



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2015; 1(8): 267-269
www.allresearchjournal.com
Received: 13-05-2015
Accepted: 16-06-2015

Bhupendra Singh Bhalavi
Senior Resident,
Department of medicine,
GRMC Gwalior,
Madhya Pradesh, India,

Venugopal Margekar
Senior Resident,
Department of medicine,
GRMC Gwalior,
Madhya Pradesh, India,

Dharmendra Dwivedi
Post Graduate Medical Officer,
District Hospital Shahdol,
Madhya Pradesh, India,

Correspondence:
Bhupendra Singh Bhalavi
Senior Resident,
Department of medicine,
GRMC Gwalior,
Madhya Pradesh, India,

Echocardiographic study in patients presented with cyanosis

Bhupendra Singh Bhalavi, Venugopal Margekar, Dharmendra Dwivedi

Abstract

Background- This study was done to identify different causes of cyanosis by using echocardiography.
Material and methods- This study was carried out in GR Medical College Gwalior. 100 patients were taken who presented with cyanosis, attended Jaya Arogya Hospital Gwalior
Results- Males are more affected than females. Children population of age group <10 year usually involved because of heart disease is mainly congenital in origin. Tetralogy of fallot, ventricular septal defect and atrial septal defect are the main diseases found in our study. Pulmonary regurgitation was most common valvular lesion than mitral regurgitation.
Conclusion- Echocardiography can help in deciding the line of management whether surgical or medical so that further cyanosis and disease complications can be prevented.

Keywords: Echocardiography, Cyanosis, Tetralogy of fallot and Septal defects.

1. Introduction

Cyanosis refers to a bluish color of the skin and mucous membranes resulting from an increased quantity of reduced hemoglobin (i.e., deoxygenated hemoglobin) or of hemoglobin derivatives (e.g., methemoglobin or sulfhemoglobin) in the small blood vessels of those tissues. It is usually most marked in the lips, nail beds, ears, and malar eminences. Cyanosis, especially if developed recently, is more commonly detected by a family member than the patient^[1]. Three factors that ultimately determine the occurrence of cyanosis are the total amount of hemoglobin (Hb) in the blood, the degree of Hb oxygen saturation or qualitative changes in the Hb and the state of the circulation. Oxygenated Hb is bright red, and deoxygenated Hb is purple. Cyanosis is evident when the reduced or deoxygenated Hb in the blood exceeds 5g per 100 ml. or when oxygen saturation approaches 85%^[2]. It may be subdivided into central and peripheral types. In central cyanosis, the SaO₂ is reduced or an abnormal hemoglobin derivative is present, and the mucous membranes and skin are both affected. Peripheral cyanosis due to a slowing of blood flow and abnormally great extraction of O₂ from normally saturated arterial blood; it results from vasoconstriction and diminished peripheral blood flow, such as occurs in cold exposure, shock, congestive failure, and peripheral vascular disease. Differential cyanosis refers to the appearance of cyanosis limited only to either the upper or lower extremities^[3], eg patent ductus arteriosus. Central Cyanosis is caused by 1- Cyanotic congenital heart disease (e.g., Tetralogy of Fallot, Eisenmenger's syndrome, tricuspid atresia, Ebstein's anomaly, transposition of the great vessels, pulmonary arteriovenous fistula) 2- Pulmonary disease A. Acute (e.g., pneumonia, pulmonary embolism, atelectasis) B. Chronic- Obstructive airway disease, restrictive lung diseases and hemoglobin abnormalities. Peripheral Cyanosis is caused by 1-Reduced cardiac output (e.g., congestive heart failure, cardiogenic shock, mitral stenosis) 2- Exposure to cold, including Raynaud's phenomenon 3- Arterial obstruction 4- Venous obstruction^[4].

Echocardiography uses ultrasound waves to generate images of cardiovascular structures and to display information regarding the blood flow through these structures. 2D echocardiography is based on ultrasound scanning of a series of lines steered to cover a 90-degree arc. It provides real time and high resolution tomographic views of the heart, which are useful in obtaining anatomical and functional information^[5].

2. Materials and methods

This study was done in GR Medical College Gwalior M.P. (Jaya Arogya Hospital) from July 2011 to July 2015. Total 100 patients of cyanosis were selected who attended Jaya Arogya Hospital for treatment or echocardiography investigation. Patients detail and complain were note down. Then patient is subjected to echocardiographic study and data was analyzed.

3. Results

In our study 100 patients were taken out of which 66 were males and 34 were females. The male: female ratio was 1.9:1 (table 1). In age wise distribution, most of the patients fall in age group 1-4 years (22%) followed by 5-10 years (17%) and 31-40 years (15%). According to which 1-10 years contains 39% of all patients (table 2). Distribution of the patients on the basis of locality 71% patients belongs to rural area and 29% from urban area (table 3). Cyanosis patients most commonly presented with complain of breathlessness (90%), cough 2nd (73%) and fatigue was 3rd (68%) most common complain (table 4). Echocardiography was found abnormal in 94% of cases of cyanosis (table 5). Out of 100 patients, origin of disease was congenital in 59 % cases and acquired in 41 % cases (table 6). Distribution of patients on the basis of valvular lesion tricuspid regurgitation was most common lesion (28%), followed by mitral regurgitation in 27% and pulmonary stenosis in 24% patients (table 7). 13 patients was found to have dilated left ventricle (>6 cms) out of 100 patients (table 8). Out of these 13 patients, ejection fraction (EF) was between 30-40% by volume in 77% patients (table 9). Pulmonary arterial hypertension was found in 36% of patients (table 10). According to the diagnosis cyanosis was found in 21% of VSD (ventricular septal defect) without TOF but other valvular lesion was also associated with these diagnoses, 18% of cyanosis having tetralogy of fallot (table 11).

4. Tables

Table 1: Sex wise distribution of patients

Sex	No. of patients	% of Patients
Males	66	66%
Female	34	34%

Table 2: Age wise distribution of patients

AGE (YRS)	TOTAL	% OF PATIENTS
< 1	12	12%
1 – 4	22	22%
5 -10	17	17%
11 – 20	13	13%
21 – 30	3	3%
31 – 40	15	15%
41 – 50	7	7%
51 -60	6	6%
>61	5	5%

Table 3: Distribution of patients according to locality

Locality	No. Of Patients	% Of Patients
Urban	29	29%
Rural	71	71%

Table 4: Distribution of patients according to complains

complains	No. Of Patients	% Of Patients
Breathlessness	90	90%
Cough	73	73%
Palpitation	56	56%
Fatigue	68	68%
Poor feeding/↓ appetite	19	19%
Oedema	18	18%

Table 5: Distribution of patients according to echo abnormality

Echo	No. of patients	% of Patients
Abnormal	94	94%
Normal	6	6%

Table 6: Distribution of patients according to origin of diseases

Origin	No. of patients	% of Patients
Chd	59	59%
Acquired	41	41%

CHD- Congenital Heart Disease

Table 7: Distribution of patients on the basis of valvular lesion

Valvular Lesion	No. Of Patients	% Of Patients
Mitral stenosis	13	13%
Mitral regurgitation	27	27%
Tricuspid stenosis	1	1%
Trucusoid regurgitation	28	28%
Tricuspid atresia	2	2%
Aortic stenosis	1	1%
Aortic regurgitation	7	7%
Pulmonary stenosis	24	24%
Pulmonary atresia	2	2%

Table 8: Distribution of patients according dilation of left ventricle in diastole > 6 cm

Lv Diameter	No. Of Patients	% Of Patients
>6 CM	13	13%
<6 CM	87	87%

Table 9: Distribution of dilated cardiomyopathy (LV diameter > 6cm) on the basis of ejection fraction (EF)

Ejection Fraction	No. Of Patients	% Of Patients
<30%	3/13	23.1%
30-35%	5/13	38.5%
36-40%	5/13	38.5%
>40%	0/13	0%

Table 10: Distribution of patients according to presence of pulmonary artery hypertension (PAH)

Pah	No. Of Patients	% Of Patients
Present	36	36%
Absent	64	64%

Table 11: Distribution of patients according to diagnosis

Diagnosis	No. Of Patients	% Of Patients
Tetralogy Of Fallot (TOF)	18	18%
Atrial Septal Defect	18	18%
Ventricular Septal Defect (without TOF)	21	21%
Rheumatic heart disease	14	14%
Dilated cardiomyopathy	13	13%
Left ventricular dysfunction	3	3%
Hypothermia	2	2%
Congenital MS	1	1%
Ebstein anomaly	1	1%
Asthma	1	1%
COPD	1	1%
Lobar pneumonia	1	1%
Other	6	6%

*Above mention diagnoses are also associated with valvular lesion given in table 7.

MS – Mitral Stenosis

COPD – Chronic Obstructive Pulmonary Disease

5. Discussion

Congenital heart disease showed male preponderance with a male to female ratio of 1.9:1 nearly same ratio of 1.5:1 (male to female ratio) was shown in study done by Shah GS *et al* [6]. Cyanotic heart disease more common in paediatric population than adult, 51 cases found in age group below 10 years. These disease affects rural population more than urban, 71% patients in our study belongs to rural area. Cyanosis patients common presented with complain of breathlessness, cough, fatigue and palpitation. Most of these patients having echocardiological abnormality because of cardiac or respiratory origin of the diseases primarily or secondarily to systemic diseases which ultimately affects cardio-pulmonary system to produce cyanosis. Cardiac disease mostly of congenital origin causes abnormal development of heart structures also affects valvular system to produce symptoms. VSD and TOF are the most common diseases found in our study similar results were found in study done by L Shamima Sharmin [7], Tantchou Tchoumi JC [8] and M Borzouee [9]. ASD (atrial septal defect) and VSD produces cyanosis when left to right shunt become right to left which is called eisenmenger's syndrome. Congenital MS, Ebstein anomaly, Transposition of great vessels and total anomalous pulmonary venous connection are found as single cases.

6. Conclusion

This study is an effort toward approaching the differential diagnosis of cyanosis because after developing cyanosis if not reverted in time may cause irreversible brain damage and death. Cyanosis is caused by cardiopulmonary involvement mainly. Echocardiography may not be the first line investigation for cyanosis but it can help in deciding the line of management whether surgical or medical so that further cyanosis and disease complications can be prevented.

7. References

1. Longo, Fauci, Kasper, Hauser, Jameson, Loscalzo. Harrison's principles of Internal medicine. 18th edition chapter 35, 2, 288.
2. Gary Fleisher R, Stephen L. Textbook of Pediatric Emergency Medicine, 6th edition 2010,198.
3. Anthony C. Pediatric Cardiac Intensive Care, basic principle of cardiology, 1998, 40.

4. Henry Harold F, Problem-oriented Medical Diagnosis S, 7TH Edition, 147.
5. Luigi B, Kevin F, Rosa S, Jose Luis Z. The EAE Textbook of Echocardiography. 2011; 1:17.
6. Shah GS, Singh MK, Pandey TR, Kalakheti BK, Bhandari GP. Incidence of congenital heart disease in tertiary care hospital, Kathmandu Univ Med J (KUMJ). 2008; 6(1):33-6.
7. Shamima Sharmin L, Azizul Haque M, Iqbal B, M Ayub A. Pattern and Clinical Profile of Congenital Heart Disease in A Teaching Hospital, TAJ December, 2008, 21(2).
8. Tantchou Tchoumi JC, Butera G, Giamberti A, Ambassa JC, Sadeu JC. Occurrence and pattern of congenital heart diseases in a rural area of sub-Saharan Africa, Cardiovasc J Afr. 2011; 22(2):63-6. DOI: CVJ-21.033.
9. Borzouee1 M, Jannati M. Distribution and Characteristics of the Heart Disease in Pediatric Age Group in Southern Iran, Iranian Cardiovascular Research Journal. 2008, 2(1).