Implementation of Home Use of Continuous Intravenous Inotrope as Palliative Therapy for a Patient with Advanced Heart Failure within the Brazilian Unified Health System: a Case Report

Ana Paula Chedid Mendes,[1] *Rita Zambonato,*[2] *Laura C. T. Hastenteufel,*[3] *Letícia Orlandin,*[3] *Nadine Clausell,*[3] *Livia Adams Goldraich*[3]

Hospital Universitário Antônio Pedro,[1] *Niterói, RJ – Brasil*

Programa de Cuidados Paliativos- Hospital de Clínicas de Porto Alegre,[2] *Porto Alegre, RS – Brasil*

Programa de Insuficiência Cardíaca e Transplante- Hospital de Clínicas de Porto Alegre,[3] *Porto Alegre, RS – Brasil*

Introduction

Contemporary evidence-based treatment has modified the natural history of heart failure (HF). Nevertheless, with the current aging of the population with HF and the elevated number of comorbidities, there is a large proportion of individuals who are ineligible for advanced therapies and who could potentially benefit from palliative care. Accordingly, strategies for relieving symptoms and improving quality of life are being prioritized over interventions that aim for medium- and long-term outcomes. For a subgroup of patients with advanced HF receiving palliative care, home therapy with continuous inotropes may be considered and integrated into general palliative care.

Case report

A 77-year-old male patient was being followed up at the Hospital de Clínicas, Porto Alegre, Rio Grande do Sul, Brazil for long-standing severe HF with reduced ejection fraction with ischemic etiology. In spite of interventional therapy with angioplasty, optimized treatment with medications for HF, and electrical devices, he evolved with disease progression, cachexia, and frequent readmissions. The patient had a prohibitive risk for heart transplantation due to age, severe malnutrition, and renal failure. During one of the hospitalizations, he evolved with intravenous inotropic dependence to control symptoms at rest. Several attempts to gradually withdraw the inotropic medication were unsuccessful, due to recurrence of dyspnea, fatigue, symptomatic hypotension, and other symptoms associated with low cardiac output and pulmonary congestion.

In joint evaluation, the multidisciplinary teams specializing in advanced HF, transplantation, and palliative care at the hospital established, together with the patient, palliative care objectives and measures that prioritized improved quality of life. The doctor of the palliative care team prepared, together with the patient, the advance directives of will, which were attached to the medical record. In order to better control symptoms and promote dehospitalization, the possibility of home use of continuous intravenous inotrope was discussed. The patient and the family, being aware of the potential risks and benefits, agreed to use of the medication, and approval was obtained from the Regional Councils of Medicine and Nursing. A protocol was organized in conjunction with the Home Care Program (HCP) of the Conceição Hospital Group, which is linked to the Municipal Health Department of Porto Alegre, so that the patient could be followed up through home visits within the Brazilian Unified Health System (SUS, abbreviation in Portuguese). The inotropic medication was funded and provided by the HCP on an exceptional basis. Guidelines were provided on the use of the drug and the infusion pump, disease progression, symptom control, and emergency situations. Nursing, pharmacy, nutrition, physiotherapy, psychology, and social work teams participated in the planning of dehospitalization with inotropes (Figure 1).

The patient was discharged with a continuous infusion of milrinone 0.27 mcg/kg/min, and he remained at home for approximately 20 days, followed up with home visits by the teams from the HCP and the original hospital. No complications were registered, and the patient, even though he was faced with limitations, remained comfortable and was able to perform activities that gave him pleasure, such as sitting on the veranda, being close to friends from his neighborhood and his routine, and the daily affection of his children. The family, who participated in the entire construction of care, showed high satisfaction with the home treatment. After this period, the patient was readmitted due to HF progression, and he died during hospitalization.

Discussion

This case report describes the implementation of home use of an intravenous inotrope as a strategy to improve the quality of life of a patient with advanced HF in palliative care within the SUS. This is considered a pioneering initiative in Brazil, and there are no other reports in the context of Brazil.

The prevalence of HF and advances in HF therapy have increased the proportion of patients living with the disease and its long-term consequences. Accordingly, the proportion of patients with advanced stage disease who require palliative care is also increasing.[1] This change in the epidemiology of HF

Keywords

Milrinone. Dobutamine. Palliative Care. Heart Failure. Home Care Services.

Mailing Address: Ana Paula Chedid Mendes •
Hospital Universitário Antônio Pedro, Serviço de Cardiologia – Rua Marquês de Paraná, 303. Postal Code 24033-900, Niterói, RJ – Brazil
E-mail: anapchedid@gmail.com
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Figure 1 – *Training of the Home Care Program Team of the Conceição Hospital Group for home use of inotropic medications in patients with advanced heart failure, held in July 2017.*

is accompanied by an increase in the home use of inotropic medications in developed countries, as a bridge to advanced therapy (heart transplantation and mechanical circulatory assist devices) or as an integrated strategy for palliative care. Between 2010 and 2014, there was a 63% and 44% increase in the number of Medicare beneficiaries in the United States who received milrinone or dobutamine, respectively, for home use.[2] Although, in Brazil, there are still many limitations (economic, social, structural, and legal) to hospital discharge with continuous inotropic infusion, we have reported a successful case of home use of continuous inotrope within the SUS, with the objective of dehospitalization, symptom relief, and improved quality of life in a patient with terminal HF receiving palliative care.

In 2021, updates to the Brazilian HF Guidelines recommended continuous intravenous inotropic outpatient therapy as a palliative treatment for symptom control in patients with advanced HF who were not eligible for mechanical circulatory assist devices or heart transplantation (class IIb).[3] The selection of patients who will potentially benefit from palliative inotropic use is based on clinical, social, and economic aspects.[4] Table 1 proposes the main aspects for evaluation and planning of home use of continuous intravenous inotrope. The use of these medications in the home environment should be considered for patients who, after starting the inotrope while still in a hospital environment, demonstrate hemodynamic and symptomatic improvement, with failed attempts to suspend the inotrope. On the other hand, their use is contraindicated in the presence of uncontrollable and refractory arrhythmias. The benefits and complications must be discussed with patients and their families. The initiation of continuous inotropic therapy at home must be in accordance with the patient's wishes and goals, and the hospital discharge plan must involve a multidisciplinary team and professionals with experience in palliative care, in addition to ensuring training and education for patients, family members, and caregivers. The structure of the patient's home must be evaluated in terms of the electricity network, telephone access, and proximity to a healthcare team.

Regardless of the main indication of bridge to transplantation/mechanical support or palliation, the majority of studies have shown an improvement in New York Heart Association functional class with outpatient inotrope use.[4] A study published in 2020[5] revealed 50% mortality at 1 year in patients in palliative care using dobutamine at home, which represented a slightly better result than in previously published series.[6,7] Arrhythmias, infections, and hospitalizations are the most frequent complications during home inotropic therapy. In a cohort of 197 patients using inotropes at home,[8] 17% had 1 or more implantable cardioverter-defibrillator shocks, 82% being appropriate shocks. The risk of shock was not associated with the dose of the inotrope, and 29% of patients had 1 or more infections during follow-up, bacteremia being the most common type of infection. Furthermore, 57% had 1 or more hospitalizations, and the most common causes of hospitalizations were worsening HF symptoms (41%), infections (20%), and arrhythmias (12%).

In spite of the possible complications, improved functional class and symptom control are fundamental points to consider in relation to treatment. Furthermore, practices in follow-up care can minimize complications. Mortality is tending to decrease, and this may be related to the use of lower doses of inotropes in more recent studies. Therefore, it is necessary to endeavor to discharge from the hospital with the minimum dose necessary to control symptoms and improve hemodynamics; to ensure regular follow-up with the multidisciplinary palliative care and HF teams; to control risk factors for arrhythmia, for example, by monitoring electrolytes and considering starting amiodarone, as suggested in some international study protocols; and, finally, to be aware of diminished inotropic response over time due to tachyphylaxis and to consider dose titration according to symptoms and change in clinical condition.

In Brazil, intravenous inotropic medication for home use is not provided by the public network. In this case report, the medication was supplied by the Conceição Hospital Group, which has a HCP linked to the Municipal Health Department of Porto Alegre. In a retrospective study,[5] cost analysis of home use of dobutamine in patients with advanced HF in palliative care indicated a significant cost reduction at 3, 6, and 12 months, mainly due to the decrease in hospitalizations for HF. In addition to the daily cost of the medication, the following were analyzed: hospitalization for HF, venous catheter insertion, costs related to catheter replacement, use of thrombolytics to clear the catheter, and costs of home nursing.

The international literature has demonstrated favorable results for the use of home inotropic therapy, with improved functional status and reduced hospitalizations for HF. In economic terms, home use of dobutamine is associated with

Table 1 – Recommendations for evaluation and planning of home use of continuous intravenous inotrope

- Appropriate indication and exhaustion of other therapeutic possibilities
- Biopsychosocial assessment of the patient (living conditions, self-care capacity, presence of a caregiver)
- Patient and caregiver are aware of the risks and benefits of the medication, and they agree with the therapy
- Discussion of patient's preferences and values, with establishment of advance directives of will
- Verification of the ethical and legal aspects particular to each region
- Clinical stability in inotropic use, initiated in the in-hospital context
- Availability of the inotropic medication and an infusion pump
- Appropriate venous access, preferably peripherally inserted central catheter
- Home care service for patient evaluation and exchange of drug infusions
- Detailed and express guidance on use of the medication (dilution, dose adjustment, compatibilities, and stability) and its adverse effects
- Guidance on how to proceed in the event of complications (contact telephone numbers, reference emergency service, possibility of replacement in case of lack of medication, electricity network for the infusion pump to work)

significant cost savings. Regarding milrinone, as it exceeds the cost of dobutamine in the United States, a study from the United States showed that there was no cost reduction after 6 months due to the cumulative costs of the medication.[7] Brazilian studies could assist in its incorporation by the SUS.

Conclusion

The number of patients with advanced HF is increasing, and an elevated proportion of these patients will not be candidates for advanced therapies. Treatment strategies should be encouraged and systematically organized to ensure comfort and quality of life for these patients. We have described a case where, aiming to humanize care in the terminal stage, home use of continuous intravenous inotrope allowed hospital discharge, control of HF symptoms, and comfort for the patient together with his family members in the home environment.

Author Contributions

Conception and design of the research: Mendes APC, Zambonato R, Hastenteufel LCT, Orlandin L, Clausell N, Goldraich LA; Writing of the manuscript: Mendes APC, Hastenteufel LCT; Critical revision of the manuscript for intellectual contente: Mendes APC, Zambonato R, Hastenteufel LCT, Clausell N, Goldraich LA.

Ethics approval and consent to participate

This article does not contain any studies with human participants or animals performed by any of the authors.

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