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Investigation of the correlation between admission diagnosis and discharge diagnosis in patients transferred from the emergency department to inpatient wards

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Abstract

While some of the patients admitted to emergency departments (ED) are treated and discharged, others are transferred to inpatient services. The follow-up of these transferred patients is mostly based on their hospitalization diagnosis. It is important that the hospitalization diagnosis is accurate and reliable. We aimed to examine whether there is a difference between the diagnosis of admission in the emergency department and the diagnosis used at discharge from the hospital during one week. After excluding patients who were admitted without being evaluated in the emergency department and patients with missing data, a total of 544 patients were included. It was observed that most admissions were made to the internal medicine unit (n=118). When it was analyzed whether the diagnosis changed, it was observed that 90.6% of the patients maintained the same diagnosis after discharge. When the tests that led to a change in diagnosis were analyzed, it was found that CT and MRI played the most important role. Although the tests performed led to a change in the hospitalization diagnosis, only 33% of the patients had a change in the hospitalization episode. This is an important point and emphasizes the importance of ensuring accurate and precise diagnoses and admissions from emergency departments. In conclusion, these findings point to the need for improvements in the diagnostic and treatment processes of patients transferred from the ED to the wards. In this way, it will be possible to improve the clinical outcomes of patients and ensure efficient use of resources.

Keywords: Diagnosis, emergency department, patient discharge

Introduction

Emergency medicine is a field of application based on the knowledge and skills necessary for the prevention, diagnosis, and management of the acute and urgent aspects of diseases and injuries affecting patients of all ages [1]. Emergency departments are a crucial component of healthcare institutions because of providing fast and effective service for patients facing various urgent health issues [2]. While some patients who visit emergency departments are treated and discharged, others are admitted to inpatient services. However, in patients transferred from the emergency department to inpatient services, it's important to investigate whether the initial diagnoses at admission match the discharge diagnoses. This is a crucial area of research.

The aim of this study is to examine the correlation between admission diagnoses and discharge diagnoses of patients transferred from the emergency department to inpatient services. Determining how well the preliminary diagnoses made during emergency department visits align with the patient's post-admission diagnosis can play a critical role in patient follow-up and treatment planning.

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In this context, using a prospective design in our research, we will compare the admission diagnoses and discharge diagnoses of patients transferred from the emergency department to inpatient services. The findings we obtain will help us understand whether the assessments made in emergency departments impact the patient's clinical course and will contribute significantly to clinical practices.

Material and Methods

This study has a prospective observational design. Ethical approval for the study was obtained from Ankara Etlik City Hospital Scientific Research Evaluation and Ethics Committee. The study was conducted at Ankara Etlik City Hospital. Patients transferred from the emergency department to inpatient services between 01/02/2024 and 07/02/2024 were included in the study. Patients referred to inpatient services from non-emergency units, those directed to admission without examination in the emergency department after registration, patients without a final diagnosis, and those with incomplete data were excluded from the study.

Demographic information, medical history, admission diagnoses, length of hospital stay, and discharge diagnoses of patients were recorded in the study. Additionally, if a difference was identified between admission diagnoses and discharge diagnoses, the diagnostic tests that led to a definitive diagnosis for the patient were noted. The clinics where patients with changing diagnoses were followed up were documented in the study.

The obtained data were used for statistical analysis. IBM SPSS 20.0 (Statistical Package for the Social Sciences) software was used for statistical analysis of the data. Microsoft Office 2016 was used for graphical representations. Descriptive data were expressed as mean, standard deviation, and percentage. A student's t-test was used for comparison between the two groups, and a p-value of less than 0.05 was considered statistically significant.

Results

The study included a total of 544 patients. Of these, 52.2% (n=284) were male, and 47.8% (n=260) were female. The mean age of the patients included in the study was 60±20 years. The mean age for males was 59±18 years, while for females it was 61±21 years. There was no statistically significant difference in age between males and females when compared (p=0.427, Student's t-test).

Patients stayed in the hospital for an average of 7.9±8.7 days. The longest hospital stay was 56 days.

201 patients stay in the intensive care unit (ICU) at least one day. Of those admitted to the ICU, 45.3% (n=91) could not be transferred from the ICU to the regular ward. Additionally, 343 patients were not admitted to the ICU throughout their hospital stay.

Of the patients admitted to the intensive care unit (ICU), 79.1% (n=159) stayed in the ICU for less than 10 days, while 13.4% (n=27) stayed for 10-19 days.

Regarding the medical history of the patients, 28.7% (n=156) had no pre-existing conditions, while 71.3% (n=388) had been diagnosed with at least one chronic illness.

When examining the units to which patients were admitted from the emergency department to inpatient services, it is observed that the majority of admissions were to the internal medicine unit (n=118). See Table 1 for details.

Table 1. Admissions to inpatient departments from emergency department

Hospital ward	n	%
Intensive care unit	51	9.4
Coronary intensive care unit (CICU)	14	2.6
Pediatric surgery intensive care unit (PICU)	2	0.4
Internal medicine ward	118	21.7
Cardiology ward	98	18
Neurology ward	36	6.6
Pulmonology department	37	6.8
Infectious diseases ward	15	2.8
Dermatology department	1	0.2
Psychiatry ward	1	0.2
Pediatrics ward	1	0.2
General surgery ward	68	12.5
Obstetrics and gynecology ward	30	5.5
Neurosurgery ward	14	2.6
Urology ward	13	2.4
Orthopedics and traumatology ward	12	2.2
Chest surgery ward	11	2
Cardiovascular surgery ward	7	1.3
Plastic and reconstructive surgery ward	5	0.9
Pediatric surgery ward	4	0.7
Otorhinolaryngology department	3	0.6
Ophthalmology department	3	0.6
Total	544	100

The provisional diagnoses of patients admitted from the emergency department are listed in the table below (Table 2).

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Table 2. The list of provisional diagnosis of patients

Provisional diagnosis	n	%
Multiple organ failure	1	0.2
Acute coronary syndrome	79	14.5
Congestive heart failure	34	6.3
Arrhythmia	7	1.3
Pneumonia	35	6.4
COPD exacerbation	11	2
Pulmonary embolism	9	1.7
Pneumothorax	3	0.6
Cerebrovascular disease	32	5.9
Sepsis	17	3.1
Soft tissue infection	12	2.2
Neutropenic fever	7	1.3
Urinary tract infection (UTI)	5	0.9
Cholecystitis	33	6.1
Pancreatitis	14	2.6
Ileus	14	2.6
Appendicitis	10	1.8
Hernia	7	1.3
Colitis, ileitis, diverticulitis	5	0.9
Tumor	5	0.9
Burn	3	0.6
Intra-abdominal abscess	3	0.6
Traumatic internal organ injury	4	0.7
Nephrolithiasis	5	0.9
Acute kidney failure	27	5
Gastrointestinal hemorrhage	24	4.4
Electrolyte imbalance	21	3.9
Anemia	6	1.1
Diabetic coma	2	0.4
Suicide	4	0.7
Excessive alcohol intake	3	0.6
Subarachnoid hemorrhage	7	1.3
Lumbar disc herniation	7	1.3
Fracture	20	3.7
Sharp object injury	5	0.9
Hematoma	5	0.9
Trombosis	3	0.6
Peripheral facial paralysis	1	0.2
High-risk pregnancy	27	5
Others	27	5
Total	544	100

When examining whether the diagnosis changed after admission from the emergency department to inpatient services, it was observed that 90.6% of patients retained the same diagnosis upon discharge (Figure 1).

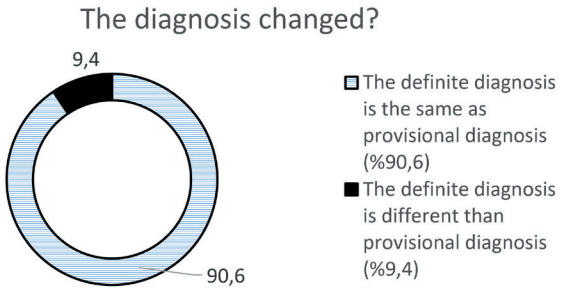

Figure 1. Diagnosis change rate

When looking at the tests that led to a change in diagnosis, it is observed that computed tomography (CT) and magnetic resonance imaging (MRI) played the most significant role in altering the diagnosis (Figure 2).

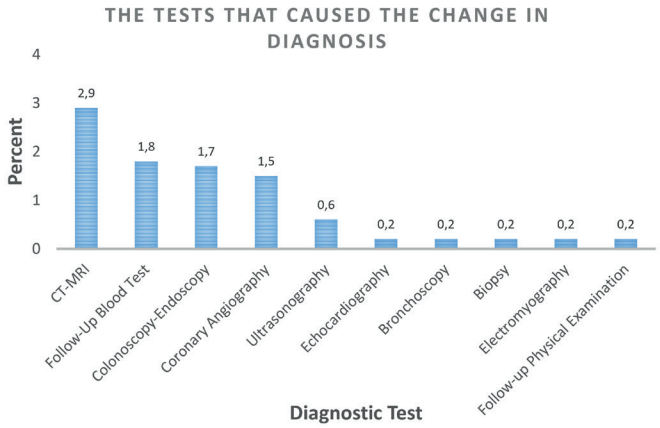

Figure 2. The percentage and types of tests contributing to diagnosis changes

Although the tests conducted may have led to changes in admission diagnoses, changes were made in the department of admission for only 33% of the patients (Figure 3).

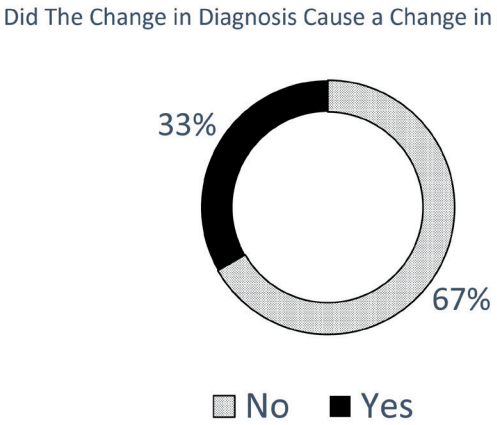

Figure 3. The rate of changing clinical wards

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After the diagnosis was changed, additional tests were performed for only 25.5% of the patients (Figure 4).

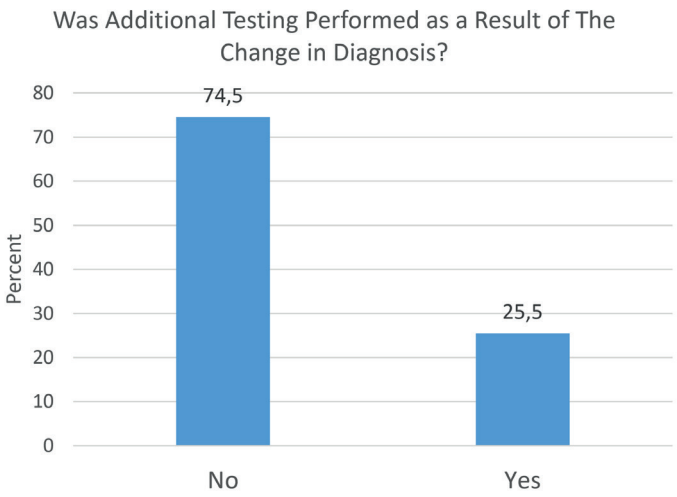

Figure 4. The rate of additional test performed?

Discussion

The results of this study evaluate the relationship between the provisional diagnoses made during admission to the emergency department and the discharge diagnoses of patients referred to inpatient services. The length of hospital stay of the patients and the number of patients admitted to which departments from the emergency department were analysed.

No significant difference in the distribution of patients admitted to inpatient services after diagnosis and treatment in the emergency department has been observed in terms of gender, and no difference in the mean ages of patients has been detected based on gender. It has been found that gender does not pose a relative risk in patients planned for admission for advanced testing and treatment in the emergency department.

In our study, we observed that 90.6% of the preliminary diagnoses made in the emergency department remained unchanged at patient discharge. This is consistent with the literature and demonstrates the effectiveness of the diagnostic methods used in the emergency department [3-5]. This success is even more remarkable when we evaluate it together with the department and diagnosis diversity we see in both tables (Tables 1 and 2). Emergency departments are not inferior to other fields in making the correct diagnosis. In this way, we observe that patients receive a high rate of effective and accurate diagnosis in emergency departments and thus, there is no need for an extra prolongation in the lenght of stay. In relation to this situation, we may not always know that the discharge diagnosis is the correct diagnosis. The diagnosis may have changed due to the course of the disease. In a similar study by Heuer et al. this situation was mentioned and it was stated that the final diagnosis of a patient who was evaluated as epileptic seizure at presentation could be bronchitis [4].

Interruptions and sudden problems experienced during emergency department patient management interrupt the clinical decision-making process of physicians. This situation was examined in the study by Monteiro et al. and the effect of interruptions and stress factors on the decision process was mentioned [6]. Although it was not included in the main theme of our study, the natural and chaotic structure of emergency departments and the decision process are affected by more changes. This makes it difficult to make the correct diagnosis. Due to this point of view, we see that the diagnoses made to the patients in the literature are generally compared over the emergency department diagnoses and the diagnoses made by emergency physicians are evaluated.

Although there are studies on these issues in the literature, there are fewer than expected. The reason for this may be that there are observation units in hospitals in many countries and in these units, patients whose diagnosis is not finalised or who are waiting to be admitted from the emergency department to the inpatient unit can be monitored. However, this method is not the preferred approach in our country. Most of the patients admitted to the ward are diagnosed in the emergency department. While this practice increases the accuracy of emergency department diagnoses, it may also lead to prolonged length of stay in the emergency department [7,8].

In emergency departments, the majority of patients are usually admitted to the internal medicine ward [9]. In our study as well, the majority of patients were admitted to the internal medicine ward. There is a significant difference between the number of patients directly admitted to the intensive care unit from the emergency department and the number of patients admitted to the intensive care unit during follow-up. This difference may be due to the limited number of intensive care beds, leading emergency department physicians to be more inclined to admit patients to the ward.

When examining the tests leading to changes in diagnosis, it was determined that CT and MRI play the most significant role. This finding highlights the importance of advanced imaging techniques in diagnostic accuracy and patient management. However, performing these tests in the emergency department can prolong emergency department stays. Particularly, MRI imaging is a time-consuming process, but it provides strong contributions to physicians in terms of diagnosis [10]. To expedite the emergency workflow, it may be preferable to conduct these advanced imaging tests after patients have been admitted to the ward. This approach can accelerate the rapid decision-making process in the emergency department and allow for faster intervention for patients requiring urgent treatment. However, deferring these tests until after admission to the ward may, in some cases, lead to changes in diagnosis.

After the change in diagnosis, it was observed that only 25.5% of patients underwent additional tests. Additionally, it was noted that in 33% of cases, the patients' admissions to the wards had to be altered. In the study by Arntz et al. misdiagnoses that would change the patient's prognosis were found at a similar rate [5]. This is a significant consideration, highlighting the importance of

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ensuring accurate and definitive diagnoses and admissions from the emergency departments. To prevent prolonging the patient's stay in the emergency department, the presence of intermediate departments in hospitals becomes crucial. In conclusion, these findings indicate the need for improvements in the diagnosis and treatment processes of patients transferred from the emergency department to the wards. This way, it will be possible to enhance the clinical outcomes of patients and ensure the efficient utilization of resources.

Emergency departments are considered a relatively new specialty area in the field of medicine, influenced by rapid advancements and technological progress in the field [1,2]. This field possesses a dynamic structure to meet constantly changing and complex healthcare needs. Advances in modern medicine, including new technologies, improvements in imaging methods, advancements in laboratory tests, and innovations in pharmacological treatments, enable emergency departments to intervene more effectively and swiftly for patients. These developments facilitate the provision of accurate diagnosis and treatment for patients when they present to emergency departments, significantly improving healthcare outcomes [11].

Conclusion

In conclusion, in our study, we found that emergency physicians diagnosed patients with high accuracy before transferring them to inpatient services. We found that a small group of patients changed their diagnosis and radiological imaging played the most effective role in this. This high diagnosis rate is remarkable in a complex and stressful environment such as the emergency department. Our results, which are consistent with the literature, reveal the necessity of further studies focussing on cost, efficiency and time.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

Ethical approval for the study was obtained from Ankara Etlik City Hospital Scientific Research Evaluation and Ethics Committee (Decision No: AEŞH-BADEK-2024-132).

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