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The ethical and clinical conflict of cardiopulmonary resuscitation (CPR) in the emergency department: futile interventions

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Abstract

Objective Scientific and technological advancements have significantly contributed to increased life expectancy; however, unresolved debates persist regarding quality of life and the dying process. Cardiopulmonary resuscitation (CPR) performed on terminal patients in the emergency department remains a subject of clinical and ethical controversy. This study aims to evaluate the ethical conflicts faced by physicians when making decisions about potentially futile treatments in emergency settings.

Materials and methods This study was conducted in the emergency department of a university hospital in Türkiye and consisted of two phases. In the first phase, 118 cardiac arrest cases were analyzed among 446,397 patients who presented to the emergency department between 2020 and 2025. In the second phase, emergency physicians were surveyed regarding their decisions to initiate or terminate CPR.

Results According to the findings, the average age of patients who responded to CPR was 65.54 ± 13.49 , whereas non-responders were significantly older. Although the majority of physicians believed that discontinuing CPR is ethically inappropriate, 98% were able to accurately predict cases in which CPR would be futile. Among physicians who refrained from terminating CPR despite anticipating non-responsiveness, the most frequently cited reasons included “concerns over legal, ethical, and professional responsibilities” (79.3%), followed by “social pressure (risk of violence or complaints)” (75.9%), and “noncompliance with religious and cultural beliefs” (69%, $n = 20$).

Conclusion Physicians’ reluctance to terminate futile treatment is influenced by legal and ethical responsibilities, social pressures, religious beliefs, and empathy. The study highlights the ethical and clinical conflicts faced by physicians in decisions regarding futile CPR and emphasizes the need for multidisciplinary approaches and ethical guidelines in such cases. Additionally, providing family members with clear information about the likely outcomes of CPR may facilitate ethical decision-making.

Keywords Cardiopulmonary resuscitation, Medical futility, Emergency service, Hospital, Ethical dilemmas, Withholding treatment

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Introduction

Advancements in scientific knowledge and the implementation of technological innovations in the health sciences have significantly contributed to the extension of life expectancy. On a global scale, scientific and technological progress continues to reshape our understanding and perception of fundamental concepts such as the human being, life, and death [1]. Over the past century, alongside these developments, disciplines such as bioethics have placed the dying process at the center of biomedical, ethical, and philosophical inquiry. In this context, while the increase in life expectancy is widely acknowledged as an undeniable fact, ongoing debates surrounding quality of life and the dying process remain unresolved and persist with vigor [2].

The administration of futile cardiopulmonary resuscitation (CPR) to patients in the process of dying in emergency departments emerges as one of the most complex ethical and clinical challenges. A review of the literature reveals that there is no universally accepted definition of “futile treatment” or “medical futility,” and these concepts are described in varying ways across different sources [3, 4].

Beauchamp and Childress have made significant contributions to the literature regarding which treatments may be considered futile, categorizing futile interventions under the following headings: procedures that physicians are incapable of performing; treatments that will not produce any physiological effect; interventions with a very low likelihood of success; treatments that result in minimal or clinically insignificant outcomes; procedures likely to cause more harm than benefit; untested or entirely controversial “treatments”; and any intervention that, when considering its effectiveness, potential benefit, and burden, should not be initiated or should be discontinued [5]. Although there is no universal consensus on this issue, from a practical standpoint, futile treatment may be defined as “intensive medical interventions that are highly unlikely to change the ultimate clinical outcome for a patient, yet require significant resources and effort” [6].

The emergency department (ED) presents a unique and challenging work environment, particularly due to the limited knowledge of critically ill patients’ medical histories, lack of information regarding medications used, and insufficient time to thoroughly review health records. Emergency department overcrowding is defined as a situation in which the demand for emergency services exceeds the capacity of a unit to provide high-quality care within a specific time frame [7]. The negative impacts of overcrowding exert significant pressure on patient care, healthcare staff performance and well-being, healthcare expenditures, and the overall efficiency of the healthcare

system. Moreover, it is increasingly being recognized as a matter of health equity [8–11].

CPR is a series of life-saving interventions aimed at supporting the breathing and circulation of infants, children, or adults who experience cardiac or respiratory arrest, with the goal of increasing the likelihood of survival. This life support procedure, as outlined in clinical guidelines, involves the manual or mechanical application of chest compressions and ventilations until advanced medical assistance becomes available [12, 13].

Despite the negative effects of emergency department overcrowding, the decision to initiate or terminate CPR remains a highly sensitive process. In particular, when patients arrive at the emergency department in cardiac arrest, there is typically little hesitation to initiate CPR before sufficient patient information is obtained. However, the real challenge arises in deciding when to discontinue CPR. Most of the literature on withdrawing or withholding treatment in acute care settings originates from intensive care units (ICUs) [14–16]. The aim of this study is to evaluate the ethical and non-ethical conflicts faced by physicians when making decisions to terminate treatment in cases where they know or anticipate the intervention to be futile. Additionally, the study seeks to identify the factors that influence such decisions and to explore physicians’ perspectives on medically ineffective interventions.

Materials and methods

Study design and setting

This study was conducted through a single-center retrospective analysis of a prospectively maintained database at a tertiary academic university hospital in Türkiye. The study consists of two phases. In the first phase, cardiac arrest cases were recorded. Between January 1, 2020, and January 1, 2025, a total of 446,397 patients presented to the emergency department, among whom 171 cardiac arrest cases were identified. Of these, 118 cases with complete data were included in the analysis. Data were obtained from the hospital’s electronic medical records and archive systems. The second phase involved a group of 34 physicians who had previously worked in emergency departments in Türkiye, to whom a structured set of questions was administered.

Selection of participants and study protocol

In the first phase, the demographic characteristics of the patients who experienced arrest, type of arrest (cardiac, respiratory, cardiopulmonary), response to CPR, causes of arrest (cardiac causes, respiratory failure, sepsis, malignancy, and other causes), need for dialysis, presence of liver failure, comorbidities, and blood gas parameters were analyzed in detail.

In the second phase, 18 cardiac arrest cases were selected, and the outcomes (survival or death) were concealed from the physicians. The selection of the 18 cardiac arrest cases was performed using a purposive sampling strategy to ensure representation of a diverse range of clinically relevant scenarios. Cases were selected to reflect variation in patient demographics, comorbidities, underlying causes of arrest, and clinical outcomes, aiming to approximate the heterogeneity encountered in routine emergency department practice. Only cases with complete, well-documented clinical data were included to ensure consistency and interpretability. To minimise bias during evaluation, outcome information (survival or death) was concealed from the participating physicians. While this approach was intended to enhance clinical relevance, we acknowledge that the absence of random sampling may introduce selection bias, and this limitation is addressed in the Discussion section. These cases were presented to 34 emergency medicine physicians, and their predictions regarding which patients would survive and which would not were evaluated. Additionally, for the patients predicted to die, physicians were asked a series of pre-prepared questions (Fig. 1). These questions addressed factors such as legal responsibility, religious and cultural beliefs, fears and concerns, empathy, social

pressure, and personal gain, and were based on insights derived from a comprehensive literature review [17–22].

Ethical statement

This study was initiated following the approval of the Duzce University Non-Interventional Clinical Research Ethics Committee (Decision No: 2024/124) on June 3,2024 and was conducted in the emergency department of a university hospital. Institutional review board (IRB) approval was obtained. All procedures involving human participants were in accordance with the ethical standards of the institutional research committee, as well as with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Statistical analysis

Statistical analyses were performed using SPSS version 23 for Windows (IBM, Chicago, IL, USA). The Shapiro-Wilk test was used to assess the normality of data distribution. For variables with normal distribution, Student’s t-test was used to compare two independent groups. For non-normally distributed variables, the Mann-Whitney U test was applied. Relationships between categorical variables were analyzed using the Chi-square test. Descriptive statistics were reported as mean ± standard deviation and

Questions
1. Based on the patients' clinical data, which patients do you think are most likely to respond to CPR?
2. Based on the patients' clinical data, in which cases would you anticipate that CPR would be futile?
3. Do you think that deciding to terminate treatment on the grounds that CPR is futile is an ethically appropriate approach? a) Yes b) No
4. Would you decide to terminate treatment if you believed that CPR was futile? a) Yes b) No
5. In cases where you believed the patient would not respond to CPR but were unable to make the decision to terminate treatment, what factors prevented you from doing so? (This question should be answered only by participants who did not terminate treatment. You may select more than one option.) A) Conflict with legal, ethical, and professional responsibilities B) Incompatibility with religious and cultural beliefs C) Fears and concerns D) Emotional connection and empathy with the patient’s family members E) Social pressure (e.g., risk of violence or complaints) F) Personal and professional gain

Fig. 1 Questions asked to physicians about patients they thought might lose their lives

median for continuous variables, and frequency and percentage (%) for categorical variables.

Results

In the first phase of the study, a total of 118 patients who experienced cardiac arrest were evaluated. The mean age of patients who responded to CPR was significantly lower (65.54 ± 13.49) compared to those who did not respond (71.66 ± 13.90) ($p = 0.03$). There was no statistically significant difference in CPR response between female (31.4%) and male (68.6%) patients ($p = 0.713$). No statistically significant difference was found between the CPR response groups based on the type of arrest (cardiac, pulmonary, cardiopulmonary) ($p = 0.776$); however, cardiopulmonary arrest was the most common presentation overall (82.2%). Cardiovascular causes were more frequently observed among patients who responded to CPR (54.3%). Overall, the cause of arrest was found to be significantly different between groups ($p = 0.044$).

No statistically significant differences were found between the two groups in terms of elevated creatinine levels (> 2 mg/dL) or need for dialysis within 24 h, or the presence of liver failure (bilirubin > 2 mg/dL, AST level twice the upper limit, or cirrhosis diagnosis) ($p = 0.275$, $p = 0.299$). Similarly, comorbidities and malignancy status were not significantly different between those who

responded to CPR and those who did not ($p = 0.195$, $p = 0.684$). There were also no significant differences between groups in pH, lactate, carbon dioxide (CO_2), and potassium levels ($p = 0.578$, $p = 0.265$, $p = 0.096$, $p = 0.091$) (Table 1).

The median age of the participating physicians was 29.5 years (range 24–45), with 35.3% female and 64.7% male participants, indicating a statistically significant gender distribution ($p < 0.001$). Male participants were notably overrepresented. Participants were evenly distributed based on years of experience: ≤ 5 years (50%) and > 5 years (50%), with a statistically significant difference in experience level ($p < 0.001$). In terms of professional status, participants were categorized as general practitioners (26.5%), residents (35.3%), and specialists (38.2%), and this distribution was also statistically significant ($p < 0.001$). The majority of participants (91.2%) had received formal ethics education. Physicians' accuracy in predicting CPR outcomes was 93.5% (range 84–98), and 98% (range 92–100) of the cases they identified as futile CPR resulted in death, indicating a high level of clinical accuracy in identifying futile interventions.

While only 23.5% of physicians considered withdrawing treatment to be ethically appropriate, the majority (76.5%) did not; however, this difference was not statistically significant ($p = 0.106$). Similarly, only 14.7% stated

Table 1 Demographic and clinical characteristics of patients with arrest

		CPR Response (+) <i>n</i> = 35	CPR Response (-) <i>n</i> = 83	Total <i>n</i> = 118	Test value <i>t</i> / χ^2	<i>p</i> value
Age (years)		65.54 ± 13.49	71.66 ± 13.90	69.85 ± 14.01	-2.203 ^t	0.03
Gender	Female	11 (31.4%)	29 (34.9%)	40 (33.9%)	0.135 χ^2	0.713
	Male	24 (68.6%)	54 (65.1%)	78 (66.1%)		
Type of Arrest	Cardiac arrest	3 (8.6%)	10 (12%)	13 (11%)	0.508 χ^2	0.776
	Pulmonary arrest	3 (8.6%)	5 (6%)	8 (6.8%)		
	Cardiopulmonary arrest	29 (82.9%)	68 (81.9%)	97 (82.2%)		
Cause of Arrest	Cardiovascular	19 (54.3%)	32 (35.6%)	51 (43.2%)	9.950 χ^2	0.044
	Respiratory	10 (28.6%)	12 (14.5%)	22 (18.6%)		
	Sepsis	2 (5.7%)	16 (19.3%)	18 (15.3%)		
	Malignancies	1 (2.9%)	8 (9.6%)	9 (7.6%)		
	Other	3 (8.6%)	15 (18.1%)	18 (15.3%)		
Creatinine > 2 or dialysis in 24 h	Present	6 (17.1%)	22 (26.5%)	28 (23.7%)	1.193 χ^2	0.275
	Absent	29 (82.9%)	61 (73.5%)	90 (76.3%)		
Liver dysfunction (bilirubin > 2 , AST $\geq 2\times$, cirrhosis)	Present	4 (11.4%)	16 (19.3%)	20 (16.9%)	1.077 χ^2	0.299
	Absent	31 (88.6%)	67 (80.7%)	98 (83.1%)		
Comorbidities	Present	27 (77.1%)	72 (86.7%)	99 (83.9%)	1.681 χ^2	0.195
	Absent	8 (22.9%)	11 (13.3%)	19 (16.1%)		
Malignancy	Present	7 (20.0%)	14 (16.9%)	21 (17.8%)	0.165 χ^2	0.684
	Absent	28 (80.0%)	69 (83.1%)	97 (82.2%)		
pH		7.078 ± 0.181	7.055 ± 0.211	7.062 ± 0.202	0.558 ^t	0.578
Lactate (mmol/L)		9.15 ± 4.39	10.32 ± 5.47	9.96 ± 5.178	-1.119 ^t	0.265
CO_2 (mmHg)		62.34 ± 26.24	53.49 ± 26.09	56.12 ± 26.34	1.680 ^t	0.096
Potassium (mmol/L)		4.51 ± 1.15	4.95 ± 1.32	4.82 ± 1.28	-1.704 ^t	0.091

Table 2 Demographic characteristics and responses of physicians

Variable		Med (min-max) n (%)	P value
Age (years)		29.5 (24–45)	
Gender	Female	12 (35.3%)	<0.001
	Male	22 (64.7%)	
Years of Medical Practice	≤ 5 years	17 (50.0%)	<0.001
	> 5 years	17 (50.0%)	
Professional Title	General Practitioner	9 (26.5%)	<0.001
	Assistant	12 (35.3%)	
	Specialist	13 (38.2%)	
Received Ethics Training	Yes	12 (35.3%)	<0.001
	No	13 (38.2%)	
Accuracy in Predicting Response to CPR (%)		93.5 (84–98)	
Percentage of Predicted Futile CPR Cases that Resulted in Death (%)		98 (92–100)	
Is it ethically appropriate to terminate futile CPR?	Yes	8 (23.5%)	0.106
	No	26 (76.5%)	
Would you terminate treatment in futile CPR cases?	Yes	5 (14.7%)	0.146
	No	29 (85.3%)	

Table 3 Evaluations of physicians who believed the patient would not respond to CPR but could not decide to terminate treatment (Based on Options in Question 5, Table 1)

Reason for Not Terminating Futile CPR		n	%
Conflict with legal, ethical, or professional responsibilities	Yes	23	79.3
	No	6	20.7
Incompatibility with religious or cultural beliefs	Yes	20	69.0
	No	9	31.0
Fears and concerns	Yes	20	69.0
	No	9	31.0
Emotional engagement or empathy with patients' family members	Yes	14	48.3
	No	15	51.7
Social pressure (e.g., risk of violence or complaints)	Yes	22	75.9
	No	7	24.1
Personal or professional gain	Yes	4	13.8
	No	25	86.2

they would consider withdrawing treatment, while 85.3% stated they would not, which was also not statistically significant ($p=0.146$) (Table 2).

The reasons why physicians who predicted a patient would not respond to CPR still refrained from withdrawing treatment are presented in Table 3, showing the distribution of “Yes” and “No” responses for each factor. The most frequently cited reason was “inconsistency with legal, ethical, and professional responsibilities” (79.3%, $n=23$), followed by “social pressure (risk of violence or complaint)” (75.9%, $n=22$), “non-conformity with religious and cultural beliefs” (69%, $n=20$), “empathy and emotional connection with family members” (48.3%,

$n=14$), “fears and concerns” (31%, $n=9$), and “personal and professional gain” (13.8%, $n=4$) (Table 3).

Discussion

CPR practices in emergency departments, particularly in cases deemed medically futile, raise significant ethical and clinical debates. This study is based on a retrospective analysis of 118 cardiac arrest cases presented to the emergency department and includes ethical evaluations of physicians' decisions to initiate and terminate CPR. In the literature, there is no consensus regarding the definition and application of medical futility. Beauchamp and Childress define futile treatments as interventions that fail to produce a physiological effect, have a very low probability of success, or pose more harm than benefit [5]. This definition aligns with the physicians' perceptions of futile CPR in our study.

The continuation of futile CPR procedures—despite being clinically ineffective—may result in adverse outcomes, such as physical suffering for the patient, psychological stress for families, and unnecessary consumption of healthcare resources. From an ethical perspective, the principles of beneficence and non-maleficence play a critical role in CPR decision-making. When the likelihood of CPR success is extremely low or virtually impossible, the potential for physical and psychological harm to the patient and their relatives represents a significant ethical concern [23]. In emergency settings, where time is limited and patients' medical histories may be unknown, decisions regarding the initiation and termination of CPR are particularly complex. Physicians often face ethical and clinical conflicts, especially regarding the discontinuation of CPR—paralleling similar challenges seen in intensive care unit decisions regarding the withdrawal of treatment [16, 24].

Among medical ethical principles, patient autonomy holds a central place. These findings highlight a fundamental ethical tension between the principles of beneficence, non-maleficence, and respect for patient autonomy in emergency decision-making. While physicians aim to avoid harm and unnecessary interventions, they must also consider patients' and families' expectations, often under conditions of uncertainty and time pressure. Patients or their families have the right to provide informed consent regarding CPR. However, in emergency departments, the limited time for communication and the unconscious state of many patients make it difficult to exercise this right [25]. The conflict between physician authority and patient autonomy is one of the key ethical challenges in end-of-life decision-making. Some perspectives argue that, based on the principle of “primum non nocere” (first, do no harm), physicians should avoid causing harm and act in the best interest of the patient—thereby making the decision to discontinue

futile interventions a matter of professional responsibility. According to this view, medical futility should be determined by the physician's clinical judgment rather than the patient's or family's preferences [26]. However, considering that patient autonomy is central to health-care decisions, other perspectives assert that individuals have the right to determine their end-of-life care and emphasize that physician authority should not be absolute [27]. Even when futile treatments are provided out of respect for patient and family autonomy, they may not only fail to provide medical benefit but also risk causing harm to the patient [28].

In our study, physicians were able to predict futile CPR cases with 98% accuracy. However, 76.5% of participants expressed the view that terminating CPR is ethically inappropriate. This finding reveals that physicians are often caught between clinical realities and ethical responsibilities, frequently facing ethical conflicts in the decision-making process. The most common reasons for physicians' reluctance to terminate CPR included concerns about violating legal, ethical, and professional responsibilities (79.3%) and social pressures (75.9%). The literature similarly notes that physicians often struggle with legal liabilities and potential backlash from patients' families when making end-of-life care decisions [29, 30]. In some cases, the continuation of CPR—despite its low effectiveness—has been associated with the expectations of the patient's relatives. Studies show that many family members overestimate the likelihood of CPR success, which leads them to oppose discontinuation [31, 32]. In our study, 48.3% of physicians cited empathizing with family members as a reason for continuing CPR. This underscores the importance of clearly communicating the likelihood of CPR failure to the patient's relatives.

Our findings also revealed that physicians correctly predicted whether a patient would respond to CPR in 93.5% of cases. Nevertheless, even when physicians believed CPR would be ineffective, they cited reasons such as incompatibility with religious or cultural beliefs (69%), fears and anxieties (31%), and personal-professional gain (13.8%) as barriers to termination. Other studies similarly highlight the significant influence of religious and cultural beliefs in end-of-life decision-making [33]. In countries like Türkiye, where strong religious and cultural values prevail, end-of-life decisions are often considered not only through a medical lens but also within the context of societal norms. In the context of Türkiye, end-of-life decision-making is further complicated by the absence of clear and widely implemented legal frameworks specifically addressing the withholding or withdrawal of life-sustaining treatments such as CPR in emergency settings. Although general medical ethics principles and patient rights regulations exist, there remains a lack of detailed and practical guidance

for physicians facing real-time decisions regarding futile interventions. This legal ambiguity may increase physicians' concerns about potential professional or legal consequences, thereby contributing to the continuation of medically futile treatments. Moreover, cultural and societal expectations in Türkiye, where family involvement in medical decision-making is prominent, may further influence physicians' reluctance to terminate resuscitation efforts. These factors highlight the need for clearer national guidelines and structured ethical frameworks to support physicians in making consistent and ethically justified decisions in emergency care. The literature indicates that physicians tend to align with general societal attitudes rather than relying solely on personal ethical beliefs when making decisions about terminating CPR [19]. To support physicians in making more informed decisions and reduce ethical conflicts, a multidisciplinary approach is essential.

This study has several important limitations that should be considered when interpreting the findings. First, the single-centre design may limit the generalisability of the results to other healthcare systems with different organisational structures, medico-legal environments, and cultural contexts. Second, the relatively small sample size, particularly in the physician cohort ($n=34$), restricts statistical power and limits the ability to perform reliable subgroup or stratified analyses based on age, experience, or professional status. In addition, the sample size was insufficient to perform statistically robust stratified analyses based on age or clinical experience. Third, the physician sample was relatively young (median age 29.5 years), with a substantial proportion having limited clinical experience. This demographic profile may not fully represent the broader emergency physician population, in which clinical decision-making in ethically complex situations may be influenced by accumulated experience and professional maturity. Therefore, the findings should be interpreted with caution when generalising to more experienced physician groups. Fourth, the selection of 18 clinical cases from a larger dataset introduces a potential risk of selection bias. Although a purposive sampling strategy was employed to include clinically diverse and representative cases, this non-random selection approach may have influenced the scenarios presented to participants. While this method was intended to enhance clinical relevance and reflect real-world variability, it may limit the generalisability of the findings. Therefore, the results should be interpreted with caution in this context. Finally, the use of structured, predefined response options in the questionnaire may have constrained participants' responses and introduced response bias. Although these categories were derived from existing literature to enable standardised quantitative analysis, the absence of open-ended responses may limit the depth

and nuance of physicians' reasoning. While these categories were derived from the literature to enable standardised quantitative analysis, the absence of open-ended responses may limit the depth and nuance of physicians' reasoning. Future multicentre studies with larger and more heterogeneous physician populations, combined with mixed-methods approaches incorporating qualitative data, are needed to provide a more comprehensive understanding of ethical decision-making in futile CPR scenarios. Taken together, these findings underscore the complexity of ethical decision-making in emergency care and the need for structured support systems for physicians.

Conclusions

In conclusion, physicians working in emergency departments frequently face complex ethical and clinical conflicts when making decisions regarding the continuation or termination of potentially futile CPR interventions. These decisions are shaped not only by clinical judgement but also by legal concerns, social pressures, cultural values, and emotional factors. Our findings suggest that supporting physicians through clearer ethical frameworks, improved communication strategies with patients' families, and context-sensitive guidance may help facilitate more consistent and ethically grounded decision-making processes.

However, these findings should be interpreted with caution given the study's methodological limitations, including the single-centre design and limited sample size. Further multicentre and mixed-methods studies are needed to better understand the ethical dimensions of decision-making in futile CPR scenarios.

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None.

Authors' contributions

**HS: ** Conceptualization, Methodology, Software, Data curation, Writing- Original draft preparation, Writing- Reviewing and Editing **AHK: ** Data curation, Writing- Original draft preparation, Writing- Reviewing and Editing, Visualization, Investigation. **JT: ** Data curation, Writing- Original draft preparation, Writing- Reviewing and Editing **HTH: ** Software, Data curation, Visualization.

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Data availability

The datasets generated and/or analysed during the current study are not publicly available due to institutional data protection policies but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the Duzce University Non-Interventional Clinical Research Ethics Committee (Decision No: 2024/124; approval date: June 3, 2024). All procedures involving human participants were performed in accordance with the ethical standards of the institutional research committee

and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Due to the retrospective design of the study and the use of anonymized clinical data, the requirement for informed consent to participate was waived by the Duzce University Non-Interventional Clinical Research Ethics Committee.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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