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Does St-Elevation Myocardial Infarction Wait for The Vacation to End?

ST-Elevasyonlu Miyokard Enfarktüsü Tatil Dinler mi?

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Abstract

Objective: This is an epidemiological study of patients diagnosed with ST-elevation myocardial infarction (STEMI) in Fethiye, one of Turkey's most popular destinations for domestic and foreign tourists. It aimed to determine a tourist group at risk for STEMI and needs attention for a holiday region that does not have a catheter laboratory and is two hours away from the nearest catheter laboratory.

Materials and Methods: The study was retrospective. Patients diagnosed with STEMI in all hospitals in the district, one state, and two private hospitals during the summer holiday period between June 1, 2021, and October 1, 2021, were examined. The most common STEMI dates and time intervals in tourists admitted to the emergency department were examined. Demographic characteristics and comorbidities of patients, including residents and tourists, were compared.

Results: A total of 331 STEMI patients were observed. 76.7 % (n =254) of the patients were Turkish residents, 1.8 % (n =6) resident foreigners, 19.3 % (n =64) domestic tourists, and 2.1% (n =7) foreign tourists. The average age of the residents was statistically significantly higher than the tourist group (64.15 vs. 57.83, [p=0.01]). A statistically significant difference was found only with hypertension as a comorbidity (P = 0.034).

Conclusion: In STEMI, no situation differs from the local people in the tourist group. Considering that elderly tourists with health problems will be encountered more frequently with the prolongation of human lifespan, efforts should continue to facilitate access to catheter laboratories in holiday regions, mainly for situations that require urgent intervention such as STEMI.

Keywords: Myocardial Infarction, Tourists, Residents, Summer, Vacation

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Öz

Amaç: Türkiye'nin yerli ve yabancı turist bakımından en gözde beldelerinden olan Fethiye ilçesinde ST elevasyonlu miyokard infarktüsü tanısı alan hastalarının epidemiyolojik inceleme çalışmasıdır. Kateter laboratuarı olmayan, en yakın kateter laboratuarına 2 saat mesafede olan bir tatil yöresi için STEMI açısından riskli olabilecek olan ve dikkat edilmesi gerekecek turist grubunu belirleyebilmek amaçlandı.

Gereç ve Yöntemler: Bu çalışma retrospektif bir çalışmadır. 01.06.2021-01.10.2021 tarihleri arasında yaz tatil döneminde 1'i devlet 2'si özel hastane olmak üzere ilçedeki tüm hastanelerde STEMI tanısı alan hastalar incelendi. Hastaların en sık MI geçirme tarih, gün, saat dilimleri incelendi. Hastalar yerli halk ve turist olmak üzere demografik özellikleri, komorbiditeleri karşılaştırıldı.

Bulgular: Toplam 331 adet STEMI hastası olduğu saptandı. Hastaların %76,7 (n=254)'si yerleşik Türk, %1,8 (n=6) yerleşik yabancı, %19,3 (n=64) Yerli turist ve %2,1 (n=7) yabancı turist idi. Yerleşik halkın yaş ortalaması turist grubuna göre istatistiksel anlamlı olarak daha yüksek izlenmiştir (64,15 vs 57,83, [p=0,01]). Komorbidite olarak sadece hipertansiyon ile istatistiksel olarak anlamlı bir farklılık saptanmıştır (p=0,034).

Sonuç: Turist grubunda ST elevasyonlu MI açısından yerli halktan farklı özellikle dikkat edilmesi gereken spesifik bir hasta grubu yoktur. İnsan ömrünün uzaması ile sağlık problemleri olan yaşlı turistlerle daha sık karşılaşılacağı gözönünde bulundurularak, tatil bölgelerinde özellikle STEMI gibi acil müdahale edilmesi gereken durumlar için katater laboratuarına erişimin daha da kolaylaşması için çabalar devam etmelidir.

Anahtar Kelimeler: Miyokardiyal İnfarktüs, Turist, Yerleşik Halk, Yaz, Tatil

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Introduction

Ischemic heart diseases are the most common cause of mortality according to World Health Organization (WHO) data (1). The European Society of Cardiology reported deaths from ischemic heart diseases as approximately 20% of all deaths in Europe (2). Many factors affect mortality in the ST-elevation myocardial infarction (STEMI) group, the riskiest group among ischemic heart diseases. These are age, Killip score, delay in initiation of treatment, treatment strategy, prior myocardial infarction history, diabetes mellitus, renal failure, and heart failure (2).

Apart from these known factors included in the guidelines, there are many studies on the prognosis and mortality of STEMI. In the last few years, it has been seen that the studies on holidays have increased. Studies on STEMI and holidays are generally the studies of centers with catheter laboratories. Most patients live in the region, and studies are conducted on weekday vs. weekend day comparisons (3,4). As a result of such studies, reasons such as lack of staff, inability to access equipment, and delays in diagnosing patients come to the fore.

Acute coronary syndromes have been reported to be a leading cause of holiday mortality. Still, studies have yet to examine whether patients have STEMI while on vacation away from their region of residence or how many STEMI patients in an area are tourists (5). However, many positive and negative changes occur in the cardiovascular system in the daily life of individuals during the holiday period. If we examine these changes, individuals move away from stress, one of the cardiovascular risk factors, when they go on vacation (6). On the other hand, during the vacation period, the frequency of alcohol use increases, eating habits change, and sleep patterns change (7-9). In addition, according to their destination, there is an altitude difference and a temperature difference, and their bodies show physiological adaptation, and these adaptive changes last for weeks (10-12). These factors may affect the cardiovascular system and ischemic heart diseases (11, 13). Apart from all these, a study examining the risk of myocardial infarction on vacation showed that driving conditions and being less luxurious might also be associated with myocardial infarction (14).

During the holiday season, it can be challenging to diagnose whether it is STEMI, which is a vital emergency in holiday resorts, and to access the catheter laboratory. In this study, we will examine the patients diagnosed with STEMI in Fethiye, one of the most popular destinations in Turkey, in terms of domestic and foreign tourists. The importance of this study is to identify the tourist group that may be at risk in terms of STEMI and needs attention for a holiday resort that does not have a catheter laboratory and is 2 hours away from the nearest catheter laboratory.

Materials and Methods

Study Design and Settings

The study was carried out with the permission of Mugla Sıtkı Kocman University Medicine and Health Sciences Ethics Committee (Date:15.11.2021 – Decision Number: 1). The study was carried out by the principles of the Declaration of Helsinki and the ethical rules. All patients with STEMI in Fethiye between 01.06.2021 and 01.10.2021 were included in the study. Study data were obtained from all hospitals in Fethiye, including one state hospital and two private hospitals. There are cardiology specialists in all three hospitals, and they are on call 24/7. Since there is no catheter laboratory in all three hospitals and the nearest percutaneous intervention center takes more than 120 minutes, thrombolytic treatment is given to STEMI patients, and the patients are referred.

Selection of the Participants

Based on previous studies, it was observed that there should be a minimum of 120 patients in the sample analysis performed by choosing type I error 0.10 and power of 90 % (1- β =0.90). Patients diagnosed with

STEMI in the emergency department were included in the study. Patients with ECG changes conforming to the definitions of ESC 4. Universal myocardial infarction as STEMI was included in the study (15).

Measurements and Outcomes

Patients with STEMI were analyzed for the following parameters; hospital type, gender, age, diabetes mellitus (DM), hypertension (HT), coronary artery disease (CAD), atrial fibrillation (AF), cerebrovascular disease (CVD), and time frame of admission to the emergency department.

Statistical Analysis

SPSS version 25.0 (SPSS Inc., Chicago, Illinois, USA) package program was used for data analysis in the study. Descriptive data on the sociodemographic and clinical information of the patients are given as N and % or mean ± standart deviation (SD) tables.

The study's data were evaluated with Kolmogorov-Smirnov in terms of normality assumptions. An Independent t-test, one of the parametric tests, was applied to determine whether there was a significant difference between the patient's status as residents and tourists. The Chi-Square and Fisher's Exact tests were used to compare categorical variables. $P<0.05$ was considered statistically significant.

Results

A total of 331 STEMI patients were detected. It was observed that 282 (85.2%) of 331 patients were diagnosed in private hospitals, and 49 (14.8%) were diagnosed in state hospitals. 64.4 % of the patient were male (Table 1).

The month with the most STEMI was found to be July (30.8%, [n=102]), and the day was Sunday (17.2%, [n=59]) of all STEMI. The most common STEMI was observed as an 8-16 shift with 37.8% (n =125) (Table 1).

If the patients were divided according to the status of being residents and tourists; 76.7% (n=254) of the Turkish residents, 1.8% (n=6) resident foreigners, 19.3% (n=64) domestic tourists, and 2.1% (n=7) foreign tourists (Table 1).

When we analyzed the patients according to the regions they lived in, 199 (60.1%) lived in Fethiye, 61 (18.4%) lived in districts close to Fethiye but where no cardiologist was available. Patients living in places other than Fethiye were referred here for cardiological evaluation. It has been observed that patients mostly live in the Marmara Region, especially İstanbul, after Fethiye and its surrounding neighborhoods (Table 1). When the patients with STEMI were examined, it was observed that there were no patients in our country who had STEMI from Eastern Anatolia and Southeastern Anatolia regions.

When the countries of foreign tourists were examined, it was observed that patients with STEMI came from Russia, the United Kingdom, the Netherlands, and Ukraine (Table 1).

Considering the comorbidities of the patients who had STEMI, 21.5% had DM, 47.7% had HT, 17.8% had CAD, 3.9 % had AF, and 2.1% had CVD (Table 1).

When the patients were divided into residents and tourists, the average age of the residents was statistically significantly higher than the tourist group (64.15 vs. 57.83, [p=0.01]) (Table 2).

When comparing the residents and tourists, no statistically significant difference was found between the month, the day, and the shift of the STEMI (Table 3). As comorbidity, a statistically significant difference was found with only hypertension (p=0.034).

Table 1.
Sociodemographic and Clinical Data of Patients (n=331)

		N or X_{mean}(Min-Max)	% or Mean ±SD
Age		64.00 (19.00-96.00)	62.80±14.13
Hospital Status	State Hospital	49	14.8
	Private Hospital	282	85.2
Gender	Male	213	64.4
	Female	118	35.6
Month	June	86	26.0
	July	102	30.8
	August	78	23.6
	September	65	19.6
Day	Monday	45	13.6
	Tuesday	52	15.7
	Wednesday	43	13.0
	Thursday	51	15.4
	Friday	39	11.8
	Saturday	42	12.7
	Sunday	59	17.8
Shift	00:00-08:00	86	26.0
	08:00-16:00	125	37.8
	16:00-24:00	120	36.3
Residents' or Tourists' Status	Resident-Turkish	254	76.7
	Resident- Foreign	6	1.8
	Domestic Tourist	64	19.3
	Foreign Tourist	7	2.1
Living Region	Fethiye	199	60.1
	Districts near Fethiye	61	18.4
	Marmara Region	36	10.9
	Aegean Region	11	3.3
	The Mediterranean Region	14	4.2
	The Inner Anatolia Region	3	.9
	Black Sea Region	2	.6
	Russia	2	.6
	The United Kingdom	1	.3
	Netherlands	1	.3
	Ukraine	1	.3
DM	No	260	78.5
	Yes	71	21.5
HT	No	173	52.3
	Yes	158	47.7
CAD	No	272	82.2
	Yes	59	17.8
AF	No	318	96.1

	Yes	13	3.9
CVD	No	324	97.9
	Yes	7	2.1

Table 2.

Comparison of Patients' Ages in Terms of Tourist Status

	Status	**N**	**Mean±SD**	**t**	**p**
Age	Residents	260	64.15±13.31	3.396	**0.001**
	Tourists	71	57.83±15.92		

*Independent samples T-test

Table 3

Comparison of Demographic and Clinical Data Groups By Residents or Tourists

	Residents	**Tourists**	**p**
Gender			
Male	163 (76.5)	50 (23.5)	0.228
Female	97 (82.2)	21 (17.8)	
Month			
June	69 (80.2)	17 (19.8)	0.728
July	80 (78.4)	22 (21.6)	
August	58 (74.4)	20 (25.6)	
September	53 (81.5)	12 (18.5)	
Day			
Monday	33 (73.3)	12 (26.7)	0.811
Tuesday	42 (80.8)	10 (19.2)	
Wednesday	31 (72.1)	12 (27.9)	
Thursday	40 (78.4)	11 (21.6)	
Friday	33 (84.6)	6 (15.4)	
Saturday	34 (81.0)	8 (19.0)	
Sunday	47 (79.7)	12 (20.3)	
Shift			
00:00-08:00	67 (77.9)	19 (22.1)	0.539
08:00-16:00	102 (81.6)	23 (18.4)	
16:00-24:00	91 (75.8)	29 (24.2)	
DM			
No	203 (78.1)	57 (21.9)	0.688
Yes	57 (80.3)	14 (19.7)	
HT			
No	128 (74.0)	45 (26.0)	**0.034**
Yes	132 (83.5)	26 (16.5)	
CAD			
No	209 (76.8)	63 (23.2)	0.103
Yes	51 (86.4)	8 (13.6)	
AF			
No	251 (78.9)	67 (21.1)	0.488*
Yes	9 (69.2)	4 (30.8)	
CVD			

No	255 (78.7)	69 (21.3)	0.645*
Yes	5 (71.4)	2 (28.6)	

Chi-square test, *: Fisher exact test

Discussion

This retrospective study was performed during the summer season in a holiday region on the southwestern coast of Turkey, which has a magnificent view of its mountains and sea; demographic data for tourists admitted to health institutions with the diagnosis of STEMI were analyzed. We aimed to determine the status of STEMI in the summer season for the residents and tourists in the holiday regions far from the catheter laboratory required for STEMI treatment since the holiday regions are relatively denser in the summer season, and the access to the extreme areas is more complicated than the inner parts.

In our study, it was observed that the patients who had STEMI in Fethiye, which is a holiday region, were mostly locals. Among the tourists, there was a higher rate of domestic tourists.

The residents had more STEMI, but the rate was higher than expected. One of the reasons for this was the lack of cardiologists in four districts near Fethiye, and the patients who had STEMI from these districts were directed to Fethiye first. Another reason may be that there are various restrictions on the arrival of foreign tourists due to COVID-19 at the time of the study and the late opening of the crossings.

It is seen that most patients are diagnosed in private hospitals; the reason for this may be that STEMI patients go to the nearest hospital either on their own or by ambulance. Prehospital diagnosis and early initiation of treatment affect prognosis and mortality in STEMI patients (16, 17). For this reason, patients are referred to the hospital, where they can be admitted to the catheter laboratory within 120 minutes. They are referred to the nearest hospital that can give fibrinolytic treatment if they cannot.

According to the literature, there are data on whether it is more, especially in cold weather, cold months, and winter (18-20). The reason why myocardial infarction, associated with respiratory tract infections, is more common in winter may be that respiratory tract infection is more common in winter (21, 22). In our study, the most STEMI was seen in July, not September, considered the coldest month of these four months. The reasons for this may be that we did not carry out a study that would include all months or that the number of domestic tourists was higher because there was a nine-day holiday in July at the time of the study. In addition, upper respiratory tract infections may be less common due to the obligation to wear a mask due to COVID-19.

The average of the residents was older than the tourist group, as we expected. The reason may be that the region is famous for paragliding and water sports, and the average age of the tourists and the general tourist group, especially for these sports, is lower (23).

With the prolongation of the human lifespan, the elderly population is increasing (24). This means encountering older tourists with comorbidities. When tourists go on vacation, they carry comorbid diseases with them. In the study of Eray et al. (25), it was conducted that non-traumatic medical emergency admissions were more common than traumatic injuries. It may be related to the high average and prevalence of residents in our study, which only found a significant difference in hypertension as comorbidity.

There are many limitations to our study. Firstly, our study is a retrospective study. The second of these is that we could not have the opportunity to conduct a study on how many of the incoming tourists have had STEMI. Another is that we needed help to reach information on which day the patients who came as tourists had STEMI. Finally, it is not known by which mode of transportation the tourists arrive.

Conclusion

There is no significant difference in the incidence of STEMI among residents or tourists in holiday regions during the summer months. Considering that elderly vacationers with comorbidities will be encountered more frequently, it is beneficial to act early regarding drugs used and STEMI symptom questioning.

Ethics Committee Approval The study was carried out with the permission of Mugla Sıtkı Kocman University Medicine and Health Sciences Ethics Committee (Date:15.11.2021 – Decision Number: 1).

Informed Consent: As this study was a retrospective study, informed consent was not obtained from the patients.

Conflict of Interest: Authors declared no conflict of interest.

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