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Chest Pain in Pediatric Patients Referred to Pediatric Cardiology Clinic

Majdi Jaafreh
Pediatric cardiologist, Queen Alia Heart Institute, Amman, Jordan.
Email: mjaafreh@gmail.com

Abstract:

Objectives: To evaluate causes of chest pain in children referred to pediatric cardiology clinic and the need for echocardiography in these patient.
METHODS: A prospective study conducted in Prince Ali Hospital, in the southern of Jordan, between Nov. 2010 till Nov. 2012. Clinical history and physical examination done. Electrocardiogram, chest X-ray, and echocardiogram for all patients, and a 24-hour Holter monitoring, if needed.
RESULTS: A total of 145 children were referred to pediatric cardiology clinic.
Musculoskeletal causes were the most common accounting for (36.6%), idiopathic chest pain (31%), respiratory causes (15%), gastrointestinal causes (4.1%) and miscellaneous disorders (6.9%), while cardiac causes found in 9 patients (6.2%), echocardiography was positive in 4 patients (2.8%).
CONCLUSIONS: The study reveals that cardiac etiologies for childhood chest pain account for a small percentage, and these can be excluded by a complete history and physical examination. Therefore, echocardiogram may not be necessary, and shouldn't be part of routine evaluation of children with chest pain**.**
Key words: Chest Pain, Pediatric Patients, Echocardiography.

Introduction:

Chest pain in children had been a concerning complaint for the family and primary care provider. It is the 2nd most frequent cause for referral to pediatric cardiology, heart murmur being the most common (1, 2).
Many studies tackle this complaint among children and adolescent, most results were that the majority of them do not have a cardiac disease (1-8).
The clinician evaluating a child with chest pain should keep in mind the broad differential diagnosis and pursue further investigation with history and physical examination.(3)

METHODS:

A prospective study conducted in referred children and adolescent with the complaint of chest pain to pediatric cardiology clinic Prince Ali Hospital, in the southern of Jordan, between Nov. 2010 till Nov. 2012.
Patients with a previous diagnosis of congenital heart disease or a previous cardiac arrhythmia were excluded.
All patients underwent complete history, physical examination, electrocardiography, and 2D echo. Holter monitor and other investigation were done according to case.
All patients followed for 1 month after their first presentation to clinic to see the progress of their chest pain and their diagnosis.

Results:

A total of 145 patients were enrolled in the study, the age range from 4.5 year to 14 year old with a mean of 11 year. Males were 85 (59%), females 60(41%).
Electrocardiography and Echocardiography were done for all pts. Holter monitoring done in 5 pts (3.4%), echocardiography was positive in 4 patients (2.8%).

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Table 1 shows the causes of chest pain in children as revealed in the study

Causes	Number	Percentage
Musculoskeletal	53	36.6%
Idiopathic chest pain	45	31%
Respiratory causes	22	15%
Miscellaneous causes	10	6.9%
Gastrointestinal	6	4.1%
Cardiac causes	9	6.2%
Total	145	

Cardiac causes diagnosed in 9 patients (6.2%). Two of them found to have Bicuspid Aortic Valve with the finding of a systolic murmur and suprasternal thrill, ECG showed left ventricular hypertrophy and ECHO revealed moderate Aortic stenosis with a maximum pressure gradient 50mmhg and 55mmhg respectively.

One patient had mitral valve prolapsed with Mitral regurgitation grade 2 by echocardiography, on physical examination the patient had a long systolic murmur with an ejection click.

Another patient whom was a girl presented with fever, orthopnia and chest pain. On examination she had muffled heart sounds, pulses paradoxes and increased jugular venous pressure, ECG revealed low voltage QRS. On echo the patient found to have pericardial effusion with thickened pericardium; the patient was referred to Queen Alia Heart Institute (QAHI) tertiary cardiac center where she underwent pericardiocenthesis, later the patient diagnosed to have systemic lupus erythematosus.

In 5 patients, palpitation was an associated symptom and there was ECG and Holter monitor finding of dysrhythymia. Two of them had wolf Parkinson white syndrome with a posteroseptal accessory pathway, referred to QAHI and underwent successful ablation.The other 3 patient had premature ventricular contractions and improved on b-Blocker.

Respiratory causes found in 22 patients (15%). Associated symptoms were cough, dyspnea and some had fever. 6 of them had bronchial asthma, 5 had patchy pneumonia on chest x-ray and 11 patients had bronchitis. All patient treated as outpatient except 2 with patchy pneumonia admitted by pediatrician for intravenous antibiotics.

Musculoskeletal causes found in 53 patients (36.6%), with a history of excessive exercise, trauma to chest or a pain after abnormal movement of upper limb and trunk. On examination they had either localized tenderness or limitation of movement.

Six patients had Gastrointestinal causes account for 4.1%, whom were referred to gastroenterology clinic. 5 of them had eosophagitis with gastroesophageal reflux disease. one, who was a girl, had achalasia with a history of regurgitation, and a finding of wide mediastinum on chest x-ray.

Miscellaneous causes were found in 10 patients (6.9%). One patient was diagnosed to have Familial Mediterranean Fever (FMF), this patient had a history of appendectomy with recurrent chest pain and found to have high ESR with a positive C reactive protein. Polymerase chain reaction for FMF emphasized the diagnosis and later his sister was diagnosed to have FMF also. Two boys had pleuritic chest pain, they were cigarette smoking. Painful breast budding found in 7 girls.

Forty five patients (31%) were diagnosed to have idiopathic chest pain with a negative history, physical examination and unrevealing investigations.

Discussion

Chest pain is a worrying complaint for the patient, the parents and the primary care provider.

Cardiac causes are their primary concern because of chest pain seriousness in adult population and the fear of underlying cardiac problem.

This study shows that non cardiac etiologies of chest pain in children are much more common than cardiac causes.

From the table we confirmed that cardiac causes account for minority of cases that is similar to other study in the literature as cardiac causes account for 0.3-4% of patients with chest pain (1,4-6).

Pediatric arrhythmias account for significant percentage of those with cardiac causes 5 out of 9 patients, this was similar to a study done by Drossner et al (5), who also found that arrhythmia account for 37.5%. While Almawazini et al (7), found that arrhythmia for 14% and valvular heart problems for 80% of cardiac causes mostly mitral valve prolapse. This difference in etiology could be related to number of patients and to the selection criteria.

Musculoskeletal causes (36.6%) were the most common etiology in the study, and Idiopathic chest pain (30.8%) was the 2nd most common. Mujtaba et al(8), had similar result, while Almawazini et al, found that idiopathic causes were 56% and musculoskeletal 16%.

All patients with cardiac chest pain had clinical clue of cardiac origin either by history or physical examination. Symptoms that associated with cardiac causes were palpitation, orthopnia and syncope. Signs were murmur, abnormal heart sounds, pulsus paradoxus and raised jugular venous pressure.

Only 4 patients revealed positive finding by echocardiography that account for (2.8%) of patients

A thorough history and a complete physical examination are the main clue in managing patients with chest pain. Consultations of other pediatric subspecialties should be done for children with chest pain if significant symptoms and signs discovered (7).

CONCLUSIONS:

The study reveals that cardiac etiologies for childhood chest pain account for a small percentage, and these can be excluded by a complete history and physical examination. Therefore, echocardiogram may not be necessary, and shouldn't be part of routine evaluation of children with chest pain**.**

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