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# A Hospital Based Study on Echocardiographic Assessment of Pericardial Diseases

Dr. Sunil Budhania[1*], Dr. Rakesh Mehla[2], Dr. Dinesh Choudhary[3], Dr. Devendra Agarwal[4], Dr. Jaipal Bugalia DM[5]

[1]Assistant Professor, Department of Cardiology, S.P. Medical College Bikaner, Rajasthan, India
[2]Assosiate Professor, Department of Cardiology, S.M.S Medical College Jaipur, Rajasthan, India
[3]Department of Cardiology, S.P. Medical College, Bikaner, Rajasthan, India
[4]Assosiate Professor, Department of Medicine, S.P. Medical College Rajasthan, India
[5]Resident, Department of Cardiology, S.P. Medical College, Bikaner, Rajasthan, India

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***Corresponding author:** Dr. Sunil Budhania

**Abstract** **Original Research Article**

***Introduction:*** Pericardial effusion was a diagnostic riddle before the advent of echocardiography, both in developed and developing countries, more so in under developed countries. Introduction of M-Mode and 2D-Echocardiography has revolutionized the diagnosis and management of pericardial diseases. The ECG and x-ray chest may be non-diagnostic in early cases. Echo-cardiography helps to overcome this difficulty. Objective of the study was to evaluate role of Echocardiography in early detection of pericardial effusion and also to quantitate the pericardial fluid by measuring the amount of fluid drained during surgery. ***Material and Methods:*** The present study was carried out at department of cardiology S. P. Medical College, Bikaner Rajasthan. About 15 patients were studied in a tertiary care set up. The age group of the study was in the range of 8-43 years. The selected patients undergo routine blood investigations, x-ray, ECG and Echo M mode and 2 Dimensional (ADL). ***Results:*** There were 11 males and 1 female patient. There were 2 cases of effusive–constrictive pericarditis, 1 case of constrictive pericarditis and the remaining (9) were of peri-cardial effusion. ***Conclusion:*** Echocardiography was awfully useful not only in demonstrating pericardial effusion but also showed various abnormalities of mitral valve, septal motion and car-diac motion.

**Keywords:** Pericardial effusion, Pericarditis, ECG, Echocar-diography.



## INTRODUCTION

In well states the two serous membranes of the pericardium are closely opposed to each other and contain 10-15 ml of fluid. During infections and inflammation, the amount of fluid increases abnormally. Persistent elevation of systemic venous pressure, Kussumal's sign (inspiratory increase in jugular venous pressure) and its absence in cardiac tamponade has been emphasizing by Spodick and others [1]. Pulsus Paradoxus is also observed in cardiac tamponade. Pericardial knock may be heard in case of constrictive pericarditis [2]. Elevated diastolic pressure is observed in both the ventricles [3]. Raised venous pressure and decreased arterial pressures are also seen. Pericardial effusion is not recognized in the initial stages but in such cases echocardiography has proved very useful. In evaluate patients with pericardial effusion [4], constrictive pericarditis, and effusive constrictive pericarditis and metastatic depositions causing effusion echocardiography has been very supportive. The benefit of 2D echocardiography over M-mode echo-cardiography 1) that it gives clear anatomical definition of pericardial space and permits identification of pericardial effusion. 2) Localized pericardial effusion can be easily seen in 2D echocardiography. 3) Medial and lateral extent of pericardial effusion and apical location of pericardial effusion can be determined by 2D echocardiography. 2D echocardiography can be done in different planes. 1) Parasternal a) Long-axis b) Short-axis view, 2) Apical view shows all four chambers of heart, 3) Subcostal, 4) Suprasternal.

## MATERIAL AND METHOD

A hospital based cross sectional study was carried out at department of cardiology S. P. Medical College Bikaner. Informed consent was taken from each and every case. A sample size of 15 cases was taken. Due to lack of data 3 cases were excluded from the study. The cases were selected irrespective of their duration of disease. The following investigations were done for all the cases.

- ESR
- Hemogram
- CUE
- Blood sugar and urea
- Chest X ray PA view
- ECG
- Echo M mode and 2 Dimensional (It was done on Advanced Technology Lab[ADL])

## RESULTS

Table 1 show anterior and posterior echo free space was absent in the case of constrictive pericarditis. A posterior echo free space range from 1-4 cm was present in all cases and an anterior echo free space was present in all, but three cases of pericardial effusion. A larger echo free space was associated with large pericardial effusion.

With 2D Echo, echo free space was seen anteriorly, posteriorly, apically, medially and laterally depending on the amount of fluid. Pericardial effusion was observed in all the cases. A small echo free space is also seen in effusive constrictive pericarditis cases which was constant both in systole and diastolic phases. The cases which were identified with 2D Echo as large pericardial effusion were confirmed at surgery. The amount of fluid ranged from 400 ml to 1000ml.Table 3 shows flat motion of posterior left ventricular wall was associated with constriction. Abnormal anterior motion during diastole in two cases was associated with large effusions.

**Table-1: Distribution of pericardial fluid in M-Mode echocardiography**

| Case No | ECHO Free space -anterior | ECHO free space-posterior |
|---|---|---|
| 1 | 1 cm | 1.5 cm |
| 2 | Not visualized | 2 cm |
| 3 | 2.5 cm | 2 cm |
| 4 | 5cm | 2 cm |
| 5 | Absent | Absent |
| 6 | Not visualized | 4 cm |
| 7 | 1cm | 3cm |
| 8 | Present | 1.5cm |
| 9 | Not visualized | 1.5cm |
| 10 | 5cm | 2cm |
| 11 | Present | 1.5cm |
| 12 | Present | 1cm |

**Table-2: Shows large effusions have 400 ml or more of pericardial fluid.**

| Case No | Echocardiographic quantification | At surgery |
|---|---|---|
| 2 | Large | 400ml |
| 3 | Large | 500ml |
| 4 | Large | 3000ml |
| 6 | Large | 500ml |
| 8 | Large | 1000ml |
| 10 | Large | 1000ml |

**Table-3: Left ventricular posterior wall (LVPW) abnormality**

| Case No | LVPW Abnormality |
|---|---|
| 1 | Nil |
| 2 | Nil |
| 3 | Nil |
| 4 | Nil |
| 5 | Not clearly visualized |
| 6 | Flat motion |
| 7 | Abnormal anterior motion during diastole |
| 8 | Abnormal anterior motion during diastole |
| 9 | Nil |
| 10 | Nil |
| 11 | Nil |
| 12 | Flat motion |

## DISCUSSION

In our study group, 12 cases were taken. Only one (8.3%) was female amongst the 12 cases. The age of the study subjects varied from 8 to 43 years. Ten patients (83.3%) cases had raised ESR and leukocytosis. Eleven patients (91.7%) were found to have cardiomegaly on x-ray chest PA view. In two thirds (66.67%) of the cases, ECG changes were not seen. In the rest (33.3%) of the cases, low voltage complexes and non specific ST-T changes were observed.

In M-Mode echocardiography [5] anterior echo free space was observed in 25% of cases and in another 25% of the cases this was not properly visualized. Half (50%) of the cases had 1-5 cm echo free space posteriorly. In constrictive pericarditis, echo free space was not observed. With 2D Echo, echo free space was observed anteriorly, posteriorly, apically, medially and laterally depending on the amount of fluid.

Paradoxical movement of septum was observed in both systole and diastole in 5/12 cases. Left ventricular posterior wall abnormality was observed in 2/12 cases and in one case flat motion was observed. Flat motion was observed in constrictive pericarditis cases. In anterior wall motion abnormality large amount of fluid was seen [6].

Inability to diagnose pericardial effusion with only clinical findings, X-ray chest and ECG in early stages, may lead to development of cardiac tamponade. With the advent of Echocardiography the diagnosis of pericardial effusion in early stages is possible [7]. There are definitive signs of cardiac tamponade by echocardiography, like right ventricular compression and swinging movements of heart [8].

It is possible to do pericardiocentesis with the help of Echocardiography [9]. The quantity of fluid can be estimated with the help of Echocardiography. In mild effusion fluid accumulation is seen only posteriorly. In moderate effusion the accumulation of fluid is limited to posterior, anterior and lateral areas. In large effusion there is accumulation of fluid anteriorly, posteriorly and apically [10].

Right ventricular compression by pericardial effusion was shown to be reliable sign of cardiac tamponade [11]. M mode Echo is much less sensitive compared to 2D Echo. Twelve cases with pericardial disease whose age ranged from 8 to 43 years were studied. There were 11 males and 1 female patient. There were 2 cases of effusive –constrictive peri-carditis, 1 case of constrictive pericarditis and the remaining were of pericardial effusion. The diagnosis was confirmed in 6 of the cases at surgery. Remaining patients showed good response to medical treatment.

Two of the cases had pyogenic pericardial effusion. Both were children, one of whom had Bronchopneumonia. Most of the patients showed raised ESR. One patient showed leucocytosis that had pyogenic effusion. All the patients had increase in size of cardiac silhouette on chest X-ray (except one case of constrictive pericarditis). Four of the cases were associated with pleural effusion. Low complexes were present in ECG of four patients and all these patients had large pericardial effusion.

Echocardiography was extremely useful not only in demonstrating pericardial effusion but also showed various abnormalities of mitral valve, septal motion [12] and cardiac motion. Swinging motion of heart [13] was diagnostic of cardiac tamponade. Highly specific signs of constrictive pericarditis such as diastolic paradoxical movement of septum were noted which were useful in detecting an element of constriction in effusive –constrictive pericarditis.

## CONCLUSION

Echocardiography is a well accepted diagnostic tool in the evaluation of patients with suspected cardiovascular disease. It is totally non-invasive, can be used at the bedside for serial evaluation and supplies anatomic and functional information not available by any other technique, and has led to its rapid acceptance over the past decade.

## REFERANCES


1. Kumar R & Sitaram M. A Study on Echocardiographic Evaluation of Pericardial Diseases. *Journal of Contemporary Medical Research*.2016; *3*(1), 254-256.
2. Kumar R, Sitaram M. A Study on Echocardiographic Evaluation of Pericardial Diseases. Journal of Contemporary Medical Research. 2016;3(1):254-6.
3. Kumar R, Sitaram M. A Study on Echocardiographic Evaluation of Pericardial Diseases. Journal of Contemporary Medical Research. 2016;3(1):254-6.
4. Martin RP, Bowden RO, Filly KA, Popp RL. Intrapericardial abnormalities in patients with pericardial effusion. Findings by two-dimensional echocardiography. Circulation. 1980 Mar;61(3):568-72.
5. Horowitz MS, Rossen R, Harrison DC. Echocardiographic diagnosis of pericardial disease. American heart journal. 1979 Apr 1;97(4):420-7.
6. Horowitz MS, Schultz CS, Stinson EB, Harrison DC, Popp RL. Sensitivity and specificity of echocardiographic diagnosis of pericardial effusion. Circulation. 1974 Aug;50(2):239-47.
7. Pepi M, Muratori M. Echocardiography in the diagnosis and management of pericardial disease. Journal of Cardiovascular Medicine. 2006 Jul 1;7(7):533-44.
8. Feigenbaum H, Zaky A, GRABHORN LL. Cardiac motion in patients with pericardial effusion: a study using reflected ultrasound. Circulation. 1966 Oct;34(4):611-9.
9. EFFUSION P. Echocardiography in evaluation of pericardial disease. JAPI. 2003 Sep;51:903.
10. Martin RP, Rakowski H, French J, Popp RL. Localization of pericardial effusion with wide angle phased array echocardiography. The American journal of cardiology. 1978 Dec 1;42(6):904-12.
11. Schiller NB, Botvinick EH. Right ventricular compression as a sign of cardiac tamponade: an analysis of echocardiographic ventricular dimensions and their clinical implications. Circulation. 1977 Nov;56(5):774-9.
12. Pool PE, Seagren SC, Abbasi AS, Charuzi Y, Kraus R. Echocardiographic manifestations of constrictive pericarditis: Abnormal septal motion. Chest. 1975 Nov 1;68(5):684-8.
13. Vignola PA, Pohost GM, Curfman GD, Myers GS. Correlation of echocardiographic and clinical findings in patients with pericardial effusion. The American journal of cardiology. 1976 Apr 1;37(5):701-7.