Original Research Article

Study of acute coronary syndrome in young adult patients: Echocardiographic and angiographic findings

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Abstract

Background: The prevalence of ACS in young adult has progressively increased in India. Echocardiography in the emergency room may facilitate early diagnosis and management in those patients with a high clinical suspicion of MI but a non-diagnostic ECG. Coronary angiography more often shows normal coronary arteries, prompting for a search for non-atherosclerotic etiology. **Aim:** To study the echocardiographic and angiographic findings of ACS in young adult patients. **Material and Methods:** Patients aged 40 years or less than 40 years of age who were diagnosed as case of acute coronary syndrome. Echocardiography was done as a precath procedure to find out the presence of wall motion abnormality prior to coronary angiography and to correlate it with findings of coronary angiography. **Results:** Total of 50 ACS patients, 32 patients (64%)has diagnosed with STEMI, 12 patients(24%) with NSTEMI and UA in 6 patients (12%). Only 3 patients (6%) had severe abnormality in EF (%<30) with majority having (27 patients) mild to moderate left ventricular systolic dysfunction.44 patients (88%) had regional wall motion abnormality on Echocardiogram.In this study single vessel disease (SVD) found in 29 patients (58%), double vessel disease in 13 patients (26%). **Conclusion:** Single vessel disease and STEMI presentation were predominant in young patients with majority having mild to moderate left ventricular systolic dysfunction on echocardiography. Thus screening of young healthy people is necessary.

Key Words: Acute coronary syndrome, young adults, echocardiography, angiography.

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INTRODUCTION

The term “acute coronary syndrome” (ACS) covers a spectrum of presentations, from unstable angina through to ST segment elevation myocardial infarction.[1] The prevalence of ACS has progressively increased in India during latter half of the last century particularly among the urban population.[2] ACS in young adults under 40 years of age is a growing medical, social, psychological and economical problem. Echocardiography in the emergency room may facilitate early diagnosis and management in those patients with a high clinical suspicion of MI but a non-diagnostic ECG. It may also diagnose unstable angina if performed during pain.[3] The potential use of echocardiography for diagnosis of myocardial infarction is based on observations of the effects of interruption of coronary flow. Left ventricular diastolic dysfunction occurs before systolic dysfunction; ECG abnormalities and chest pain are relatively late events. Although the etiology of ACS in young subjects is related to coronary atherosclerosis in 80% of cases, a number of differences regarding both the risk factor profile and clinical and angiographic characteristics exist in comparison to older patients.[4,5] Coronary angiography (CAG) more often shows normal coronary arteries, prompting for a search for non-atherosclerotic etiology such as coronary spasm, vasculitis, embolism, or hypercoagulability.[6]The present study was conducted to study the echocardiographic and angiographic findings of ACS in young adult patients.

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MATERIAL AND METHODS

In this prospective observational study young patients with acute coronary syndrome attended the Medicine and the Cardiology departments at a Tertiary Care Centre were included after informed written consent and Institutional Ethical approval. A young patient was defined as one aged 40 years or less than 40 years of age on admission. The cases were grouped into two; viz. ST elevation MI (STEMI) and non ST elevation acute coronary syndrome (NSTACS includes NSTEMI/UA). Patients aged 40 years or less than 40 years of age who were diagnosed as case of acute coronary syndrome on the basis of clinical history, examination, ECG changes and biochemical markers were included. All the patients were evaluated through a thorough history, clinical examination and relevant investigations with special importance given to the cardiovascular function. In all patients, echocardiography was done as a precath procedure to find out the presence of wall motion abnormality prior to coronary angiography and to correlate it with findings of coronary angiography. It was done by EnVisor C Ultrasound System (Philips) C 1.3.1 model. Coronary angiography was done using Philips AlluraXper system. Selective coronary arteriography was performed in multiple projections using Judkins catheter. Arterial access was obtained with femoral artery with 5F or 6F intra-arterial sheaths by using modified Seldinger technique. Angiograms were evaluated by experienced interventional cardiologists.

RESULTS

This study included a total of 50 patients. There were 41men (82%) and 9 women (18%) Out of 50 patients studied 9(18%) were females and the remaining 41 (82%) were males. In this study of young ACS, the majority were male patients, there were 41 (82%) males and 9 (18%) females. Male to female ratio was 4.5:1. A total of 50 patients were studied. Their age ranged from 21 to 40 years and mean age was 35.7 years. Majority were in the age group 36-40 years (64%). followed by (26%) who were in age group 30 -35years and (6%) were in 21–25 years, (4%) in 26–29years and 1 case in age group 20–25 years. Mean age of ACS patients in male was 35.9 years, in female it was 34.6years. All the patients with ACS have at least one identifiable risk factor and 38 patients (76%) has multiple risk factors.Smoking was the most common risk factor (64%) followed by dyslipidemia (54%), obesity (36%), hypertension (30%), diabetes (28%), positive family history of IHD (18%).Smoking emerged as single most important risk factor for ACS in young patients. Total of 50 ACS patients, 32 patients (64%) has diagnosed with STEMI, 12 patients (24%) with NSTEMI and UA in 6 patients (12%).

Table 1: Echocardiography EF% Findings in ACS Patients

EF%(LVSD)	STEMI	NSTEMI	UA	Total No.	Percentage
<30(Severe)	02	00	01	03	6%
30-44(Moderate)	07	03	00	10	20%
45-54(Mild)	12	4	1	17	34%
>55(No)	11	5	4	20	40%

Echocardiography was done for all the patients of young ACS in this study, only 3 patients (6%) had severe abnormality in EF (%<30) with majority having (27 patients) mild to moderate left ventricular systolic dysfunction.44 patients (88%) had regional wall motion abnormality on Echocardiogram. One patient had pericardial effusion.

Table 2: Echocardiography Findings

Echo Finding	No. of Patients	Percentage
LV Systolic Dysfunction	30	60%
Mildly Abnormal	17	34%
Moderately Abnormal	10	20%
Severe Abnormal	03	6%
Diastolic Dysfunction	15	30%
RWMA	44	88%
PericardialEffusion	01	1%
Valvular Lesion	-	-

All the 50 patients under went coronary angiography, 29 pts had SVD (58%), 13 patients had DVD (26%). 4 patients had triple vessel disease (8%). Four patients (8%), had normal coronaries.

Table 3: Coronary Angiogram Finding

Vessels Affected	No. of Patients	Percentage
SVD	29	58%
DVD	13	26%
TVD	04	8%
Normal	04	8%

DISCUSSION

In this hospital based observational study, 50 patients aged 40 and below admitted with a diagnosis of acute coronary syndrome were studied for echocardiographic and angiographic findings. Young patients require special attention, and developing an approach to the early diagnosis and identification of high-risk patients is a challenge for modern cardiology. ACS in young was found to be more common in males as compared to females. In our study 82% of patients were males, 18% were females (Male and female ratio is 4.5:1). The most common risk factor was smoking (64%), followed by dyslipidemia (54%), obesity (36%), hypertension (30%) and diabetes (28%). Similar to study done byAl‑Khadra *et al*,[7] most common risk factor was smoking (76.9%), dyslipidemia (33.8%) and hypertension (18.5%). The most common presentation of ACS in young was STEMI found in 32 patients (64%),NSTEMI in 12 patients(24%), UA in 6 patients (12%), which correlates with

study done by Adhikari CM *et al*, there were 66.6% STEMI, 9.2% NSTEMI and 24.2% unstable angina patients.[8] Echocardiography was done for all the patients of young ACS in this study. Only 3 patients (6%) had severe abnormality in EF (% <30), with majority having (27 patients) mild to moderate left ventricular systolic dysfunction. Because of the wide spectrum of causes for ACS in young people, diagnostic angiography should be performed in all cases to confirm the cause and suggest the most suitable treatment.[9] Performing promptly a coronary angiography in young patients compared with the elderly, is a lifesaving treatment that has been proven after several investigations in hospitals equipped with catheterization laboratory.[10] Coronary angiography was done in all patients in this study revealed some important findings. In this study single vessel disease (SVD) found in 29 patients (58%), double vessel disease in 13 patients (26%), triple vessel disease in 4 patients (8%), normal in 4 patients (8%). We could see that single vessel disease was evidently more common among the young adults with ACS. Our study findings correlate with findings of study done by Prajapati J *et al*, in which single vessel involvement was the most common finding.[11] Study done by Sricharan KN *et al* found majority of the patients (57.14%) with single vessel disease.[12]Tamrakar R *et al*, also found that single vessel disease was most common finding followed by double vessel disease and triple vessel disease.[13] To conclude, the population of young adults with ACS was predominantly male smokers with dyslipidemia. Single vessel disease and STEMI presentation were predominant in young patientswith majority having mild to moderate left ventricular systolic dysfunction on echocardiography. Thus screening of young healthy people and young ACS patients for dyslipidemia and other risk factors may help find people at high risk for early development of ACS and can help health care workers to take more aggressive approach to more effective primary and secondary preventive measures and therapeutic measures.

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