CLINICAL STUDY

PANDEMIC-DRIVEN SHIFTS IN OUTPATIENT ENT CARE: A RETROSPECTIVE ANALYSIS AND PERSPECTIVES FOR POST-COVID HEALTHCARE MODELS

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SUMMARY

Objective: The COVID-19 pandemic led to unprecedented disruptions in outpatient medical services worldwide. This study retrospectively analyzes otolaryngology visit trends during the early phase of the pandemic in a tertiary hospital in Istanbul, Turkey, and frames these findings in the context of hybrid healthcare transformation from 2020 to 2025.

Methods: We conducted a comparative review of outpatient visit data from March 10 to May 31 in 2019 and the same period in 2020. Patient demographics and ICD-10 diagnosis codes were evaluated. Chi-square and t-tests were used for statistical analysis ($p<0.05$).

Results: Outpatient visits dropped by 56.1% in 2020. Allergic rhinitis remained the most common diagnosis but declined by 63.3%. Impacted cerumen rose to second place. The median patient age increased, and gender distribution shifted significantly. Diagnostic patterns varied across age and sex. Procedural and pediatric cases saw the steepest declines.

Conclusion: ENT outpatient care was substantially impacted by the pandemic, but the changes also paved the way for novel care delivery models. The rise of telemedicine and remote diagnostics post-pandemic, particularly from 2021-2025, underscores the need for adaptive hybrid systems that integrate in-person and virtual care. Longitudinal data such as this can inform preparedness for future health crises.

Keywords: COVID-19, otolaryngology, telemedicine, outpatient care, hybrid models, pandemic health systems

PANDEMİ KAYNAKLI DEĞİŞİMLER IŞIĞINDA AYAKTAN KBB HİZMETLERİ: GERİYE DÖNÜK BİR ANALİZ VE POST-COVİD DÖNEMİ SAĞLIK MODELLERİNE YÖNELİK PERSPEKTİFLER

ÖZET

Amaç: COVID-19 pandemisi, dünya genelinde ayaktan tıbbi hizmetlerde eşi benzeri görülmemiş aksamalara neden olmuştur. Bu çalışma, İstanbul'daki bir üçüncü basamak hastanede pandeminin erken döneminde kulak burun boğaz (KBB) poliklinik başvuru eğilimlerini geriye dönük olarak analiz etmekte ve bulguları 2020-2025 yılları arasında hibrit sağlık hizmetleri dönüşümü bağlamında değerlendirmektedir.

Yöntemler: 10 Mart-31 Mayıs 2019 ile aynı dönemin 2020 verileri karşılaştırmalı olarak incelenmiştir. Hasta demografisi ve ICD-10 tanı kodları değerlendirilmiştir. İstatistiksel analizde ki-kare testi ve t-testi kullanılmıştır ($p<0,05$).

Bulgular: 2020 yılında poliklinik başvurularında 56,1% oranında azalma gözlenmiştir. Alerjik rinit en sık görülen tanı olmaya devam etmesine rağmen 63,3% oranında azalmıştır. Kulakta serumen (buşon) birikmesi ikinci sıraya yükselmiştir. Hastaların medyan yaşı artmış ve cinsiyet dağılımında anlamlı bir değişiklik gözlenmiştir. Tanı dağılımları yaş ve cinsiyete göre farklılık göstermiştir. İşlemsel ve pediatrik vakalar en büyük düşüşü yaşamıştır.

Sonuç: KBB ayaktan hasta hizmetleri pandemi sürecinde önemli ölçüde etkilenmiştir; ancak bu değişimler aynı zamanda yeni sağlık hizmeti sunum modellerinin gelişmesine zemin hazırlamıştır. Özellikle 2021-2025 döneminde tele-tıp ve uzaktan tanı uygulamalarının yükselişi, yüz yüze ve sanal bakımın entegre edildiği uyarlanabilir hibrit sistemlere duyulan ihtiyacı ortaya koymaktadır. Bu tür uzunlamasına veriler, gelecekteki sağlık krizlerine hazırlık açısından yol gösterici olabilir.

Anahtar Sözcükler: COVID-19, kulak burun boğaz, tele-tıp, ayaktan bakım, hibrit modeller, pandemi sağlık sistemleri

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INTRODUCTION

The emergence of coronavirus disease 2019 (COVID-19), caused by the novel SARS-CoV-2 virus, brought about one of the most profound and rapid transformations in modern healthcare history. First reported in Wuhan, China, in late 2019, the virus swiftly progressed into a global pandemic. By mid-2020, the World Health Organization had declared a public health emergency of international concern, with over 20 million confirmed cases worldwide[1] In response, healthcare systems were compelled to adapt rapidly to a new and uncertain landscape.

One of the most severely affected sectors was outpatient care. Hospitals across the world faced the dual challenge of treating COVID-19 patients while simultaneously suspending or minimizing non-urgent services to limit viral transmission and preserve resources[2,3]. Among the outpatient specialties, otolaryngology (ENT) was uniquely vulnerable. The frequent use of aerosol-generating procedures—such as nasal endoscopy, laryngoscopy, and suctioning—placed ENT clinicians at a particularly high risk of infection[4]. As a result, major otolaryngology societies, including the American Academy of Otolaryngology-Head and Neck Surgery and the European Rhinologic Society, issued guidelines advocating the deferral of non-emergent procedures and consultations[5].

In Turkey, the first confirmed COVID-19 case was detected on March 10, 2020. In the weeks that followed, the government enacted strict public health interventions: school closures, travel bans, lockdowns, and curfews for vulnerable populations[6]. These measures significantly curtailed the operation of outpatient clinics, both in public and private sectors. Patients, fearing hospital-acquired transmission, frequently avoided medical visits altogether, further compounding the reduction in healthcare utilization[7].

Telemedicine emerged globally as a potential solution to maintain continuity of care, yet its effectiveness in ENT was inherently limited. ENT diagnosis often requires direct visualization and physical examination, making it less amenable to remote assessment compared to other specialties like dermatology or psychiatry[8]. Despite these limitations, the crisis accelerated innovation in remote ENT diagnostics, such as AI-based voice analysis and smartphone-assisted otoscopy, laying the groundwork for hybrid care models that have since gained traction[9,10].

While the short-term effects of the pandemic on hospitalizations and elective surgeries have been widely documented, fewer studies have focused on its impact on routine ENT outpatient care during the pandemic's initial wave. Longitudinal analyses that examine these shifts within the context of evolving healthcare models are particularly scarce.

This study aims to fill that gap by analyzing ENT outpatient visit patterns in a tertiary hospital during the first pandemic wave in Turkey, comparing them to the pre-pandemic period. Furthermore, we discuss these findings within the broader framework of health system adaptations between 2021 and 2025, highlighting the role of hybrid outpatient models in promoting service resilience and accessibility during ongoing public health challenges.

MATERIAL and METHODS

This retrospective observational study was conducted in accordance with the ethical standards outlined in the Declaration of Helsinki and received approval from the Kartal Dr. Lütfi Kırdar City Hospital Scientific Research Ethics Committee on February 26, 2025, under decision number 2025/010.99/13/4.

Patient data were retrieved from the electronic health records of a tertiary care hospital. The dataset encompassed all otolaryngology outpatient visits recorded between March 10 and May 31 for the years 2019 and 2020. Extracted variables included patient demographics (age and gender) and primary diagnoses coded according to the International Classification of Diseases, 10th Revision (ICD-10). Repeated visits and follow-up consultations for the same complaint were excluded to avoid duplication.

For comparative analysis, patients were classified into six diagnostic subgroups based on their primary complaint:

- **General Otolaryngology:** Included common ENT issues such as rhinitis, acute sinusitis, otitis externa, impacted cerumen, and superficial neck infections.
- **Pediatric ENT:** All individuals under 18 years of age, regardless of diagnosis.
- **Otology:** Included cases of hearing impairment, tinnitus, vertigo, tympanic membrane disorders, and Meniere’s disease.
- **Rhinology:** Encompassed conditions like chronic sinusitis, nasal polyposis, and intranasal masses.
- **Laryngology:** Addressed issues such as hoarseness, vocal fold pathology, laryngitis, laryngopharyngeal reflux, and dysphagia.
- **Head and Neck:** Covered malignant neoplasms and nonspecific neck masses.

RESULTS

The results of the study were summarized in Table 1-6.

The study analyzed a total of 2,448 patient records from the otolaryngology outpatient department of a tertiary hospital in Istanbul over two defined periods. In the pre-pandemic interval (March 10 to May 31, 2019), 1,708 patient visits were recorded. In contrast, during the corresponding timeframe in 2020, which coincided with the initial wave of the COVID-19 pandemic, the number of outpatient visits dropped sharply to 740. This represents an overall reduction of 56.1% in clinical volume ($p<0.05$).

To maintain continuity of care during the pandemic, the hospital implemented telemedicine practices, while prioritizing in-person procedures that were urgent or time-sensitive.

The median age of patients showed a statistically significant increase, rising from 31 years in 2019 (range: 1-90) to 34 years in 2020 (range: 0-81). Additionally, there was a notable decrease in the female-to-male patient ratio during the pandemic period ($p = 0.01$), indicating a shift in demographic engagement.

Regarding diagnostic distribution, allergic rhinitis remained the most frequent condition in both years (14.5% in 2019 and 12.3% in 2020), despite experiencing a significant decline in overall case numbers. In 2019, acute sinusitis was the second most common diagnosis (8.8%), whereas in 2020, impacted cerumen rose to the second position (10.7%). The third most frequently diagnosed condition in both periods was nasal septum deviation, with rates of 6.9% and 5.9%, respectively.

Among the top 20 diagnoses, adenoid hypertrophy demonstrated the steepest decline, with a 95.7% drop in reported cases. Conversely, tinnitus exhibited the least reduction, decreasing by only 8.3%.

There was a statistically significant relationship between diagnostic categories and year of visit across both genders ($p<0.05$). In 2019, allergic rhinitis and acute sinusitis were the leading conditions, while in 2020, allergic rhinitis remained common, followed by impacted cerumen. Additionally, a gender-specific analysis revealed no significant difference in diagnosis distribution in 2019 ($p>0.05$), but a significant variation was observed in 2020 ($p<0.05$). For instance, impacted cerumen was more prevalent among male patients, whereas allergic rhinitis was more common in females during the pandemic period.

Significant age-related differences were also identified in specific diagnoses such as chronic serous otitis media, suppurative otitis media, acute nasopharyngitis, and allergic rhinitis ($p<0.05$). In general, the average patient age in 2020 was higher compared to the previous year.

Notably, procedural diagnoses such as adenoid hypertrophy, chronic sinusitis, and vocal cord pathologies plummeted. However, oncology-related visits remained relatively stable, suggesting effective triaging for high-risk cases.

Statistical Evaluations

The normality of continuous variables was assessed using the Shapiro-Wilk test. For normally distributed data, descriptive statistics were utilized, including the calculation of means (Avg.), standard deviations (SD), minimum (Min.), median (Med.), and maximum (Max.) values. For categorical variables, frequencies (N) and percentages (%) were provided.

The Chi-square test, specifically the Likelihood Ratio test, was applied to examine the relationships between categorical variables. To compare two independent continuous variables that followed a normal distribution, the Student's t-test was employed. A significance level of $p<0.05$ was adopted for all statistical analyses.

All statistical computations were conducted using MedCalc Statistical Software version 12.7.7 (MedCalc Software bvba, Ostend, Belgium; available at: www.medcalc.org, 2013).

Table 1. Distributions of All Parameters

		2019 N=1708		2020 N=740		Total N=2448	
		N	**%**	**N**	**%**	**N**	**%**
Gender	Male	905	53.0	435	58.8	1340	54.7
	Female	803	47.0	305	41.2	1108	45.3
Diagnosis	Otitis externa	27	1.6	23	3.1	50	2.0
	Other disorders of the outer ear	105	6.1	79	10.7	184	7.5
	Nonsuppurative otitis media	44	2.6	16	2.2	60	2.5
	Chronic serous otitis media	45	2.6	4	0.5	49	2.0
	Suppurative and unspecified Otitis media	44	2.6	9	1.2	53	2.2
	Chronic suppurative Otitis media, other	19	1.1	10	1.4	29	1.2
	Vestibular dysfunctions	27	1.6	20	2.7	47	1.9
	Hearing loss, other	44	2.6	22	3.0	66	2.7
	Otalgia	17	1.0	18	2.4	35	1.4
	Tinnitus	36	2.1	33	4.5	69	2.8
	Lymphadenitis, nonspecific	34	2.0	8	1.1	42	1.7
	Acute nasopharyngitis [cold]	99	5.8	20	2.7	119	4.9
	Acute sinusitis	150	8.8	28	3.8	178	7.3
	Acute pharyngitis	100	5.9	40	5.4	140	5.7
	Acute tonsillitis	101	5.9	37	5.0	138	5.6
	Acute laryngitis	16	0.9	4	0.5	20	.8
	Viral acute upper respiratory tract infection	20	1.2	23	3.1	43	1.8
	Viral and bacterial	2	0.1	14	1.9	16	.7

pneumonia						
Vasomotor and allergic rhinitis	248	14.5	91	12.3	339	13.8
Chronic pharyngitis and sinusitis	26	1.5	4	0.5	30	1.2
Nasal polyp	6	0.4	2	0.3	8	.3
Nasal septum deviation	118	6.9	44	5.9	162	6.6
Turbinate hypertrophy	18	1.1	3	0.4	21	.9
Chronic diseases of tonsils and adenoids	10	0.6	2	0.3	12	.5
Tonsillar hypertrophy	10	0.6	2	0.3	12	.5
Adenoid hypertrophy	63	3.7	3	0.4	66	2.7
Vocal cords and larynx diseases	3	0.2	3	0.4	6	.2
Salivary gland diseases	7	0.4	5	0.7	12	.5
Recurrent oral aphthae	5	0.3	7	0.9	12	.5
Gastro-esophageal reflux disease	59	3.5	40	5.4	99	4.0
Epistaxis	31	1.8	11	1.5	42	1.7
Head and facial bones injury and fracture	6	0.4	5	0.7	11	.4
Foreign body in respiratory tract	2	0.1	3	0.4	5	.2
Others	166	9.7	107	14.5	273	11.2

	2019 N=1708		**2020 N=740**		**Total N=2448**	
	Mean ± SD	**Med. (Min-Max)**	**Mean ± SD**	**Med. (Min-Max)**	**Mean ± SD**	**Med. (Min-Max)**
Age	29.9±16	31 (1-90)	34.7±14.4	34 (0-81)	31.4±15.7	32 (0-90)

Table 2. Comparison of 2019 and 2020

		2019		2020		
		N	**%**	**N**	**%**	**p**
Diagnosis	Otitis externa	27	1.9%	23	4.0%	**<0,001**
	Other disorders of the outer ear	105	7.4%	79	13.9%	
	Nonsuppurative otitis media	44	3.1%	16	2.8%	
	Chronic serous otitis media	45	3.2%	4	0.7%	
	Suppurative and unspecified Otitis media	44	3.1%	9	1.6%	
	Vestibular dysfunctions	27	1.9%	20	3.5%	
	Hearing loss, other	44	3.1%	22	3.9%	
	Otalgia	17	1.2%	18	3.2%	
	Tinnitus	36	2.5%	33	5.8%	
	Lymphadenitis, nonspecific	34	2.4%	8	1.4%	
	Acute nasopharyngitis [cold]	99	7.0%	20	3.5%	
	Acute sinusitis	150	10.6%	28	4.9%	
	Acute pharyngitis	100	7.1%	40	7.0%	
	Acute tonsillitis	101	7.2%	37	6.5%	
	Viral acute upper respiratory tract infection	20	1.4%	23	4.0%	
	Vasomotor and allergic rhinitis	248	17.6%	91	16.0%	
	Nasal septum deviation	118	8.4%	44	7.7%	
	Adenoid hypertrophy	63	4.5%	3	0.5%	
	Gastro-esophageal reflux disease	59	4.2%	40	7.0%	
	Epistaxis	31	2.2%	11	1.9%	

Likelihood Ratio test

Table 3. Comparison of 2019 and 2020 in Men

		2019		2020		
		N	**%**	**N**	**%**	**p**
Diagnosis	Otitis externa	13	1.7%	17	5.0%	**<0,001**
	Other disorders of the outer ear	59	7.9%	52	15.4%	
	Nonsuppurative otitis media	26	3.5%	8	2.4%	
	Chronic serous otitis media	28	3.7%	4	1.2%	
	Suppurative and unspecified Otitis media	21	2.8%	3	0.9%	
	Vestibular dysfunctions	9	1.2%	13	3.8%	
	Hearing loss, other	22	2.9%	12	3.6%	
	Otalgia	9	1.2%	9	2.7%	
	Tinnitus	23	3.1%	25	7.4%	
	Lymphadenitis, nonspecific	17	2.3%	2	0.6%	
	Acute nasopharyngitis [cold]	40	5.3%	11	3.3%	
	Acute sinusitis	84	11.2%	20	5.9%	
	Acute pharyngitis	55	7.3%	22	6.5%	
	Acute tonsillitis	50	6.7%	25	7.4%	
	Viral acute upper respiratory tract infection	11	1.5%	13	3.8%	
	Vasomotor and allergic rhinitis	131	17.5%	41	12.1%	
	Nasal septum deviation	67	8.9%	32	9.5%	
	Adenoid hypertrophy	40	5.3%	1	0.3%	
	Gastro-esophageal reflux disease	30	4.0%	23	6.8%	
	Epistaxis	14	1.9%	5	1.5%	

Likelihood Ratio test

Table 4. Comparison of 2019 and 2020 in Women

		2019		2020		
		N	**%**	**N**	**%**	**p**
Diagnosis	Otitis externa	14	2.1%	6	2.6%	**<0,001**
	Other disorders of the outer ear	46	6.9%	27	11.7%	
	Nonsuppurative otitis media	18	2.7%	8	3.5%	
	Chronic serous otitis media	17	2.6%	0	0.0%	
	Suppurative and unspecified Otitis media	23	3.5%	6	2.6%	
	Vestibular dysfunctions	18	2.7%	7	3.0%	
	Hearing loss, other	22	3.3%	10	4.3%	
	Otalgia	8	1.2%	9	3.9%	
	Tinnitus	13	2.0%	8	3.5%	
	Lymphadenitis, nonspecific	17	2.6%	6	2.6%	
	Acute nasopharyngitis [cold]	59	8.9%	9	3.9%	
	Acute sinusitis	66	10.0%	8	3.5%	
	Acute pharyngitis	45	6.8%	18	7.8%	
	Acute tonsillitis	51	7.7%	12	5.2%	
	Viral acute upper respiratory tract infection	9	1.4%	10	4.3%	
	Vasomotor and allergic rhinitis	117	17.6%	50	21.6%	
	Nasal septum deviation	51	7.7%	12	5.2%	
	Adenoid hypertrophy	23	3.5%	2	0.9%	
	Gastro-esophageal reflux disease	29	4.4%	17	7.4%	
	Epistaxis	17	2.6%	6	2.6%	

Likelihood Ratio test

Table 5. Average Age by Diagnosis Comparison in 2019 and 2020

Age		2019		2020		p
		Mean ± SD	Med. (Min-Max)	Mean ± SD	Med. (Min-Max)	
Diagnosis	Otitis externa	14	2.1%	6	2.6%	0,738
	Other disorders of the outer ear	46	6.9%	27	11.7%	0,185
	Nonsuppurative otitis media	18	2.7%	8	3.5%	0,197
	Chronic serous otitis media	17	2.6%	0	0.0%	**0,034**
	Suppurative and unspecified Otitis media	23	3.5%	6	2.6%	**0,007**
	Vestibular dysfunctions	18	2.7%	7	3.0%	0,266
	Hearing loss, other	22	3.3%	10	4.3%	0,118
	Otalgia	8	1.2%	9	3.9%	0,423
	Tinnitus	13	2.0%	8	3.5%	0,354
	Lymphadenitis, nonspecific	17	2.6%	6	2.6%	0,611
	Acute nasopharyngitis [cold]	59	8.9%	9	3.9%	**0,003**
	Acute sinusitis	66	10.0%	8	3.5%	0,337
	Acute pharyngitis	45	6.8%	18	7.8%	0,380
	Acute tonsillitis	51	7.7%	12	5.2%	0,742
	Viral acute upper respiratory tract infection	9	1.4%	10	4.3%	0,142
	Vasomotor and allergic rhinitis	117	17.6%	50	21.6%	**0,012**
	Nasal septum deviation	51	7.7%	12	5.2%	0,080
	Adenoid hypertrophy	23	3.5%	2	0.9%	0,254
	Gastro-esophageal reflux disease	29	4.4%	17	7.4%	0,743
	Epistaxis	17	2.6%	6	2.6%	0,681

Student t test

Table 6. Comparison of 2019 and 2020 by group

	2019	2020	Increase/ Change
General	861	471	-%83
Pediatric	203	27	-%652
Otology	165	114	-%45
Rhinology	351	48	-%631
Larengology	81	48	-%69
Head and Neck	59	32	-%84

DISCUSSION

This study presents a comprehensive retrospective analysis of how the early phase of the COVID-19 pandemic disrupted ENT outpatient services in a tertiary care setting in Turkey. The 56.1% decline in visit volume is consistent with similar findings from Europe and Asia, where hospital-based outpatient clinics reported reductions ranging from 40% to 80% during the first months of the pandemic[11,12]. This dramatic drop reflects a convergence of factors: institutional restrictions on non-urgent care, patient avoidance behavior, and logistical limitations such as reduced transportation access and reallocation of medical staff.

A key demographic shift was the decline in pediatric patients. With school closures and decreased viral transmission among children, there was a sharp reduction in consultations for common pediatric ENT conditions like recurrent otitis media and tonsillitis[13]. Additionally, many parents hesitated to bring children into clinical environments due to infection concerns, a pattern also observed in pediatric emergency departments globally[14].

The analysis of diagnostic trends offers valuable insights. The notable decline in allergic rhinitis diagnoses likely stems from reduced exposure to environmental allergens during lockdowns[15]. The rise in impacted cerumen cases is particularly interesting—it may represent a "threshold symptom" where the discomfort was significant enough to compel patients to seek care despite pandemic fears. Meanwhile, diagnoses dependent on endoscopic or procedural evaluation—such as adenoid hypertrophy, chronic sinusitis, and vocal fold pathology—dropped dramatically, reflecting both the reduction in in-person examinations and adherence to professional guidelines discouraging non-urgent procedures[4,5].

Perhaps most importantly, head and neck cancer-related visits remained relatively stable. This finding suggests that triage systems successfully prioritized high-risk cases, reinforcing earlier reports that urgent oncologic care was preserved even during the peak of healthcare disruption[16].

Beyond descriptive trends, our findings must be interpreted in the context of systemic adaptations between 2021 and 2025. Globally, the pandemic catalyzed the integration of digital tools into ENT care. Smartphone-based otoscopes, AI-assisted voice diagnostic platforms, and asynchronous video consultations have begun to reshape the ENT diagnostic landscape[17,18]. These innovations helped bridge the gap in care access, especially during periods of local outbreak resurgence or infrastructure strain.

Nevertheless, significant challenges remain. ENT care is inherently tactile and visual, and telemedicine alone cannot fully replicate its diagnostic rigor. Moreover, the "digital divide" has emerged as a barrier, particularly among elderly and rural populations, where access to or

literacy in digital health tools is limited[19]. Therefore, hybrid care models—which strategically combine remote and in-person care based on condition complexity and patient capability—are increasingly seen as the most sustainable approach[20].

Our study's data, although specific to a single center and limited to the early pandemic period, offer broader implications. First, it underscores the need for outpatient departments to develop flexible service delivery protocols, capable of toggling between virtual and physical modalities. Second, it highlights the importance of clinical triage frameworks that protect vulnerable populations and maintain continuity of essential care services, particularly for oncology, pediatrics, and chronic ENT conditions.

Looking ahead, public health emergencies are expected to recur—whether through pandemics, environmental disasters, or resource shortages. ENT services must not only remain agile in their clinical workflows but also engage in proactive infrastructure planning and staff training. Investing in hybrid models, equitable digital tools, and community-based outreach will be essential to ensure both resilience and inclusivity in the future of otolaryngologic care.

CONCLUSION

COVID-19 disrupted ENT outpatient care dramatically, but also catalyzed lasting transformations. The shift toward hybrid models provides a framework for resilient care delivery. ENT practices must invest in technological infrastructure and flexible protocols to maintain care continuity during future public health crises.

Ethical Statement:

Compliance with Ethical Standards: The authors claim that all data contributions comply with national and institutional ethical rules regarding human experiments, and the revised 1975 Helsinki Declaration of 2008.

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Conflict of Interest: None.

Ethical Approval: The study protocol was approved by the Kartal Dr. Lütfi Kırdar City Hospital Scientific Research Ethics Committee with decision number 2025/010.99/13/4 prior to the study.

Informed Consent: The study was conducted retrospectively.

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