

Real-world evidence of patient blood management effectiveness in elective surgical patients



UNIDADE LOCAL DE SAÚDE
TÂMEGA E SOUSA

= EXIGO

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INTRODUCTION

Effective use of scarce resources is a priority for public referral hospitals (PRH) providing specialised medical care. Patient Blood Management (PBM) is a multidisciplinary patient-centred strategy aiming to optimize patient's own blood, minimize blood loss, and manage anaemia to improve patients' outcomes, reducing transfusions related risks, and sustain the blood supply. Significant proportion of patients are anaemic pre-operatively which triggers effective PBM prehabilitation in major elective surgery. Our objective was to assess the impact of a PBM policy before, during, and after its implementation at our PRH using real-world data (RWD).

METHODS

Deterministic data linkage algorithms allowed integration of different sources of patient level data: inpatient, blood diagnostics, PBM patient journey, blood products use and transfusions. Clinical effectiveness measures were: red blood cells (RBC) transfusion, anemia prehabilitation, in-hospital mortality and infections. Efficiency of health resource utilization was assessed by hospital length of stay (LOS). PBM impact was assessed comparing pre-PBM (2016-2018) versus post-PBM (2019-2025) periods in patients referenced to PBM management (Cohort 1, n=2,809) and in a subset of anaemic patients (Cohort 2, n=1,313). Cohorts were balanced using propensity score matching based on age, index disease, gender, pre-surgical hemoglobin and comorbidities. Relative risks (RR) for clinical effectiveness outcomes were estimated (causal inference) using the average treatment effect.

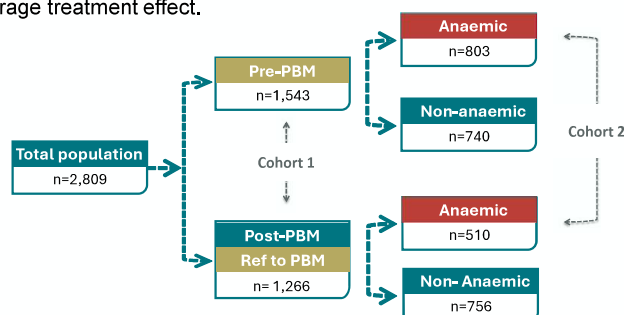


Figure 1. Populations and analytical cohorts

RESULTS

We included 2,809 patients subject to trauma (n=976), orthopedic (n=910) and oncologic (n=923) surgery in Hospital Padre Américo, a tertiary hospital of Unidade Local de Saúde Tâmega e Sousa, north of Portugal.

Table 1. Baseline Demographic and Clinical Characteristics of the Patients

Characteristic	Pre-PBM (n=1,543)		Referenced to PBM (n=1,266)
	Pre-matching	After matching	
Age (mean, years)	75.0	71.9	71.6
Female (%)	33.2	47.4	47.2
Hemoglobin (mean, g/dL)	12.0	12.5	12.6
Anemia (%)	52.0	43.3	40.3
Hypertension (%)	47.3	63.3	62.2
Diabetes (%)	19.4	23.8	25.8
Dyslipidemia (%)	29.9	48.1	48.5
Chronic kidney disease (%)	5.4	6.2	5.1
Angina (%)	0.6	1.0	0.2
Ischemic heart disease (%)	0.3	0.1	0.2
Myocardial infarction (%)	0.1	0.3	1.3
Liver Disease (%)	1.6	1.2	3.7

RESULTS

Before matching, samples were unbalance in the distribution of age, gender and proportion of anaemic patients. These were balanced after propensity score matching (PSM) alongside with comorbidities like hypertension, diabetes, dyslipidemia and liver disease (Table 1).

After PBM implementation, Cohort 1 (Figure 2) demonstrated a notably increased likelihood of anaemia correction (RR=3.40, 95% CI: 1.99-5.81), a 37% reduction in RBC transfusion risk (RR=0.63, 95% CI: 0.52-0.76), and a statistically significant 41% decrease in in-hospital infection risk (RR=0.59, 95% CI: 0.38-0.90). In Cohort 2, the proportion of patients achieving haemoglobin optimization after PBM implementation was statistical significantly higher (RR=2.54, 95% CI: 1.55-4.18), and the RBC transfusion risk was reduced by 41% (RR=0.59, 95% CI: 0.49-0.71).

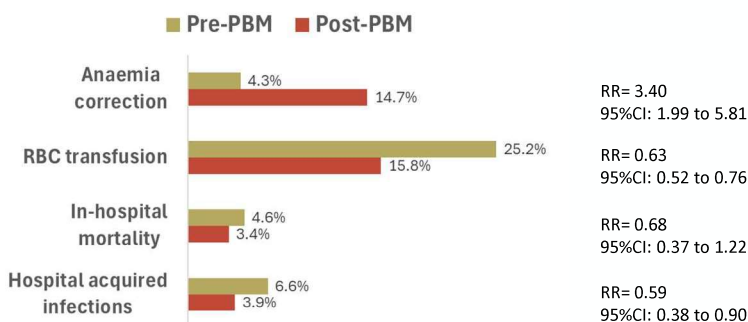


Figure 2. Cohort 1. Pre PBM (n=1,543) vs referenced to PBM (Post PBM n=1,266)

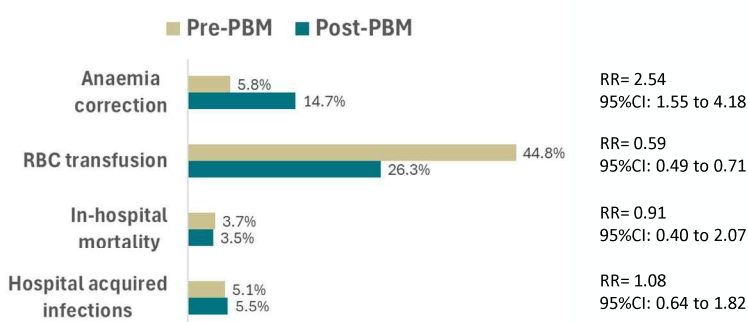


Figure 3. Cohort 2. Anaemic Pre-PBM (n=803) vs referenced to PBM (Post PBM n=510)

Both cohorts exhibited non-statistically significant differences in LOS and in-hospital mortality with PBM policy. After COVID-19 pandemics hospital discharge date also included outpatient hospital long-term care, resulting in a structural change in trauma LOS time series, potentially biasing the LOS analysis in both cohorts.

= CONCLUSION

Real world evidence confirms patient blood management impact in clinical outcomes and contribution to better health resource management in our public referral hospital

