Monitoring Concordance in the Management of Transfusing Blood Components in Cirrhotic Patients for Paracentesis with Evidence-Based Guidelines

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Background

- The frequency of chronic liver disease is on the rise, with approximately 150,000 new cases detected annually in the United States. About 20% of these cases are accompanied by cirrhosis upon initial diagnosis, although this figure may not accurately reflect the full extent of the disease's prevalence[1,2]. Studies suggest that up to one-third of patients are not diagnosed until autopsy[3,4]. Unfortunately, morbidity and mortality rates among this patient population are substantial, accounting for 1.03 million deaths globally each year.
- Patients with cirrhosis frequently exhibit abnormal results in conventional hemostasis tests, including platelet (PLT) count, prothrombin time (PT), and partial thromboplastin time (PTT), which may indicate an increased risk of bleeding. However, research utilizing global hemostasis testing suggests that stable cirrhosis patients actually exhibit balanced hemostasis despite the abnormal results in routine tests[5]. Despite the limitations of conventional hemostatic tests, clinicians often rely on them to determine whether to transfuse PLTs, plasma, or cryoprecipitate. This approach persists despite limited evidence supporting the use of arbitrary laboratory values to guide prophylactic or therapeutic transfusions[6].

Objective

- Decrease unnecessary infusion of blood products in cirrhotic patients > 18 years of age at Medical City Weatherford undergoing invasive medical procedures
- Implement a problem-solving to design and iteratively implement interventions which enable implement intervention which enables clinical staff to develop, test, and implement changes and allow learning through trial and error, consensus building, and communications

Component	Recommendations
PLT transfusions for mild to moderate risk procedures*	Transfusing PLTs with counts > 30 x 10^9 L is not recommended
PLT transfusions for high-risk procedures**	PLTs may be warranted during procedure with PLT count ≤ 30 x 10^9 L^{-1} (for percutaneous liver biopsy ≥ 50 x 10^9 L^{-1})
Plasma transfusions in patients undergoing a procedure or actively bleeding	INR ≤ 2.5, no plasma indicated INR ≥ 2.6, give 10 mg IV vitamin K and plasma transfusion at 10 mL/kg (provided that fibrinogen is > 100)***
Cryoprecipitate	With fibrinogen concentrations < 100 mg/dL, transfuse one dose of cryoprecipitate****
RBC transfusion in hemodynamically stable patients without cardiovascular disease	Transfuse only with Hb < 7 g/dL

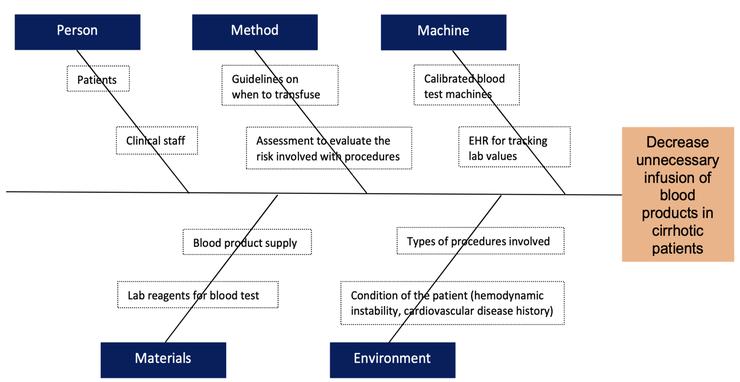
*Moderate-risk procedures include the following: diagnostic endoscopies with or without biopsy, endoscopic interventions for gastrointestinal bleeding such as clip placement or cauterization or epinephrine injection, elective variceal banding, routine screening colonoscopy (polyps up to 1 cm in size can be biopsied or removed with cold snare).

**High-risk procedures involving significant disruption of mucosa such as endoscopic ultrasound with biopsy or fine-needle aspiration, endoscopic retrograde cholangiopancreatography with sphincterotomy, snare polypectomy (for polyps > 1 cm in size), and endoscopic dilation.

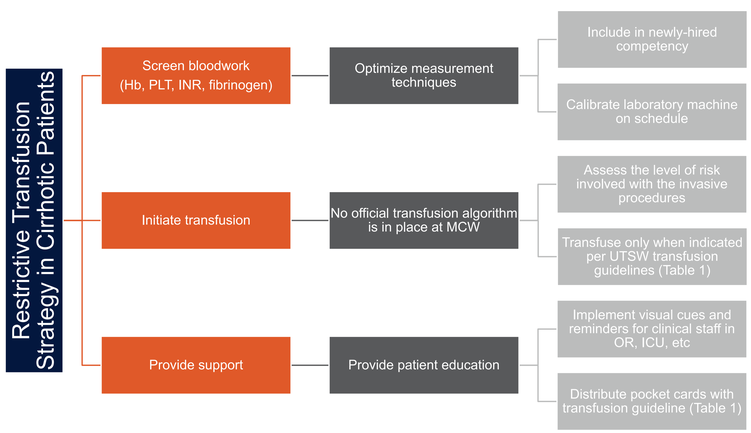
***If INR does not correct with IV vitamin K, it is likely due to significant liver dysfunction or significant hypofibrinogenemia, in which case the transfusion of cryoprecipitate should be considered.

****One dose = 10 units

Cause and Effect



Process Flow



Discussion

DMAIC Framework Timeline	Goal Completion Date
Define - Define the problem, improvement activity, opportunity for improvement, the project goals, and customer (internal and external) requirements	03/01/2023
Measure - Process map for recording the activities performed as part of a process; Capability analysis to assess the ability of a process to meet specifications	03/01/2023
Analyze - the process to determine root causes of variation and performance	04/01/2023
Improve - process performance by addressing and eliminating the root causes	05/01/2023
Control - the improved process and future process performance	06/01/2023

Conclusion and Next Steps

The following outcomes will be assessed through retrospective data analysis from electronic health records (EHR):

- Percentage of indicated transfusion meeting requirement
- Monthly data run charts, which will enable us to visually display and assess outcomes in a time

This initiative aims to reduce unnecessary transfusions in cirrhotic patients to prevent the overuse of blood products. Currently, the MCW facility lacks official guidelines for administering these agents, which can hypothetically lead to procedural delays, prolonged hospital stays, and the potential development of complications from transfusion reactions. Additionally, this overuse can increase the financial burden on patients and healthcare systems. It would be interesting to develop a metric system that can be followed to compare patient outcomes.

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