Is it time to wean the midodrine?

A review of midodrine use post ICU discharge

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Introduction

Midodrine is an α1 agonist which increases blood pressure. In ICU, it can be seen used off label as an intravenous vasopressor weaning agent.[1] Anecdotally, midodrine use in patients discharged from the ICU to a ward has been sub-optimal.[2]

An initial retrospective audit was conducted (2021-2022) to examine midodrine use post ICU discharge. Key findings were as follows:

- Patients remained on midodrine for extended periods (i.e., > 72 hours) once on the wards.
- Poor documentation of weaning plans.

Consequently, several interventions were implemented. An education session for staff was conducted. Additionally, a guideline titled 'Midodrine Use in the ICU' was developed at Austin Health. This includes the following[2]:

- Protocol for obtaining clinical pharmacology approval to prescribe midodrine for > 72 hours on a general ward.
- An appropriate weaning protocol.

Aim

To re-examine midodrine prescribing in patients discharged on midodrine from ICU to a ward following intervention.

Method

Data was collected retrospectively using the process outlined in figure 1.

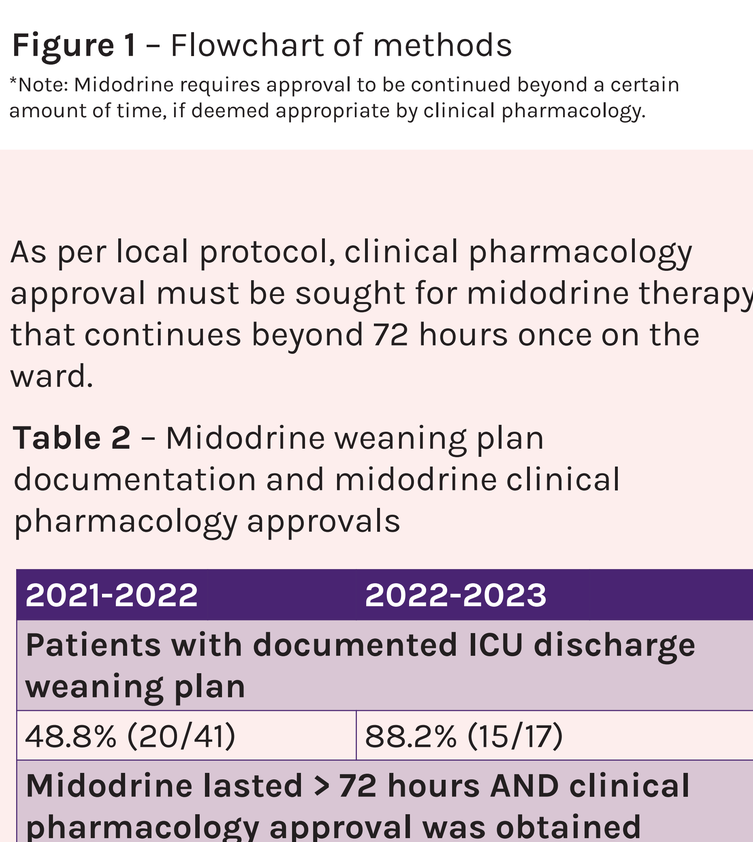

Figure 1 – Flowchart of methods

*Note: Midodrine requires approval to be continued beyond a certain amount of time, if deemed appropriate by clinical pharmacology.

Inclusion and exclusion criteria

Inclusion criteria

- Patients commenced on midodrine in the ICU between 01/06/21 and 01/06/22 (initial audit) and between 01/12/22 and 01/03/23 (follow up audit) for an ICU approved indication.

Exclusion criteria

- Patients already on midodrine pre-admission.

Endpoints

Primary endpoint #1 – Proportion of patients with a documented discharge weaning plan from ICU.

Primary endpoint #2 – Proportion of patients for whom clinical pharmacology approval was obtained.

Secondary endpoint #1 – Median length of time of midodrine therapy on the ward.

Secondary endpoint # 2 – Most common midodrine doses on ICU admission & discharge.

Results

41 patients met the inclusion criteria in the first audit between 01/06/21 to 01/06/22 and 17 patients met the inclusion criteria in the follow up audit between 1/12/22 and 1/2/23.

Table 1– Length of midodrine therapy once on the ward

2021-2022		2022-2023	
Length of midodrine therapy once on the ward (days)			
Median	Range	Median	Range
7	4-81	6	1-27
Percentage of patients with midodrine use beyond 72 hours on the ward			
56% (23/41)		59% (10/17)	

As per local protocol, clinical pharmacology approval must be sought for midodrine therapy that continues beyond 72 hours once on the ward.

Table 2 – Midodrine weaning plan documentation and midodrine clinical pharmacology approvals

2021-2022	2022-2023
Patients with documented ICU discharge weaning plan	
48.8% (20/41)	88.2% (15/17)
Midodrine lasted > 72 hours AND clinical pharmacology approval was obtained	
35.7 % (8/23)	20% (2/10)

The initial audit (2021-2022) found that:

- 10 mg three times a day was the most common ICU initiation dose.
- 10 mg three times a day was the most common ICU discharge dose.

The follow up audit (2022-2023) found that:

- 10 mg three times a day and 5 mg three times a day were equally the most common ICU initiation dose.
- 10 mg three times a day was the most common discharge dose.

Discussion

Staff education sessions and the development of the guideline titled 'Midodrine Use in the ICU' demonstrated effectiveness in improving documentation of ICU discharge midodrine weaning plans driven by the ICU physician team.

Conversely, a decline in the percentage of cases where clinical pharmacology approval was required was observed despite a similar proportion of patients across both audits continuing midodrine on general wards post ICU discharge.

The average length of use of midodrine after leaving ICU was seen to decline post-intervention. Further analysis would help determine a relationship between decreased days of midodrine use and the requirement for clinical pharmacology approval.

Strengths

- Able to assess the real-world impact of implementing a guideline and enforcing clinical pharmacology approval requirements .
- Simple and cost-effective

Limitations

- Small sample size – not generalisable to all hospitals.
- Cannot account for seasonal variations i.e., initial audit was 06/2021 to 06/2022 whereas follow up audit was 12/ 2022 to 02/2023.

Conclusion

The repeat audit highlights that improvement has been made with the documentation of an ICU-lead midodrine weaning plan on transfer to a general ward. Improvement surrounding the need to obtain clinical pharmacological approval for midodrine use beyond 72 hours on the ward is still required.

Regular education sessions may improve outcomes further. Increased involvement of ward pharmacists and guidance regarding clinical pharmacology approval may also lead to more appropriate use of midodrine post ICU discharge.

References

1. Australian Medicines Handbook. Australian Medicines Handbook Pty Ltd. Updated July 2022. Accessed October 20, 2022. https://amhonline-amh-net-au.ap1.proxy.openathens.net/
2. Austin Health, Melbourne, Australia, Clinical Practice Guideline on Midodrine Use in the Intensive Care Unit, [Internet, last updated 06/07/2022; 17/03/2023], Available from: https://austinhealth.sharepoint.com/sites/OPPIC