CASE STUDY: IMPROVING WARFARIN MANAGEMENT THROUGH MULTIDISCIPLINARY COLLABORATION AND PDSA CYCLES

Background

Warfarin is a widely used anticoagulant (medication that prevents blood clots) that requires meticulous monitoring to balance its therapeutic benefits against the risks of bleeding and stroke. The International Normalized Ratio (INR) indicates how long it takes the blood to clot, and an INR greater than 5, considered extremely unsafe but the event is preventable. Achieving optimal INR levels is crucial for patient safety and effective anticoagulation therapy.

Problem

Our institution aimed to improve performance on the Vizient INR based metric, which necessitates that less than 2% of patients have an INR greater than 5. This goal required a significant reduction in the incidence of high INR values, necessitating a robust and systematic approach to warfarin management.

Quality Improvement Methods

A multidisciplinary team, including pharmacists, physician champions, and executive sponsors, was assembled to address this challenge. The team employed the Plan-Do-Study-Act (PDSA) cycle, a cornerstone of quality improvement, to develop and implement clinical decision support strategies and standard operating procedures over a 24-month period.

Interventions

The team introduced several key interventions to improve warfarin management:

PDSA CYCLE 1

- **Hold Warfarin if INR > 3.5:** This intervention aimed to prevent further increases in INR by withholding warfarin doses when INR levels were already elevated.

PDSA CYCLE 2

- **Omnicell Alert:** An alert system was implemented to notify healthcare providers before administering warfarin if the INR was greater than 3.5.
- **Patient Risk Report:** A report listing patients at risk of high INR levels was generated and emailed once daily in the morning to pharmacists. This enabled pharmacists to monitor and manage these patients more closely.
- **EHR Tool:** An electronic health record (EHR) tool was developed to update throughout the day with new orders and lab values. It is available for pharmacists, nurses, and providers to identify patients with rapidly rising INR levels and is designed to be the single source of truth for all disciplines.

PDSA CYCLE 3

- **Drug Interaction Alert:** Alerts were added to highlight potential drug interactions that could affect INR levels.
- **Daily INR Monitoring:** Daily monitoring of INR levels was mandated to ensure timely adjustments to warfarin dosing.
- **Standardized Assessment Note:** Drug interactions were included in a standardized assessment note to ensure consistent documentation and awareness.

PDSA CYCLE 4

- **Dose Adjustment Protocol:** If INR was greater than 2.5 and had increased by more than 0.6 in 24 hours, the warfarin dose was held, and the weekly dose was decreased by 50%.

PDSA CYCLE 5

- **Warfarin-INR Pharmacist Education:** Targeted educational sessions were provided for pharmacists to enhance their knowledge and skills in managing warfarin therapy and maintaining optimal INR levels. This aimed to proactively reduce elevated INR instances and improve patient safety.

- **Placeholder Order Added:** A placeholder order was integrated into the EHR system to standardize the process of holding warfarin doses when the INR exceeded 3.5. This ensured prompt and consistent action, helping to maintain therapeutic anticoagulation.
- **Pharmacist Peer Review Committee Developed:** A peer review committee of pharmacists was established to regularly review cases of elevated INR and share best practices. This fostered continuous learning and ensured high standards in warfarin management.

Results

The implementation of these interventions, guided by the PDSA cycle, led to a significant improvement in warfarin-INR metric performance:

- **Metric Performance Improvement:** The performance improved by 55.2%.
- **Peer Ranking:** The institution's ranking among peers improved by 89.4%.
- **Sustained Improvement:** The institution's performance on this Vizient metric has continued to improve. Through period 3 of FY 25 (July 2024 - March 2025 discharges), performance remains better than the median performance of other comprehensive academic medical centers.

Key Takeaways

The success of this initiative underscores the importance of a multidisciplinary approach and the use of the PDSA cycle in quality improvement.

For clinicians looking to develop their own quality improvement projects, it's important to note that the stepwise, multidisciplinary approach we utilized is not unique to managing warfarin toxicity. This model can be applied to other medication management challenges or quality measures. Start by assembling a team that includes diverse expertise and perspectives, then employ a methodical approach to data collection, intervention implementation, and continuous improvement through PDSA cycles. This framework ensures that the project is adaptable and can address different clinical issues effectively, fit the specific clinical context and continuously improve the protocols based on real-time data and feedback from all relevant stakeholders. By applying this model, you can achieve significant improvements in patient care and safety in your own practice setting.

Incorporating technology can vastly enhance the efficacy and efficiency of your interventions. Utilize electronic health records (EHCs) to set up alerts and reminders for critical lab values, integrate decision support systems that provide evidence-based guidelines at the point of care, and employ data analytics to identify trends and areas for improvement. EHC clinical decision support tools facilitates timely interventions, standardizes care practices, and ensures better communication within the multidisciplinary team.

Conclusion

The sustained improvement in warfarin management achieved through this initiative demonstrates the power of the PDSA cycle and multidisciplinary collaboration in enhancing patient safety and care quality. The strategies and tools developed are not only effective but also adaptable to other clinical settings, making them valuable assets in the ongoing effort to improve healthcare outcomes.

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