



Study on Serum Magnesium Levels in Acute Myocardial Infarction

Authors

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Introduction

- Magnesium has been implicated in the pathogenesis of Acute Myocardial infarction and its complications like arrhythmias.
- Magnesium ions are considered essential for the maintenance of the functional integrity of the myocardium.
- Myocardial magnesium concentration in patients with sudden death due to ischemic heart disease was found to be very low. It has been pointed out that magnesium has a vital role in ventricular fibrillation, which causes sudden death in IHD.
- The coronary vasospasm resulting from magnesium deficiency has been suggested as another important factor in the sudden death in IHD.
- Magnesium deficiency was also postulated to have role in the genesis of atheromatous plaques in that it leads to hyperlipidemia.

Aims and Objectives

- To know the relation between level of serum magnesium and arrhythmias in patients with acute myocardial infarction

who are presenting within 12 hours of onset of symptoms.

Materials and Methods

Source of Data: The study was conducted on 60 cases of acute myocardial infarction admitted in intensive coronary care unit of Gems Medical College and Hospital, Srikakulam

Study Design: observational study

Duration of Study: 10 months

Study Period: October 2019 to July 2020

Inclusion Criteria

Patients were diagnosed to have Acute Myocardial Infarction, only if they had 2 of the following characteristics:

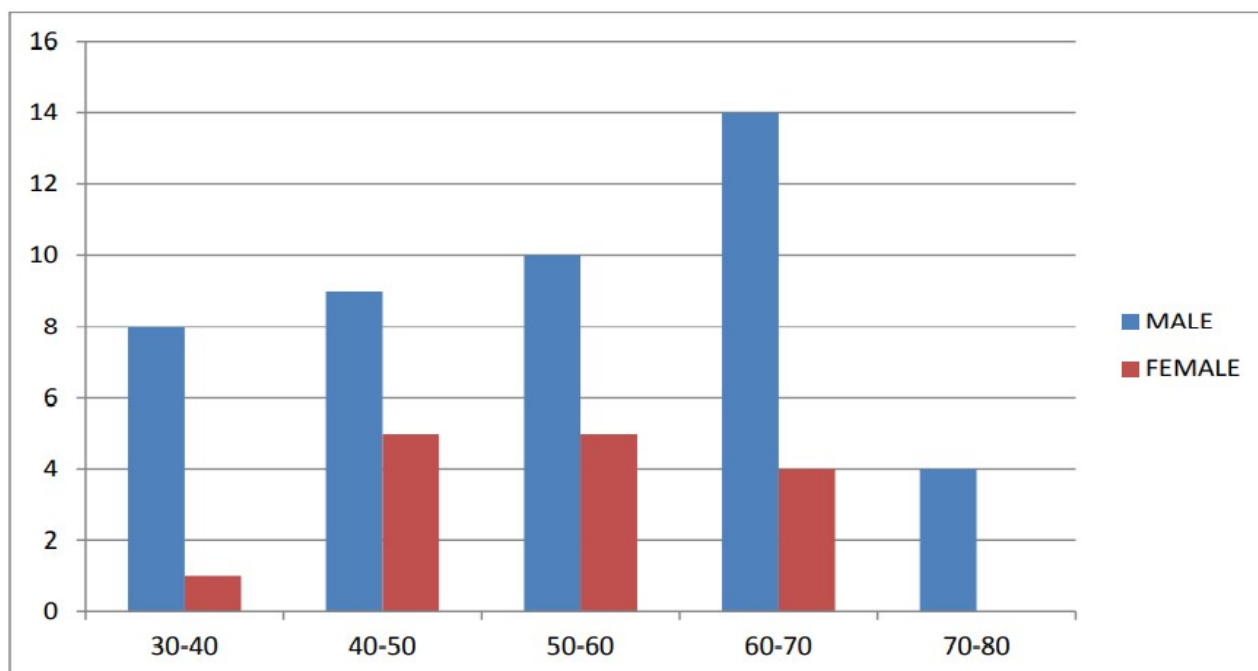
- 1) Chest Discomfort.
- 2) ECG features of Acute Myocardial Infarction.
- 3) Elevation of Cardiac Enzymes.

Only those patients presenting to the hospital within 12 hours of the onset of symptoms were included in the study.

Exclusion Criteria

1. Patients with hypokalemia.
2. Statistical analysis and Results

Distribution of patients by age and sex



Serum magnesium levels in patients without arrhythmias

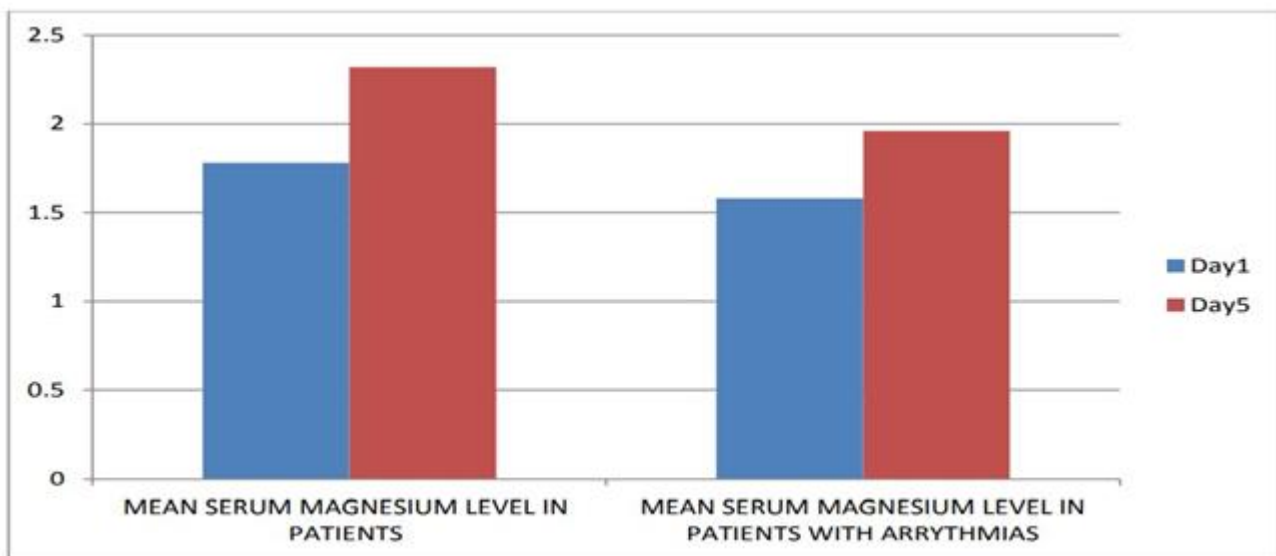
Serum magnesium (mg/dl)	Day 1	PERCENT	DAY 5	PERCENT
<1.6	6	10%	-	-
1.6 – 2.5	18	30%	21	35%
>2.5	6	10%	9	15%

Serum magnesium levels in patients with arrhythmias

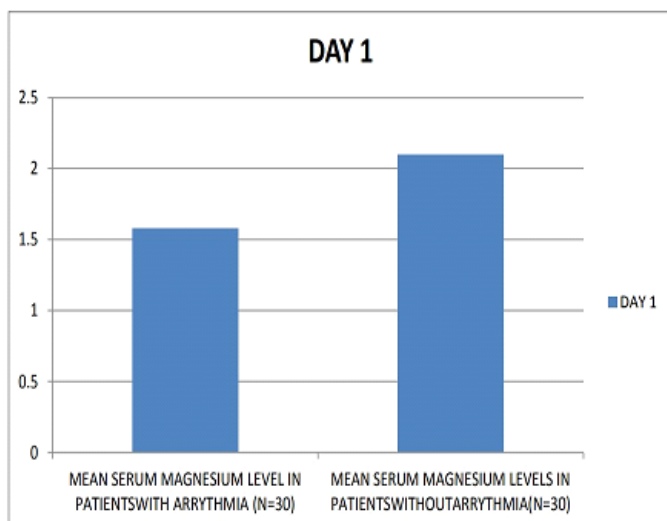
SERUM MAGNESIUM(mg/dl)	Day - 1	PERCENT	DAY - 5	PERCENT
< 1.6	12	20%	6	10%
1.6 to 2.50	18	30%	24	40%
>2.5	-	-	-	-

Mean serum magnesium levels

	DAY 1	DAY 5
Mean serum Mg in 60 cases	1.78 + ₋ 0.32	2.32 + ₋ 0.44
Mean serum Mg level in patients with arrhythmia (30 patients)	1.58 + ₋ 0.30	1.96 + ₋ 0.32

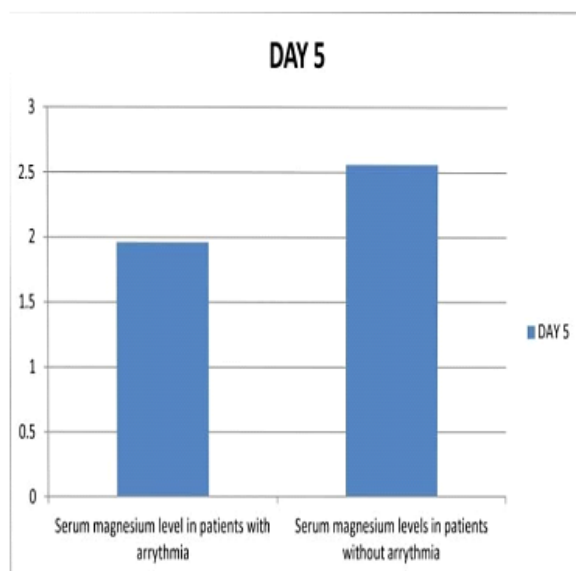


Comparison of serum magnesium levels In patients with arrhythmias and without arrhythmias on day 1



	No of cases	Serum magnesium (Day 1)	p -value
Mean serum Mg in patients with arrhythmia	30	1.58 + ₋ 0.30	<0.001
Mean serum mg level in patients without arrhythmia	30	2.10 + ₋ 0.50	

Comparison of serum magnesium levels In patients with and without arrhythmias on day 5



	no. of cases	serum Mg Day-5	p- value
Mean serum magnesium levels in patients with arrhythmia	30	1.96+ _{0.32}	<0.001
Mean serum Mg levels in patients without arrhythmia	30	2.56+ _{0.48}	

Discussion

- Magnesium is essential for activation of ATP, which maintains the sodium-potassium pump and also because of calcium blocking action magnesium has been implicated in relation to arrhythmias after acute myocardial infarction
- In the study group of 60 patients, 45 were males and 15 were females with a male-female ratio of 4:1. The maximum incidence of acute myocardial infarction was seen in the 6th and 7th decades. In the present study of 60 patients, the mean serum magnesium level on day-1 in all 60 patients was 1.78 ± 0.32 and the mean serum magnesium level on day-5 was 2.32 ± 0.44 .

Conclusion

In the present study, the serum magnesium level on day-1 was significant lower in patients with arrhythmias than those without arrhythmia ($p < 0.001$). There was an increase in serum magnesium from Day-1 to Day-5 in both those with arrhythmias and those without arrhythmias.

Summary

- Coronary artery disease is a major cause of morbidity and mortality throughout the

world. Major cause of death in coronary artery disease are due to complications like arrhythmias.

- In the present study, patients with acute myocardial infarction with low magnesium level are more prone to develop ventricular arrhythmias compared to those who are having normal magnesium levels. Magnesium replacement therapy in patients with acute myocardial infarction who is having low serum magnesium level may reduce the incidence of arrhythmias.

References

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