

EVALUATION OF INTERNAL MEDICINE PATIENTS PRESENTING TO THE EMERGENCY DEPARTMENT DURING THE COVID-19 PANDEMIC

COVID-19 PANDEMİSİ SÜRECİNDE ACİL SERVİSE BAŞVURAN DAHİLİYE HASTALARININ DEĞERLENDİRİLMESİ


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ABSTRACT

Objective: During the COVID-19 pandemic, emergency departments became the primary units in the control and management of the epidemic worldwide. This study aimed to evaluate patients who presented to the emergency department and required internal medicine consultation in the pre- and post-COVID-19 periods, and to investigate the impact of the pandemic on the profile and outcomes of these patients.

Method: This retrospective study was conducted by comparing two periods: May 2019 (pre-COVID-19 period) and May 2020 (post-COVID-19 period). Hospital database records were reviewed separately for each period, and patients aged 18 years and older were included. Demographic characteristics, reasons for emergency department admission, indications for internal medicine consultation, consultation processes, and outcomes were analyzed based on internal medicine consultation forms recorded in the hospital information system (HICAMP®). Statistical analyses were performed using SPSS version 21 (SPSS Inc, Chicago, IL, USA) software.

Results: There was no statistically significant difference between the two periods regarding mean age and gender distribution. In both periods, the most common reasons for emergency department admission were oral intake disorders, deterioration in general condition, altered consciousness, and fatigue. However, a significant increase in gastrointestinal-related complaints was observed in the post-COVID-19 period. Gastrointestinal causes remained the leading reason for internal medicine consultation in both periods, while consultations due to infectious and nephrological causes increased significantly after the pandemic. Evaluation of consultation outcomes revealed a significant increase in intensive care unit admissions in the post-COVID-19 period, whereas no significant difference was observed in hospitalization rates to inpatient services.

Conclusion: The findings of this study indicate that the post-pandemic period was associated with increased intensive care admissions and a higher rate of internal medicine consultations for infectious and nephrological conditions, reflecting a shift in patient severity and clinical characteristics following the COVID-19 pandemic.

Keywords: COVID-19, emergency department, internal medicine

ÖZET

Amaç: COVID-19 döneminde tüm dünyada acil servisler salgının kontrolü açısından ilk odaklanılan birimler olmuştur. Bu çalışmada acil servise başvuran ve dahili açıdan değerlendirilmek üzere iç hastalıkları konsültasyonu istenilen hastaların COVID-19 pandemisi öncesinde ve sonrasında karşılaştırılarak değerlendirilmesi ve pandeminin dahili grup hastalar üzerindeki etkisinin araştırılması amaçlanmıştır.

Yöntem: Çalışma, Mayıs 2019 (COVID-19 öncesi dönem) ve Mayıs 2020 (COVID-19 sonrası dönem) dönemlerinde planlanmıştır. Bu kapsamda her bir periyot için hastane veri tabanı ayrı ayrı retrospektif olarak taranmış ve 18 yaş ve üzeri hastalar değerlendirilmiştir. Hastalara ait demografik özellikler, acile başvurma sebepleri, iç hastalıkları konsültasyonu istenme sebepleri, konsültasyon süreçleri ve konsültasyon sonuçları hastane bilgi sistemindeki (HICAMP®) iç hastalıkları konsültasyon form kayıtları dikkate alınarak değerlendirilmiştir. Elde edilen veriler SPSS versiyon 21 (SPSS Inc, Chicago, IL, USA) programı kullanılarak analiz edilmiştir.

Bulgular: Dönemler arasında hastaların yaş ortalaması ve cinsiyeti açısından anlamlı bir farklılık tespit edilmemiştir. Her iki dönemde de iç hastalıkları tarafından değerlendirilen hastaların en sık acil servise başvurma nedenlerinin oral alım bozukluğu, genel durum bozukluğu, bilinç bozukluğu ve halsizlik olduğu saptanmıştır. Bununla birlikte COVID-19 sonrası dönemde gastrointestinal sisteme ait şikayetlerle acil servise başvuruda anlamlı bir artış olduğu gözlenmiştir. İç hastalıkları konsültasyon istem nedenlerine göre değerlendirildiğinde her iki dönemde de en sık konsültasyon istem nedeni gastrointestinal nedenlerken, COVID-19 sonrası dönemde enfeksiyöz ve nefrolojik nedenlerle konsültasyon isteminde anlamlı bir artış olduğu gözlenmiştir. Hastalar konsültasyon sonlanım durumuna göre değerlendirildiğinde ise COVID-19 sonrası dönemde yoğun bakım ünitesine yatış oranında anlamlı bir artış saptanırken servis yatışlarında anlamlı bir değişim saptanmamıştır.

Sonuç: Çalışmanın sonuçları, pandemi sonrası dönemde enfeksiyöz ve nefrolojik nedenlerle dahiliye konsültasyonlarının yanı sıra yoğun bakım ünitesine yatış oranlarında artış olduğunu göstermektedir. Bu bulgular, COVID-19 pandemisi sonrasında acil servise başvuran hastaların klinik ciddiyetinde ve özelliklerinde bir değişim olduğunu düşündürmektedir.

Anahtar Kelimeler: COVID-19, acil servis, iç hastalıkları

Introduction

Since the official announcement of the first COVID-19 case in our country on March 11, 2020, emergency departments have become the primary units focused on controlling the outbreak and have functioned as the main units for access to healthcare services for non-COVID-19 reasons as in the rest of the world (1-3). Due to factors such as fear of contracting COVID-19, the desire to avoid adding extra burden on hospitals and social restriction measures taken for the pandemic, there have been significant disruptions in patients' access to the healthcare system (4,5). Patients in the internal medicine group, who have high potential for comorbidity and chronic diseases, have been among the most affected patients during this period and changes have been observed in their applications to outpatient clinics and emergency services. However, the literature contains a limited number of studies focusing on the evaluation of internal medicine patients presenting to the emergency department (6). In this study, it is aimed to determine the effect of the pandemic on internal medicine group patients

presenting to emergency services by comparing pre-pandemic period and to contribute to the management and follow-up process of these patients in possible similar future situations.

Materials and Methods**Design of the study**

This was a retrospective, single-center study, employing a cross-sectional design.

Ethical Committee Approval

The study was approved by the Ethics Committee of Ankara City Hospital (Approval No: E1-23-4379; Date: 13 December 2023). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Participants and study protocol

The study was conducted in Ankara City Hospital,

which has a bed capacity of 3,810 and receives an average of 339,000 emergency department admissions per year since its opening in 2019. For the study, May 2019 (pre-COVID-19) and May 2020 (post-COVID-19) periods were considered. For each period, the hospital database (HICAMP®) was retrospectively scanned separately, and adult patients (18 years and older) who were consulted to internal medicine after emergency department admission for each period were included in the study. Repeated consultations for the same patient were evaluated together. Patients with incomplete medical records, presenting with obstetric or gynecological complaints, had terminal malignancy or were receiving palliative care were excluded from the study. Demographic characteristics, reasons for emergency admission, reasons for internal medicine consultation, consultation processes and outcomes were recorded based on internal medicine consultation forms.

Statistical analysis

At the end of the study, data were evaluated statistically using SPSS version 21 (SPSS Inc, Chicago, IL, USA). Descriptive statistics were used, and values were expressed as mean±standard deviation and percentage. Non-normally distributed numerical variables and ordinal variables were compared using the Mann-Whitney U test while the Student's t-test was applied to normally distributed continuous variables. The Chi-square test was used to compare categorical variables. A p-value <0.05 was considered statistically significant for all data.

Results

In pre-COVID-19 period, a total of 20.809 patients

presenting to the Ankara City Hospital Emergency Department, and consultations were requested for 46% (n=9572) of them. The proportion of patients for whom internal medicine consultation was requested was 14.8% (n=1435) and when repeated consultations were evaluated together, 741 patients were included in the study. The mean age of patients who received internal medicine consultation was 62.8±18.1 (19-98) years and 49.9% (n=370) were male. The most common underlying diseases were hypertension (HT) 53% (n=392) and diabetes mellitus (DM) 17.5% (n=130) (Table 1).

Evaluating according to complaints for hospital admission, 26.5% (n=197) of the patients presented with oral intake disorder (OID), deterioration of general condition (DGC), altered consciousness (AC) and fatigue; 24.4% (n=181) were with nausea, vomiting, abdominal pain and diarrhea (Table 2). According to consultation outcomes, 52% (n=382) of the patients were admitted to the internal medicine service and 32.6% (n=242) were discharged. Total of 64.8% (n=480) of the patients were consulted for gastroenterological reasons such as gastrointestinal bleeding, cholangitis, and acute pancreatitis and 22.1% (n=164) for nephrological reasons such as high BUN, creatinine, and electrolyte imbalance (Table 3). In post-COVID-19 period, a total of 22.439 patients presenting to the Ankara City Hospital Emergency Department, and consultations were requested for 71% (n=16.156) of these patients. The proportion of patients for whom internal medicine consultation was requested was 10.4% (n=1687) and when repeated consultations were evaluated together, 811 patients were included in the study. The number of the patients presenting to the emergency department was higher in the post-COVID-19 period (Figure 1).

Table 1. Demographic characteristics, comorbidities and consultation outcomes of the patients consulted to internal medicine before and after COVID-19

		Before COVID-19 (n=741)	After COVID-19 (n=811)	P
Age (years), mean ± SD		62.8 ± 18.1	63.2 ± 18.7	0.756
Gender	Male	370 (49)	393 (48.5)	0.597
	Female	371 (51)	418 (51.5)	
Comorbidities	Diabetes Mellitus	130 (17.5)	214 (26.4)	<0.001
	Hypertension	392 (53)	262 (32.3)	<0.001
	Malignancy*	122 (16.5)	110 (13.6)	0.126
Consultation outcomes	Discharged	242 (32)	211 (26)	0.065
	Service admission	382 (52)	389 (48)	0.085
	ICU admission	100 (13.4)	178 (22)	<0.001
	Exitus	17 (2.2)	33 (4)	<0.001

*Hematologic/oncologic malignancy

Table 2. Emergency department complaints of the patients consulted to internal medicine before and after COVID-19

Admission Reason	Before COVID-19 (n=741)	After COVID-19 (n=811)	p
OID, DGC, AC, fatigue	197 (26.5)	156 (19.2)	<0.05
Nausea, vomiting, abdominal pain, diarrhea	181 (24.4)	319 (39.3)	<0.001
Melena, hematemesis, hematochezia	99 (13.3)	85 (10.5)	0.794
Dyspnea	51 (6.8)	66 (8.1)	0.346
Fever	21 (2.8)	43 (5.3)	<0.05
Other*	192 (26.9)	142 (17.5)	<0.001

Abbreviations: OID: Oral intake disorder; DGC: Deterioration of general condition AC: Altered consciousness.
*Other: nonspecific symptoms such as headache, joint pain, dizziness

Table 3. Reasons for requesting internal medicine consultation before and after COVID-19*

Consultation Reason	Before COVID-19 (n=741)	After COVID-19 (n=811)	p
Gastroenterological	480 (64.8)	327 (40.3)	<0.001
Nephrological	164 (22.1)	309 (38)	<0.001
Hematological	25 (3.3)	22 (2.7)	0.394
Oncological	24 (3.2)	26 (3.2)	0.376
Endocrinological	28 (3.7)	29 (3.5)	0.432
Infectious	20 (2.6)	99 (12.2)	<0.001

*Includes consultations referred from outpatient clinics or requested by other departments in the emergency service.

Compared to the pre-COVID-19 period, a statistically significant decrease was observed in internal medicine consultation rate ($p < 0.001$) (Figure 2).

The mean age of these patients was 63.2 ± 18.7 (19-98) years, and 48.5% (n=393) were male. There was no

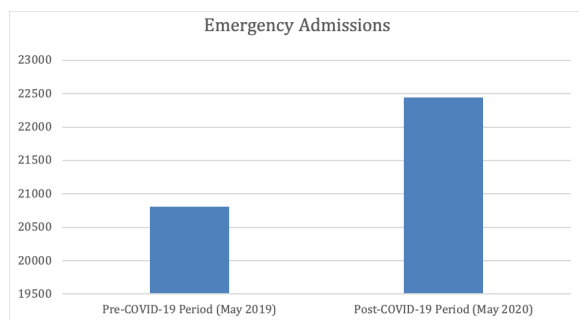


Figure 1. Comparison of total emergency admissions in Pre- and Post-COVID-19 periods.

significant difference in terms of age and gender of the patients compared to the pre-COVID-19 period ($p = 0.756$ and $p = 0.597$ respectively).

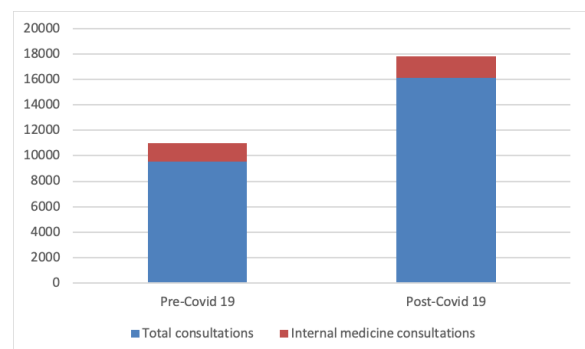


Figure 2. Comparison of total consultations and internal medicine consultations in Pre- and Post-COVID-19 periods.

The most common underlying diseases were HT 32.3% (n=262), DM 26.4% (n=214). Compared to the pre-COVID-19 period, while the number of patients with hypertension decreased, the number of patients with diabetes increased significantly ($p < 0.001$).

Regarding consultation outcomes, 48% (n=389) of

the patients were admitted to the internal medicine service, 22% (n=178) were admitted to ICU, 26% (n=211) were discharged and 4% (n=33) died in the emergency department. There was a significant increase in the number of patients admitted to ICU and died in emergency department compared to the pre-COVID-19 period. Demographic characteristics, comorbidities and consultation outcomes of the patients consulted to internal medicine before and after COVID-19 were summarized in Table 1.

When classified according to emergency department complaints, %39.3 (n=319) of the patients were with nausea, vomiting, abdominal pain and diarrhea; %19.2 (n=156) were with OID, DGC, AC and fatigue; 10.5% (n=85) were with melena, hematemesis and hematochezia.

Comparing with pre-COVID-19 period, the number of the patients admitted to the emergency department with nausea, vomiting, abdominal pain, diarrhea and fever were increased ($p<0.001$ and $p<0.05$ respectively); while the number of the patients with OID, DGC, AC, fatigue and non-specific symptoms such as headache, joint pain and dizziness were decreased significantly ($p<0.05$ and $p<0.001$ respectively). Emergency department complaints of the patients consulted to internal medicine before and after COVID-19 were summarized in Table 2.

Total of 40.3% (n=327) of the patients were consulted for gastroenterological reasons; 38% (n=309) for nephrological reasons. Comparing with pre-COVID-19 period, while the number of the patients consulted for gastroenterological reasons were decreased, the number of the patients consulted for nephrological and infectious reasons were increased significantly ($p<0.001$). Reasons for requesting internal medicine consultation before and after COVID-19 were summarized in Table 3.

Discussion

COVID-19 is a disease caused by a new type of the Coronavirus family member named SARS-Cov-2 and was the reason of a major pandemic worldwide in 2020 (7,8). In addition to causing a significant number of deaths, the COVID-19 pandemic led to serious disruptions in healthcare and social services globally due to quarantine measures, curfews, and the fear of contracting COVID-19 (9,10). Therefore, especially for internal medicine group patients with high comorbidity, disruptions in access to healthcare during the pandemic delayed their follow-up and treatment and changed their habits of hospital admission (6,11).

While literature indicates a decrease in emergency department admissions during the pandemic (9-11),

our study observed a slight increase compared to the pre-COVID-19 period. This discrepancy is likely due to our hospital's role as a designated pandemic center and the primary admission site for the city.

Although there are many studies in the literature evaluating patients admitted to emergency departments during the pandemic, the number of studies evaluating patients who were consulted to internal medicine after emergency admission is limited (6,12,13). A study in Switzerland showed a decrease in the number of internal medicine consultations requested after emergency admission during the pandemic, with no significant difference in age and gender (12). Another study in our country found no significant change in the rate of internal medicine consultation requests after emergency admission (14). In our study, while there was a significant increase in total consultation rate, a statistically significant decrease was observed in the rate of internal medicine consultation requests. Also there was no significant difference in the age and gender distribution.

Some studies have shown that the comorbidity rates of patients admitted to emergency departments was lower during the pandemic (13,15,16). However when diabetic and hypertensive patients were evaluated separately, the results differed. Some studies reported a decrease in the number of diabetic and hypertensive patients admitted to emergency departments during the early period of the pandemic, while other studies found an increase, especially in the late period of the pandemic (16-18). In our study, there was a significant increase in the number of diabetic patients after the pandemic, while a significant decrease was observed in the number of hypertensive patients.

An increase in the number of patients presenting to the emergency department with complaints of fever and dyspnea was observed during the pandemic (12,19,20). In our study, there was no significant change in the number of patients presenting with dyspnea while a significant increase was found in the number of patients presenting with fever. Additionally a significant increase was detected in the number of the patients with gastrointestinal complaints such as nausea, vomiting, abdominal pain and diarrhea. This may be because of the patients with gastrointestinal complaints were consulted to internal medicine, while those with dyspnea were consulted to other departments. Additionally, the fact that COVID-19 could present with gastrointestinal symptoms may have contributed to this situation (21).

A study conducted in the United States (201 hospitals across 36 states), examined data from over one million patients and found that mortality increased in emergency room visits for reasons other than

COVID-19 during the pandemic (22). Our study also observed a significant increase in the mortality of patients consulting internal medicine specialists in the emergency room compared to the pre-pandemic period. This situation was considered to be possibly related to the postponement of healthcare utilization due to the pandemic, leading patients to present to the emergency department with a more severe clinical condition.

Although there is no clear data in the literature on internal medicine service hospitalization rates, many studies have shown that intensive care unit admissions increased during the pandemic period (23-25). In our study, there was no significant difference in internal medicine service admissions but there was a significant increase in ICU admission rates like similar studies.

A review of the literature revealed no data on the reasons for internal medicine consultations after emergency room visits during the pandemic. However some studies have shown an increase in the incidence of acute renal failure and renal replacement therapy during the pandemic (26). Also, because of quarantine and isolation measures such as handwashing and mask use, a general decrease was observed in the frequency of non-COVID-19 infections during the pandemic (27,8). According to our study, comparing the reasons for internal medicine consultation after emergency admission, a significant increase was observed in nephrological and infectious reasons and a significant decrease was observed in gastroenterological reasons after the pandemic. The increase in the number of patients consulted due to infectious reasons may be because of the fact that our study included data from

a specific group of patients consulted by internal medicine specialists in the emergency department. The decline in the rate of internal medicine consultations for gastroenterological reasons may be because of the fact that this group of patients were consulted to other specialties due to suspicion of COVID-19.

Our study is limited as it is a single-center study and compares only a one-month period before and after the pandemic. However because of it was conducted in one of the biggest healthcare complex of the country, used as a main center during the pandemic, we think that it provides statistically significant data.

Conclusion

During the COVID-19 pandemic, quarantine measures and social restrictions made it difficult for patients to access the healthcare system and changed their hospital admission habits worldwide. Data obtained from our study and similar studies may guide the management of internal medicine group patients in possible future pandemics.

Disclosures

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