Patient Blood Management Efficiency in Patients Subject to Orthopedic and Oncologic Elective Surgery

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OBJECTIVES

Patient Blood Management (PBM) is highlighted as a patient-centred approach aimed at improving patient outcome by managing and preserving the patient's own blood. It aligns with principles of health promotion, health protection and disease prevention. Our objective was to assess the impact of a PBM program before, during, and after the implementation of PBM at our tertiary hospital using real-world data (RWD)

METHODS

Deterministic data linkage algorithms allowed the integration of patient level data from hospital (inpatient, diagnosis related groups, blood diagnostics, PBM patient journey) and nationwide (blood products use and transfusions) databases. Outcome measures were anemia correction, red blood cells (RBC) transfusion, length of hospital stay (LOS), in-hospital mortality and infections. PBM impact was compared and assessed post (referenced to PBM program) versus pre-PBM implementation in patients referenced to PBM management (Cohort1) and in a subset of anemic patients (Cohort2). Statistical analysis was performed after adequately matching pre and post-PBM cohorts using propensity score matching (PSM) based on age, gender, index disease, pre-surgical hemoglobin value and comorbidities.

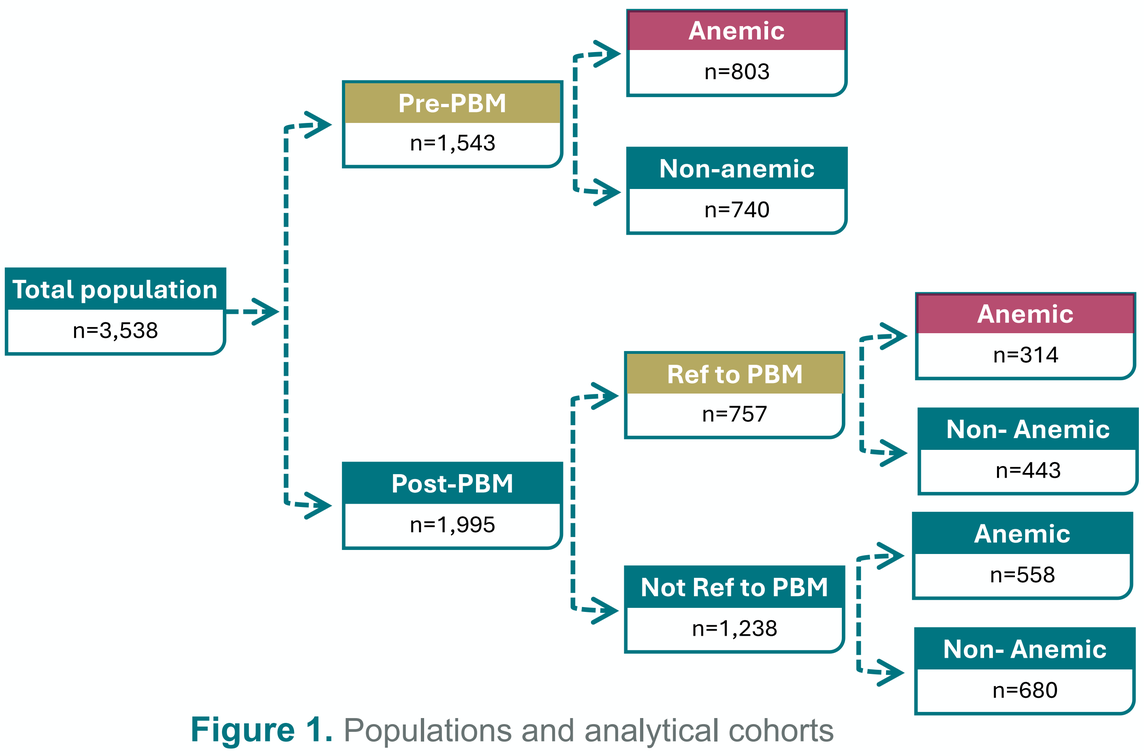

Figure 1. Populations and analytical cohorts

RESULTS

We included 3,538 patients subject to elective orthopedic (n=2,304) and oncologic (n=1,234) elective surgery in Hospital Padre Américo, a terciary hospital of Unidade Local de Saúde Tâmega e Sousa, north of Portugal.

Table 1. Demographic and Clinical Characteristics of the Patients at Baseline

Characteristic	Pre-PBM (n=1,543)		Referenced to PBM (n=757)
	Pre-matching	After matching	
Age (mean, years)	75	71	71
Female (%)	47	60	59
Hemoglobin (mean, g/dL)	12	13	13
Anemia (%)	52	45	41
Hypertension (%)	47	60	59
Diabetes (%)	19	24	25
Dyslipidemia (%)	30	41	43
Chronic kidney disease (%)	5.4	5.1	4.8
Angina (%)	0.6	0.2	0.3
Ischemic heart disease (%)	0.3	0.02	0.3
Myocardial infarction (%)	0.13	0.14	0
Liver Disease (%)	1.6	3.5	3.6

RESULTS

The RWD sample was composed of 1,543 patients in pre-PBM (2016-2018) and 1,995 patients in the post-PBM (2019-2024) periods (Figure 1). Before matching, samples were unbalance in the distribution of age, gender and proportion of anemic patients. These were balanced after propensity score matching (PSM) alongside with comorbidities like hypertension, diabetes, dyslipidemia and liver disease (Table 1).

With PBM intervention, in Cohort1 (Figure 2) we observed a higher likelihood of anemia correction (relative risk [RR]=3.2, 95%CI: 1.9-5.4), a 21% RBC transfusion risk reduction (RR=0.79, 95%CI: 0.66-0.95) and 52% reduction in the risk of in-hospital infections (RR=0.48, 95%CI: 0.29-0.79). In Cohort2 (Figure 3) the proportion of patients with anemia correction after PBM was significantly higher (RR=2.2, 95%CI: 1.3-3.8) and the RBC transfusion risk was 21% lower (RR=0.79, 95%CI: 0.64-0.97). A non-significant reduction in LOS and in-hospital mortality was observed in both cohorts in favour of the PBM intervention.

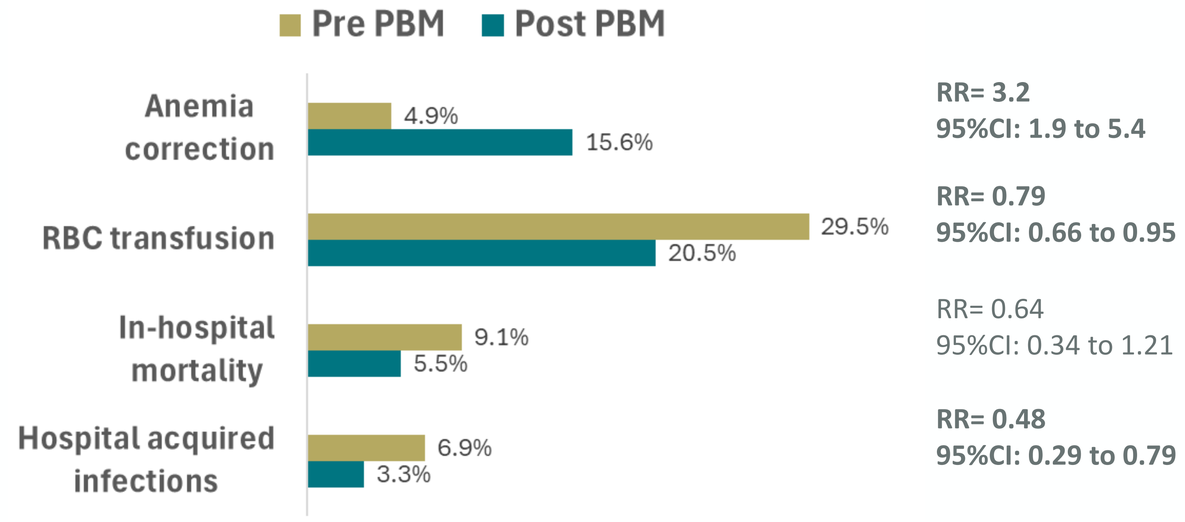

Figure 2. Cohort 1. Pre PBM (n=1,543) *vs* referenced to PBM (Post PBM n=757)

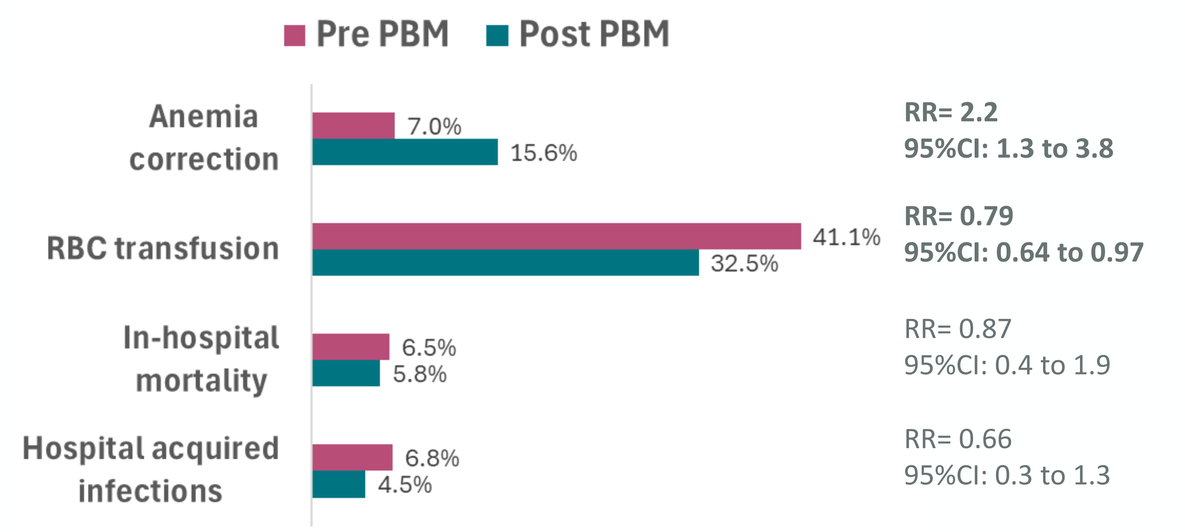

Figure 3. Cohort 2. Anemic Pre PBM (n=803) *vs* referenced to PBM (Post PBM n=314)

= CONCLUSION

Patient blood management improved the outcomes of patients subject to elective surgery in our tertiary hospital and reduced costly transfusion dependency, which allows the reallocation of limited funds to where they are most needed.