



Optimizing Anemia with Limited Time: Assessing the Impact of IV Iron Infusions on Perioperative Outcomes

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Introduction

Anemia affects 24.3% of the global population, with iron deficiency anemia (IDA) as the leading cause^[1]. IDA is a treatable perioperative risk factor, and if uncorrected, can increase perioperative morbidity^[2]. A previous analysis at our Center of Perioperative Medicine (CPM) showed that two preoperative IV ferumoxytol infusions significantly reduced pneumonia rates, surgical site infections, ICU stay, and costs in elective cardiac surgery patients.^[3]

This retrospective pilot study expands the intervention to all elective surgeries, assessing whether different frequencies of IV iron infusions in patients with new IDA diagnoses reduce postoperative morbidity in a dose-dependent manner.

Description of Intervention + Methods

We retrospectively reviewed 77 patients with newly diagnosed IDA identified at preoperative assessment during a visit at the CPM from August 2023 to February 2024. All patients were prescribed two IV ferumoxytol infusions, but due to logistical issues, not all completed both. For the purposes of this comparison, patients were divided into three groups: zero infusions (n=30, control), one infusion (n=26), and two infusions (n=21). We assessed all groups for intraoperative and postoperative outcomes, including pRBC transfusion rate, hospital LOS, SSI rate, Hgb change, ICU admission rate, and 30-day readmission rate.

	0 Infusions	1 Infusions	2 Infusions	ANOVA Analysis
Peri-Op Blood Transfusion Rate*	13.9%	26.9%	27.3%	p = 0.349
Surgical Site Infection Rate	6.67%	19.23%	4.76%	p = 0.130
Average Change in Hb**	-0.575	+0.095	+0.314	p = 0.268
Hospital Length of Stay	2.33 days	5.28 days	3.62 days	p = 0.455

Table 1: Relationships Between Preoperative IV Iron Infusion and Postoperative Outcomes. This table explores the trends in various postoperative outcomes stratified by the frequency of IV iron infusions prior to surgery.

* = a Perioperative blood transfusion was defined as any pRBC infusion that occurred intra-operatively or within 30 days post-operatively.

** = Hemoglobin (Hb) changes were compared using the day-of surgery hemoglobin lab (prior to surgery) and day-of preoperative assessment hemoglobin lab values (g/dL).

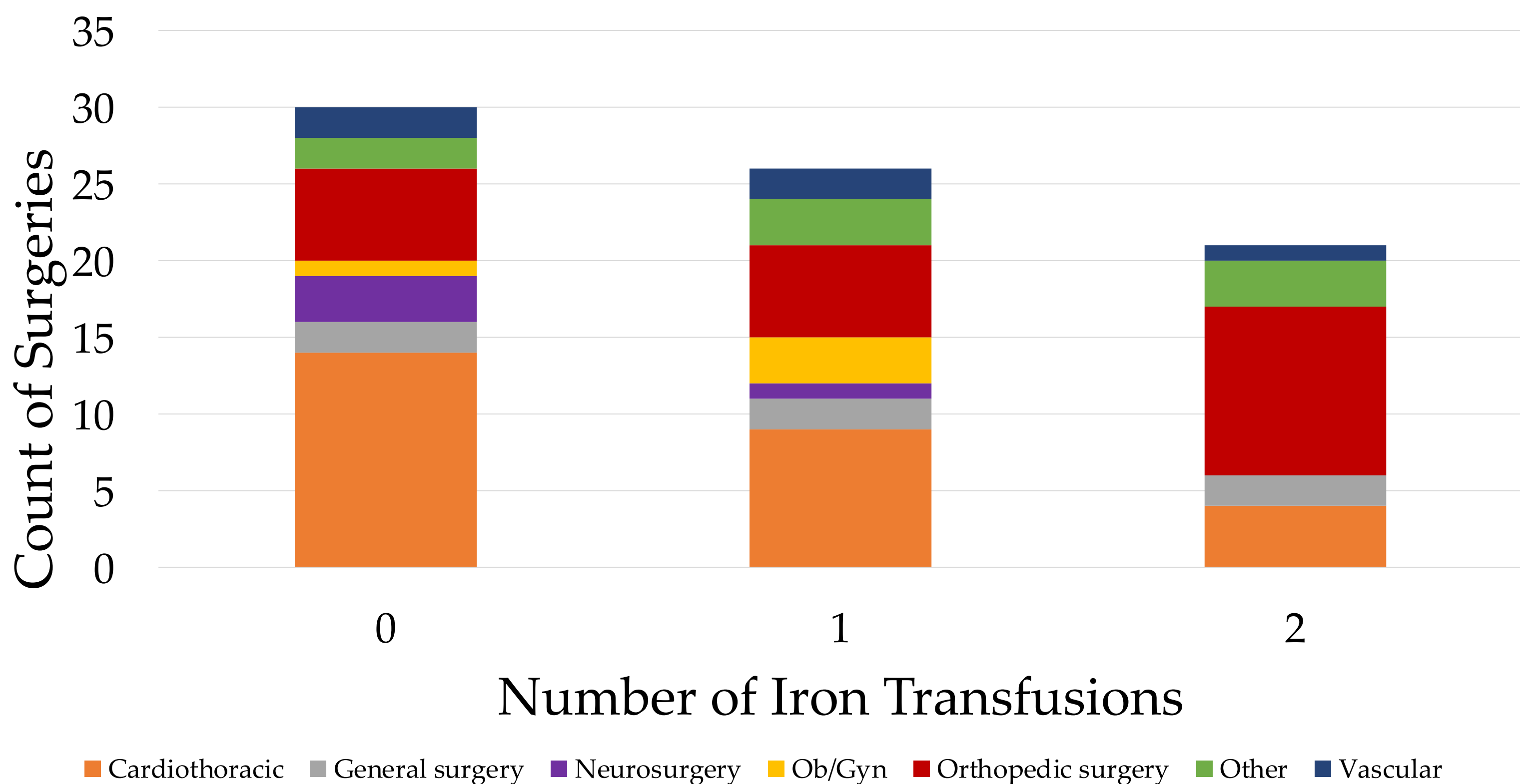


Figure 1: Surgical Case Counts Grouped by Surgical Service and Stratified by Total Iron Transfusions.

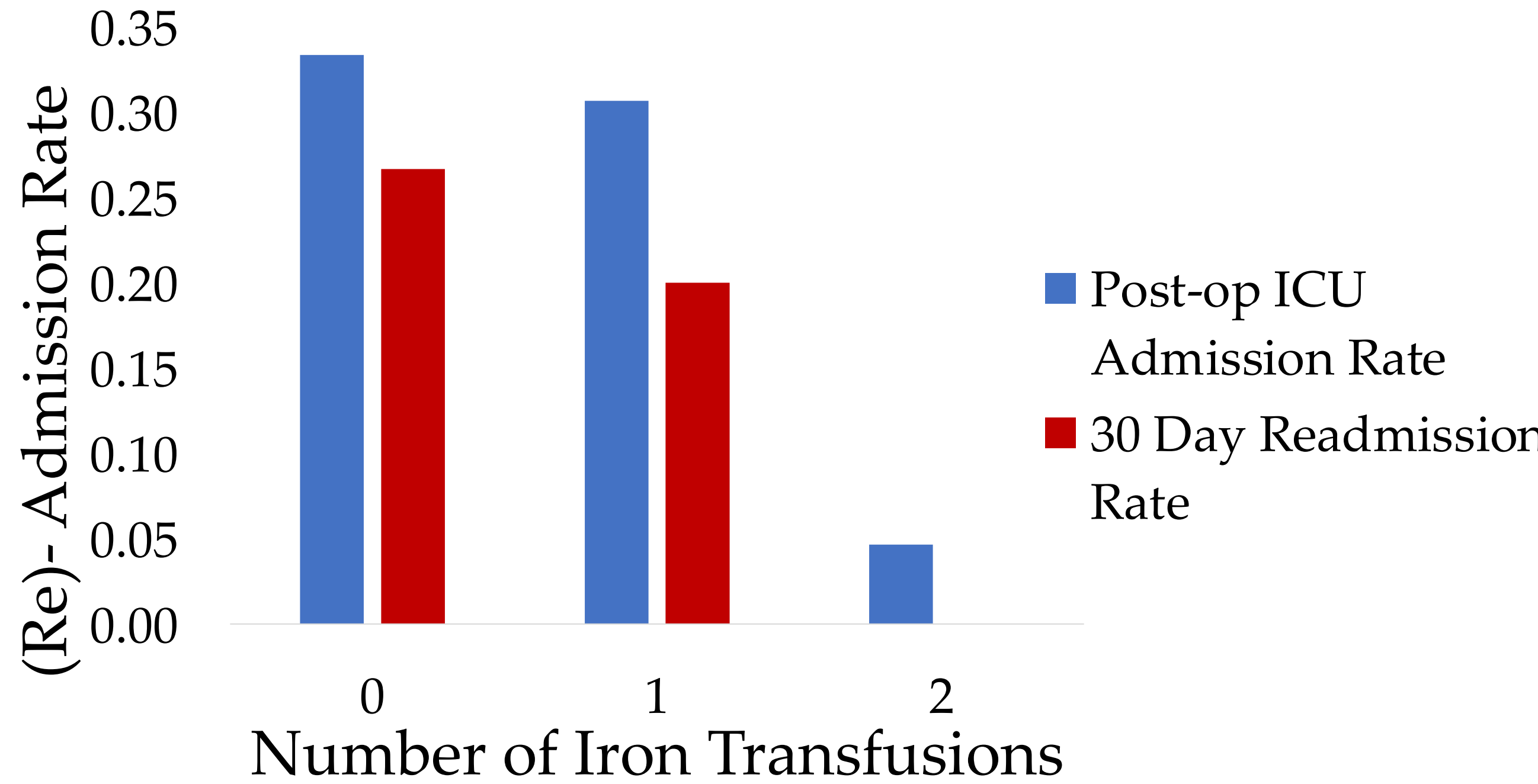


Figure 2: Impact of Preoperative IV Iron Transfusions on Post-Operative ICU and 30-Day Readmission Rates. As the number of preoperative IV iron transfusion increases, there is a dose-dependent decrease in both ICU admissions and readmissions within 30 days. Statistical analysis shows a significant association for ICU admission ($\chi^2 = 6.219$, $p = 0.045$) and 30-day readmission ($\chi^2 = 6.415$, $p = 0.04$).

Discussion

This pilot study highlights the value of rapid preoperative anemia optimization in reducing perioperative morbidity. Our findings show that IV iron infusion is associated with lower 30-day readmission and ICU admission rates in patients with IDA undergoing various elective surgeries. Patients receiving two doses of IV iron had the most benefit, with reduced ICU admissions and no 30-day readmissions. These results support prior research in cardiac patients showing reduced ICU and hospital stays with anemia optimization attempts. Extending this model to broader surgeries demonstrates that preoperative anemia management is both effective and adaptable, even with single-dose IV iron.

Future Management and Direction

Larger future studies could validate these findings and help refine protocols for optimal dosing and timing of IV iron infusions across surgical specialties. Additionally, we plan to improve tracking of preoperative lead times; among the 56 patients unable to complete both infusions, 50% lacked sufficient time (average 6.6 days from CPM visit to surgery). Leveraging electronic records to enhance scheduling visibility, we aim to maximize preoperative time, facilitating two full IV iron doses whenever possible.

References

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