



Retrospective Study of Safety and Efficacy of Milrinone in Home-Infusion Setting

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Background

Milrinone is a phosphodiesterase III inhibitor that is used in patients with acute or chronic heart failures and pulmonary hypertension. It is often used in cardiac surgeries requiring cardiac support such as CABG surgery and cardiac transplantation. Its approved indications include acute decompensated heart failure with reduced ejection fraction in need of inotropic support. The use of milrinone in the outpatient setting is generally limited to patients with severe symptoms of congestive heart failure refractory to optimal medical therapy. In the myocardium, PDE III inhibition leads to increased contractility and improved relaxation which improves systolic and diastolic function, optimizing cardiac output. In the vasculature, PDE III inhibition prevents cGMP metabolism in the smooth musculature and results in vasodilation in both arteries and veins.

Objective

The purpose of this study is to evaluate clinical efficacy of continuous milrinone infusion in home settings by monitoring periodic assessments for side effects, patient overall condition and feedback. This study will examine currently active and discharged patients on milrinone at this home infusion pharmacy.

Methods

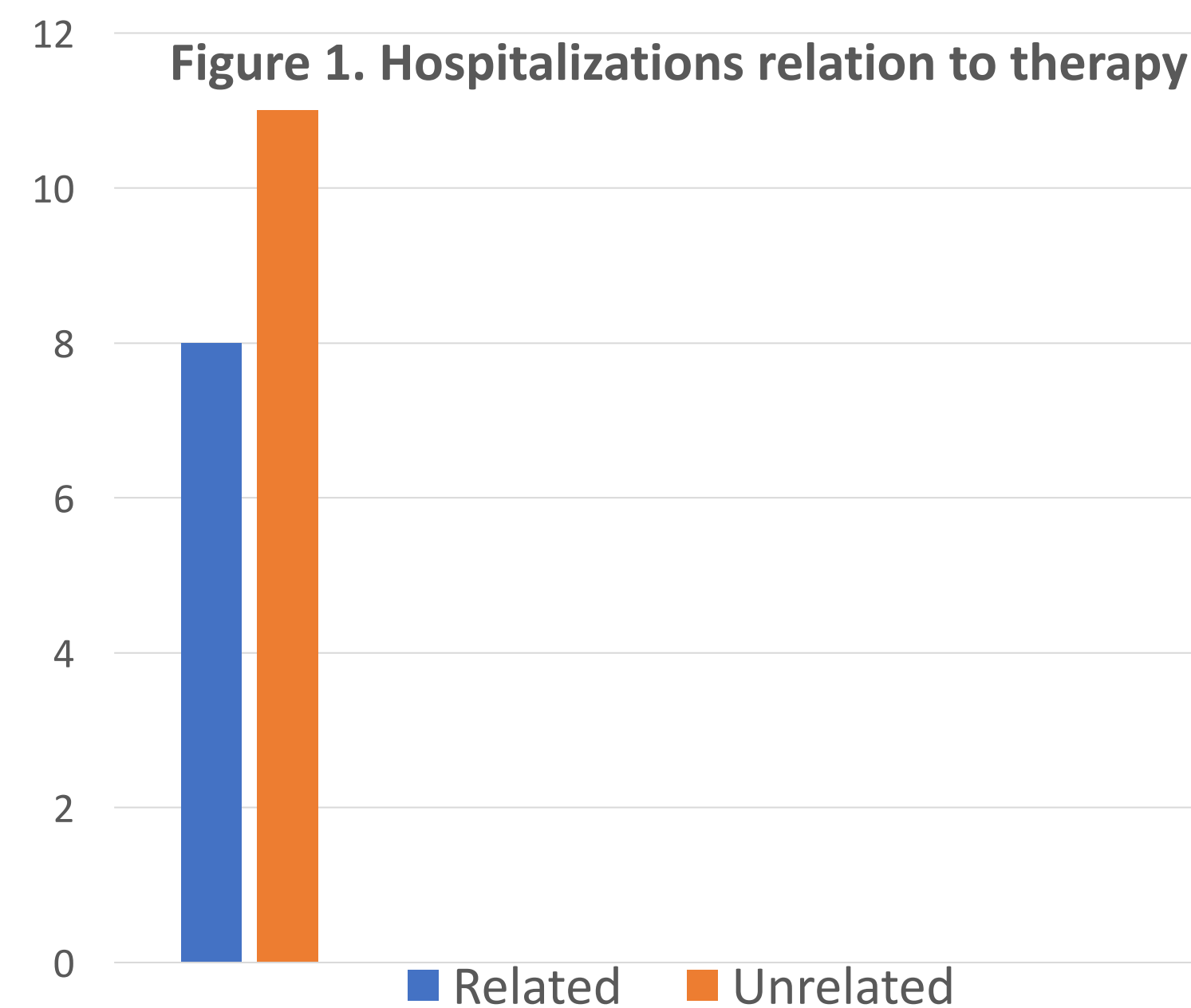
Retrospective analysis of the electronic medical records of the current and discharged patients on milrinone at this home infusion company was performed. Data was obtained from the electronic medical records of 21 patients with dates ranging from 9/4/2020 to 1/30/23. Exclusion criteria included pediatrics, patients with no catheter access information and patients canceled from the service prior to administration of the first dose.

Data from resources such as monthly assessments conducted for chronic patients on service for at least one month and weekly inotropic assessments were used to identify common adverse effects. Factors such as any side effects, changes in weight greater than 3 lbs from initial weight, assessment of daily living activities, presence of edema, changes in oxygen use, shortness of breath, recent heart rate and blood pressure were used to evaluate safety and efficacy of milrinone treatment in a diverse yet specific patient population.

Weekly labs conducted to monitor patients while on service were obtained to compare results and to identify a trend of abnormal lab values if any present. Significant electrolyte values out of range were also monitored. Weekly nursing visits were used as a monitoring parameter for any noticeable changes in patients' conditions.

Table 1. Patient demographics

Gender	
Male	12 (57.1%)
Female	9 (42.9%)
Age range	
<65	10 (47.6%)
>65	11 (52.4%)
Diagnosis	
Heart failure	7 (33.3%)
Ischemic cardiomyopathy	1 (4.8%)
Systolic heart failure	6 (28.6%)
Diastolic heart failure	3 (14.3%)
Combined systolic and diastolic heart failure	4 (19.0%)



Improved ADL in 85.7% of patients

No AE reported in 33.3% of patients

Results

This study demonstrated that milrinone infusions can be safely administered in home settings as 21 patients safely received one or more infusions from 9/4/2020 to 1/30/2023. 18 of 21 patients (85.7%) have at least once mentioned during the weekly or monthly assessment that milrinone therapy has helped or improved their ADLs (activities of daily living). 13 patients have had at least one hospitalization while on service, and of the total 19 hospitalizations, 8 (42.1%) were related to therapy. 7 patients (33.3%) reported no adverse events or lab abnormalities during duration of service. Of the adverse events reported during weekly and monthly assessments, shortness of breath was the most common with 24 incidences, followed by lab abnormality (16), edema (11), chest pain (9), changes to urine output (4), significant weight change defined by greater than 3 lbs (4) and fatigue (3). The 15 inactive patients were discharged with various reasons related (3) and non-related (12) to therapy. Such reasons include hospitalizations, rehab admission, transfer to a different branch and lack of response from the patient.

Discussion

Although the study shows that milrinone can be safely administered in home settings, a potential limitation is that this study lacks in sample size and would require additional trials with larger populations to further demonstrate safety and efficacy of milrinone in home settings. Additional studies are necessary to validate the safety and efficacy of milrinone in home settings for future uses. Also, adverse reactions could have been underreported as 7 patients have reported no side effects while they were on service.

Conclusion

In conclusion, this study has shown that milrinone is generally safe to administer in home settings as most patients are continuing the infusion with no major side effects/ significant lab abnormalities or are discharged with reasons unrelated to the therapy. Overall, most patients have tolerated the therapy well with minimal adverse reactions.

References

Ayres JK, Maani CV. Milrinone. PubMed. Published 2020. <https://www.ncbi.nlm.nih.gov/books/NBK532943/>