ORIGINAL ARTICLE

Clinical and Laboratory Findings of Normal Children Suspected of Having Cardiac Disease

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ABSTRACT The definite diagnosis of cardiac disease in infants and children usually cannot be made on the clinical evidence alone; in most instances supporting examinations are required. It is understandable, therefore, that non-cardiologists might suggest that normal subjects are thought to have cardiac problems; the reverse is also true: infants and children with cardiac disease may be ignored. This study aimed to examine the clinical and laboratory findings of normal infants and children who were initially suspected to have cardiac disease. Of 3601 patients referred to our OPD of the Division of Cardiology, Department of Child Health, Medical School, University of Indonesia, from January 1983 to December 1992; in 1782 pasien (49.5%) no cardiovascular problems were detected. Most of them (66.2%) were of the age of less than 1 month. Most of the referring physicians (66.3%) were general practitioners. The referring diagnoses were congenital heart disease (286), cardiomegaly (197), rheumatic fever or rheumatic heart disease (110), and syndromes with cardiac involvement (104). The diagnoses were based on dyspnea, cyanosis on crying, chest pain, joint pains, and easy fatiguability. Murmurs found on examination were systolic in 355 patients (19.9%), and continuous in 6 patients (0,33%). No diastolic murmurs were noted. The final diagnoses were normal (including innocent murmurs and sinus arrhythmias) in 85.8%, mild cardiomegaly in 10.4%., *breath holding spells* in 2.0%, sinus tachycardia in 0.9%, polyarthritis in 0.2% and other in 0.7% of all cases. More practice in cardiac physical examination is needed for medical students to reduce the unnecessary referrals. **[Paediatr Indones 1998; 38: 85-90]**

Introduction

In recent years there has been increasing awareness of the possibility of cardiac disease in infants and children. This in part was influenced by the increasing expert in the field of pediatric cardiology in Indonesia. Indeed, congenital heart disease is the

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most frequently found congenital malformations. Its incidence is between 6 to 10 per 1000 live births. In other words, slightly less than 1 percent of all live births have congenital heart disease, from the most mild one that no treatment is needed to the most severe ones, which need prompt diagnosis and treatment without delay.

It is a common belief that general practitioners and pediatricians think that the diagnosis of cardiac disease in infants and children is a difficult task. Not infrequently physicians who are challenged with infants or children who are suspected to have cardiac problem are not eager to establish the diagnosis; instead, they immediately refer the patients to an adult or pediatric cardiologist. While this practice may give some benefit, i.e., delay in diagnosis and management could be avoided, to some extent it may also give negative aspects, including the negative attitude of the physician to learn more about how to establish the diagnosis of cardiac diseases in infants and children. On the family's side this practice may give some burden, both psychologically and financially. This paper reviews the clinical and demographic aspects of patients who were originally referred for suspected cardiac disease.

Methods

Records of all patients referred to the outpatient clinic, Division of Cardiology, Department of Child Health, Medical School, University of Indonesia / Cipto Mangunkusumo Hospital between January 1983 through December 1992 were reviewed. All patients were initially examined by the pediatric resident, and were then confirmed by the consultants. From 1993 through 1985 no echocardiographic examination was performed. The diagnosis was based on clinical history, physical findings, standard chest x-ray, and electrocardioraphy. Patients who were planned for surgery underwent cardiac catheterization with or without angiography. In 1986 through 1987 echoardiography was available in our hospital, so that the majority, but not all patients were examined. From 1987 on every patients with suspected cardiac disease underwent complete examination, including clinical history, physical examination, chest x-ray, ECG. and echocardiography-Doppler. Cardiac catheterization was performed in patients planned for surgery.

Results and Discussion

A total of 3601 medical records of patients seen in our clinic during the study period were reviewed. Out of the 3601 patients referred to the outpatient clinic, Division of Cardiology, Department of Child Health, Cipto Mangunkusumo Hospital, nearly 50%, i.e., 1782 patients (49,5%) showed no evidence of cardiovascular disease.

Most of them (66.2%) were of the age of less than 1 year, and 60.3% were females (Table 1). It is understandable that the most frequently referred patients were neonates, since history and physical examination in neonates are often obscure. Cyanosis in commonly seen in healthy newborn infants, which is usually disappear in several days. Parents, especially those of first children, may be inappropriately concern about their babies who look 'bluish' upon crying. They frequently tell that their babies show a bit dark around their mouth. It should be noted that infants with cyanotic cardiac disease show cyanosis in their mucosa (such as lips or buccal mucosa), but not circum-oral. Other parents may compare their newly born babies with the older babies, and noted that their babies' fingers look more dark than the other babies. Such complaints, when told to the doctor, may make their doctor become uncertain of what they are facing, so that referral is the only best answer.

Other physical findings that may confuse the physician is audible murmur. It is an old saying, that heart disease always cause murmur and the presence of murmur means heart disease. The reverse is true: not every heart disease causes murmur, and the presence of murmur by no means indicate heart disease. There is bulk of data indicates that many complex heart disease cause murmur, and we also know that there are many murmurs heard in the neonatal period that are basically normal (so called innocent murmurs).

Table 1. Age and sex distribution of patients

	Sex		Total	% of Total
Age group	Male	Female		
0-12 month	451	729	1180	66.2
1-3 yrs	92	109	201	11.3
3-5 yrs	78	115	207	11.6
6-10 yrs	74	84	158	8.9
> 15 yrs	12	24	36	2.0
Total	707	1075	1782	100.0

Regarding the referring physician, most of them (66.3%) were referred by the general practitioners, followed by health centers, pediatricians, general outpatient clinic of Department of Child Health, and midwives. See Table 2. The data tell nothing about the association between mis-diagnosis and the specialty, since we do not know the ratio of the pediatrician to the general practitioners and other health providers. However, the data may only indicate that the number of general practitioners outnumbered the number of pediatricians.

Table 2. Distribution of the referring health workers

Referring health worker	No	Percentage
General practitioners	1181	66.3
Primary health centers	211	11.9
Pediatricians	208	11.7
OPD Dept. of Child Health	138	7.7
Midwives	36	2.0
Others	8	0.4
Total	1782	100.0

The diagnoses of referral were respectively, congenital heart disease (286), cardiomegaly (197), rheumatic fever / rheumatic heart disease (110), syndrome associated with cardiovascular disease (104), cardiac disease (90), murmurs (88), *breath holding spells* (80), cyanosis (65), dysrhythmias (43), thalassemia (42). In the rest of referred subjects, no specific suspected diagnoses were provided.

Table 3. Diagnosis of referrals

Diagnosis	n	Percentage
Congenital heart disease	286	16.0
Cardiomegaly	197	11.1
Rheumatic fever / rheumatic heart disease	110	6.2
Clinical syndrome	104	5.8
Cardiac disease	90	5.1
Murmurs	88	4.9
Breath holding spells	80	4.5
Cyanosis	65	3.6
Dysrhythmias	43	2.4
Thalassemia	42	2.4
No information	677	38.0
Total	1782	100.0

The fact that more than 50% of all referrals did not provide specific diagnosis reflected the uncertainty on the side of the referring physicians of what they were facing. We have no explanation other than to suggest that the skill most of the physicians was not sufficient in analyzing symptoms and signs of infants and children as it related to cardiovascular disease.

From clinical history, complaints of dyspnea, cyanosis upon crying, chest pain, joint pain, and easy fatiguability were mostly complained by the parents. On physical examination systolic murmurs were detected in 355 patients (19.9%), diastolic murmur in 0 patient, and continuous murmur (venous hum) in 6 patients (0,33%).

All supporting examinations (including laboratory tests, chest x-ray, electrocardiography, echocardiography) gave normal results, or only minimal changes. The final diagnosis was normal (including innocent murmur and sinus arrhythmia) in 85,8% of patients, mild cardiomegaly in 10,4%, *breath holding spells* in 2%, tachycardia in 0,9%, and polyarthritis in 0,2%. Murmurs are frequently found in infants and children. It may range from innocent murmurs to severe congenital heart disease.

Table 4. Distribution of symptoms as put forward by the parents

Symptoms	No	Percentage
Dyspnea	549	30.8
Cyanosis	328	18.4
Chest pain	217	12.2
Joint pain	158	8.9
Easy fatiguability	145	8.1
Others	385	21.6
Total	1782	100.0

Table 5. Final diagnosis

Diagnosis	n	%
Normal	1529	85.8
Mild cardiomegaly	185	10.4
Breath holding spells	36	2.0
Tachycardia	16	0.9
Polyarthritis	16	0.9
Total	1782	100

To sum up, we have analyzed the patients referred to our outpatient department for cardiac evaluation who were subsequently judged as having no cardiac problems. Most of the patients aged less than 1 year, and they were referred mainly because of subtle complaints or physical signs. The most frequently reasons for referrals were innocent murmurs and sinus arrhythmia. Although the situation is similar to that in other countries, the large percentage (approximately 50%) of referred patients who had no cardiac disease implied that more skill is necessary for the physicians (especially general practitioners) with regard to evaluating cardiac symptoms and signs.

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