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Exploring pediatric surgery dissertations: Focus areas and future directions

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ABSTRACT

Objectives: The aim of this study was to evaluate pediatric surgery dissertations included in the Higher Education Council dissertation database.

Methods: A search was conducted in Turkey's Higher Education Council dissertation database using the keyword "pediatric surgery" to identify all dissertations published in the database between 2019 and 2023. The evaluation focused on dissertation topics.

Results: A total of 120 dissertations were analyzed. The most common topics were related to the gastrointestinal system (n=37) and urology (n=30). Clinical studies showed an increasing trend over the years, rising from 53% in 2019 to 80% in 2022, before slightly decreasing to 72% in 2023. Experimental studies accounted for 47% of the studies in 2019 but declined to 20% in 2022, with a slight recovery to 28% in 2023 (P=0.242). Clinical studies dominated in most sections, particularly in traumatology (100%), thoracic surgery (86%), and general pediatric surgery (80%). Experimental studies had higher proportions in gynecology (60%) and urology (43%) (P=0.090). The most common topics were related to appendicitis (n=9), esophageal atresia (n=8), anorectal malformations (n=7), hypospadias (n=7), and testicular conditions (n=7). Dissertation top five topics accounted for 32% of all topics.

Conclusions: Pediatric surgery dissertations mainly centered on clinical studies, with a notable focus on gastrointestinal and urological topics. Appendicitis, esophageal atresia, and anorectal malformations were the most studied areas. Regenerative medicine was significantly underrepresented. Encouraging studies in regenerative medicine and multidisciplinary approaches could drive innovation and address gaps in pediatric surgery research.

Keywords: Pediatric surgery, Medical Specialization Board, thesis, dissertations

In Turkey, the Medical Specialization Board (TUK) is an official body responsible for setting and supervising the standards of medical specialization training [1]. Operating under the Ministry of Health, the board develops training curricula for specialization fields, evaluates the adequacy of training institutions, and oversees the organization of specialization exams. TUK coordinates the Medical Specialization Examination (TUS) process, which places medical school graduates into specialization programs. Additionally, it conducts activities to accredit training programs, address the rights and responsibilities of

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specialization students, and improve the quality of training processes [2]. This TUK system aims to enhance the quality of medical education in Turkey and to train specialists in line with international standards.

In our country, approximately 30 pediatric surgery positions are offered during each term of the medical specialty examination, and an average of 20-30 pediatric surgeons receive their specialty certification each year [1-3]. The duration of training in each specialty varies, typically ranging from 3 to 5 years. The duration of pediatric surgery specialty training, however, is 5 years. According to the TUK regulation, every doctor specializing in medicine must write a dissertation at the end of the specialization period [1-3].

Not only in Turkey but also worldwide, and not only in pediatric surgery but across all medical specialties, every residency or specialty trainee must prepare a dissertation at the end of their training. Each trainee preparing this dissertation must have at least one supervising advisor. This dissertation topic can be a clinical or experimental study.

The aim of this study was to evaluate pediatric surgery dissertations included in the Higher Education Council dissertation database.

METHODS

For this study, a search was conducted in Turkey's Higher Education Council dissertation database using the keyword "pediatric surgery" to identify all dissertations published in the database between 2019 and 2023 (5 years) [4]. The evaluation focused on the location and institution where the dissertation was conducted, the author, the title, whether the study was experimental or clinical, the subspecialty it involved, the organ it addressed, the topic of the study, and the methodology used. A flow chart is given in Fig. 1.

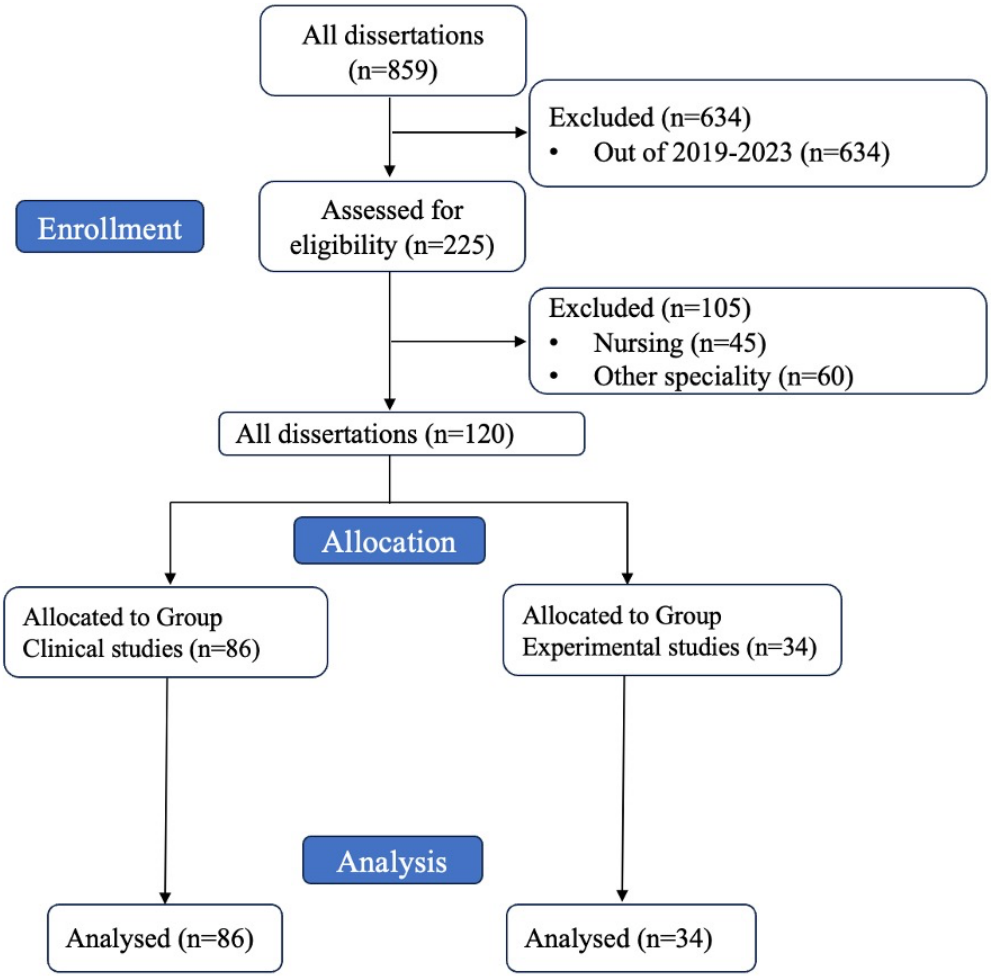

Fig. 1. Selection of dissertations.

Inclusion criteria

The dissertation must have been conducted by a pediatric surgery specialist and completed and polished in database between 2019 and 2023.

Exclusion criteria

Dissertations in the field of pediatric surgery nursing, those conducted by researchers specializing in disciplines other than pediatric surgery (even if related to pediatric surgery), and dissertations outside the specified years were excluded from the study.

This study was based on data obtained from the dissertations database and does not involve any human or animal subjects. Throughout the process, adherence to the Personal Data Protection Law was ensured.

Statistical Analysis

The data obtained from the database were coded into an Excel file. Statistical analyses were performed using Jamovi software. The data were expressed as frequencies and percentages. The chi-square test was used to compare categorical variables, with a significance level set at $P<0.05$. Relationships between the data were illustrated and analyzed using a Sankey diagram. A scatter plot was designed to address the cumulative percentage.

RESULTS

In this study, a total of 120 dissertations were analyzed between 2019 and 2023. The most common topics were related to the gastrointestinal system and urology (Table 1).

The distribution of dissertations by year revealed 17 cases in 2019, 19 cases in 2020, 29 cases in 2021, 30 cases in 2022, and 25 cases in 2023. The data demonstrated a consistent increase in the number of cases from 2019 to 2022, followed by a decline in 2023 (Fig. 2). The average number of dissertations per year was 24.

The analysis of studies by section revealed that the gastrointestinal system was the most researched area, with a total of 37 studies, accounting for the highest proportion of the dataset. Urology followed with 30 studies, demonstrating its significance as another major focus of research. Thoracic surgery and traumatology contributed to 14 and 12 studies, respectively,

Table 1. Total dissertations number

	Gastrointestinal	General pediatric surgery	Gynecology	Hepatobiliary	Oncology	Thoracic	Traumatology	Urology	Total
2019	5	0	2	0	2	2	1	5	17
2020	8	1	0	1	0	3	1	5	19
2021	8	4	1	2	0	3	5	6	29
2022	10	2	1	2	1	3	5	6	30
2023	6	3	1	3	1	3	0	8	25
Total	37	10	5	8	4	14	12	30	120

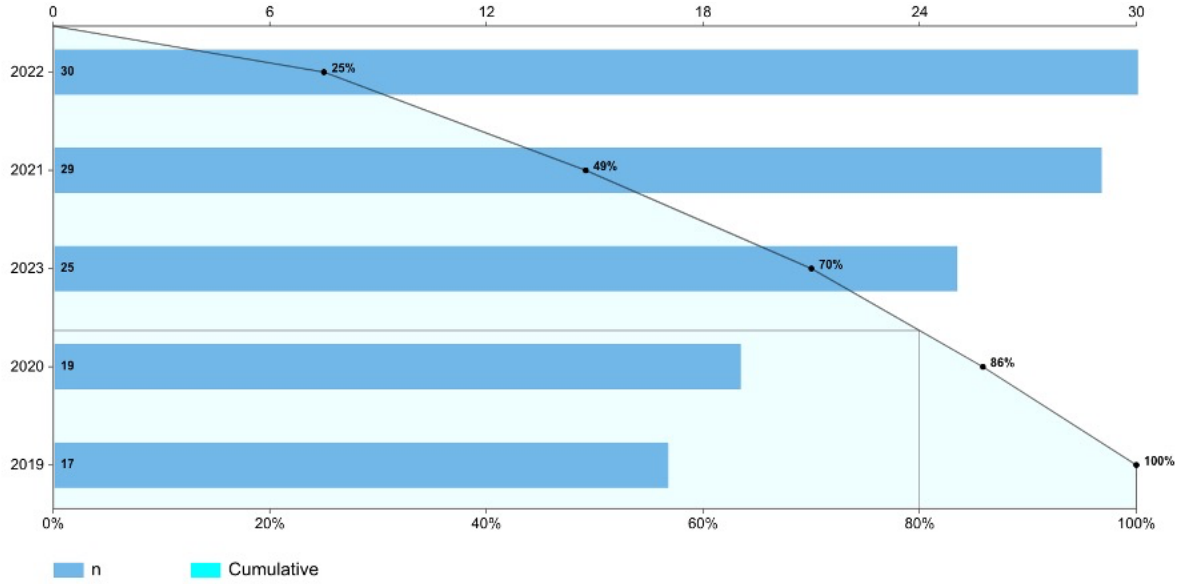

Fig. 2. Pareto chart for dissertations distribution by years.

highlighting their clinical and experimental relevance. General pediatric surgery and hepatobiliary studies had relatively fewer contributions, with 9 and 8 studies, respectively. Gynecology and oncology were less represented, with 5 and 4 studies, while the "Other" category included only a single study (Fig. 3).

Clinical studies showed an increasing trend over the years, rising from 53% in 2019 to 80% in 2022, before slightly decreasing to 72% in 2023. Experimental studies accounted for 47% of the studies in 2019 but declined to 20% in 2022, with a slight recovery to 28% in 2023. There was no statistically significant difference in the distribution of clinical and experimental studies across the years (P=0.242). The study types were also analyzed based on their focus area. Clinical studies dominated in most sections, particularly in traumatology (100%), thoracic surgery (86%), and general pediatric surgery (80%). Experimental studies had higher proportions in gynecology (60%) and urology (43%). However, the distribution of clinical and experimental studies across different sections was not statistically significant (P=0.090) (Table 2).

The relation between years, study types, and topics was presented as a Sankey diagram (Fig. 4).

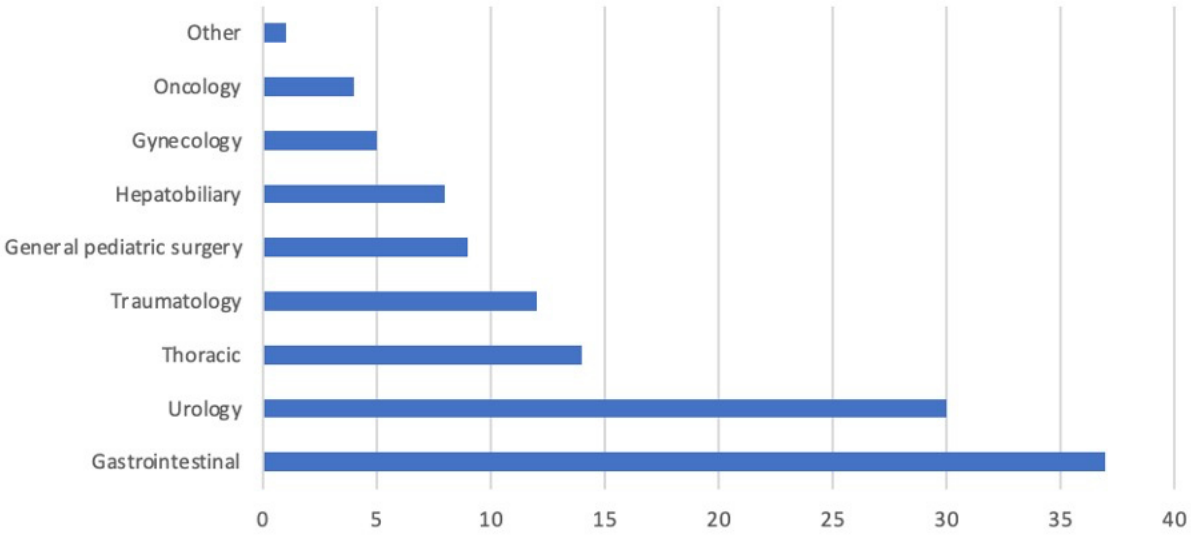

Fig. 3. Analysis of studies by section.

Table 2. Comparison of study type by years

	Clinical studies (n=86)	Experimental studies (n=34)	P value
Years, n (%)			0.242
2019	9 (53%)	8 (47%)	
2020	12 (63%)	7 (37%)	
2021	23 (79%)	6 (21%)	
2022	24 (80%)	6 (20%)	
2023	18 (72%)	7 (28%)	
Section / subspeciality, n (%)			0.090
Gastrointestinal system	26 (70%)	11 (30%)	
General pediatric surgery	8 (80%)	2 (20%)	
Gynecology	2 (40%)	3 (60%)	
Hepatobiliary	6 (75%)	2 (25%)	
Oncology	3 (75%)	1 (25%)	
Thoracic surgery	12 (86%)	2 (14%)	
Traumatology	12 (100%)	0 (0%)	
Urology	17 (57%)	13 (43%)	

Other: Topics related COVID-19

Among the dissertations, the most common topics were related to appendicitis (n=9), esophageal atresia (n=8), anorectal malformations (n=7), hypospadias (n=7), and testicular conditions (n=7). Dissertation's top five topics accounted for 32% of all topics. The number of studies on other topics is provided in Table 3.

In recent years, studies related to regenerative medicine have become particularly prominent in fields such as orthopedics, general surgery, and anesthesiology. However, in the field of Pediatric Surgery, among

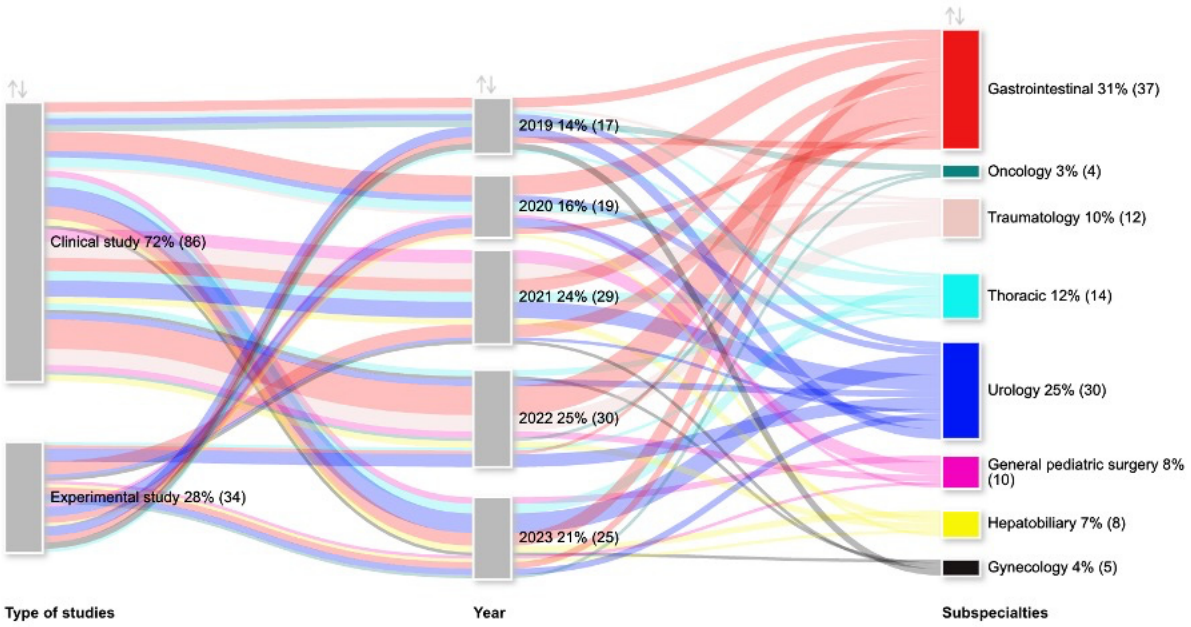

Fig. 4. Sankey diagram.

Table 3. Main topics

Topics	n
Appendicitis	9
Esophageal atresia/stricture	8
Anorectal malformations	7
Hypospadias/disorders of sex development	7
Testis	7
Hirschsprung disease	6
Abdominal/thoracic/urogenital traumas	5
Corrosive ingestion/esophagitis	5
Intussusception/volvulus	5
Lower urinary disfunction/neuropathic bladder/urotherapy/bladder	5
Ovarian pathologies	5
Bowel ischemia/reperfusion /short bowel syndrome/bowel adhesion	4
Hydronephrosis/ureteropelvic and ureterovesical junction obstruction	4
Vesicoureteral reflux	4
Burns	3
Cholelithiasis/cholecystectomy	3
Circumcision/penile diseases	3
Necrotizing enterocolitis	3
Foreign body ingestion	2
Hypertrophic infantile pyloric stenosis	2
Inguinal hernia	2
Liver related fibrosis / damage	2
Pectus excavatum / carinatum	2
Sacrococcygeal teratoma	2
Breast disorders	1
Congenital diaphragmatic hernia	1
Coronavirus disease	1
Enhanced recovery after surgery	1
Hepaticojejunostomy	1
Hepatoblastoma	1
Hydatid cyst	1
Intestinal atresia	1
Neuroblastoma	1
Portal hypertension	1
Pneumothorax	1
Thyroid disorders	1
Tracheostomy	1
Vascular access	1
Wound infections	1

the dissertations we reviewed, only two dissertations (2/120) in the last five years were related to regenerative medicine. One of these was published in 2023 (on stem cells), and the other in 2019 (on platelet-rich plasma) (Table 4). Both of dissertation studies were experimental. In the field of pediatric surgery, no dissertations have been conducted on regenerative medicine clinical studies.

DISCUSSION

This study analyzed pediatric surgery dissertations published between 2019 and 2023, highlighting trends in study types, topics, and subspecialties. Clinical studies were predominant, showing a consistent rise before a slight decline in the final year, while experimental studies followed an opposite trend. The gastrointestinal system emerged as the most researched area, followed by urology and thoracic surgery. Appendicitis, esophageal atresia, anorectal malformations, hypospadias, and testicular conditions were the most common topics, comprising nearly one-third of all dissertations. Regenerative medicine remained underrepresented, with only two experimental studies identified.

Güler [3] examined 238 pediatric surgery dissertations (2010-2021) to evaluate their contribution to the literature. Of these, 63 (26.5%) were published as articles, with experimental studies more likely accepted in Science Cititaions Index Expanded (SCI-E) journals. While clinical studies dominated, the publication rate declined in recent years. Dissertation topics remained static, reflecting limited adaptation to medical advancements. Aydın *et al*. [5] analyzed 49 pediatric surgery dissertations (1978-2010) from Cerrahpaşa Medical Faculty. Most focused on gastrointestinal (31) and urologic (16) topics, with experimental and clinical studies nearly balanced. Only 14 dissertations were presented nationally, and 14 were published (4 national, 10 international). Recommendations include earlier topic selection, financial support, and fostering multidisciplinary collaboration to improve dissertation quality and scientific impact. In our study, we were unable to analyze whether these dissertations were published, which can be considered a limitation of our work. Our findings are similar to those of Aydın *et al*. [5] in terms of the high number

Table 4. Topics related regenerative medicine

Title	Year
Do exosomes derived from adipose mesenchymal stem cells prevent ischemia-reperfusion injury after torsion-detorsion in rat testes?	2023
The effect of different bacteria contamination in adhesive intestinal obstruction and the role of 50% dextroz solution and PRP (platelet rich plasma) in preventing the postoperative peritoneal adhesions in rats	2019

of dissertations focused on the gastrointestinal system. Additionally, the number of experimental studies aligns closely with the findings of Güler *et al*. [3].

In Turkey, it is observed that both clinical and experimental studies are conducted in sufficient numbers. However, the data reveal that research in areas such as artificial intelligence and regenerative medicine is very limited. In recent years, there has been a significant increase in regenerative medicine articles published in the international literature [6-10]. Turkey must initiate regenerative medicine research, both experimentally and clinically, as part of residency dissertations. Several studies in this field are essential. Although the number of regenerative medicine articles focusing on pediatric cases is currently low, it is evident that these will see a geometric increase in the future, leading to substantial contributions to the field. The number of experimental and clinical studies related to regenerative medicine in pediatric surgery must be increased. The same applies to the field of tissue engineering. New studies could focus on conditions requiring tissue repair, such as esophageal atresia, hypospadias, bladder exstrophy, diaphragmatic hernia, airway malformations, gastroschisis, and omphalocele [11-16]. Early-career physicians entering their specialty training should consider selecting dissertation topics in these innovative fields. Each study conducted in these areas is likely to be considered "innovative," significantly increasing the probability of publication in prestigious SCI-E journals.

Similarly, as noted by Zani *et al*. [17] and Zani [18], the limited number of cases in pediatric surgery results in a scarcity of publications for many rare conditions. This poses a significant challenge in establishing guidelines for these rare diseases. Consequently, survey studies play a crucial role in addressing these gaps in pediatric surgery. Although some survey studies have been published as articles from Turkey [19-23], none have been conducted as dissertations in the studied 5 years. Therefore, early-career physicians beginning their specialty training should consider this and select dissertation topics in this area to contribute to the literature.

Future Directions

Future research in pediatric surgery should focus on diversifying topics to include emerging fields such as regenerative medicine, stem cell research, tissue engineering, and artificial intelligence. Collaborative efforts between pediatric surgeons, researchers, and multidisciplinary teams can drive innovation and bridge gaps in underrepresented areas. Expanding clinical studies in regenerative medicine could offer significant advancements in patient outcomes. Additionally, promoting international collaborations and access to funding may help overcome resource limitations. Encouraging structured mentorship programs for dissertation preparation can enhance the quality of research. Establishing national research databases and integrating standardized metrics for evaluation will further support comprehensive and impactful studies in the field. The authors recommend conducting studies on stem cell, regenerative medicine and tissue engineering in the field of pediatric surgery which will be the future of pediatric surgery.

Limitations

This study has several limitations. First, it relied solely on data from the Higher Education Council database of Turkey, which may not include all dissertations in pediatric surgery during the specified period. Second, the analysis was restricted to dissertations published between 2019 and 2023, potentially overlooking trends or shifts in earlier or subsequent years. Third, categorization of topics and methodologies was based on available dissertation titles and abstracts,

which might have introduced subjective bias. Lastly, the study excluded nursing-related dissertations and those conducted by researchers outside pediatric surgery, limiting the scope and generalizability of the findings to broader interdisciplinary research.

CONCLUSION

Between 2019 and 2023, pediatric surgery dissertations mainly centered on clinical studies, with a notable focus on gastrointestinal and urological topics. Appendicitis, esophageal atresia, and anorectal malformations were the most studied areas. Regenerative medicine was significantly underrepresented, emphasizing the need for more diversified research. Encouraging studies in regenerative medicine and multidisciplinary approaches could drive innovation and address gaps in pediatric surgery research.

Ethical Statement

Administrative permission was received from the Esenyurt Necmi Kadıoğlu State Hospital Management for this study (Date: 27.01.2025).

Authors' Contribution

Study Conception: MA, TOK; Study Design: MA, TOK; Supervision: MA, TOK; Funding: MA, TOK; Materials: MA, TOK; Data Collection and/or Processing: MA, TOK; Statistical Analysis and/or Data Interpretation: MA, TOK; Literature Review: MA, TOK; Manuscript Preparation: MA, TOK and Critical Review: MA, TOK.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

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