# An Observational Study of Coronary Stenting Vs No Coronary Stenting with the use of Levosimendan

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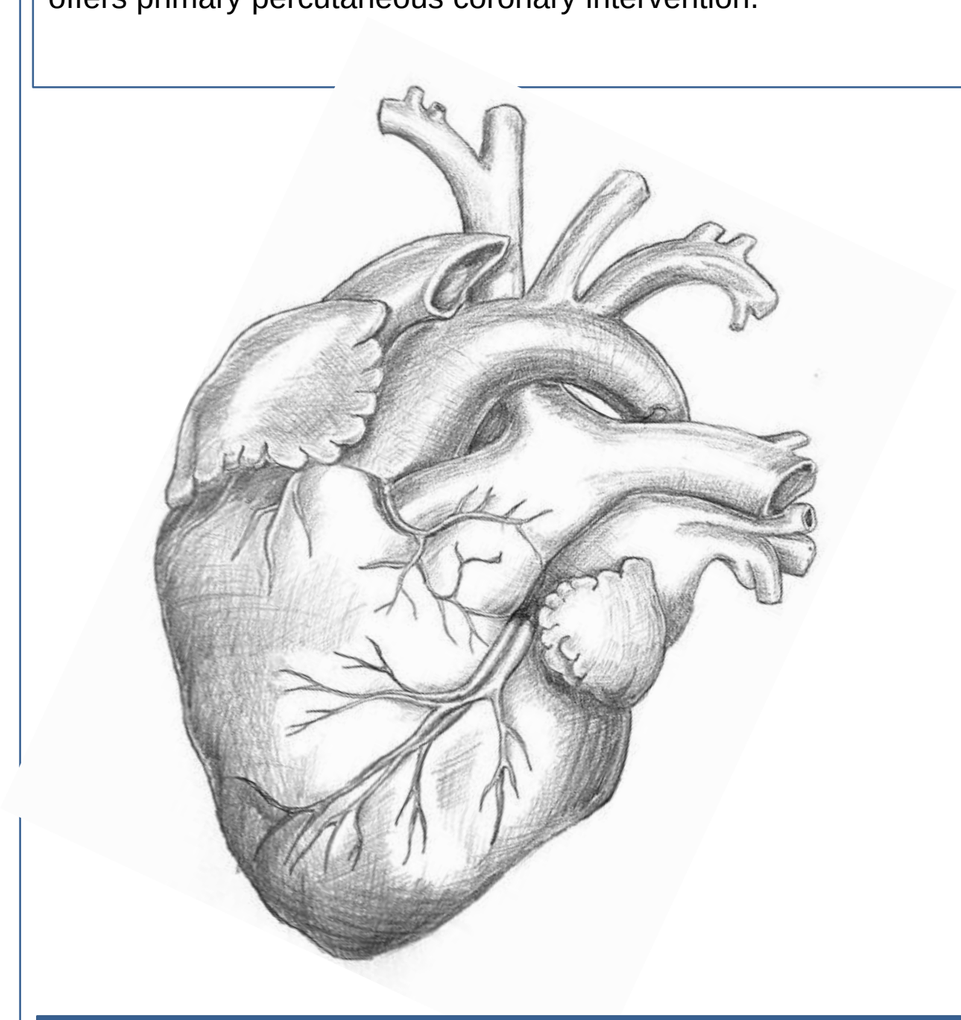
## Introduction

Levosimendan acts as a vasodilator opening ATP-sensitive potassium channels in vascular smooth muscle, increasing myocardial oxygen supply and reducing preload and afterload. It protects against ischemia-reperfusion injury and activating stunned myocardium in patients following cardiac intervention [1]

An Observational Study was designed to review the impact of Levosimendan in the first 24 hours of treatment by measuring Cardiac Index (CI). This data was collected in a district general hospital which offers primary percutaneous coronary intervention.



## Objectives

To observe the impact of Levosimendan on CI during cardiogenic shock in patients who received an intervention of coronary stenting vs nil intervention.

## Methods

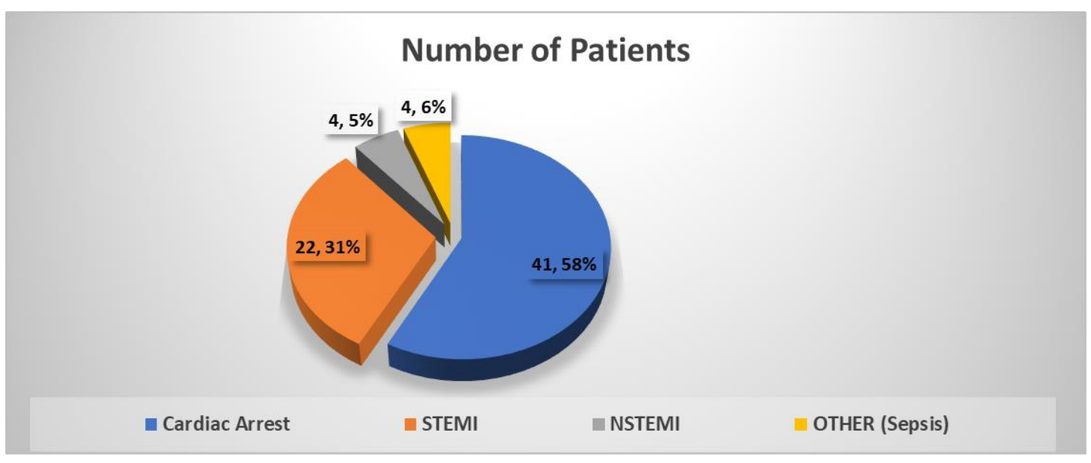
Patients requiring Levosimendan due to cardiogenic shock where observed over an 8 year period. These patients were subject to inclusion and exclusion criteria.

CI studies where performed on onset of Levosimendan, 12 hours and 24 hours from initiation.

| Inclusion | Exclusion |
|---|---|
| *>18yrs old* | *Patients unlikely to survive >24hrs* |
| *Myocardial stunning with decreased organ perfusion* | *un-correctable medical conditions* |
| *Ejection Fraction <35% or regional wall abnormalities* | *Right heart failure due to pulmonary embolus* |
| *CI <2.5L/min/m2 or dobutamine up to 10mcg/kg/min* | *High output failure due to thyrotoxicosis, arrhythmias, anaemia or massive blood loss* |
| | *hypertrophic cardiomyopathy* |
| | *uncorrected stenotic valve disease in patients with no definite procedure planned.* |

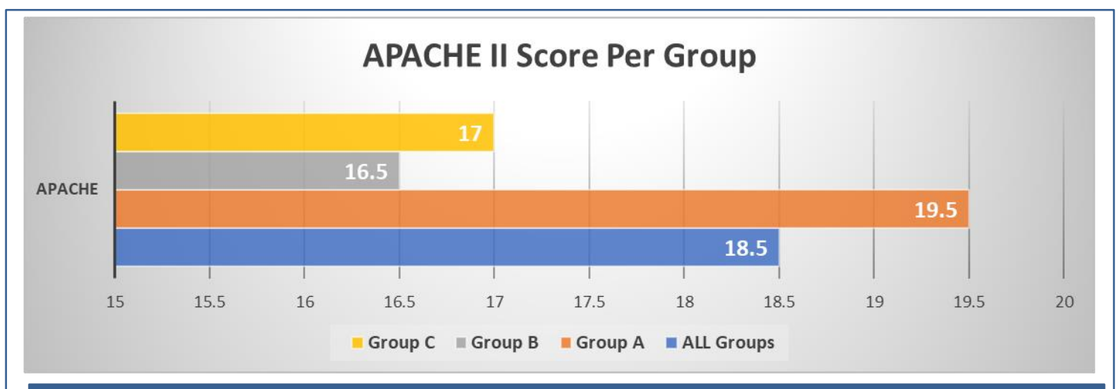
## Results

Manual data of 71 patients with a median age of 62 years. The male to female ratio was 76% vs 21% and the average organ support for the patients consisted of 3 organs.



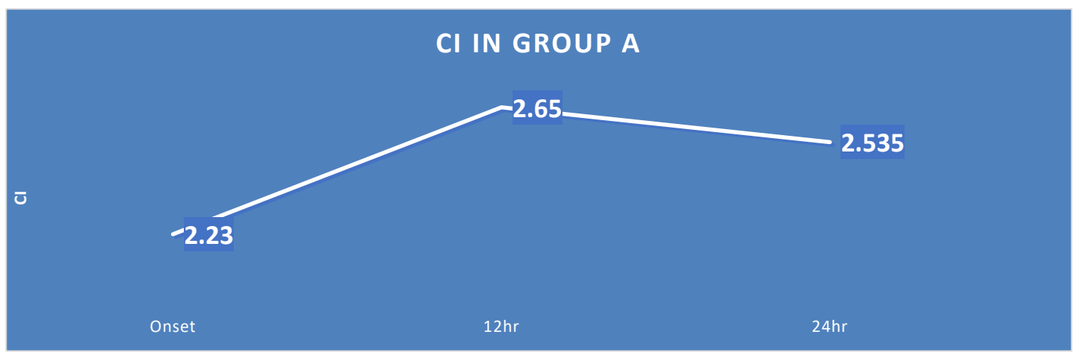

The patients were then observed for changes in CI at onset, 12hour and 24hour post Levosimendan infusion, in 3 groups;

| | |
|---|---|
| **Group A** | Patients Receiving coronary stenting |
| **Group B** | Patients who didn't receive coronary stenting |
| **Group C** | Septic Patients not assessed for coronary stenting |

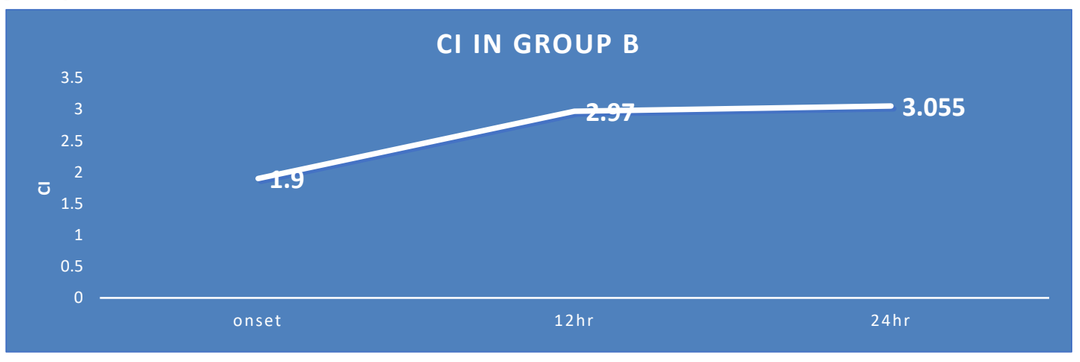



## Results

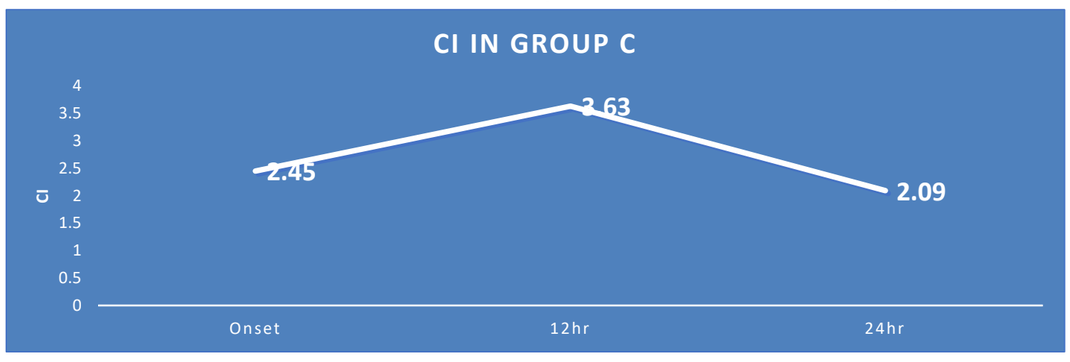
The CI in patients in Group A, overall improved from onset of 2.23L/min/m2 to 24 hour CI of 2.535L/min/m2, however the CI at 12hrs was most improved to 2.65L/min/m2. The overall mortality for this group of patients was 58%.



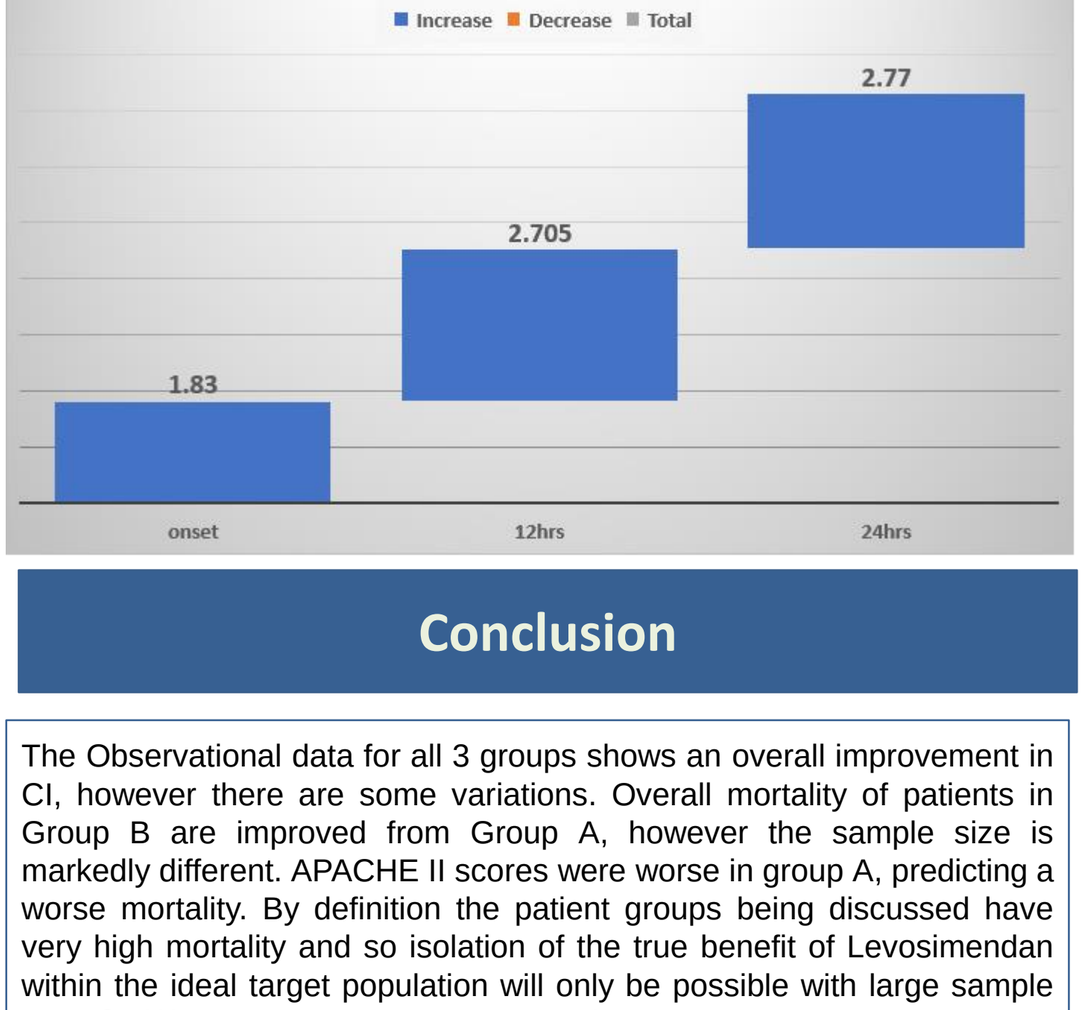

For patients in Group B, the median CI improved consistently over the 24hrs from a CI of 1.9L/min/m2 to 3.055L/min/m2. The Overall mortality for this group was 39%.




The data collected for patients in Group C was comparatively small and may well be excluded for this fact, however showed a varying CI of onset 2.45L/min/m2 to 2.09L/min/m2. All the patients survived in this group.




The CI in all patients improved group together improved from onset to 24hrs of commencement of Levosimendan from a median CI of 1.83L/min/min2 to 2.77L/min/m2




## Conclusion

The Observational data for all 3 groups shows an overall improvement in CI, however there are some variations. Overall mortality of patients in Group B are improved from Group A, however the sample size is markedly different. APACHE II scores were worse in group A, predicting a worse mortality. By definition the patient groups being discussed have very high mortality and so isolation of the true benefit of Levosimendan within the ideal target population will only be possible with large sample size [2]. We postulate that due to cost, Levosimendan may be used too late. Further study into timing of administration of Levosimendan use in post coronary intervention group and use as first line therapy is warranted. We suggest future randomised controlled trials with larger patient groups, closer observation of demographic data, severity scores, timing administration and other variables within the patient group, to compare Levosimendan use vs standard therapy.

## References

[1] Manakers. *Use of Vasopressors and Inotropes. https://www.uptodate.com/contents/use-of-vasopressors-and-inotropes?search=use%20of%20vasopressors%20and%20inotropes&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1 (accessed 06/08/2021).*

[2] Brookes L et al. *REVIVE II and SURVIVE: Use of levosimendan for the treatment of acute decompensated heart failure. http://www.medscape.org/viewarticle/523043 (accessed 08/08/2021).*

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