

Analysis of the Knowledge Level of Surgical Residents Regarding the Preoperative Assessment of Adult Elective Non-cardiac Surgery Patients with Specific Clinical Conditions

Elektif Non-kardiyak Cerrahi Geçirecek Spesifik Klinik Durumlara Sahip Hastalarda Cerrahi Asistanlarının Preoperatif Değerlendirme Hakkındaki Bilgi Düzeyinin Ölçülmesi

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Abstract

Objective: We aimed to analyze the knowledge level of surgical residents regarding preoperative assessment and increase their collaboration with other teams in optimizing the general medical status of patients to reduce the duration of hospital stay and complication rates.

Method: Our study included 80 surgical residents. The 2018 update of the European Society of Anesthesiology (ESA) was used during the preparation of the survey questions. The questions were categorized on the basis of the specific clinical conditions and medications noted in the ESA guidelines. Answer choices were "correct", "wrong" or "no idea."

Results: Analysis of the distribution of the mean correct answer rates (%) revealed that the question regarding "herbal medications" led to the lowest correct answer (13.75%), whereas the category "bridging and anticoagulation" was associated with the highest (72.5%) correct answer. The total mean correct answer was calculated as 50.8%. There was no significant correlation between the residents' seniority level (i.e., postgraduate year) and their correct answer rates in the neurosurgery, general surgery, ear-nose-throat, and plastic surgery divisions. However, there were statistically significant differences in the ophthalmology, urology, orthopedic surgery, and obstetrics and gynecology divisions.

Öz

Amaç: Cerrahi asistanlarının ameliyat öncesi değerlendirme konusundaki bilgi düzeylerini analiz etmeyi ve hastaların genel tıbbi durumlarını optimize ederek hastanede kalış süresini ve komplikasyon oranlarını azaltmak için diğer ekiplerle iş birliklerini artırmayı amaçladık.

Yöntem: Çalışmamız 80 cerrahi asistanıyla gerçekleştirilmiştir. Anket sorularının hazırlanmasında Avrupa Anesteziyoloji Derneği'nin (ESA) 2018 güncellemesinden yararlanılmıştır. Sorular, ESA kılavuzunda belirtilen spesifik klinik durumlara ve ilaçlara göre kategorize edilmiştir. Cevap seçenekleri "doğru", "yanlış" veya "fikrim yok" şeklinde olmuştur.

Bulgular: Ortalama doğru cevap oranlarının (%) dağılımı incelendiğinde, en düşük doğru cevabın "bitkisel ilaçlar" ile ilgili soru (%13,75) olduğu, en yüksek doğru cevabın ise "köprüleme ve antikoagülasyon" kategorisiyle (%72,5) ilişkili olduğu görülmüştür. Toplam doğru cevap ortalaması %50,8 olarak hesaplanmıştır. Asistanların kıdem düzeyleri (lisans üstü yıl) ile beyin cerrahisi, genel cerrahi, kulak-burun-boğaz ve plastik cerrahi branşlarındaki doğru cevap oranları arasında anlamlı bir ilişki saptanmamıştır. Ancak göz hastalıkları, üroloji, ortopedi ile kadın hastalıkları ve doğum bölümleri arasında istatistiksel olarak anlamlı farklılıklar bulunmuştur.

*We regret to inform you that Nagihan Karahan MD, has passed away.



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Abstract

Conclusion: The general medical status of patients should be optimized to reduce the risk of complications. To achieve this goal, surgical residents should collaborate with other teams at each perioperative stage. In addition, we suggest that the curriculum be reviewed to increase the knowledge level of surgical residents regarding preoperative care.

Keywords: Elective non-cardiac surgery, knowledge level of residents, pre-operative assessment

Öz

Sonuç: Komplikasyon riskini azaltmak için hastaların genel tıbbi durumu optimize edilmelidir. Bu hedefe ulaşmak için cerrahi asistanlarının her perioperatif aşamada diğer ekiplerle iş birliği yapması gereklidir. Çalışmanın sonuçları doğrultusunda; cerrahi asistanlarının ameliyat öncesi bakım konusunda bilgi düzeyinin artırılması amacıyla müfredatın gözden geçirilmesini öneriyoruz.

Anahtar kelimeler: Ameliyat öncesi değerlendirme, asistanların bilgi düzeyi, elektif kalp dışı cerrahi

Introduction

Today, anesthesiologists' preoperative assessment of patients is considered critical because of the comorbid diseases accompanying the patients' clinical conditions necessitating surgical treatment. Novel strategies and preparation methods have emerged in health systems with developing technology. The primary aim of preoperative anesthesia assessment is to optimize the patient's medical condition before surgery and anesthesia administration (1).

Preoperative anesthesia assessment is implemented after the patient is referred to the anesthesiologist. The American Society of Anesthesiologists (ASA) recommended that preoperative anesthesia assessment be performed before the day of surgery in patients with high risk, while it could be implemented on the morning of the day of surgery in other patient groups. Although there are no standardized preoperative anesthesia assessment criteria, determination of the specific clinical conditions of the patients, anesthesia management, and follow-up during recovery are the responsibilities of the anesthesiologist (2).

It was determined that a preoperative anesthesia assessment performed before the day of surgery in close collaboration with the surgeon reduced the risk of complications and duration of hospital and intensive care unit (ICU) stays, provided that the comorbid clinical conditions of the patients were optimized. Therefore, this approach leads to effective use of ICU resources. Besides, during the preoperative anesthesia assessment, the patient can be counseled by the anesthesiologist and surgeon regarding the surgical procedure, anesthesia, and perioperative analgesia. It has been suggested that this strategy could reduce the anxiety of the patients (3,4).

The knowledge level of surgery residents is essential for the initial assessment of surgery patients, management of their comorbidities, and intraoperative and postoperative medical treatments. Relevant cooperation can reduce the rates of perioperative complications and duration of

hospital stay, lead to effective use of ICUs, and decrease treatment costs. In our study, we analyzed the knowledge level of surgery residents regarding preoperative anesthesia assessment.

Materials and Methods

This study was conducted as a prospective, observational, single-center study. This study was approved by the Non-Interventional Clinical Studies Ethical Council of the İzmir Katip Çelebi University Atatürk Training and Research Hospital (12.05.2020/692). Written informed consent was obtained from the surgical residents. A Likert-type survey, including 41 questions, was prepared and applied to the surgical residents. This questionnaire was prepared on the basis of the European Society of Anesthesiology (ESA) guideline for the preoperative evaluation of adults undergoing elective non-cardiac surgery, which was updated in 2018. The survey questions were categorized according to the specific clinical conditions and medications mentioned in the ESA guidelines. The answer choices were "correct", "wrong" and "no idea". Demographic data of the surgical residents, such as age, gender, specialties, and postgraduate years, were also recorded. Overall, 100 surgical residents were enrolled in this study.

Surgery residents under training in cardiovascular surgery, basic science, or medical specialties were not included in this survey study. In contrast, residents under training in a surgical residency training program in our hospital other than cardiovascular surgery were included. In total, residents from eight different surgical programs were enrolled in our study.

Statistical Analysis

Statistical analysis of the data was performed using IBM SPSS Statics Version 24 software. Pearson's chi-square and Fisher's Exact tests were used to compare the groups regarding categorical data. Continuous data were non-normally distributed; Kolmogorov-Smirnov ($p < 0.05$)

and Mann-Whitney U tests were used for intergroup comparisons. The relationship between the postgraduate years of the residents and the number of correct answers to the specific questions was analyzed by Spearman rho correlation analysis. A p-value of 0.05 was considered significant.

Results

This study was conducted with surgery residents of eight different surgical residency programs. Overall, 80 residents were included.

Analysis of the demographic data revealed that 73 (91.3%) residents were aged between 26 and 35. Sixty-five (81.2%) respondents were male, while 15 (18.8%) were female. Most (n=20, 25%) of the residents were in postgraduate year 4 (Table 1).

Investigation of the categorical distribution (%) of the rate of correct answers to the questions on specific clinical conditions showed that the mean correct answer rate was lowest in the “herbal medications” (13.8%), “kidney diseases” (22.5%), and “anemia and preoperative blood-saving strategies” (25.6%) categories. On the other hand, the mean correct answer rates were highest in the “bridging and anticoagulation” (72.5%), neuromuscular diseases” (67.5%), and “coagulation disorders” (65.8%) categories (Table 2).

The correlation analysis between the rates of correct answers to the questions regarding specific clinical conditions and the surgical residents’ postgraduate year (i.e., seniority level) revealed no significant correlation

between these two parameters in neurosurgery, general surgery, ear-nose-throat (ENT) surgery, and plastic surgery programs (p>0.05) (Table 3).

On the other hand, a positive, perfect, and statistically significant correlation was found between the correct answer rates of the ophthalmology residents to the questions regarding “bridging and anticoagulation” and their seniority level (p>0.05).

Table 1. Distribution of the subjects based on demographic data

		n	%
Age	18-25	4	5.0
	26-35	73	9.3
	36-45	3	3.8
Gender	Male	65	81.3
	Female	15	18.8
Residency programme	Neurosurgery	11	13.8
	General surgery	15	18.8
	Ophthalmology	5	6.3
	Obstetrics and gynecology	15	18.8
	ENT	7	8.8
	Orthopedic surgery	11	13.8
	Plastic surgery	7	8.8
Postgraduate year	Urology	9	11.3
	1	16	20.0
	2	19	23.8
	3	17	21.3
	4	20	25.0
	5	8	10.0

ENT: Ear, nose and throat surgery

Table 2. Distribution of the mean answer rates of the subjects to the questions regarding specific clinical conditions

Specific clinical conditions	Mean	SD	Median	Min.	Max.
CVS diseases (7 questions)	61.59	20.39	57.1	0	100
Respiratory diseases and OSAS (3 questions)	53.76	22.83	66.7	0	100
Kidney diseases (2 questions)	22.50	30.71	0	0	100
Diabetes (2 questions)	40.00	24.39	50	0	100
Obesity (2 questions)	48.13	35.08	50	0	100
Coagulation disorders (3 questions)	65.84	29.05	66.7	0	100
Anemia and preoperative blood saving strategies (4 questions)	25.63	23.86	25	0	100
Geriatric patients (2 questions)	48.75	21.01	50	0	100
Neuromuscular diseases (3 questions)	67.52	20.53	66.7	0	100
Herbal medications (1 question)	13.75	34.65	0	0	100
Psychotropic medications (6 questions)	42.92	27.14	33.3	0	100
Bridging and anticoagulation (2 questions)	72.50	35.49	100	0	100
Correct answers (total) (37 questions)	50.84	14.92	50	19.4	102.8

SD: Standard deviation, CVS: Cardiovascular system, OSAS: Obstructive sleep apnea syndrome

Table 3. Correlation between the rate of correct answers to the questions regarding specific conditions and the surgical residents' seniority levels

		Neurosurgery	General surgery	Opth	Obs&Gyn	ENT	Orthopedic surgery	Plastic surgery	Urology
CVS diseases	r	0.371	0.260	0.763	0.552	0.404	0.296	-0.265	0.203
	p	0.261	0.349	0.133	0.033	0.369	0.376	0.566	0.600
Respiratory diseases and OSAS	r	-0.528	0.033	0.263	0.032	0.163	-0.451	-0.438	-0.101
	p	0.095	0.907	0.669	0.910	0.728	0.163	0.325	0.796
Kidney diseases	r	0.077	0.064	-0.115	0.642	-	-0.680	-0.535	-0.206
	p	0.822	0.821	0.854	0.010	-	0.021	0.216	0.595
Diabetes	r	-0.166	0.386	0.344	0.604	0.105	0.082	-0.663	-
	p	0.625	0.156	0.571	0.017	0.823	0.811	0.105	-
Obesity	r	0.599	-0.137	0.487	-0.438	0.000	-0.224	-0.384	0.772
	p	0.052	0.626	0.406	0.103	1.000	0.508	0.395	0.015
Coagulation disorders	r	-0.484	0.033	0.803	0.047	0.278	0.024	-0.407	0.642
	p	0.131	0.907	0.102	0.867	0.547	0.943	0.365	0.063
Anemia and preoperative blood saving strategies	r	-0.063	-0.116	0.158	0.474	0.297	-0.145	-0.642	-0.419
	p	0.854	0.680	0.800	0.074	0.518	0.670	0.120	0.262
Geriatric patients	r	-0.206	0.192	0.344	0.091	0.105	-0.131	0.642	-
	p	0.543	0.494	0.571	0.746	0.823	0.702	0.120	-
Neuromuscular diseases	r	-0.591	0.098	0.287	0.379	-0.010	-0.122	-	-0.303
	p	0.056	0.729	0.640	0.164	0.984	0.722	-	0.428
Herbal medications	r	-0.103	0.281	0.363	0.203	-	-0.256	-	-0.303
	p	0.763	0.310	0.548	0.467	-	0.448	-	0.428
Psychotropic medications	r	-0.377	0.302	0.553	0.140	0.481	-0.212	0.135	-0.681
	p	0.253	0.273	0.334	0.619	0.274	0.530	0.773	0.044
Bridging and anticoagulation	r	-0.051	0.383	0.892	-0.230	0.488	-0.414	0.000	-
	p	0.882	0.158	0.042	0.409	0.267	0.206	1.000	-
Correct answers (total)	r	-0.363	0.291	0.462	0.288	0.352	-0.329	-0.252	0.057
	p	0.272	0.293	0.434	0.298	0.439	0.324	0.585	0.885

Spearman Rho correlation. ENT: Ear, nose and throat surgery, CVS: Cardiovascular system, OSAS: Obstructive sleep apnea syndrome

There was a moderate positive correlation between the correct answer rate of the obstetrics and gynecology residents to the cardiovascular system (CVS) disease questions and their seniority levels and a positive, good-level, statistically significant correlation between the rate of correct answers to the “kidney diseases” and diabetes questions and their seniority levels ($p>0.05$).

There was a negative, good-level, and statistically significant correlation between the rate of correct answers of the orthopedic surgery residents to the “kidney diseases” questions and the residents' seniority levels ($p>0.05$). On the other hand, there was a positive, good-level correlation between the correct answer rates of the urology residents to the obesity questions, total correct answer rates, and these residents' seniority levels ($p>0.05$). Analysis of these residents' answers to the questions regarding

psychotropic medications revealed a negative, good-level, and statistically significant correlation between the correct answer rates and the postgraduate year of the residents ($p>0.05$).

There was no statistically significant correlation between the rates of correct answers of the ophthalmology, obstetrics and gynecology, orthopedic surgery, and urology residents to the questions from other categories and the residents' seniority levels ($p>0.05$).

Discussion

There has yet to be a consensus regarding preoperative assessment standards, preoperative investigations, and their timing in patients undergoing elective non-cardiac surgery. In Turkey, the preoperative assessment guide prepared by Tard (Turkish Society of Anesthesiology and

Reanimation) agrees with those of ASA and ESA. Although preoperative investigations target the best standard of care, their benefits are debatable in the setting of low-risk surgeries (2,5).

In our study, the analysis regarding the distribution (%) of the correct answers of the surgery residents to specific clinical conditions revealed that the correct answer rate was lowest in the “herbal medications” category (13.8%) and highest (72.5%) in the “bridging and anticoagulation” category. Furthermore, these rates were 22.5% in “kidney diseases”, 25.6% in “anemia and blood-saving strategies”, 48.1% in “obesity”, 40% in “diabetes”, 48.8% in “geriatrics” categories and 50.8% in total. Because the correct answer rates were low in questions related to vital topics, we suggest that surgical residents collaborate closely with the anesthesiology teams and other branches in the preoperative period.

The rate of surgical procedures is increasing in the geriatric patient population. Furthermore, this patient group has comorbidities and “polypharmacy” (i.e., the use of multiple medications). Thus, the risk of postoperative delirium and other complications is higher in these patients than in younger patients (6).

In our study, we found that the correct answer rate of the surgical residents to the questions about “geriatric patients” was 48.8%. This rate was lowest (40%) in the obstetrics and gynecology residents’ group and highest (57%) in the plastic surgery residents’ group. We suggest that the perioperative complication risk will be reduced if the surgical residents have more profound knowledge about the unique aspects of the geriatric patient population and geriatric physiopathology during preoperative patient management.

There is an approximately 50% risk of perioperative myocardial damage in patients undergoing major noncardiac surgery. In patients with cardiac risks, preoperative optimization of the general medical status and stabilization of the patient regarding comorbidities can improve the outcomes. On the other hand, the decision concerning the cessation of aspirin treatment should be made by an individualized approach considering the pros and cons for the patients based on ESA and European Society of Cardiology guidelines (7-9).

Our survey contained seven questions on CVS diseases with a 61.6% correct answer rate. The correct answer rate was highest (66.7%) for the urology residents and lowest (54.5%) for the orthopedic surgical residents. There was a positive, moderate level, and statistically significant correlation

between the correct answer rates of the obstetrics and gynecology residents to the CVS disease questions and their seniority levels (i.e., post-graduate year) ($p>0.05$). We suggest that perioperative cardiac complication rates can be reduced if surgeons keep themselves updated regarding the most recent medical innovations and current practice guidelines.

A study by Mutter et al. (10) determined that the preoperative administration of continuous positive airway pressure led to a decrease in the rate of postoperative complications. Therefore, patients should be screened preoperatively for obstructive sleep apnea syndrome (OSAS) (10,11). Smoking cessation at least 4 weeks before surgery is critical for respiratory complications, wound healing, and wound infections (12,13). Because most patients are not referred to an anesthesiologist at that stage, surgeons should be aware of the importance of preoperative smoking cessation.

In our study, three questions were asked regarding OSAS and respiratory diseases. One question was asked regarding smoking. The correct answer rate was 53.76%. While the highest (60%) correct answer rate was detected in general surgery, ophthalmology residents had the lowest (46.7%) correct answer rate.

Preoperative cessation of anticoagulant medications or maintenance of anticoagulation at this stage is a critical topic, and several studies have been conducted on this subject. Yamamoto et al. (9) determined that patients who received dual antiplatelet treatment after coronary angiogram and underwent non-cardiac surgery had a higher risk of bleeding than those on a single antiplatelet drug.

Our survey had two questions regarding bridging and anticoagulation; the mean correct answer rate was 72.5%. While orthopedic surgery residents had the highest (86.4%) correct answer rate, plastic surgery and ophthalmology residents had the lowest (50%) correct answer rates.

In the study of Laflı Tunay (14), which analyzed the knowledge level and attitudes of family physicians regarding preoperative patient management, it was reported that relatively more comprehensive preoperative patient care protocols should be used in medical school curricula.

In our study, the mean correct answer rate of the eight surgical divisions was calculated as 50.8%. Therefore, we suggest that a more comprehensive preoperative patient management curriculum should be followed during surgical residency training to increase the surgical residents’ knowledge levels.

Conclusion

Preoperative assessment of patients is vital for anesthesiologists, other medical doctors, and surgeons. We suggest that to decrease the rates of potential complications and optimize the preoperative general medical status of patients, surgical residents should be knowledgeable about preoperative patient care and collaborate closely with the anesthesia teams. In addition, the medical school and surgical residency training curricula should be revised to heighten their knowledge of preoperative patient management.

Information: This article has been produced from a medical specialty thesis written with the approval of the Non-Interventional Clinical Studies Ethical Council of the İzmir Katip Çelebi University Atatürk Training and Research Hospital (12.05.2020/692).

Ethics

Ethics Committee Approval: This study was conducted as a prospective, observational, single-center study. This study was approved by the Non-Interventional Clinical Studies Ethical Council of the İzmir Katip Çelebi University Atatürk Training and Research Hospital (12.05.2020/692).

Informed Consent: Written informed consent was obtained from the surgical residents.

Authorship Contributions

Surgical and Medical Practices: G.A., M.A., S.G., N.K., Concept: G.A., M.A., S.G., N.K., Design: G.A., M.A., S.G., N.K., Data Collection or Processing: G.A., M.A., S.G., N.K., Analysis or Interpretation: G.A., M.A., S.G., N.K., Literature Search: G.A., M.A., S.G., N.K., Writing: G.A., M.A., S.G., N.K.

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