



ASSESSMENT OF ECHOCARDIOGRAPHIC AND ANGIOGRAPHIC PROFILE WITH INVASIVE CENTRAL VENOUS PRESSURE MONITORING IN PATIENTS ADMITTED WITH ACUTE INFERIOR WALL MYOCARDIAL INFARCTION WITH CARDIOGENIC SHOCK

Cardiology

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ABSTRACT

Background - Cardiogenic shock is the most common cause of death in patients hospitalized with acute myocardial infarction. Inferior wall MI is associated with RVMI in up to 50% of cases. The mortality rate of an inferior wall MI is less than 10 percent. RVMI, RV dysfunction, hypotension, bradycardia, heart block, and cardiogenic shock are associated with higher mortality. CVP is usually raised in cardiogenic shock. This study is done to assess the angiographic profile in patients with IWMI with cardiogenic shock. **Methods** – This is a prospective observational study done in 150 patients with inferior wall myocardial infarction and cardiogenic shock over a period of 6 months conducted in the department of cardiology, Chengalpattu medical college & hospital. ECG and ECHO were done at admission. Central line was secured at presentation and CVP monitoring was done before and after saline challenge in patients without pulmonary edema and monitored through out the course. Coronary angiogram was done and angiographic profile assessed using syntax score. **Results** – Out of 150 patients 92(61.3%) were males and 58(38.6%) were females with mean age 54+ 4.5. Among 150 patients 112 (74.6%) had RVMI and 131 (87.3%) had RV dysfunction on echo. Proximal RCA was involved in most of the patients 111(74%) . Most of the patients had angiographic score (Syntax score) ranging between 18-27 (74.6%) . An average of 850 + 150 ml was required to increase the SBP by 10mmHg. The optimal amount of IV fluid needed to treat hypotension or shock and maintain SBP>90mmHg in IWMI with RV dysfunction was 2250 +250ml. CVP was high at presentation in most patients with cardiogenic shock. 117(78%). A positive response to fluids was observed when CVP values were < 15mmHg but was unlikely when values were > 15 mmHg . The sensitivity of elevated CVP in predicting RV dysfunction was 85.71%. Elevated CVP was statistically significant with RV dysfunction (P<0.001) **Conclusion** –Elevated CVP is statistically significant with RV dysfunction(P<0.001). It is advisable to administer fluids in patients with IWMI with Cardiogenic shock when CVP is < 15mmHg. And it is wise to cautiously administer fluids in patients with IWMI with Cardiogenic shock when CVP is >15mmHg. In Patients with CVP values >15mmHg proximal cut RCA off was predominantly seen (P<0.005). CVP can be good predictor of RV dysfunction in IWMI cardiogenic shock and IV fluids can be administered based on CVP for early correction of shock.

KEYWORDS

Cardiogenic shock, central venous pressure ,inferior wall MI, Right ventricular MI, RV dysfunction, Pulmonary edema , Angiogram

INTRODUCTION

Cardiogenic shock is the most common cause of death in patients hospitalized with acute myocardial infarction. Inferior wall MI is associated with RVMI in up to 50% of cases. The involvement of right ventricle during inferior wall myocardial infarctions makes worst clinical outcomes. Almost half of the patients diagnosed with inferior wall myocardial infarction have complications that subsides later to give a favorable prognostic outcome. Acute Inferior wall myocardial infarction has also has favorable short term and long term prognosis having 8% mortality rate. The mortality rate is increased to 28% when right ventricle myocardial infarction occurs. Cardiogenic shock defined as ultimate pumping disability of heart causing clinical hypo perfusion in the body. It is also recognized when intravenous inotropes or intra-aortic balloon pump are required to maintain >90 mmHg of systolic blood pressure and >1.8l/min/m² of cardiac index. The major debilitating phenomenon of Cardiogenic shock is complicating almost 10% cases of acute myocardial infarction leading to increase in overall mortality rates. Despite of the advantages of early percutaneous vasovagal intervention or CABG, the diagnosis of cardiogenic shock foreshadows a rising fatality rate of 50% .RVMI , RV dysfunction, hypotension, bradycardia, heart block, and cardiogenic shock are associated with higher mortality. CVP is usually raised in cardiogenic shock . CVP of < 10 mm Hg can almost rule out RV dysfunction. This study is done to assess the angiographic profile in patients with IWMI with cardiogenic shock along with CVP monitoring

MATERIALS AND METHODS

This is a prospective observational study done in patients with inferior wall myocardial infarction and cardiogenic shock admitted in cardiology department in chengalpattu medical college. The study done in 150 patients over a period of 6 months (March 2024 to August 2024).

Inclusion Criteria

Patients admitted with acute inferior wall myocardial infarction with cardiogenic shock

Exclusion Criteria

Patients with inferior wall myocardial infarction without cardiogenic shock, with past history of myocardial infarction, Patients with advanced heart failure, Chronic kidney disease and other associated systemic illness, Known structural and valvular heart disease

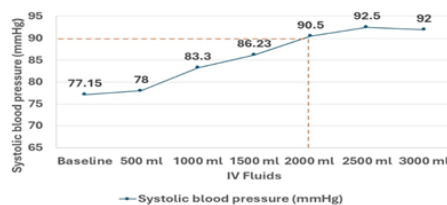
Patients with acute inferior wall myocardial infarction with cardiogenic shock who are fitting into the criteria of cardiogenic shock are evaluated in detail as per their symptomatology, a detailed physical examination, routine blood investigations, ECG and ECHO were done at admission. Central line was secured at presentation and CVP monitoring was done before and after saline challenge in patients without pulmonary edema and monitored through out the course. All patients after medically stabilization were subjected to coronary angiogram as and when indicated. The angiographic profile of the coronary artery disease was assessed using the syntax score

RESULTS

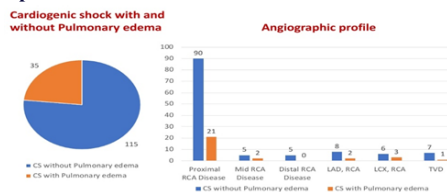
Out of 150 patients 92(61.3%) were males and 58(38.6%) were females with mean age 54+ 4.5. Among 150 patients 112 (74.6%) had RVMI and 131 (87.3%) had RV dysfunction on echo. Proximal RCA was involved in most of the patients 111(74%) . Most of the patients had angiographic score (Syntax score) ranging between 18-27 (74.6%). An average of 850 + 150 ml was required to increase the SBP by 10mmHg. The optimal amount of IV fluid needed to treat hypotension or shock and maintain SBP>90mmHg in IWMI with RV dysfunction was 2250 + 250ml. CVP was high at presentation in most

patients with cardiogenic shock (78%). A positive response to fluids was observed when CVP values were < 15 mmHg but was unlikely when values were > 15 mmHg. The sensitivity of elevated CVP in predicting RV Dysfunction was 85.71%. Elevated CVP was statistically significant with RV dysfunction ($P < 0.001$)

Responsiveness To IV Fluids

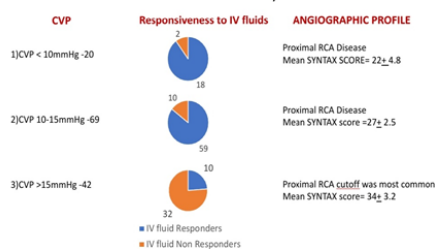


Angiographic Profile



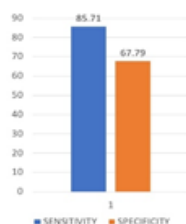
CVP And It's Correlation With IV Fluids Response

In Patients with RV Dysfunction



Sensitivity And Specificity Of CVP In RV Dysfunction

Sensitivity and Specificity of CVP in predicting RV dysfunction



DISCUSSION

The present study was conducted to find the usefulness of CVP in assessing the RV Dysfunction in inferior wall MI patients with cardiogenic shock and the study findings showed that elevated CVP was statistically significant with RV dysfunction. Among all patients with inferior wall MI and cardiogenic shock 74.6% patients had RVMI and 87.3% had RV dysfunction. Various studies have shown that Cardiogenic shock has increased the mortality rates in the MI patients. However, patients who have not developed RV dysfunction had shown improved survival rates. Another study also showed that the right ventricular involvement during myocardial infarction are accountable for the high mortality rate. CVP was high at presentation in most of the patients with cardiogenic shock .In this study proximal RCA was predominantly involved (74%) with syntax score ranging between 18-27(74.6%).A positive response to fluids was observed when CVP values were < 15mmHg but was unlikely when values were > 15 mmHg .The sensitivity of elevated CVP in predicting RV dysfunction was high.

CONCLUSION

Elevated CVP is statistically significant with RV dysfunction ($P<0.001$). It is advisable to administer fluids in patients with IWMI with Cardiogenic shock when CVP is $<15\text{mmHg}$. And it is wise to cautiously administer fluids in patients with IWMI with Cardiogenic shock when CVP is $>15\text{mmHg}$. In Patients with CVP values $>15\text{mmHg}$ proximal cut RCA off was predominantly seen. ($P<0.005$). CVP can be good predictor of RV dysfunction in IWMI cardiogenic

shock and IV fluids can be administered based on CVP for early correction of shock

REFERENCES

1. Berger, P. and Ryan, T. (1990). Inferior myocardial infarction. High-risk subgroups. *Circulation*, 81(2), pp.401-411.
2. Khan S, Kundi A, Sharieff S. Prevalence of right ventricular myocardial infarction in patients with acute inferior wall myocardial infarction. *Int J Clin Pract*. 2004;58:354e357.
3. Bueno H, Lopez-Palop R, Bermejo J, Lopez-Sendon JL, Delcan JL. In-hospital outcome of elderly patients with acute inferior myocardial infarction and right ventricular involvement. *Circulation* 1997; 96: 436-441.
4. Overgaard C, Fitchett D. Cardiogenic shock from right ventricular infarction. *Cardiol Rounds*. 2002;VII(8).
5. Chapra D et al. –A study of the clinical profile of right ventricular infarction in context to inferior wall myocardial infarction in a tertiary care center. *Journal of Cardiovascular Disease Research* 4 (2013) 170e176
6. Iqbal A, Muddarangaappa R, Shah S, Vidyasagar A study of right ventricular infarction in inferior wall myocardial infarction. *J Clin Sci Res*. 2013; 2:66-71.
7. Iqbal MA, Khan N, Rauf MA, Khan SB, Shah I, Kibria Z, Hafizullah M. In-hospital complications of acute Right ventricular myocardial infarction. *Journal of Postgraduate Medical Institute (Peshawar-Pakistan)*. 2013 Jun 21; 27(3).
8. Kolte D, Khera S, Aronow WS, Mujib M, Palaniswamy C, Sule S, et al. Trends in incidence, management, and outcomes of cardiogenic shock complicating ST-Elevation myocardial Infarction in the United States. *Journal of the American Heart Association*. 2014; 3(1):e005090.
9. Menon V, Hochman JS. Management of cardiogenic shock complicating acute myocardial infarction. *Heart*. 2002; 88(5):531-7.
10. Kumar V, Sinha S, Kumar P, Razi M, Verma CM, Thakur R, et al. Short-term outcome of acute inferior wall myocardial infarction with emphasis on conduction blocks: a prospective observational study in Indian population. *Anatolian journal of cardiology*. 2017; 17(3):229-34. doi:10.14744/AnatolJCardiol.2016.6782.
11. Iqbal MA, Rauf MA, Faheem M, Shah I, Khan N, Khan SB, et al. Comparison of In Hospital outcome of acute inferior myocardial infarction complicated by right ventricular infarction with isolated acute inferior myocardial infarction. *Pakistan Heart Journal*. 2013; 45(4).
12. Berger PB, Ruocco Jr NA, Ryan TJ, Jacobs AK, Zaret BL, Wackers FJ, et al. Frequency and significance of right ventricular dysfunction during infarction wall left ventricular myocardial infarction treated with thrombolytic therapy (results from the Thrombolysis In Myocardial Infarction [TIMI] II trial). *The American journal of cardiology*. 1993; 71(13):1148-52.
13. Puymirat E, Fagon JY, Aegerter P, Diehl JL, Monnier A, Hauw-Berlemont C, et al. Cardiogenic shock in Intensive care units: evolution of prevalence, patient Profile, management and outcomes, 1997–2012. *European journal of heart failure*. 2017;19(2):192-200.