

Panic disorder in a child with recurrent chest pain

Şensin Haşçelik¹, Sema Özer¹, Yasemen Taner², Ebru Aypar¹, Dursun Alehan¹
Yusuf Usta¹, Akgün Ölmez¹

Departments of ¹Pediatrics, and ²Child and Adolescent Psychiatry, Hacettepe University Faculty of Medicine, Ankara, Turkey

SUMMARY: Haşçelik Ş, Özer S, Taner Y, Aypar E, Alehan D, Usta Y, Ölmez A. Panic disorder in a child with recurrent chest pain. Turk J Pediatr 2007; 49: 105-108.

A 10-year-old boy was admitted to the Pediatric Cardiology Unit with complaints of chest pain and dizziness. Physical examination did not show any pathologic signs. Family history revealed no heart disease and diagnosis of panic disorder (PD) in one of his family members. On follow-up, he was admitted to the pediatric emergency department several times with the same complaint. Organic etiologies of chest pain were excluded by extensive diagnostic work-up. He was referred to the Child and Adolescent Psychiatry Department for further work-up, and PD was diagnosed. A few weeks after starting paroxetine therapy, the frequency and the intensity of the chest pain attacks began to diminish. Early diagnosis of PD will avoid unnecessary investigations and prevent utilization of expensive health services, especially those performed in the emergency department. Physicians should consider that chest pain may be related to psychiatric disorders and refer their patient to mental health professionals for further management. Pharmacological therapy and cognitive-behavioral interventions are successfully used in the management of PD in children and adolescents.

Key words: chest pain, children, panic disorder, panic attack.

Chest pain is one of the most common symptoms among children and adolescents that lead to extensive diagnostic work-up. However, it is usually a benign symptom and rarely because of a serious disease. Although patients suffering from chest pain are usually referred to cardiologists, studies in the literature suggest that panic disorder (PD), which is a psychiatric condition, may also cause chest pain by autonomic system activation, hyperventilation and several other mechanisms. Therefore, psychiatric work-up should also be included while evaluating recurrent chest pain in children and adolescents to prevent unnecessary medical diagnostic procedures. Physicians should refer these patients to mental health professionals for further management when they suspect PD.

Case Report

A 10-year-old boy was admitted to the Pediatric Cardiology Unit with complaints of chest pain and dizziness. The pain was a sharp pain

lasting for 10-30 minutes. There were no other accompanying complaints such as headache, abdominal pain or fatigue. Physical examination did not reveal any pathologic signs. There was no tenderness on palpation of the chest.

Past history revealed that he had a healthy twin brother and 17-year-old sister. Family history revealed that he had nonconsanguineous healthy parents with no history of cardiac disease and an aunt with PD. His psycho-social and motor developmental milestones were normal.

Electrocardiographic examination showed negative T waves on left precordial derivations, so serum cardiac enzyme analysis and exercise test were performed. During exercise test he also had a chest pain which ended within 15 minutes. Echocardiographic examination was normal. Holter monitoring and transtelephonic recording and transesophageal electrophysiologic study were performed to exclude rhythm abnormality and all were normal. Tilt-test was also performed, and the patient did not

experience syncope. Laboratory investigations revealed increased serum cholesterol level of 226 mg/dl (normal value <200 mg/dl) and normal cardiac enzyme levels. Lipid electrophoresis examination was normal. A 2300 kilocalories/day diet containing 30% lipids was started.

Three days later he was admitted to the Pediatric Emergency Unit for the second time with complaint of chest pain. Electrocardiography demonstrated upright T waves on left precordial derivations. Myocardial scintigraphy was performed and it revealed normal perfusion of the heart.

On follow-up, he had three more chest pain attacks and dizziness and each time was admitted to the Pediatric Emergency Unit. He was referred to the Pediatric Neurology Department to determine whether or not the dizziness complaint was due to a convulsion. Electroencephalographic examination did not show any epileptic activity. Coronary angiography revealed normal anatomy of coronary arteries. To rule out gastrointestinal disorders, an upper gastrointestinal tract endoscopy was performed, but showed normal appearance of esophageal, gastric and duodenal mucosa with normal histopathological examination. Thoracic tomographic examination was normal.

On his last admission, he had severe dyspnea preceding chest pain. He was consulted with the Child and Adolescent Psychiatry Department. Psychiatric examination revealed that the patient had anxiety about having another attack. PD is characterized by family history, attacks lasting for a few hours with chest pain, dyspnea, tremor, perspiration and fear of losing control or fear of death. He was decided as PD because he was not found to have an organic pathology and he fulfilled the disease criteria. Paroxetine (200 mg/day, p.o.) was started with parental permission after explaining drug side effects. A few weeks after starting paroxetine, both the frequency and intensity of the patient's attacks began to decrease.

Discussion

Recurrent chest pain is a common complaint in children, which requires extensive diagnostic work-up and utilizes high-cost health care resources¹. Patients frequently visit emergency

units and undergo a variety of medical consultations. However, unlike in adults, it is often a benign and self-limited symptom in children and rarely because of a serious cardiac disease². In addition to the difficult diagnostic challenge for physicians, it causes anxiety to patients and parents.

Chest pain is usually more common in older children and adolescents³. Chest wall disorders such as costochondritis, Tietze syndrome, precordial catch, slipping rib syndrome, myositis and gynecomastia are the most common causes of chest pain^{3,4}.

Pulmonary disorders such as asthma, cystic fibrosis, bronchitis, tracheitis, pneumonitis, diaphragmatic irritation and gastrointestinal disorders, including gastroesophageal reflux, esophagitis and hernias, are the other causes^{3,4}. We did not detect any of these disorders in our patient.

Cardiovascular system disorders are the least common cause, but the most serious and life-threatening³. Careful physical examination should be performed and family history should be taken to rule out these disorders. The character of the pain usually rules out the cardiovascular etiology. Pain at rest or lasting a few seconds or more than three hours is not related to cardiac origin in many cases. Pain upon exercise or presenting with syncope, dizziness, tachycardia or dysrhythmias must alert the physician and needs further evaluation. The laboratory investigations should include chest radiography, electrocardiogram, echocardiography, exercise test, Holter monitoring and serum lipid screening. Cardiac catheterization may be performed. All were performed in our patient but results were normal except for a minimal increase in cholesterol level. The cardiovascular disorders resulting in chest pain among children can be listed as follows: 1. Structural defects (mitral valve prolapse, coronary artery anomalies, left ventricular outflow tract obstruction), 2. Myopericardial diseases (malignancy, autoimmune pericarditis, rheumatic-viral-bacterial infections, coronary arteritis or aneurysms), and 3. Dysrhythmias (supraventricular tachycardias, atrioventricular blocks).

Recurrent chest pain of psychogenic origin was also reported in the literature⁴. One study reported that one-third of 36 patients with chest pain had pain of psychogenic origin⁵. The physician should also evaluate family

while evaluating the child with psychogenic pain. Hyperventilation, family history of cardiac disease or sudden death, and anxiety are the main clues of psychogenic chest pain in children³. Our patient had a family history of PD. His chest pain usually occurred on Sunday nights, the day before school. Careful interview with the patient and the family revealed that he had anxiety about attending the school and his parents had ascended to his wishes in order to lessen his anxiety by allowing him to stay home or buying him expensive gifts. We observed that the child had secondary gains because of his disease.

It was explained to the parents that they should not act in a way that would reinforce his secondary gains. At the beginning of psychiatric treatment, the family had difficulty in accepting that these symptoms were because of a disorder of psychiatric origin. He visited the Psychiatry Department weekly and both the family and the child were educated about PD. The parents changed their behavior. The Emergency Unit visits stopped and the patient had no more secondary gains. Behavioral management of the attacks was also explained to the patient and he began to better cope with the attacks.

Panic disorder is an anxiety disorder characterized by recurrent unexpected episodes of intense fear or discomfort associated with several cognitive and somatic symptoms¹. Although the usual onset of PD is during adolescence and early-middle adulthood, there are case reports documenting PD in younger children. Retrospective studies also documented that panic symptoms of adult patients may have begun in their childhood^{6,7}. Masi et al.⁸ reported the prevalence of PD as 10.4% in a study among 220 children. The presence of a relative with PD or with anxiety and/or depressive disorders is considered as a strong risk factor of a PD in the offspring⁶.

The symptoms of PD can be listed as follows⁸:

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| Palpitations | Paresthesias |
| Sweating | Feeling of choking |
| Trembling | Feeling of cold |
| Sensation of shortness of breath | Fear of death |
| Chest pain | Fear of losing control |
| Nausea or abdominal stress | Chills or hot flushes |
| Dizziness | |
| Derealization-depersonalization | |

As seen above, PD is associated with many somatic symptoms, and chest pain is a common symptom of the disorder. Our patient always

had chest pain, usually with shortness of breath and hyperventilation. Several studies have discussed why PD causes chest pain, and reported that chest pain may occur via a number of mechanisms including cardiac and noncardiac systems^{1,9}. Autonomic activation and hyperventilation during the attacks cause coronary spasm which leads to myocardial ischemia. During a panic attack, sympathetic discharge occurs, leading to coronary artery vasospasm and microvascular angina. The sympathetic nervous system also increases the vascular tone in coronary arteries, resulting in decrease in coronary blood flow⁹. This mechanism may explain transient negative T waves at left precordials in our patient. It is also reported that negative T waves can be detected during positional and temperature changes¹⁰. Hyperventilation, anxiety and physical exercise may also cause negative T waves¹⁰.

Noncardiac mechanisms that are held responsible for chest pain during panic attacks are musculoskeletal, esophageal, and anxiety-related conditions. Strain or spasm of intercostal muscles during hyperventilation and dysmotility of esophagus by anxiety are also said to be the underlying noncardiac mechanisms⁹.

Early diagnosis of PD will avoid unnecessary investigations and prevent utilization of high- cost health services, especially those performed during Emergency Unit admissions. Pharmacological therapy and cognitive-behavioral interventions are successfully used in the management of PD in children and adolescents. Physicians should reassure the parents that noncardiac chest pain may be related to psychiatric disorders and they should refer the patient to mental health professionals for further management.

REFERENCES

1. Fleet R, Beitman B. Unexplained chest pain: when is it panic disorder? *Clin Cardiol* 1997; 20: 187-194.
2. Fyfe D, Moodie D. Chest pain in pediatric patients presenting to a cardiac clinic. *Clin Pediatr* 1984; 23: 321-324.
3. Coleman W. Recurrent chest pain in children. *Pediatr Clin North Am* 1984; 31: 1007-1026.
4. Feinstein R, Daniel W. Chronic chest pain in children and adolescents. *Pediatric Ann* 1986; 15: 685-694.
5. Tunaoglu F, Olgunturk R, Akcabay S, Oğuz D, Gücüyener K, Demirsoy S. Chest pain in children referred to a cardiology clinic. *Pediatr Cardiol* 1995; 16: 69-72.

6. Ballenger JC, Carek DJ, Steele JJ, Cornish-McTighe D. Three cases of panic disorder with agoraphobia in children. *Am J Psychiatry* 1989; 146: 922-924.
7. Vitiello B, Behar D, Wolfson S, McLeer SV. Diagnosis of panic disorder in prepubertal children. *J Am Acad Child Adolesc Psychiatry* 1990; 29: 782-784.
8. Masi G, Favilla L, Mucci M, Millepiedi S. Panic disorder in clinically referred children and adolescents. *Child Psychiatry Hum Dev* 2000; 31: 139-151.
9. Huffman J, Pollack M, Stern T. Panic disorder and chest pain: mechanisms, morbidity, and management. *Primary Care Companion J Clin Psychiatry* 2002; 4: 54-62.
10. Fisch C. The electrocardiogram. In: Braunwald E (ed). *Heart Disease: A Text Book of Cardiovascular Medicine* (5th ed). Philadelphia: W.B. Saunders Co; 1997: 108-152.