



## A TRANSTHORACIC ECHOCARDIOGRAPHY (TTE) PROFILE OF PRE-OPERATIVE PATIENTS ADMITTED IN A TERTIARY CARE HOSPITAL AND EVALUATION OF ADHERENCE IN INDICATIONS TO INTERNATIONAL GUIDELINES.

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### ABSTRACT

**Introduction:** Transthoracic Echocardiography (TTE) is commonly used tool to evaluate the nature and severity of cardiac disease prior to anaesthesia for risk stratification. Clinical evidence showing appropriate utilization of pre-operative echocardiography in non-cardiac surgery is scanty. This will help us to formulate hospital guidelines regarding judicious use of this invaluable resource.

**Objective:** To present a profile of echocardiography findings in pre-operative patients and to evaluate what percentage of perioperative echocardiography are adhering to BSE and ASE guidelines of indications.

**Method:** 100 patients referred to Echocardiographic lab for pre-operative cardiac risk stratification were enrolled in this prospective study.

**Results:** Only 21 percent of the patients satisfied the criteria of pre-operative echocardiographic indication for risk stratification and 79 percent had no indication.

**Conclusion:** High percentage of non-indicated referrals indicates poor awareness among the clinicians of pre-operative risk stratification protocols. In order to judiciously use the limited resources, the anaesthetists and physicians need to made aware of the standard protocols of the peri operative risk assessment.

### KEYWORDS : Echocardiography, Pre-operative

#### INTRODUCTION

Many perioperative complications in any non-cardiac surgery are due to cardiac diseases. Evaluation of the nature and severity of cardiac disease prior to anaesthesia is important for risk stratification. Transthoracic echocardiography (TTE) is a practical tool in view of safety, portability and repeatability to directly visualize the various chambers of the heart, valves and major vessels.

Currently, British Society of Echocardiography (BSE) as well as American Society of Echocardiography (ASE) is establishing guidelines for Echocardiography in the pre-operative assessment with periodic revision. BSE recommends TTE in patients with documented IHD with reduced functional capacity (<4 metabolic equivalents [METS]), unexplained shortness of breath in the absence of clinical signs of heart failure, if electrocardiogram (ECG) and/or chest X-ray are abnormal, murmur in the presence of cardiac or respiratory symptoms, murmur in an asymptomatic individual in whom clinical features or other investigation suggest severe structural heart disease. (1,2)

Some studies show that any degree of LV dysfunction is associated with perioperative myocardial infarction or cardiogenic pulmonary edema. (3) It was found that the overall greatest risk of complications was associated with ejection fraction <35%. (4) Hence it makes cardiac risk stratification pertinent pre-operatively.

Clinical evidence showing appropriate utilization of pre-operative echocardiography in non-cardiac surgery is scanty. The purpose of this study is to present a profile of echocardiography findings in pre-operative patients admitted in our hospital and also to see what percentage of perioperative echocardiography are adhering to BSE and ASE guidelines. This will help us to formulate hospital guidelines regarding judicious use of this invaluable resource.

#### RESEARCH METHODS

##### Study Design

It was a non-invasive exploratory prospective study. The study recruited all pre-operative patients referred to Echocardiography Lab. during the period with effect from 1<sup>st</sup> Feb 2020 to 31<sup>st</sup> December 2020. The study was approved by the local ethical committee. The demographic characteristics of all the participants were noted. Written informed consent was taken from all patients enrolled in the study.

##### Study tools

The research tools of the study consisted of clinical, electrocardiographic, and echocardiographic parameters of all pre-operative patients coming to echocardiography lab and were evaluated for the needed indication as per the guidelines of British Society of Echocardiography (April 2013).

#### GUIDELINES FOR PRE-OPERATIVE ECHOCARDIOGRAPHY FOR ELECTIVE AND SEMI-URGENT SURGERY (BRITISH SOCIETY OF ECHOCARDIOGRAPHY)

##### Indicated

- Documented ischemic heart disease with reduced functional capacity (<4 METS)
- Unexplained shortness of breath in the absence of clinical signs of heart failure if ECG and/or CXR abnormal
- Murmur in the presence of cardiac or respiratory symptoms
- Murmur in an asymptomatic individual in whom clinical features or other investigation suggest severe structural heart disease.

##### Not indicated

- Repeat assessment of previous echocardiogram with no intervening change in clinical status
- Routine pre-operative echocardiography

##### Statistical Analysis

Descriptive analysis of all parameters was done in guidance with Central Research Dept. SKNMC, Pune.

##### Facilities and Equipment:

Echocardiography machine (Seimens 2009) is available in echocardiography Lab of the Dept. of Medicine at SKNMC Pune.

#### RESULTS

##### Demographic Characteristics

n=100. 56 were men and 44 were women. The mean age of the participants in years was 36.84±10.12, the mean BMI in Kg/sq. m was 26.68±4.08.

##### Characteristics of the study group

Demographic	Mean age	
	Male	56
	Female	44
Clinical	Diabetics	20
	Hypertensives	48
	Pre-existing IHD	2
	Old CVA	4
Electrocardiographic	Normal Sinus rhythm	98
	Supraventricular Ectopics	2
	Axis deviation	Left=12; Right=4; Normal=84
	LV Hypertrophy	4
	LBBB	4
	ST-T changes	27

Echocardiographic	LV hypertrophy	12
	Diastolic dysfunction	40
	RWMA	8
	Systolic dysfunction	4
	Degenerative Aortic Valve	14
	Degenerative Mitral Valve	9

#### Comparative characteristics as per BES guidelines

	Indicated parameter as per BES guidelines	N
A	Documented ischemic heart disease with reduced functional capacity (<4 METS)	8
B	Unexplained shortness of breath in the absence of clinical signs of heart failure if ECG and/or CXR abnormal	7
C	Murmur in the presence of cardiac or respiratory symptoms	2
D	Murmur in an asymptomatic individual in whom clinical features or other investigation suggest severe structural heart disease.	0

#### DISCUSSION

BSE recommends TTE in patients with documented IHD with reduced functional capacity (<4 metabolic equivalents [METS]). In our study only 32 percent patients had electrocardiographic findings suggestive of IHD, but only 8 percent had reduced functional capacity. So technically speaking only 8 percent satisfied the criterion of indication.

The second criterion suggests indication in unexplained shortness of breath in the absence of clinical signs of heart failure, if electrocardiogram (ECG) and/or chest X-ray are abnormal. Although 53 percent of the patients in our study had abnormal ECG, but only 7 percent had any shortness of breath on clinical history. Only 2 percent patients had murmur in the presence of cardiac or respiratory symptoms and no patient came with the indication of murmur in an asymptomatic individual in whom clinical features or other investigation suggest severe structural heart disease. (1,2)

Some studies show that any degree of LV dysfunction is associated with perioperative myocardial infarction or cardiogenic pulmonary edema. (3) It was found that the overall greatest risk of complications was associated with ejection fraction <35%. (4) In our study only 4 percent patients had systolic dysfunction that met this criterion. It is worthwhile to mention that 79 percent of the patients sent for pre-operative echocardiography had no indication for risk assessment.

Authors feel that this high percentage of non-indicated referrals indicates poor awareness among the clinicians of pre-operative risk stratification protocols. In order to judiciously use the limited resources, the anaesthetists and physicians need to be made aware of the standard protocols of the peri operative risk assessment.

#### CONCLUSION

Most of the risk stratification protocols are easy to practice as they are based on history, ECG and chest radiographic assessments. Often just on the basis of functional assessments of the patient, if it is more than 4METS is enough to stratify low perioperative risk and does not require an echocardiographic referral. This can also expedite the process of posting patients in the operating list and will reduce the unnecessary delay in the waiting period. Authors feel such studies on large scale if done at different centres will help to generate the awareness among the clinicians in this regard.

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