Optimizing Vasoactive Titration Orders to Improve Hospital Safety, Compliance, and Communication

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Background

If ordered incorrectly, intravenous, titratable vasoactive medications can quickly lead to patient harm, increased length of stay, and poor patient outcomes. The optimal titration order, per standard MM.04.01.01 of Joint Commission, contains key requirements to guide the care provider on how to adjust and monitor these medications[1]. The elements outlined include:

- Medication name and route
- Initial or starting rate of infusion (dose/min)
- Incremental units the rate can be increased or decreased
- Frequency for incremental doses
- Maximum rate (dose) of infusion
- Objective clinical endpoints for which to titrate

A 10% audit was conducted for vasoactive titration medication orders placed between July 1, 2017 and December 31, 2017 at Children's Mercy Hospital – Kansas City to determine titration order compliance based on regulatory standards. A total of 1950 orders were identified; 200 orders were reviewed. Zero titration orders reviewed were found to be compliant to all parameters, indicating a need for efforts to improve order communication and patient safety. The goal of the pharmacy team was to utilize technology to enhance titration orders and improve overall safety, compliance, and communication.

Table 1: Vasopressor Joint Commission Compliance Audit Jul-Dec 2017, n= 200

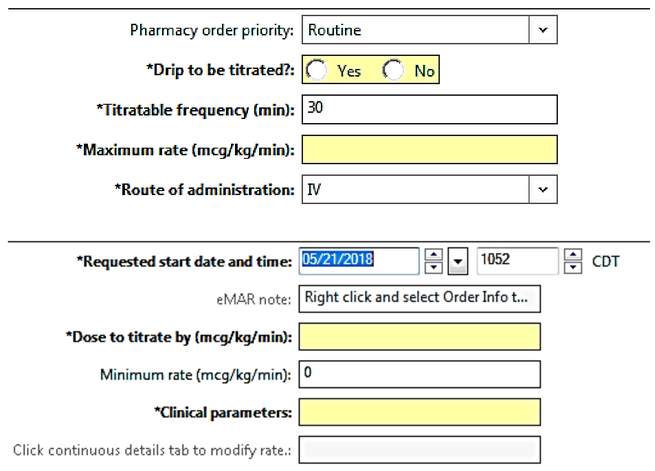
Titration Drug	Initial Rate (dose/min)	Increments to < or >	Frequency of < or >	Max rate (dose)	Clinical Endpoint
Dopamine	100%	33%	29%	9%	13%
Norepinephrine	100%	20%	11%	9%	40%
Epinephrine	100%	25%	12%	1%	44%
Percent of Orders at Full-Compliance					**0%**

Methods

An analysis of other Cerner hospital titration orders was conducted to help develop a new titration order format. The new order build established required fields for prescribers to input the information necessary to communicate an effective care plan to providers. Pharmacy met with physician leaders, clinical safety, and informatics to gain support for implementation and modify the build to meet multidisciplinary needs. The build was approved in July 2018 and implemented for all intravenous vasoactive medications through January 2019.

A washout period was allowed up to April 30, 2019 to ensure no additional changes to the titration order build were needed. An audit of all orders placed between May 1 and October 31, 2019 was conducted to assess titration compliance post-intervention.

Figure 1: Final titration order build in Electronic Medical Record (EMR)



Results

Five hundred and seventy-three vasoactive titration orders were assessed; 521 (90.9%) orders were found to follow regulatory standards. Order errors fell into one or more of the following categories: clinical parameters (81.7%, 42), dose to titrate by (63.5%, 33), maximum titration rate (51.9%, 27), and frequency of titration modifications (1.9%, 1).

Table 2. Non-Compliant Order Breakdown by Required Field May-October 2019, n=52

Compliance Parameter	Clinical Parameter	Dose to Titrate By	Max Rate	Titration Frequency
% (No.)	81.7 (42)	63.5 (33)	51.9 (27)	1.9 (1)
% Total Field Compliance	92.7	94.2	95.3	99.8

Discussion

The following barriers to achieving titration order compliance post-intervention were observed:

- Increased effort for pharmacist to review orders to ensure compliance
- Provider confusion when designating order as "titrate" or "non-titrate"
- Re-education required due to turnaround rate of residents, students, and providers on-service

To mitigate these issues, a report was created to monitor compliance on a monthly basis and target providers in need of additional education. The report and overall compliance rate was shared with pharmacists to encourage further efforts of monitoring these orders.

Conclusion

By redesigning titration orders to require specific parameters, a pediatric institution was able to improve regulatory compliance, communication, and overall patient safety.

1. Joint Commission. Comprehensive accreditation manual for hospitals: the official handbook. Oakbrook Terrace, IL: Joint Commission Resources; 2016.