



Diagnostic Evaluation of Children Presenting with Chest Pain to a Paediatric Cardiology Policlinic: Effect of the COVID-19 Pandemic on Aetiology

Çocuk Kardiyoloji Polikliniğine Göğüs Ağrısı Şikayetiyle Başvuran Hastaların Tanısal Değerlendirilmesi: Covid 19 Pandemisinin Etiyolojiye Etkisi

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Abstract

Aim: The aim of this study was to evaluate the aetiology of chest pain, the demographic data of patients with chest pain, and the effect of the coronavirus disease 2019 (COVID-19) pandemic on these variables.

Material and Method: The study included patients who presented with complaints of chest pain at a paediatric cardiology policlinic between November 2019 and August 2020. The patients were divided into two groups based on the date 11 March 2020, when restrictions to daily life were implemented because of the COVID-19 pandemic in Turkey. Groups 1 and 2 included patients who presented with chest pain before and after that date, respectively.

Results: Evaluations were made in 251 patients comprising 136 (54.2%) females and 115 (45.8%) males with a mean age of 11.6±2.9 years. The chest pain was felt most often in the precordial area (46.2%) as a needle pricking sensation (64.9%). The most causes of the chest pain were determined to be the musculoskeletal system (55%), psychogenic (16.3%), and idiopathic (13.5%), respectively. A cardiac aetiology was determined in 2.8% of the patients. Psychogenic reasons were more prevalent, and more patients had been referred by a physician and from rural areas, in Group 2 than Group 1 (p<0.05).

Conclusion: To prevent repeated policlinic presentations with non-cardiac chest pain, and unnecessary and lengthy tests, the concerns of families must be eliminated. Since the beginning of the COVID-19 pandemic, the number of children with chest pain of psychogenic cause has increased.

Keywords: Chest Pain, COVID-19, pandemic, psychogenic

Öz

Amaç: Çalışmamızda göğüs ağrılarını demografik ve etiyolojik açıdan değerlendirmeyi ve bu değişkenlere corona virüs hastalığı 2019 (COVID-19) pandemisinin etkisini araştırmayı amaçladık.

Gereç ve Yöntem: Kasım 2019- Ağustos 2020 tarihleri arasında çocuk kardiyoloji polikliniğine göğüs ağrısı şikayetiyle başvuran hastalar çalışmaya alındı. Hastaların özgeçmiş ve soygeçmiş bilgileri, göğüs ağrısının özellikleri, fizik muayene bulguları, ekg ve ekokardiyografik bulguları kaydedildi. Hastalar Türkiye'de covid 19 pandemisi nedeniyle toplumsal yaşamda kısıtlamaların uygulanmaya başlandığı 11 Mart 2020 öncesi (grup 1) ve sonrası (grup 2) olmak üzere iki gruba ayrıldı.

Bulgular: Çalışmaya yaş ortalaması 11,6±2,9 yıl olan 136'sı kız (%54,2) toplam 251 hasta alındı. Ebeveynlerin %46'sı, hastaların ise %12'si göğüs ağrısının kardiyak kökenli olduğunu düşünüyordu. Göğüs ağrısı en sık prekordiyal alanda (%46,2) ve iğne batar tarzda (%64,9) hissedilmekteydi. Hastaların 116'sında (%46,2) soygeçmişinde kalp hastalığı mevcuttu. Göğüs ağrısının en sık sırayla kas-iskelet sistemi (%55), psikojenik (%16,3) ve idyopatik (%13,5) sebepli olduğu görüldü. Hastaların %2,8'inde kardiyak sebep saptandı. Gruplararası karşılaştırmada pandemi sonrası (grup II) de psikojenik sebeplerin daha fazla olduğu, hastaların daha fazla hekim sevkıyla ve kırsaldan geldiği saptandı (p<0,05).

Sonuç: Nonkardiyak göğüs ağrılarında tekrarlayan poliklinik başvuruları, gereksiz ve uzun süren tetkikleri önlemek için ailelerin endişeleri giderilmelidir. Covid 19 pandemisi sonrasında çocuklarda psikojenik nedenli göğüs ağrılarında artış saptandı.

Anahtar Sözcükler: COVID-19, göğüs ağrısı, pandemi, psikojenik



INTRODUCTION

Chest pain is frequently seen in children and adolescents, and in contrast to adults, generally has a benign aetiology. Although it is one of the most common complaints on presentation at paediatric cardiology policlinic, when not managed correctly, chest pain leads to repeated policlinic presentations, unnecessary tests, and family worry.^[1-5] The vast majority of instances of chest pain in children are not of cardiac origin.^[1,3,5,6] Chest pain is the cause of 5.2% of the consultations requested from the paediatric cardiology policlinic, 13% of emergency department evaluations, and 19% of new patient consultations from the emergency department.^[4] However, despite these frequent evaluations, it has been reported that the rate of chest pain of cardiac cause in children is only 0–5%.^[2,3,6]

The novel severe acute respiratory syndrome coronavirus 2 (SARS CoV-2) responsible for coronavirus disease 2019 (COVID-19) first emerged in Wuhan, China in December 2019 and spread rapidly around the world. The World Health Organization (WHO) declared COVID-19 a global pandemic on 10 March 2020.^[7] The first case in Turkey was reported on 11 March 2020, after which daily life restrictions of varying degrees were implemented, particularly to protect children and the elderly (schools, businesses, and public areas were closed and curfews applied).^[7] Somatic symptoms and psychiatric disorders such as anxiety disorder, depressive symptoms, post-traumatic stress disorder (PTSD), feelings of guilt, psychosis, and suicide have been associated with the pandemic.^[8-10] Although there are limited data regarding the effects of the pandemic on the mental health of children, situations such as physical and social restrictions during a pandemic, fear, long-term absence from school, or the loss of a close relative can lead to severe psychological problems in children.^[10]

The aims of this study were to analyse the patients presenting at our policlinic with complaints of chest pain and, by determining an appropriate approach, to prevent unnecessary tests, eliminate the concerns of patients and their families, and prevent repeated hospital presentations. The study was conducted during the COVID-19 pandemic to examine the effect of restrictions on daily life due to the pandemic on patients presenting with complaints of chest pain.

MATERIAL AND METHOD

The study included a total of 251 patients who presented at the Paediatric Cardiology Policlinic because of complaints of chest pain between November 2019 and August 2020. Data retrieved from patient records included the age and sex of the patients and personal and family histories. The parents' education levels, the ideas of the parents and patient regarding the origin of the pain, the localisation, character, frequency, duration, and spread of the pain, accompanying factors, and physical examination, laboratory test, electrocardiography (ECG), and echocardiography findings were recorded. When necessary, the patients were referred to the paediatric psychiatry department or other departments that treat

paediatric diseases. The patients were divided into two groups based on the date 11 March 2020, when restrictions on daily life were implemented because of the COVID-19 pandemic in Turkey. Groups 1 and 2 included patients who presented with chest pain before and after that date, respectively. The groups were compared with respect to demographic data and diagnosis. Approval for the study was granted by the local ethics committee (decision no:2020/593).

Statistical analysis

Data were analysed statistically using SPSS for Windows version 23.0 software. Continuous data with a normal distribution are expressed as the mean±standard deviation and non-parametric data as the median (minimum–maximum). The Chi-square test was applied to compare categorical data and Student's t-test to compare independent groups of measurements with a normal distribution. A value of $p<0.05$ was considered statistically significant.

RESULTS

A total of 251 patients with a mean age of 11.6 ± 2.9 years, comprising 136 (54.2%) females and 115 (45.8%) males, were evaluated. No patient had COVID-19. Of these patients, 176 (70.1%) were referred by another physician, and 75 (29.9%) visited our policlinic directly. The chest pain was felt most often in the precordial area (46.2%) and in the form of needle pricking (64.9%). There was a family history of heart disease in 116 (46.2%) patients. Radiating pain was reported by 53 (21.1%) patients, toward the left arm in 22 (8.8%), toward the back in 9 (3.6%), toward the right side of the chest in 9 (3.6%), toward the neck in 8 (3.2%), toward the posterior sternum in 3 (1.2%), and toward the abdomen in 2 (0.8%). The demographic data and characteristics of the chest pain are shown in **Table 1**.

The chest pain was thought to be of cardiac origin according to the parents of 123 (49%) patients and according to 30 (12%) patients themselves, of whom 18 (14.6%) and 10 (33.3%) patients, respectively, were determined to have a psychogenic origin. There was a significantly higher rate of chest pain of psychogenic origin in patients who thought they had heart disease compared to who don't thought ($p=0.015$). The education level of the parents was middle school or higher for 72 (28.7%) patients and primary school for 89 (35%) patients; the parents of 90 (35.9%) patients had not attended school. The chest pain was accompanied by shortness of breath in 25 (9.9%) patients, a burning feeling in the stomach in 16 (6.4%), and palpitations in 3 (1.2%).

On cardiac auscultation, a late systolic click was heard in the apex in six patients, a late systolic murmur in one patient, and a systolic click with a diastolic murmur in the left second intercostal space in two patients. Chest x-ray was performed in 22 patients. One of the radiographs showed pneumonic infiltrations, and three showed skeletal system deformities. Other radiographic findings were normal. Exercise tests were performed in 16 patients with exercise-related chest pain,

but no pathological findings were found. Holter monitoring was performed in 28 patients, but no pathological finding to explain the chest pain was observed. No abnormal values were observed in any of the 34 patients with available troponin level measurements. In patients with a non-cardiac aetiology, specific examinations of the aetiology were performed by the relevant departments.

Regarding the aetiology of the chest pain, the most common cause was the musculoskeletal system in 138 (55%) patients, followed by psychogenic in 41 (16.3%), the gastrointestinal system (GIS) in 16 (6.4%), and the respiratory system in 13 (5.5%). Thelache pain was determined in two (0.8%) patients, and a cardiac origin was determined in seven (2.8%). In 34 (13.5%) patients, no cause could be found, and these patients were considered to have idiopathic chest pain. The aetiologies of the chest pain are shown in **Figure 1**. The duration of the complaints exceeded 6 months in 28 (82.3%) patients with idiopathic chest pain and 41 (18.9%) patients with a determined cause; the difference was statistically significant ($p=0.000$). All patients considered to have chest pain associated with the gastrointestinal system were referred to the paediatric gastroenterology department, of whom 12 were diagnosed with gastroesophageal reflux disease (GERD) and 4 with gastritis. Of the patients with chest pain associated with the respiratory system, 1 was diagnosed with pneumonia and 12 with asthma. In those diagnosed with asthma, the lung sounds were normal

in all but one. Patients diagnosed with asthma were followed up by the paediatric allergy department. The pathology was determined by echocardiographic examination in 14 (5.6%) patients: mitral valve prolapse (MVP) in 10 patients, bicuspid aorta and mild level aorta failure in 3 patients, and mild mitral failure with a history of rheumatic heart disease in 1 patient. The chest pain in 7 (2.8%) patients with MVP was thought to be associated with a cardiac pathology. On electrocardiographic examination, right branch block was seen in two patients and a short PR interval in one patient; the other evaluations were normal.

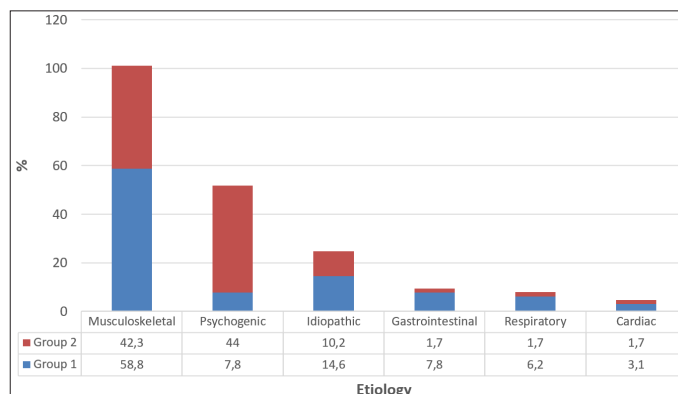


Figure 1. The aetiologies of the chest pain

Characteristics of the chest pain		Total n (%)	Group 1 n(%)	Group 2 n(%)	p
Localisation	Precordial, n (%)	116 (46.2)	86 (44.8)	30(50.8)	0.18 [†]
	Epigastric, n (%)	11 (4.4)	9 (4.7)	2 (3.4)	
	Diffuse chest, n (%)	19 (7.6)	15 (7.8)	4 (6.8)	
	Right side of Chest, n (%)	7 (2.8)	6 (3.1)	1 (1.7)	
	Left side of Chest, n (%)	65 (25.9)	55 (28.6)	10 (16.9)	
	Left shoulder, n (%)	9 (3.6)	4 (2.1)	5 (8.5)	
	Posterior Sternum, n (%)	24 (9.6)	17 (8.9)	7 (11.9)	
Character	Needle pricking	163 (64.9)	124 (64.6)	39 (66.1)	0.57 [†]
	Squeezing	67 (26.7)	51 (26.6)	16 (27.1)	
	Burning feeling	8 (3.2)	8 (4.2)	0 (0)	
	Stabbing sensation	7 (2.8)	5 (2.6)	2 (3.4)	
	Pressure	6 (2.4)	4 (2.1)	2 (3.4)	
	Duration, minute	0-1	107 (42.6)	85 (44.3)	
1-10	104 (41.4)	79 (41.1)	25 (42.4)		
10-30	16 (6.4)	9 (4.7)	7 (11.9)		
30-60	15 (6)	11 (5.7)	4 (6.8)		
>60	9 (3.6)	8 (4.2)	1 (1.7)		
Onset of the symptom	0-1 week	69 (27.5)	56 (29.2)	13 (22)	0.16 [†]
	1 week-1 month	64 (25.5)	43 (22.4)	21 (35.6)	
	1 - 6 month	49 (19.5)	41 (21.4)	8 (13.6)	
	6 month- 1 year	50 (19.9)	36 (18.8)	14 (23.7)	
	>1 year	19 (7.6)	16 (8.3)	3 (5.1)	
Spread	Yes	53 (21.1)	44 (22.9)	9 (15.2)	0.12 [†]
	No	198 (78.9)	148 (77.1)	50 (84.8)	
Relationship with effort	Yes	9 (3.6)	9 (4.7)	0 (0)	0.09 [†]
	No	242 (96.4)	183 (95.3)	59 (100)	
Relationship with food	Yes	21 (8.4)	21 (10.9)	0 (0)	0.008 [†]
	No	230 (91.6)	171 (89.1)	59 (100)	
Relationship with position	Yes	15 (6)	15 (7.8)	0 (0)	0.02 [†]
	No	236 (94)	177 (92.2)	59 (100)	
Accompanied symptom	No	195 (77.7)	147 (76.5)	48 (81.4)	0.2 [†]
	Shortness of breath	25 (10)	17 (8.9)	8 (13.6)	
	Palpitation	3 (1.2)	3 (1.6)	0 (0)	
	Burning feeling in the stomach	28 (11.2)	25 (13)	3 (5)	

†: chi-square test

All 41 patients with chest pain of psychogenic origin were evaluated by a paediatric psychiatry specialist. These 41 patients comprised 24 (58.5%) girls and 17 (41.5%) boys; 28 (68.3%) lived in the city, and 21(51.2%) had a family history of heart disease. The mean age was 12.83 ± 3.01 years in patients with pain of psychogenic origin and 11.41 ± 2.8 years in those with pain of non-psychogenic origin. No significant difference in terms of sex, place of residence, or family history of heart disease was determined between patients with and those without chest pain of psychogenic origin ($p=0.54$, $p=0.46$, and $p=0.48$, respectively). The mean age was significantly higher in patients with psychogenic origin chest pain than in those with a non-psychogenic origin ($p=0.005$). Of the patients with a psychogenic origin, 12 were diagnosed with an anxiety disorder, 11 with PTSD, 4 with a conversion disorder, 6 with mild depression, 3 with moderate depression, 1 with severe depression, and 4 with a panic disorder. The patients were treated with behavioural therapy in 13 patients and behavioural therapy together with medical therapy in 28 patients. Treatment was not continued by 13 patients. In the 28 patients who continued treatment, a significant reduction in complaints was observed. Except for the 13 patients who did not continue treatment, the patients were followed up by the child psychiatry department. The distribution of psychiatric disorders is shown in **Table 2**.

Comparison of Group 1, who presented before the pandemic, and Group 2, who presented during the pandemic, showed that Group 2 patients more often resided in rural areas ($p=0.04$), were referred by physicians ($p=0.005$), and had a psychogenic aetiology ($p=0.000$) compared with Group 1 patients. The comparisons of Groups 1 and 2 are shown in **Table 3**.

DISCUSSION

Chest pain due to cardiac causes is extremely rare in children. If the correct approach is not applied in these patients, they often undergo lengthy, unnecessary, and expensive examinations and repeat presentations because of the family's fear of death.^[1,3-5,11] The aims of this study were to determine the correct approach to use in patients with chest pain by examining their clinical and laboratory findings, and to evaluate the effect of the COVID-19 pandemic on policlinic presentations due to chest pain.

Previous studies reported that >50% of parents thought that the aetiology of their child's chest pain was heart disease.^[2,3,12,13] In a study by Aygun et al. of 782 patients,^[14] the parents of 70.8% of patients and 90.2% of patients themselves thought that the chest pain was due to heart disease. In another study, 69% of children with chest pain restricted their activity, 40% did not attend school, 44% thought they had had a heart attack, and 12% thought they had cancer.^[15] Anxiety disorder has been reported in up to 60% of patients with non-cardiac chest pain and their families.^[3,15] In our study, while the parents of 49% of the patients thought that their child had heart disease, only 12% of the patients themselves believed the origin to

Table 2. The distribution of psychiatric disorders

Psychiatric Disorder	Group 1, n	Group 2, n	Total, n
Depression, Severe	0	1	1
Moderate	2	1	3
Mild	2	4	6
Anxiety Disorder	3	9	12
PTSD	3	8	11
Panic Disorder	3	1	4
Conversion Disorder	2	2	4
Total	15	26	41

PTSD: Post-traumatic stress disorder

Table 3. The Comparisons Of Group 1 And Group 2.

Parameter	Total (n=251)	Group 1 (n=192)	Group 2 (n=59)	P
Age, year, ort±SS	11.6 ± 2.9	11.59±2.9	11.84±3.1	0.56*
Sex, M/F	115/136	88/104	27/32	0.99†
Living place, City/ Rural	183/68	146/46	37/22	0.04†
Cardiac disease in family, Yes/No	116/135	90/102	26/33	0.7†
Referred, Yes/No	176/75	126/66	50/9	0.005†
Diagnosis	Total n(%)	Group 1 n (%)	Group 2 n (%)	p
Musculoskeletal, n (%)	138 (55)	113 (58.8)	25 (42.3)	0.02†
Psychogenic, n (%)	41 (16.3)	15 (7.8)	26 (44)	0.000†
Cardiac, n (%)	7 (2.8)	6 (3.1)	1 (1.7)	0.56†
Gastrointestinal, n (%)	16 (6.4)	15 (7.8)	1 (1.7)	0.008†
Idiopathic, n (%)	34 (13.5)	28 (14.6)	6 (10.2)	0.92†
Respiratory, n (%)	13 (5.2)	12 (6.2)	1 (1.7)	0.16†
Telars, n (%)	2 (0.8)	2 (0.8)	0 (0)	

M: Male, F: Female, *: student t test, †: chi-square test

be heart disease. Furthermore, of the patients who thought they had heart disease, psychogenic causes were significantly more common than organic causes. Our findings indicate the importance of relieving the heart disease-related concerns of the parents of patients with chest pain admitted to paediatric cardiology outpatient clinics without any evidence of cardiac pathology.

Pathologies of the musculoskeletal system are seen most often.^[1,5,6,15-17] These diagnoses must be kept in mind when there is pain in the ribcage with palpation on physical examination, a change in pain with breathing and movement, and a history of sporting activity.^[1,3] In the literature, chest pain associated with the musculoskeletal system has been reported at a rate of 7–69%.^[3,17] In the current study, chest pain was determined to be of musculoskeletal system origin in 55% of the patients, consistent with the literature.

Chest pain of respiratory system origin has been reported at a rate of 3–12%.^[3] Especially in patients diagnosed with asthma, there may be chest pain after effort even if the lung sounds are normal. In the current study, 13 (5.5%) patients had chest pain of respiratory system origin, which was consistent with findings in the literature.

A gastrointestinal system origin should be considered when chest pain is felt in the epigastric region or in the form of burning in the sternum posterior or if it increases when lying down or is associated with food.^[1,3] The rate of chest pain associated with the gastrointestinal system is 2–8% in the literature.^[2] In the current study, 12 patients were diagnosed with GERD and 4 with gastritis. The chest pain complaints of these patients decreased significantly with treatment. The data obtained in the current study are consistent with previous findings in the literature.

Chest pain for which no aetiology can be found despite the necessary tests and detailed anamnesis and physical examination is defined as idiopathic chest pain, with a reported rate of 12–85%.^[2,11,18,19] This kind of pain is generally chronic, the severity of the pain does not change with respiration or position, the physical examination and tests are normal, and the pain goes away spontaneously.^[2,17] Despite all of the examinations conducted, no aetiology could be determined in 34 (13.5%) of the patients in our study, and thus the diagnosis was idiopathic chest pain, which was consistent with the literature. The idiopathic chest pain had lasted at least 6 months in 82.3% of patients, of longer duration than that in patients with non-idiopathic chest pain. Informing patients and their families that heart disease is absent is the best approach to eliminate concerns inpatients and their families.

The most important concern of patients presenting at hospitals with chest pain is the possibility of heart disease, which could lead to sudden cardiac death. Despite this concern in more than 50% of patients and their families, the rate of identifying a cardiac pathology in paediatric chest pain is extremely low (0–5%).^[1-3,12,13,20] In the presence of a family history of sudden cardiac death at a young age, pain occurring with effort, abnormal findings on physical examination, or abnormal ECG findings, a detailed cardiac evaluation must be made. The main cardiac pathologies causing chest pain are coronary artery pathologies, cardiomyopathies, left ventricle output pathway pathologies, aortic aneurysm and aneurysm rupture, pericarditis/myocarditis, arrhythmia, and MVP.^[1,3] In the current study, a cardiac aetiology was determined in 7 (2.8%) patients, which was consistent with the literature. All of these patients had MVP; they were given information and recommendations and then followed up in the paediatric cardiology policlinic.

Psychogenic-origin chest pain is often seen in adolescents aged >12 years.^[1-3] In approximately one-third of these patients, a significant stress factor can be determined, such as a death or significant disease in the family or separation from school or family. Anxiety disorder, various degrees of depression, panic disorder, and conversion disorder are among the psychogenic causes of chest pain.^[1-3] Chest pain of psychogenic origin in children has a reported rate of 5–30%,^[2,3,17] consistent with our rate of 16.3% (41 patients) in the current study. The mean age of these patients was older than that of the other patients. In some recent studies, a

greater rate of chest pain of psychogenic origin than organic chest pain has been reported, and depression, anxiety, and suicidal thoughts have been reported at higher rates in those with non-cardiac chest pain compared with control groups.^[21] Therefore, it is important that these patients be evaluated by paediatric psychiatry specialists and monitored. All 41 patients in the current study thought to have chest pain of psychogenic origin were evaluated and followed up by a paediatric psychiatry specialist.

COVID-19 disease started in Wuhan, China, and with rapid global spread became a pandemic, which has led to many deaths worldwide.^[7,22] The weekly epidemiological update on 5 October 2020 by the WHO reported nearly 35 million COVID-19 cases and more than 1 million deaths.^[23] Most children with COVID-19 have mild or no symptoms; however, some children can become severely ill. They might require hospitalization, intensive care, or a ventilator to help them breathe, and in rare cases, they could die. Chest pain is a rare symptom of COVID-19 in children. It was reported that 2.5% of patients diagnosed with COVID-19 under the age of 18 years complain of chest pain.^[24] However, this is a concern because of pathologies with high morbidity and mortality, such as COVID-19-associated myocarditis, pulmonary embolism, pneumonia, and multisystem inflammatory syndrome in children (MIS-C), which can be diagnosed in patients presenting with chest pain. COVID-19 was not detected in any of the 59 patients who visited our outpatient clinic during the pandemic period. However, these results may reflect the small number of patients. Studies on this subject with larger patient groups are needed.

Despite that the whole world is affected by the physical effects of COVID-19 and its treatment, there has been insufficient focus on the psychological effects of the pandemic.^[22,25] However, several studies conducted during this period have shown increased rates of psychological disorders, such as anxiety, depression, panic disorder, insomnia, and PTSD, due to the effects of isolation, restricted social activities, fear, hopelessness, and false news and rumours.^[9,21,22,25]

The results of the current study showed a significantly higher rate of chest pain of psychogenic origin in patients evaluated after the onset of the pandemic compared with those who presented before the pandemic. Personal and social isolation during the pandemic, written and visual media, and distancing from school and friends may be responsible for the increased rate of psychogenic-origin chest pain. The finding that the rate of psychogenic chest pain in our Group 1 patients was not higher than those in other studies conducted in our country^[14] and region^[26] suggests that the patients were affected by restrictions on social life rather than by the news. This is the first study to report an increased rate of chest pain of psychogenic origin in children during the pandemic. In addition, after the onset of the pandemic, more patients with chest pain were from rural areas and referred by other physicians. Before the pandemic, the rate of direct,

non-referred presentations was 34.3%; this rate decreased to 15.2% after the onset of the pandemic, which suggests that despite the concerns of families, fear of COVID-19 infection limited the number of direct presentations.

The limitations of this study are the small number of cases, the retrospective design, the lack of screening of patients and parents for cardiovascular risk factors, and the short study duration. More comprehensive and prospective studies are needed.

CONCLUSION

The possibility of cardiac-origin chest pain in children is very low, despite the concerns of families. To reduce repeated presentations and unnecessary and lengthy examinations, the patient and family should be sufficiently informed about non-cardiac chest pain to eliminate concerns regarding cardiac pathologies, and psychiatric evaluations should be performed if necessary. The personal and societal restrictions implemented because of the COVID-19 pandemic have increased the rate of psychogenic chest pain in children. This is the first study to report an increased rate of chest pain of psychogenic cause in children during the COVID-19 pandemic.

ETHICAL DECLARATIONS

Ethics Committee Approval: This study was performed in accordance with the local ethics committee (SBÜ Gazi Yaşargil Education and research hospital, 16.10.2020/593).

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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