 1–3. https://doi.org/10.1038/s41443-024-01010-5