Uludağ Üniversitesi Tıp Fakültesi Dergisi
Journal of Uludağ University Medical Faculty
52, 1955266, 2026
DOI: https://doi.org/ 10.32708/uutfd.1955266

ORIGINAL RESEARCH

Perioperative Antibiotic Prophylaxis Practices Among Urologists and General Surgeons in Türkiye: A Cross-Sectional Survey Study

Yavuz Mert AYDIN[1], Murat ŞEN[2]

[1] Zonguldak Bülent Ecevit Universtiy, Faculty of Medicine, Department of Urology, Zonguldak, Türkiye.
[2] Bursa Uludağ University, Faculty of Medicine, Department of General Surgery, Bursa Türkiye.

ABSTRACT

To evaluate perioperative antibiotic prophylaxis (PAP) practices and factors associated with prolonged postoperative antibiotic use among urologists and general surgeons in Türkiye. This cross-sectional questionnaire-based study was conducted among actively practicing urologists and general surgeons in Türkiye between April-May 2026. The survey evaluated demographic characteristics, PAP preferences, postoperative antibiotic use patterns, institutional protocol adherence, and factors associated with prolonged prophylaxis. Prolonged postoperative antibiotic use was defined as antibiotic continuation beyond 24 hours. Comparisons between specialties were performed, and logistic regression analysis was used to identify independent predictors of prolonged antibiotic use. A total of 102 surgeons participated in the study, including 52 urologists and 50 general surgeons. First-generation cephalosporins were the most commonly preferred prophylactic antibiotics (49%). Although 66.7% of participants reported preferring a single-dose PAP strategy, 45.1% continued postoperative antibiotics beyond 24 hours in actual clinical practice, and 19.6% prescribed oral antibiotics at discharge. Fear of infection (43.1%), institutional habits (19.6%), and medicolegal concerns (17.6%) were the leading perceived reasons for prolonged antibiotic use. Urologists more frequently preferred third-generation cephalosporins, prolonged postoperative antibiotic use, and discharge oral antibiotics (all $p<0.05$). In multivariable analysis, urology specialty was the only independent predictor of prolonged postoperative antibiotic use (OR:3.87, 95% CI: 1.45–10.27, p=0.007). Prolonged postoperative antibiotic use remains highly prevalent among surgeons in Türkiye despite contemporary guideline recommendations. Significant discrepancies exist between theoretical knowledge and real-world clinical practice, particularly among urologists. Strengthening antimicrobial stewardship interventions and improving adherence to evidence-based PAP protocols may help reduce unnecessary antibiotic exposure.

Keywords: Perioperative antibiotic prophylaxis. Antimicrobial stewardship. Urology. General surgery.

Türkiye'deki Ürolog ve Genel Cerrahlar Arasında Perioperatif Antibiyotik Profilaksisi Uygulamaları: Kesitsel Bir Anket Çalışması

ÖZET

Bu çalışmada, Türkiye'deki ürolog ve genel cerrahların perioperatif antibiyotik profilaksisi (PAP) uygulamaları ile uzamış postoperatif antibiyotik kullanımı arasındaki ilişki ve bu uygulamalarla ilişkili faktörlerin değerlendirilmesi amaçlandı. Bu kesitsel, anket temelli çalışma Nisan–Mayıs 2026 tarihleri arasında aktif olarak çalışan ürolog ve genel cerrahlar arasında gerçekleştirildi. Ankette demografik özellikler, PAP tercihleri, postoperatif antibiyotik kullanım alışkanlıkları, kurumsal protokol varlığı ve uzamış profilaksi ile ilişkili faktörler değerlendirildi. Yirmi dört saati aşan antibiyotik kullanımı uzamış postoperatif antibiyotik kullanımı olarak tanımlandı. Branşlar arası karşılaştırmalar yapıldı ve bağımsız prediktörleri belirlemek amacıyla lojistik regresyon analizi uygulandı. Çalışmaya 52 ürolog ve 50 genel cerrah olmak üzere toplam 102 cerrah katıldı. En sık tercih edilen profilaktik antibiyotik birinci kuşak sefalosporinlerdi (%49). Katılımcıların %66,7'si tek doz PAP yaklaşımını benimsediğini belirtmesine rağmen, gerçek klinik pratikte %45,1'i antibiyotik kullanımını 24 saatin ötesine sürdürmekteydi ve %19,6'sı hastaları oral antibiyotik reçetesi ile taburcu etmekteydi. Uzamış antibiyotik kullanımının başlıca nedenleri enfeksiyon korkusu (%43,1), kurumsal alışkanlık (%19,6), ve medikolegal kaygılar (%17,6) olarak bildirildi. Ürologlar genel cerrahlara kıyasla daha sık üçüncü kuşak sefalosporin tercih etmekte, postoperatif antibiyotik kullanımını uzatmakta ve hastaları oral antibiyotik ile taburcu etmekteydi (tümü için $p<0,05$). Çok değişkenli analizde uzamış postoperatif antibiyotik kullanımının tek bağımsız prediktörü üroloji branşıydı (OR: 3,87; %95 GA: 1,45–10,27; p=0,007). Güncel kılavuz önerilerine rağmen Türkiye'de cerrahlar arasında uzamış postoperatif antibiyotik kullanımı halen yaygındır. Özellikle ürologlarda olmak üzere, teorik bilgi ile klinik uygulama arasında belirgin bir uyumsuzluk bulunmaktadır. Antimikrobiyal yönetim programlarının güçlendirilmesi ve kanıta dayalı PAP protokollerine uyumun artırılması gereksiz antibiyotik maruziyetini azaltabilir.

Anahtar Kelimeler: Perioperatif antibiyotik profilaksisi. Antimikrobiyal yönetim. Üroloji. Genel cerrahi.

Date Received: 20.May.2026
Date Accepted: 5.June.2026

Dr. Yavuz Mert AYDIN
Zonguldak Bülent Ecevit Universtiy, Faculty of Medicine,
Department of Urology, Zonguldak, Türkiye.
E-posta Adresi: yavuzmertaydin@gmail.com

AUTHORS' ORCID INFORMATION
Yavuz Mert AYDIN: 0000-0002-6287-6767
Murat ŞEN: 0000-0002-1170-7170

Inappropriate use of antibiotics in surgical practice has become a central concern for antimicrobial stewardship programs worldwide, and perioperative antibiotic prophylaxis (PAP) is among the settings in which deviations from evidence-based recommendations are most frequently observed. Previous studies have reported low adherence to PAP guidelines, with substantial institutional and individual variations in clinical practice, which may be influenced by fear of postoperative infections, lack of standardization, and medicolegal concerns[1–5].

Current guidelines recommend administering a single dose of PAP before incision or limiting prophylaxis to a maximum of 24 hours for most clean and clean–contaminated procedures. Moreover, recent evidence has shown that prolonged postoperative antibiotic use is generally unnecessary and may contribute to antimicrobial resistance and avoidable drug exposure[6-9].

Excessive antibiotic exposure is associated with adverse outcomes such as Clostridioides difficile infection, acute kidney injury, allergic reactions, and avoidable healthcare costs, without providing a significant reduction in surgical site infection rates[9–11].

Nevertheless, prolonged postoperative antibiotic use remains highly prevalent in routine surgical practice, with previous studies reporting rates of up to 80%[1,4,5,12]. Data evaluating real-world PAP practices and guideline adherence among surgeons in Türkiye remain limited, particularly in comparisons between surgical specialties. Urology and general surgery are two of the largest disciplines performing clean and clean–contaminated procedures, yet they differ substantially in operative profiles, prosthetic material use, and traditional prophylaxis practices, which may result in distinct postoperative antibiotic practices. Therefore, this study aimed to evaluate PAP practices and factors associated with prolonged postoperative antibiotic use among urologists and general surgeons in Türkiye.

Materials and Methods

This cross-sectional, questionnaire-based study was conducted among actively practicing urology and general surgery specialists in Türkiye to evaluate PAP practices, with a primary focus on postoperative antibiotic duration. The survey was distributed anonymously through WhatsApp groups of practicing urologists and general surgeons and via e-mail invitations circulated by relevant national professional associations between 13 April and 13 May 2026. Participation was voluntary, and all responses were collected anonymously. Because the survey was disseminated through these open communication channels rather than a fixed sampling frame, the exact number of potential recipients could not be determined, and a response rate could therefore not be calculated.

We developed the questionnaire based on current international guidelines and the existing literature on surgical PAP, including recommendations from the Centers for Disease Control and Prevention (CDC), American Society of Health-System Pharmacists ASHP, and American Urological Association (AUA)[6,8,9]. The questionnaire was not subjected to formal psychometric validation or a structured pilot study. Prior to dissemination, the survey's content and clarity were reviewed by senior academic staff members not otherwise involved in the study, and the final version was revised based on their feedback. The survey consisted of 14 items and required approximately 2–3 minutes to complete. The survey was designed as a concise and focused instrument to facilitate participation and minimize respondent fatigue during completion. To avoid duplicate responses, the survey platform was configured to allow a single submission per Internet Protocol address.

The questionnaire included three main sections: demographic characteristics (specialty, professional experience, and institution type), PAP practices (preferred antibiotics, prophylaxis duration, postoperative antibiotic continuation, and factors associated with prolonged PAP use), and attitudes toward PAP use (perception of excessive antibiotic duration, ideal PAP strategy, institutional protocols, and perceived causes of prolonged PAP use). Some questions allowed multiple responses.

Prolonged postoperative antibiotic use was defined as any postoperative antibiotic administration extending beyond 24 hours, including continued parenteral therapy after the first postoperative day or prescription of oral antibiotics at hospital discharge. Participants who reported discharge oral antibiotic prescriptions were therefore classified as having prolonged postoperative antibiotic use.

Ethical Statement

The study protocol was approved by the Zonguldak Bülent Ecevit University Non-Interventional Clinical Research Ethics Committee (date: 08/04/2026; approval number: 2026/07-14). The study was conducted in accordance with the principles of the Declaration of Helsinki, and electronic informed consent was obtained from all participants before survey completion.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as frequencies and percentages. Comparisons between

groups were performed using Pearson's chi-square test, Continuity Correction, or Fisher's exact test when appropriate. Variables associated with prolonged postoperative antibiotic use were further evaluated using univariable and multivariable logistic regression analyses, and the results were reported as odds ratios (ORs) with 95% confidence intervals (CIs). Multicollinearity was assessed using variance inflation factor (VIF) analysis. Model calibration and discrimination were evaluated using the Hosmer–Lemeshow goodness-of-fit test and area under the receiver operating characteristic curve (AUC), respectively. A p-value <0.05 was considered statistically significant.

Results

A total of 102 surgeons participated in the study, including 52 (51%) urologists and 50 (49%) general surgeons. Overall, 49% of the surgeons had more than 10 years of professional experience. Among the participants, 33.3% worked in private hospitals, 31.4% in university hospitals, 25.5% in state hospitals, and 9.8% in training and research hospitals. The most commonly performed type of surgery was clean-contaminated surgery (62.7%). (Figure 1)

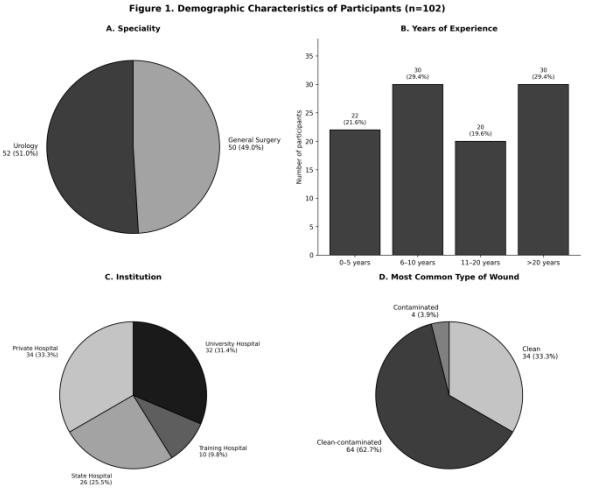


Figure 1.
*Demographic characteristics of the study participants (n = 102). **(A)** Distribution by surgical specialty. **(B)** Distribution of professional experience. **(C)** Type of institution where participants currently practice. **(D)** Most commonly performed type of surgical wound according to wound classification.*

Half of the participants (n=50, 49.0%) reported using first-generation cephalosporins (cefazolin) for prophylaxis, followed by third-generation cephalosporins (n=24, 23.5%), second-generation cephalosporins (n=16, 15.7%), and metronidazole plus cephalosporin combinations (n=12, 11.8%). In elective clean/clean-contaminated surgery, 66.7% of the participants preferred a single preoperative dose of antibiotic prophylaxis, whereas 21.6% administered prophylaxis for less than 24 hours, 7.8% for 24–48 hours, and 3.9% for more than 48 hours. However, when asked about actual postoperative antibiotic use practices, these rates differed. Overall, 37.3% of the participants reported not using postoperative antibiotics, 17.6% used antibiotics for <24 hours, 9.8% for 24–48 hours, and 7.8% for >48 hours; additionally, 7.8% continued parenteral antibiotics until discharge, while 19.6% (n=20) prescribed oral antibiotics at discharge. In other words, 45.1% of the participants continued antibiotic use for longer than 24 hours in actual postoperative practice. Nevertheless, 66.7% of the participants believed that antibiotic use was generally prolonged beyond what was necessary.

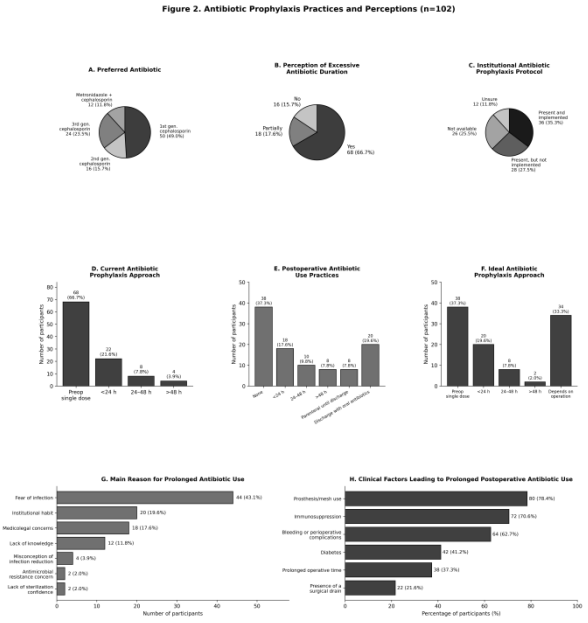


Figure 2.
*Antibiotic prophylaxis practices and perceptions among study participants (n = 102). **(A)** Preferred antibiotic agent for perioperative prophylaxis. **(B)** Participants' perception of whether postoperative antibiotic duration is generally excessive. **(C)** Availability and implementation of an institutional antibiotic prophylaxis protocol. **(D)** Self-reported antibiotic prophylaxis approach in elective clean and clean-contaminated procedures. **(E)** Actual postoperative antibiotic use practices, including parenteral continuation until discharge and oral antibiotic prescription at discharge. **(F)** Participants' opinion regarding the ideal antibiotic prophylaxis approach. **(G)** Single most important perceived reason for prolonged postoperative antibiotic use. **(H)** Clinical factors reported to lead to extension of postoperative antibiotic use (multiple-response item; percentages exceed 100% as participants could select more than one option).*

Regarding the ideal approach to PAP, 37.3% of the participants considered a single-dose regimen appropriate, 19.6% preferred a duration of 24 hours, 7.8% preferred 48 hours, and 2.0% favored durations longer than 48 hours, while 33.3% stated that the optimal approach should vary according to the type of operation. Regarding institutional protocols, only 35.3% of participants reported that a clear protocol was available and actively implemented; 27.5% reported that a protocol existed but was not followed; 25.5% stated that no protocol was available; and 11.8% were unsure of its existence. As the main reason for prolonged postoperative antibiotic use, 43.1% of the participants (n=44) identified fear of infection, followed by institutional habit (19.6%), medicolegal concerns (17.6%), lack of knowledge (11.8%), the misconception that prolonged use reduces infection (3.9%), and concern about antimicrobial resistance and lack of confidence in sterilization/asepsis (2.0% each). When the clinical factors leading to prolonged postoperative antibiotic use were evaluated, the most frequently reported factors were prosthesis/mesh use (78.4%), immunosuppression (70.6%), and bleeding or perioperative complications (62.7%). These were followed by diabetes (41.2%), prolonged operative time (37.3%), and the presence of a surgical drain (21.6%). Figure 2

There were no significant differences between urologists and general surgeons in professional experience or in the most commonly encountered surgical wound type. However, the majority of urologists worked in university hospitals, whereas most general surgeons were employed in state and private hospitals. Significant differences were observed between urologists and general surgeons regarding PAP practices. Urologists more frequently preferred third-generation cephalosporins, whereas general surgeons predominantly used first-generation cephalosporins and combinations of metronidazole plus cephalosporins ($p<0.001$). Prolonged postoperative antibiotic use and discharge with oral antibiotics were significantly more common among urologists ($p<0.001$). In addition, general surgeons were more likely to consider current PAP durations excessively long compared with urologists (88.0% vs. 46.2%, $p<0.001$). Differences were also observed in the perceived ideal duration of prophylaxis ($p=0.016$) and the main reasons for prolonged postoperative antibiotic use ($p=0.023$). Urologists more commonly identified fear of infection (50.0% vs. 36.0%) and medicolegal concerns (23.1% vs. 12.0%) as the main reasons for prolonged postoperative antibiotic use, whereas general surgeons more frequently considered institutional habit (24.0% vs. 15.4%) and lack of knowledge (20.0% vs. 3.8%) to be the leading contributing factors. Table I.

Table I. Baseline demographic and comparison of perioperative antibiotic prophylaxis practices between urologists and general surgeons

Variable		Urology (n=52)	General Surgery (n=50)	p-value
Experience	0-5 years	10 (19.2%)	12 (24.0%)	0.347[a]
	6-10 years	18 (34.6%)	12 (24.0%)	
	11-20 years	12 (23.1%)	8 (16.0%)	
	>20 years	12 (23.1%)	18 (36.0%)	
Institution	University Hospital	24 (46.2%)	8 (16.0%)	**0.001[a]**
	Training Hospital	8 (15.4%)	2 (4.0%)	
	State Hospital	8 (15.4%)	18 (36.0%)	
	Private Hospital	12 (23.1%)	22 (44.0%)	
Most common type of wound	Clean	18 (34.6%)	16 (32.0%)	0.141[b]
	Clean-contaminated	34 (65.4%)	30 (60.0%)	
	Contaminated	0 (0%)	4 (8.0%)	
Preferred antibiotic	1st generation cephalosporin	16 (30.8%)	34 (68.0%)	**<0.001[a]**
	2nd generation cephalosporin	14 (26.9%)	2 (4.0%)	
	3rd generation cephalosporin	22 (42.3%)	2 (4.0%)	
	Metronidazole + cephalosporin	0 (0%)	12 (24.0%)	
Antibiotic prophylaxis approach	Preoperative single dose	32 (61.5%)	36 (72%)	0.066[b]
	< 24-hour	10 (19.2%)	12 (24%)	
	24-48 hours	6 (11.5%)	2 (4%)	
	> 48-hour	4 (7.7%)	0 (0%)	
Postoperative antibiotic use practices	None	12 (23.1%)	26 (52.0%)	**<0.001[b]**
	< 24-hour	8 (15.4%)	10 (20.0%)	
	24-48 hours	2 (3.8%)	8 (16.0%)	
	> 48-hour	8 (15.4%)	0 (0%)	
	Parenteral until discharge	4 (7.7%)	4 (8%)	
	Discharge with oral antibiotics	18 (34.6%)	2 (4%)	
Perception of excessive antibiotic duration	Yes	24 (46.2%)	44 (88.0%)	**<0.001[a]**
	Partially	16 (30.8%)	2 (4.0%)	
	No	12 (23.1%)	4 (8.0%)	
Ideal antibiotic prophylaxis approach	Preoperative single dose	18 (34.6%)	20 (40.0%)	**0.016[b]**
	< 24-hour	10 (19.2%)	10 (20.0%)	
	24-48 hours	8 (15.4%)	0 (0%)	
	> 48-hour	2 (3.8%)	0 (0%)	
	Depends on the operation	14 (26.9%)	20 (20.0%)	
Institutional antibiotic prophylaxis protocol	Present and implemented	24 (46.2%)	12 (24.0%)	0.119[a]
	Present, but no implemented	12 (23.1%)	16 (32.0%)	
	Not available	10 (19.2%)	16 (32.0%)	
	Unsure	6 (11.5%)	6 (12.0%)	
The main reason for prolonged AP use	Fear of infection	26 (50.0%)	18 (36.0%)	**0.023[b]**
	Institutional habit	8 (15.4%)	12 (24.0%)	
	Medicolegal concerns	12 (23.1%)	6 (12.0%)	
	Lack of knowledge	2 (3.8%)	10 (20.0%)	
	Misconception that it reduces infection	2 (3.8%)	2 (4.0%)	
	Concern about antimicrobial resistance	2 (3.8%)	0 (0%)	
	Lack of confidence in sterilization	0 (0%)	2 (4.0%)	

[a]: Chi-square Test (Continuity Correction)
[b]: Chi-square Test (Fisher's Exact Test)

In univariate analysis, specialty and >20 years of professional experience were significantly associated with prolonged postoperative antibiotic use. Urologists had a significantly higher likelihood of prolonged postoperative antibiotic use compared with general surgeons (OR: 4.11, 95% CI: 1.78–9.46, $p=0.001$). In multivariable logistic regression analysis, specialty remained an independent predictor of prolonged postoperative antibiotic use, with urologists having a nearly fourfold higher risk than general surgeons (OR: 3.87, 95% CI: 1.45–10.27, $p=0.007$). No significant association was observed between institution type and prolonged postoperative antibiotic use. The regression model demonstrated acceptable calibration and discrimination, with a non-significant

Hosmer–Lemeshow test (p=0.079) and an AUC of 0.767 (95% CI: 0.67–0.86). No significant multicollinearity was detected among the independent variables, with VIF values ranging between 1.08 and 1.20. Table II.

Table II. Multivariable logistic regression analysis of factors associated with prolonged postoperative antibiotic use.

Factor		Univariate Analysis				Multivariate Analysis			
		OR	p-value	95% CI		OR	p-value	95% CI	
				Lower	Upper			Lower	Upper
Specialty	*Urology vs. General Surgery (R)*	4.114	**0.001**	1.789	9.460	3.870	**0.007**	1.459	10.270
Experience	*0-5 years (R)*		0.058				**0.112**		
	6-10 years	1.250	0.694	0.411	3.803	1.311	**0.676**	0.368	4.671
	11-20 years	0.556	0.348	0.163	1.894	0.499	**0.332**	0.122	2.034
	>20 years	0.303	**0.045**	0.094	0.972	0.319	**0.094**	0.084	1.215
Institution	*University Hospital (R)*		0.132				0.596		
	Training Hospital	0.400	0.217	0.093	1.711	0.347	0.212	0.066	1.829
	State Hospital	0.375	0.071	0.129	1.089	0.552	0.363	0.153	1.987
	Private Hospital	0.327	**0.029**	0.120	0.893	0.721	0.590	0.219	2.374

Postoperative prolonged antibiotic use was defined based on participants' responses regarding their postoperative antibiotic use practices. Antibiotic use exceeding 24 hours was considered prolonged antibiotic use.
R: Reference Category

Discussion and Conclusion

This study demonstrated that prolonged postoperative antibiotic use remains highly prevalent (45.1%) among both urologists and general surgeons in Türkiye, despite current guideline recommendations favoring single-dose or short-duration PAP. Although two-thirds of participants reported preferring a single-dose PAP approach for clean and clean-contaminated procedures, nearly half of these respondents (44.1%) continued antibiotics beyond 24 hours in actual postoperative practice. Furthermore, one-fifth of participants prescribed oral antibiotics to their patients at discharge. Notably, two-thirds of the participants also acknowledged that postoperative antibiotics are frequently used longer than necessary, while more than half (53%) reported either the absence of an institutional PAP protocol or poor adherence to existing protocols. Fear of postoperative infection (43.1%), institutional habits (19.6%), medicolegal concerns (17.6%), and lack of knowledge (11.8%) emerged as the leading perceived reasons for prolonged antibiotic use. Urologists more frequently attributed prolonged postoperative antibiotic use to fear of infection and medicolegal concerns, whereas general surgeons mainly associated it with institutional habits and lack of knowledge. In addition, prosthetic material-mesh use (78.4%), immunosuppression (70.6%), and perioperative complications (62.7%) were the most commonly reported clinical factors associated with the need to extend postoperative antibiotics. Significant differences were observed between specialties: urologists more frequently preferred third-generation cephalosporins, continued postoperative antibiotics for longer durations, and prescribed oral antibiotics at discharge compared with general surgeons. Moreover, nearly half of the urologists considered an ideal PAP protocol to involve postoperative antibiotic use beyond 24 hours, whereas only one-fifth of general surgeons shared this view. The urology specialty was identified as the only independent predictor of prolonged postoperative antibiotic use in multivariable analysis.

As observed worldwide, inappropriate PAP use among surgeons also remains a persistent problem in Türkiye. Our findings demonstrate that this problem persists today, much as it did two decades ago. In the nationwide survey conducted by Hoşoğlu et al. in 2003, prophylaxis duration exceeded 24 hours in 80% of procedures and exceeded 48 hours in nearly half of all cases (46%), while only 26% of surgeons fully complied with guideline recommendations. Notably, adherence to PAP guidelines was highest among general surgeons, whereas urologists demonstrated one of the lowest adherence rates (only 17%). Moreover, urologists more frequently preferred prolonged postoperative antibiotic use and third-generation cephalosporins compared with general surgeons [12]. These findings show a striking similarity to the results of our study conducted 23 years later. More recently, Karaali et al. similarly reported poor compliance with ASHP recommendations among general surgeons in Türkiye, with overall guideline adherence remaining as low as 26.8%. In that study, 33%–47.6% of surgeons continued antibiotics throughout hospitalization, and 22.7%–38.5% prescribed antibiotics at discharge, depending on procedure type[13]. Our findings largely concur with this report: 45.1% of participants in the present study

continued postoperative antibiotics beyond 24 hours, and nearly one-fifth were prescribed oral antibiotics at discharge. Similarly, Özgüler et al. reported that although most surgeons were aware that PAP should not be prolonged, only 46.8% limited PAP to 24 hours, while substantial proportions continued antibiotics until drain removal, discharge, or for several postoperative days[14]. Interestingly, in our cohort, two-thirds of surgeons also acknowledged that antibiotics are frequently used longer than necessary, but a smaller proportion limited PAP to 24 hours, suggesting a persistent discrepancy between theoretical knowledge and real-world clinical practice.

A particularly striking finding of our study was the clear disconnect between surgeons' knowledge and their clinical behavior: while two-thirds of participants acknowledged that postoperative antibiotics are used longer than necessary, 45.1% continued to do so in their own practice. Previous reports have emphasized fear of postoperative infections, habitual prescribing behaviors, lack of institutional standardization, and insufficient implementation of antimicrobial stewardship as major contributing factors of prolonged antibiotic use[12–14]. In line with these findings, fear of infection, institutional habits, medicolegal concerns, and lack of knowledge emerged as the leading perceived drivers of prolonged postoperative antibiotic use in our study. The primary fear of surgical site infections, compounded by medicolegal concerns, has driven urologists to prolong postoperative antibiotic use. Several factors may explain why urologists differ from general surgeons in PAP practices. Urological procedures frequently involve urinary tract instrumentation, indwelling catheters, stents, prosthetic materials, and operations performed in potentially colonized urinary systems, which may increase surgeons' perception of postoperative infectious risk. In addition, historical practice patterns and concerns regarding urosepsis may contribute to more defensive antibiotic prescribing behaviors among urologists.

Despite increasing awareness regarding antimicrobial resistance and the widespread availability of international guidelines, our findings suggest that surgeons' PAP practices in Türkiye have changed only minimally over the past two decades. The persistence of prolonged postoperative antibiotic use may reflect insufficient awareness of current evidence, limited implementation of antimicrobial stewardship principles in surgical practice, inadequate institutional standardization, and the continuation of traditional prescribing habits. The discrepancy observed between surgeons' theoretical knowledge and their real-world practices further supports the possibility that behavioral and institutional factors may play a major role in inappropriate PAP use. These findings highlight the need for more effective antimicrobial stewardship strategies specifically targeting surgical practice. Standardized institutional PAP protocols, regular educational activities, dissemination of procedure-specific guidelines, prospective audit-feedback systems, and closer collaboration among surgeons, infectious disease specialists, and infection control teams may help improve adherence to evidence-based recommendations. In addition, national surgical societies may play an important role in increasing awareness and promoting standardized PAP practices across different surgical specialties[7,15].

The present study has several limitations. First, the study was questionnaire-based and relied on self-reported practices rather than direct observation; social desirability bias may therefore have led to an underestimation of inappropriate PAP use, suggesting that the true magnitude of the problem may be greater than reported here. Second, the questionnaire was not subjected to formal psychometric validation or a structured pilot study; instead, its content and clarity were reviewed by senior academic staff members not otherwise involved in the study, and the survey was revised based on their feedback. Third, the survey was distributed anonymously through WhatsApp groups and professional associations' e-mail networks rather than a fixed sampling frame; consequently, the total number of potential recipients and the corresponding response rate could not be determined, and selection bias cannot be excluded, as surgeons with a particular interest in antimicrobial stewardship may have been more likely to participate. Fourth, the relatively limited sample size and recruitment through professional networks may not fully represent all surgeons in Türkiye. Fifth, the distribution of specialties across institution types was imbalanced, which may have masked institution-level effects in the multivariable analysis. Finally, procedure-specific differences, dosing details, and subspecialty practices were not evaluated in detail. Nevertheless, the study provides important contemporary data regarding PAP practices and highlights persistent specialty-based differences in postoperative antibiotic use.

In conclusion, prolonged postoperative antibiotic use remains highly prevalent among surgeons in Türkiye. Urologists more frequently preferred prolonged PAP regimens and broader-spectrum antibiotics than general surgeons. Significant discrepancies exist between theoretical knowledge and real-world clinical practice. Fear of infection, institutional habits, and medicolegal concerns are the major drivers of inappropriate PAP use. Strengthening antimicrobial stewardship interventions and improving institutional adherence to evidence-based PAP protocols may help reduce unnecessary postoperative antibiotic exposure. Given that this pattern has persisted across three nationwide surveys spanning more than two decades, future improvements will likely depend on

multimodal, behavior-targeted antimicrobial stewardship interventions rather than on guideline dissemination or educational efforts alone.

Artificial Intelligence Use: Artificial intelligence-assisted tools were used solely for language editing and improvement of academic writing in this study. The authors reviewed all generated content and take full responsibility for the manuscript's scientific accuracy and final content.

Researcher Contribution Statement:
Idea and design: Y.M.A., M.Ş.; Data collection and processing: Y.M.A., M.Ş.; Analysis and interpretation of data: Y.M.A., M.Ş.; Writing of significant parts of the article: Y.M.A., M.Ş.
Support and Acknowledgement Statement:
N/A
Funding: The authors declare that no financial support was received for this study.
Conflict of Interest Statement:
The authors declare no conflict of interest.
Ethics Committee Approval Information:
Approving Committee: Zonguldak Bülent Ecevit University Non-Interventional Clinical Research Ethics Committee
Approval Date: 08/04/2026
Decision No: 2026/07-14

References

1. Mossanen M, Calvert JK, Holt SK, et al. Overuse of antimicrobial prophylaxis in community practice urology. J Urol. 2015;193(2):543-547.
2. Lawson KA, Rudzinski JK, Vicas I, Carlson KV. Assessment of antibiotic prophylaxis prescribing patterns for TURP: A need for Canadian guidelines?. Can Urol Assoc J. 2013;7(7-8):E530-E536.
3. Lebentrau S, Gilfrich C, Vetterlein MW, et al. Impact of the medical specialty on knowledge regarding multidrug-resistant organisms and strategies toward antimicrobial stewardship. Int Urol Nephrol. 2017;49(8):1311-1318
4. Kıymaz YÇ, Karakök T, Büyükkörük M, et al. Evaluation of surgical antimicrobial prophylaxis compliance: A multicenter point prevalence study. Am J Infect Control. 2025;53(5):552-558.
5. Sekimoto M, Imanaka Y, Evans E, et al. Practice variation in perioperative antibiotic use in Japan. Int J Qual Health Care. 2004;16(5):367-373.
6. Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health Syst Pharm. 2013;70(3):195-283
7. Global Guidelines for the Prevention of Surgical Site Infection. Geneva: World Health Organization; 2018.
8. Lightner DJ, Wymer K, Sanchez J, Kavoussi L. Best Practice Statement on Urologic Procedures and Antimicrobial Prophylaxis. J Urol. 2020;203(2):351-356.
9. Berríos-Torres SI, Umscheid CA, Bratzler DW, et al. Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017. JAMA Surg. 2017;152(8):784-791.
10. Branch-Elliman W, O'Brien W, Strymish J, Itani K, Wyatt C, Gupta K. Association of Duration and Type of Surgical Prophylaxis With Antimicrobial-Associated Adverse Events. JAMA Surg. 2019;154(7):590-598.
11. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for Prevention of Surgical Site Infection, 1999. Centers for Disease Control and Prevention (CDC) Hospital Infection Control Practices Advisory Committee. Am J Infect Control. 1999;27(2):97-96.
12. Hosoglu S, Sunbul M, Erol S, et al. A national survey of surgical antibiotic prophylaxis in Turkey. Infect Control Hosp Epidemiol. 2003;24(10):758-761.
13. Karaali C, Emiroglu M, Esin H, et al. Assessment of prophylactic antibiotic usage habits of the general surgeons in Turkey. J Infect Dev Ctries. 2020;14(7):758-764
14. Özgüler M, Esin H, Özgüler İM, Köse Ş. Surgeons' Approach to Preoperative Antibiotic Prophylaxis. The Journal of Tepecik Education and Research Hospital. 2022 Dec;32(3):431–438.
15. Sartelli M, Duane TM, Catena F, et al. Antimicrobial Stewardship: A Call to Action for Surgeons. Surg Infect (Larchmt). 2016;17(6):625-631.