

# CHEST PAIN IN CHILDREN A PROSPECTIVE STUDY

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## ABSTRACT

Thirty five children with a primary complaint of chest pain were prospectively studied. The average age was 9.7 years for boys and 8.9 years for girls; 60% were male.

The most frequently diagnosed cause was psychogenic (54.2%). Forty percent of the patients were classified as having idiopathic chest pain. Precordial pain was encountered in 2.9%, along with costochondritis and mitral valve prolapse.

It is concluded that chest pain in children is a relatively benign symptom which is infrequently associated with a serious underlying organic condition; extensive laboratory investigations are not required.

Psychogenic chest pain is a prevalent problem that commonly causes considerable anxiety in children and their families.

*MJIRI, Vol.2, No.2, 127-129, 1988*

## INTRODUCTION

Chest pain is a relatively common presenting problem in children. Nevertheless, it has received inadequate attention in pediatric journals and standard textbooks.<sup>1,2</sup>

In other texts,<sup>3,4</sup> contradictory discussions regarding etiology and evaluation of the disease are presented which may result in different approaches to the management of the condition.

The purpose of this paper is to present the clinical features and underlying causes of a prospective study of children who were referred to the pediatric cardiac clinic complaining of chest pain.

## PATIENTS AND METHODS

Children with the primary complaint of chest pain seen at the Nemazee Hospital Out-Patient Cardiac Clinic in Shiraz, were included in this prospective study. Thirty five cases were recognized during a 2-year period ending on July 30, 1985.

Complete history and physical examination were carried out in all patients. Cardiac auscultation was performed while the patients were in supine, sitting and

erect positions. Since laboratory evaluation in previous studies<sup>5,6,7,8</sup> had revealed infrequent abnormalities, in this study the paramedical investigations were selectively performed whenever it was deemed appropriate.

## RESULTS

There were 21 boys and 14 girls. the average age of the boys was 9.7 years (range, 3-15 years) and that of the girls was 8.9 years (range, 4-13 years).

The frequency of the etiological factors is shown in Table I.

In 14 patients (40%) no cause for chest pain was

Table I. Etiology of chest pain

	Patients	
	No.	%
Idiopathic	14	40
Psychogenic	19	54.2
Costochondritis	1	2.9
Mitral valve prolapse	1	2.9
Total	35	100

Table II. Psychogenic factors precipitating chest pain

Age	Sex	situations
12	M	Asthmatic, Nervousness, School exam, Heart disease in family
9	F	Heart disease in family, Overanxious mother, New school
8	M	New baby in family
12	F	Obesity; teased by other children
8	F	Overanxious mother
12	M	Anxiety due to school exam
12	M	Obesity; teased by other children
11	M	Headache and extremity pain
7	M	Overprotected child
11	M	Hyperventilation
10	F	Nervousness
7	F	New baby in family
8	F	Overprotected child, Father has chest pain
11	F	Nervousness, Aunt has mitral stenosis
9	F	Nervousness, Death of father, Grandfather has heart disease
11	M	Nervousness, Father died of myocardial infarction 3 months earlier
11	F	Abdominal and extremity pain
10	M	Dizziness, Nervousness
15	M	Nervousness

identified. Psychiatric evaluation revealed some psychogenic abnormalities in more than half of the patients, to which chest pain could be attributed; only 2 patients (5.8%) had true organic disease.

Since the psychogenic group has formed the majority of the children presenting with chest pain, more detailed information which could have precipitated precordial pain is listed in Table II.

The duration of chest pain varied from 2 weeks to 2 years. Eighty percent of the children with idiopathic chest pain and 36% of the patients with psychogenic precordial pain had symptoms for more than 6 months. The shortest duration of complaint belonged to children with costochondritis and mitral valve prolapse.

The nature of pain (Table III) did not help to differentiate the diagnostic categorization, nor was it useful in the etiological classification. The symptom meant "heart" to all of the children.

The age, sex, and socio-economic status of the study group were compared with the characteristics of the 100 randomly selected records of the clinic population. The age and sex distribution of the study and control groups were found to be similar: in the study group the mean age was 9 years and 60% were male, while in the control population, 58% were male and the average age was 10 years. In the control population, the socio-economic status, based on the father's occupation was rated good (60%), fair (30%), or poor (10%), while in the study group 63% were rated good and 37% fair; with no patient of poor socio-economic status.

Laboratory investigations such as complete blood count, erythrocyte sedimentation rate, SGOT, and urinalysis were carried out in 5 children with normal results. Chest x-ray and electrocardiography were

Table III. Nature of the chest pain

Description of Pain	Patients	
	No	%
Dull pressure	31	88.4
Sharp like a needle	1	2.9
"Pouring blood"	1	2.9
Blow by a fist	1	2.9
"Wind-like" feeling	1	2.9
Total	35	100

performed in 12 patients. Chest radiography was negative in all except one child with left costosternal chondritis. The ECGs were normal in all except one, which showed some left ventricular preponderance. Echocardiography was performed in one case who had a non-ejection click on physical examination, and proved to have mitral valve prolapse.

## DISCUSSION

Although chest pain commonly denotes serious underlying disease in adults, it is believed to be a benign pediatric problem. Furthermore, chest pain in children rarely signals an organic cause or a serious underlying disease that is not apparent from a complete history and physical examination. Although Coleman<sup>9</sup> presented a comprehensive review of organic etiologies of chest pain in children, others,<sup>5-7</sup> as well as the present study, found that the majority of children with precordial pain did not have an identifiable cause, and a sizable number have some form of psychogenic factor. The major concern of the patients and their families was the belief that the chest pain means heart disease, as the symptoms meant "heart" to all of our patients. Nevertheless, in only one child in the present study (with mitral valve prolapse) and very infrequently in other studies<sup>5,6,7,8</sup> was heart disease diagnosed.

In the present study, the majority of the children were diagnosed as having psychogenic chest pain following some forms of emotional conflict. The distress produced by a socio-environmental crisis, the household atmosphere, and relationships of the child with his parents and peers are some of the important factors leading to psychogenic chest pain in our patients.

Psychogenic chest pain seems to be more prevalent in girls as has been reported by Asnes and associates<sup>5</sup> but our study as well as that of Driscoll and colleagues<sup>7</sup> did not substantiate this belief: both sexes were almost evenly distributed in the two latter studies.

Chest pain in children with costochondritis is readily recognized by the presence of tenderness and swelling of the rib cartilage. There was one child in this study with left costosternal chondritis which might represent

an example of Tietze's syndrome.<sup>9 10</sup> The natural course of this syndrome is usually benign. Its epidemiology and etiology are not known. The incidence of costochondritis in other reports was higher than this study, but the reason for such a discrepancy is not clear.

Chest pain was encountered infrequently in mitral valve prolapse,<sup>11</sup> as evidenced by finding of only one patient in our group and rarely in other reports.<sup>5,7</sup> The cause of chest pain in this disease is unclear. A thorough physical examination and the finding of a late systolic murmur and/or mid-systolic click is highly suggestive of the condition.<sup>11,12</sup>

The duration of chest pain tended to be longer in idiopathic and psychogenic types than in children with an organic cause of symptom.

It is interesting that chest pain was not found in children belonging to the low socio-economic group. It is possible that the family structure, the overprotective attitude of the parents, and the child's affect in fair to good socio-economic classes played some roles.

Since the results of this study and those of others<sup>5,6,7,8</sup> demonstrate that the laboratory investigations do not yield helpful diagnostic information, it is recommended that extensive paramedical work-up in evaluating a child with uncomplicated chest pain be avoided.

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