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Endocrinology consultations evaluated in the emergency department: a single center experience.

Acil serviste değerlendirilen endokrinoloji konsültasyonları: tek merkez deneyimi

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ABSTRACT

Aim: The increasing trend of metabolic diseases causes endocrine emergencies to be encountered more frequently in emergency services. This trend increases the importance of endocrinology consultations from emergency services. Examining the features of these consultations will allow the process to be concluded more quickly and effectively.

Materials and Methods: Patients who applied to Manisa Celal Bayar University Faculty of Medicine Emergency Department between March 1, 2017, and March 1, 2022, and were consulted with the Department of Endocrinology were included. The patients' age, gender, diagnoses, the day, the season, the duration and the results of the consultations were evaluated.

Results: The mean age of the 326 patients included in the study was 51.56 ± 19.4 years. 53.4% (n=174) were female, 46.6% (n=152) were male. Of the patients, 29.8% (n=97) were diagnosed as diabetic ketoacidosis, 23.8% (n=78) hyperglycemia, and 15.3% (n=50) diabetic ketosis. The mean consultation duration was 65.21 ± 46.23 minutes. 32.2% of the patients (n=105) were discharged from the emergency department. This was followed by endocrinology service admission (23.9%; n=78) and intensive care unit admission (17.8%; n=58).

Conclusion: In the sample group with homogeneous gender and age distribution, it was observed that the majority of the patients applied to the emergency service with diabetes-related emergencies. The diagnosis spectrum of the patients was quite wide, and the consultations were concluded within an average of about one hour. A further investigation of the emergency department endocrinology consultations in detail will contribute to detecting the problems in this process and; therefore, its improvement.

Keywords: Consultation, emergency department, endocrinology.

This work has been previously presented as poster presentation in "43. Türkiye Endokrinoloji ve Metabolizma Hastalıkları Kongresi" congress held in Antalya, Türkiye between 18th and 22nd of May, 2022.

ÖZ

Amaç: *Metabolik hastalıkların yıllar içinde artış eğiliminde olması acil servislerde gün geçtikçe daha sık endokrinolojik acillerle karşılaşılmasına neden olmakta; bu da acil servislerden istenen endokrinoloji konsültasyonlarının öneminin artmasını beraberinde getirmektedir. Bu konsültasyonların özelliklerinin incelenmesi, sürecin daha hızlı ve etkili şekilde sonuçlanabilmesine olanak sağlayacaktır.*

Gereç ve Yöntem: *1 Mart 2017 – 1 Mart 2022 tarihleri arasında Manisa Celal Bayar Üniversitesi Hafsa Sultan Hastanesi Acil Servis kliniğine başvurup Endokrinoloji ve Metabolizma Hastalıkları bölümü ile konsülte edilen hastalar çalışmaya dahil edildi.*

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Hastaların yaşı, cinsiyeti, konsültasyon günü, mevsimi, konsültasyon sonucu aldıkları tanı, konsültasyon gerçekleşme süresi ve konsültasyon sonuçları değerlendirildi.

Bulgular: *Çalışmaya dahil edilen 326 hastanın ortalama yaşı 51,56 ± 19,4 yıl saptandı. %53,4'ü (n=174) kadın, %46,6'sı (n=152) erkek idi. Hastaların %29,8'i (n=97) diyabetik ketoasidoz, %23,8'i (n=78) hiperglisemi, %15,3'ü (n=50) diyabetik ketoz tanısı almıştı. Ortalama konsültasyon sonuçlandırma süresi 65,21 ± 46,23 dakika saptandı. Hastaların en sık olarak acil servisten taburcu oldukları (%32,2; n=105), bunu endokrinoloji ve metabolizma hastalıkları servisi yatışının (%23,9; n=78) ve yoğun bakım servisi yatışının (%17,8; n=58) izlediği görüldü.*

Sonuç: *Cinsiyet ve yaş dağılımı homojen olan örneklem grubunda hastaların çoğunluğunun diyabete bağlı acil durumlar ile acil servise başvurmuş olduğu görüldü. En sık olarak acil servisten taburcu edilen hastaların tanı spektrumu oldukça geniş olup ortalama yaklaşık bir saat içinde konsültasyon sürecinin sonuçlandığı görüldü. Acil servis endokrinoloji konsültasyon sürecinin detaylı bir şekilde irdelenmesi, süreçteki aksaklıkların saptanması ve sürecin iyileştirilmesine katkıda bulunacaktır.*

Anahtar Sözcükler: *Acil tıp, endokrinoloji, konsültasyon.*

Bu çalışma 18 – 22 Mayıs 2022 tarih aralığında Antalya'da düzenlenen "43. Türkiye Endokrinoloji ve Metabolizma Hastalıkları Kongresi"nde poster olarak sunulmuştur.

INTRODUCTION

In emergency practice, consultation is the inspection by a certain specialist (consultant) when the patient's condition requires an intervention that is outside of the emergency physician's expertise (1). Consultations are frequently needed in the emergency departments of tertiary hospitals, and these consultations often result in hospitalization. In the literature, the frequency of consultations in the emergency departments varies between 20-60% (2). Due to the fact that subspecialty departments are usually present in tertiary hospitals, the frequency of consultations from the emergency departments in these hospitals is twice as high when compared to other hospitals (3).

The burden of endocrine diseases on developing countries is constantly increasing (4). In the TURDEP-II study published in 2013, it was revealed that the prevalence of diabetes increased by 90%, the prevalence of impaired glucose tolerance by 106%, and the prevalence of obesity by 40% in 12 years (5). This finding reveals the increasing prevalence of these diseases in our country.

The rapid increase in endocrine diseases leads to emergency cases as well. This causes an increasing number of endocrinology consultations requested from emergency departments. Therefore, emergency consultations now have a more important place in endocrinology practice. In our study, we aimed to evaluate the endocrinology consultation process in the emergency department in detail by examining the endocrinology consultations requested by the emergency department of our hospital in the last five years.

MATERIALS and METHODS

Patients who referred to Manisa Celal Bayar University Faculty of Medicine Emergency Department between March 1, 2017 and March 1, 2022, and were consulted with the Department of Endocrinology and Metabolic Diseases were included in this cross-sectional retrospective study. The study was approved by the Ethics Committee of Manisa Celal Bayar University, Faculty of Medicine on 15.06.2022 (approval number 20.478.486). Endocrinology consultations requested for the patients were obtained from the hospital information management system. Because the study was a retrospective analysis, there was no informed consent obtained from the patients. Consultations requested for patients that were referred to the emergency department from the outpatient clinic for hospitalization and repeated consultations requested for the same patient were excluded, and the remaining consultations were analyzed. The age and gender of the patients, the day, the duration and the results of the consultations and the diagnoses of the patients were examined.

IBM SPSS Statistics 22.0 program was used for the analysis of the obtained data. Descriptive values were shown as mean ± standard deviation. Frequencies were shown as number (n) and percentage (%).

RESULTS

A total of 522 endocrinology and metabolic diseases consultations were requested from the emergency department during the five-year period set for the study. After excluding the consultations of the patients referred from the outpatient clinic for hospitalization and the repeated consultations requested for the same patient, 326 consultations were obtained and analyzed. According to the data obtained, the mean age of the patients was 51.56 ± 19.4 years. The minimum age was 18 and the maximum age was 100. The gender distribution of the sample group was homogeneous, with 53.4% (n=174) of the patients being female and 46.6% (n=152) male.

The obtained data revealed that consultations were requested less frequently on weekends compared to weekdays; the day with most consultations was Tuesday (n=65) while Saturday was the day with the least number of consultations (n=24).

When the diagnoses of the patients were analyzed, it was found that diabetes-related emergencies were the most frequent among all endocrinology emergencies. Of the patients, 29.8% (n=97) were diagnosed as diabetic ketoacidosis, 23.8% (n=78) hyperglycemia and 15.3% (n=50) diabetic ketosis. Detailed information about the diagnoses of the patients is shown in (Table-1).

From the analysis of the consultation durations, it was seen that the average consultation conclusion time was 65.21 ± 46.23 minutes. Mean consultation completion time was evaluated for each diagnosis. The Addison's crisis consultations were concluded the fastest (average 24.33 minutes). Completion of hyperglycemia consultations took the longest (average 73.88 minutes). Details about the average consultation completion times according to the diagnoses are given in (Table-2).

When the final outcomes of the consulted patients were analyzed, it was observed that the patients were most frequently discharged from the emergency department (32.2%; n=105). This was followed by endocrinology and metabolic diseases service admissions (23.9%; n=78) and intensive care unit admissions (17.8%; n=105). During the emergency department follow-ups, only 1 mortality was recorded; this was due to diabetic ketoacidosis secondary to meningococcal meningitis. Detailed information about the results of the emergency service admissions of the patients is shown in (Table-3).

In our study, we also analyzed the seasonal variability of the cases. Some cases such as hypoglycemia, hypercalcemia, hyperparathyroidism and diabetic ketosis were distributed homogenously among the seasons, whereas there were some seasonal variabilities in some cases, such as adrenal insufficiency, Addison's crisis and diabetic ketoacidosis. These information can be observed in detail in (Table-4).

Table-1. Diagnoses of the consulted patients.

Diagnosis	Number (n)	Percentage (%)
Diabetic Ketoacidosis	97	29.8
Hyperglycemia	78	23.8
Diabetic Ketosis	50	15.3
Hypercalcemia + Hyperparathyroidism	15	4.6
Adrenal Insufficiency + Addison's Crisis	15	4.6
Hypoglycemia	14	4.3
Hypothyroidism + Myxedema Coma	11	3.4
Diabetic Foot	8	2.5
Thyrotoxicosis	8	2.5
Hyperosmolar Hyperglycemic State	7	2.1
Other*	23	7.1
Total	326	100

***Other**: acromegaly (n=1), diabetes insipitus (n=2), hyperlipidemia (n=3), hypernatremia (n=1), pituitary adenoma (n=2), hypocalcemia (n=1), hyponatremia (n=1), hypoparathyroidism (n=1), hypopituitarism (n=2), insulin resistance (n=1), ketosis without diabetes (n=2), paraganglioma (n=1), psychosis (n=1), rhabdomyolysis (n=1), syncope (n=1), steroid induced myopathy (n=1), surrenal adenitis (n=1)

Table-2. Consultation durations of the diagnoses.

Diagnosis	Number (n)	Mean Consultation Duration (minutes)	Standard Deviation (minutes)
Addison's Crisis	6	24.33	18.84
Adrenal insufficiency	9	61.56	15.17
Diabetic foot	8	60.25	46.99
Diabetic ketoacidosis	97	65.39	52.95
Diabetic ketosis	50	63.08	44.77
Hypercalcemia + Hyperparathyroidism	15	59.87	38.54
Hyperglycemia	78	73.88	47.02
Hyperosmolar Coma	7	70.43	40.05
Hypoglycemia	14	63.43	28.01
Hypothyroidism + Myxedema Coma	11	50.36	37.32
Thyrotoxicosis	8	64.25	32.12
Other*	23	63.96	50.85
Total	326	65.21	46.23

***Other**: acromegaly (n=1), diabetes insipitus (n=2), hyperlipidemia (n=3), hypernatremia (n=1), pituitary adenoma (n=2), hypocalcemia (n=1), hyponatremia (n=1), hypoparathyroidism (n=1), hypopituitarism (n=2), insulin resistance (n=1), ketosis without diabetes (n=2), paraganglioma (n=1), psychosis (n=1), rhabdomyolysis (n=1), syncope (n=1), steroid induced myopathy (n=1), surrenal adenitis (n=1)

Table-3. Consultation outcomes.

Consultation Outcome	Number (n)	Percentage (%)
Discharge from ED	105	32.2
Admission to E & M Ward	78	23.9
Admission to ICU	58	17.8
Referral to Another Center	39	12
Admission to Another Ward	32	9.8
Voluntarily Discharge	13	4
Exitus	1	0.3
Total	326	100

ED: Emergency Department, **E&M**: Endocrinology and Metabolic Diseases, **ICU**: Intensive Care Unit

Table-4. Consultation distribution by seasons.

Diagnosis	Winter (n)	Spring (n)	Summer (n)	Autumn (n)	Total (n)
Diabetic ketoacidosis	16	23	27	31	97
Hyperglycemia	25	15	19	19	78
Diabetic Ketosis	14	12	14	10	50
Hypercalcemia + Hyperparathyroidism	3	5	4	3	15
Adrenal Insufficiency + Addison's Crisis	3	1	6	5	15
Hypoglycemia	3	4	3	4	14
Hypothyroidism + Myxedema Coma	2	2	5	2	11
Diabetic Foot	1	1	3	3	8
Thyrotoxicosis	1	3	3	1	8
Hyperosmolar Hyperglycemic State	3	0	0	4	7
Other*	9	4	7	3	23
Total	80	70	91	85	326

***Other**: acromegaly (n=1), diabetes insipitus (n=2), hyperlipidemia (n=3), hypernatremia (n=1), pituitary adenoma (n=2), hypocalcemia (n=1), hyponatremia (n=1), hypoparathyroidism (n=1), hypopituitarism (n=2), insulin resistance (n=1), ketosis without diabetes (n=2), paraganglioma (n=1), psychosis (n=1), rhabdomyolysis (n=1), syncope (n=1), steroid induced myopathy (n=1), surrenal adenitis (n=1)

DISCUSSION

Advances in technology and medical sciences facilitate the diagnosis and management of endocrine diseases. This situation causes endocrine diseases to become an increasing burden, especially in developing countries (6). Due to the increasing prevalence of endocrine diseases, an increasing number of endocrine emergencies are encountered in emergency services. Therefore, the diagnosis and management of these cases should be carried out carefully and as rapidly as possible.

Treatment of diabetic emergencies creates a significant burden for the health system of countries. For example, in the United States, managing a case of diabetic ketoacidosis costs an average of $17,500; this equates to $2.4 billion annually on hospital basis (7). In another study conducted in Spain, it is stated that as of 2012, 70.7 million Euro was spent for the management of hyperglycemic crises (8). In our study, diabetic emergencies constituted the majority of the patients referred to the emergency department. Considering this, the cost of endocrine emergencies to our hospital and national healthcare system will be better understood.

In our study, the average time of consultation was found to be 65.21 ± 46.23 minutes. Since there is no study in the literature evaluating the duration of endocrinology consultations in emergency departments, comparisons could be made with the emergency service consultation times of different departments in similar studies. The study of Üzer et al. in which pulmonology consultations were evaluated reported that the average consultation response time was 93.8 minutes (9). Dönmez et al. found this duration to be 306 ± 393 minutes for nephrology consultations, 289 ± 273 minutes for gastroenterology consultations, and 234 ± 273 minutes for neurology consultations (10). Compared with these data, the duration of our unit's emergency service consultation is relatively shorter. There are several factors related to this fact. The fact that conclusion of some branch consultations such as nephrology and gastroenterology rely on some interventional procedures (e.g., endoscopic procedures, catheter insertion, hemodialysis) may be one of these. The distances between different units in the hospital, consultation of patients in more than one department, the consultant’s extra duties such as providing outpatient services, the duration of blood analyses requested from the patient can be counted among other factors that affect the duration of the consultation. The fact that endocrine emergencies in general do not require interventional procedures verifies that our consultation duration is relatively shorter compared to interventional departments. However, as a department that relies mainly on blood sample tests, endocrinology consultation durations may delay while waiting for the test results. Our results revealed that Addison’s crisis consultations were concluded the fastest. The reason for this might be the fact that patients with Addison’s disease are generally well-informed about their condition and usually carry a patient card with themselves. This provides brief but valuable information to the physician in the emergency department and the endocrinology consultant and as a result, the consultation is quickly completed. Among our cases, hyperglycemia consultations took the longest time to finalize. This may be because of the fact that hyperglycemia might not be the top prior condition of those patients. In these patients, the hyperglycemia status might be accompanying more severe conditions such as myocardial infarction, stroke, et cetera. These conditions will require multidisciplinary approach and possibly interventional procedures which will possibly delay the consultation process.

Hyperglycemic and hypoglycemic conditions related to diabetes are more common among all endocrinology emergencies (11). In our study, the most frequently diagnosed conditions were diabetic ketoacidosis (29.8% n=97), hyperglycemia (23.8% n=78) and diabetic ketosis (15.3% n=50). This data supports the literature above. Also, our diagnostic spectrum appears to be quite wide (**Table-1**). This is probably as a result of the fact that our hospital is the only tertiary healthcare institution in our city.

From the data analyzed, we can see that the consulted patients were most frequently discharged from the emergency department. This is followed by admissions to endocrinology and metabolism service and intensive care unit. These three conditions account for a total of approximately 73% of all cases. When these three conditions were analyzed, it was seen that among the discharged patients, the most frequent diagnosis was hyperglycemia (34.3%, n=36). Diabetic ketoacidosis patients (32.1%,

n=25) and diabetic ketosis patients (28.2%, n=22) constituted the majority of the cases admitted to the endocrinology and metabolism service; while diabetic ketoacidosis was the most frequent diagnosis (43.1%, n=25) of the patients admitted to the intensive care unit.

A substantial proportion of patients (12%; n=39) were referred to another health institution and a small group of patients (4%; n=13) voluntarily left the emergency department with treatment refusal. Only one mortality was recorded among the patients during the emergency department follow-ups, equivalent to the rate of 0.3% (n=1). In the study conducted by Idowu et al., the mortality rate was 3.7% (n=4), whereas the same rate was found to be 22% (n=29) in the study of Anyanwu et al. (4, 6). The fact that our mortality rate is low compared to similar studies is promising. The 12% rate of referral to an external center is related with the insufficient capacity and physical conditions in the wards and intensive care units of our hospital.

In our study, we also analyzed the seasonal variability of the endocrine emergency cases. There are some cases which show clinical significance regarding their distribution among seasons. Diabetic ketoacidosis was seen most frequently in autumn. This is no surprise considering the fact that respiratory tract infections, one of the most important reasons for diabetic ketoacidosis, is most frequently seen in autumn. Also, the majority of adrenal insufficiency and Addison's crisis cases (11 out of 15) were encountered in summer and autumn, when the temperature levels in our city are high and the patients are more likely to suffer from dehydration.

Starting from the middle of the 20th century, parallel to the rapid global developments in healthcare systems, the incidence and rates of diseases have changed from communicable diseases to non-communicable diseases. One of the most important subgroups of non-communicable diseases is metabolic diseases. Developments in technology, the gradual global decrease in the need for labor, and intervening pandemics have led to a sedentary life; increasing the incidence of metabolic diseases even more. Therefore, it can be predicted that this increase will reflect more on the emergency services as metabolic emergencies.

In this study, we investigated the general demographic information, diagnosis diversity, consultation durations and outcome of the consultations of the emergency service patients consulted with our endocrinology clinic. There are two studies other than ours in the literature on endocrinology consultations in the emergency department, both conducted in Nigeria (4). Our study is a guiding nationwide study for the development and improvement of the endocrinology consultation process in the emergency departments.

This study has some limitations. First of all, the follow-ups of the patients after their emergency department admissions were not analyzed. In subsequent studies, examining the follow-up of the patients in the clinics they were hospitalized and their consultations with our clinic, if any, will be useful in terms of revealing the possible relationships between the clinical course of the patient and the consultation process. Moreover, since demographic properties of the patients may differ by location, multicenter studies involving centers from different regions can be planned in the future for more accurate results.

CONCLUSION

The fact that endocrine emergencies are encountered more frequently in emergency services necessitated the analysis of this consultation process. With the improvements to be made in the light of the data obtained, it will be possible to provide a faster and more effective consultation process. This will contribute to the provision of more effective health services primarily on the basis of our clinic and center, and then on the basis of our province and country.

Conflicts of interest: Authors declared no conflict of interest.

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