Reduction of transfusion requirements and length of hospital stay in patients undergoing major planned surgery after the implementation of Patient Blood Management (PBM) in Spain

CO83

María J. Colomina[1], Ignacio de la Fuente Graciani[2], Adela Pereda-Manso[2], Marta Barquero[1], Esther Mendez[1], Antonio Ramirez de Arellano[3], Neige Morin[3], Núria Lara[4], Carles Illa[4], Montse Roset[4], Nuria Ruiz[2]
[1] Hospital Universitario Bellvitge, Barcelona; [2] Hospital Clínico Universitario de Valladolid; [3] CSL Vifor; [4] IQVIA

INTRODUCTION

Red blood cell (RBC) transfusion represents the mainstay to correct anemia, however, it is also an overused procedure (1). Patient blood management (PBM) is a proactive, patient-centered, and multidisciplinary approach to manage anemia, optimize hemostasis, minimize iatrogenic blood loss, implement strategies of pre-habilitation and a restrictive transfusion policy to improve patient outcomes and preserving his own blood (2, 3). Although in 2010 the World Health Organization (WHO) endorsed the PBM implementation, there is still an urgent need to integrate PBM program into the clinical routine of many hospitals (4).

The objective of the study was to compare the RBC transfusion rate and length of hospital stay (LOHS) before vs. after PBM implementation in two hospitals in Spain.

METHODS

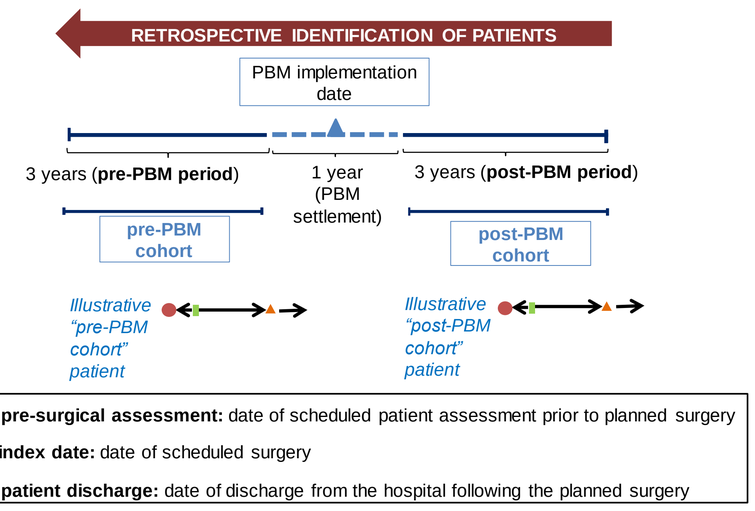
STUDY DESIGN. This is an observational retrospective study including adult patients who underwent major planned surgeries (hip or knee replacement, major abdominal surgery, and cardiac valve) in two Spanish hospitals (Bellvitge University Hospital, Barcelona, and Valladolid University Clinical Hospital).

STUDY POPULATION. Two separate cohorts:

- pre-PBM cohort: surgeries performed during the 3 years period before PBM program use
- post-PBM cohort: surgeries performed during the 3 years period after PBM implementation

STUDY COLLECTION PERIODS. The date of the patient surgery was referred to as **index date**. The data collection period spanned two main stages anchored to the date of index event: the **pre-surgical assessment period** (date of assessment up to three months before the surgery); and the **post-index event period**, starting one day after the index date and ending 30 days after patients being discharged from the hospital or death, whichever occurred first (Figure 1).

Figure 1. Study design

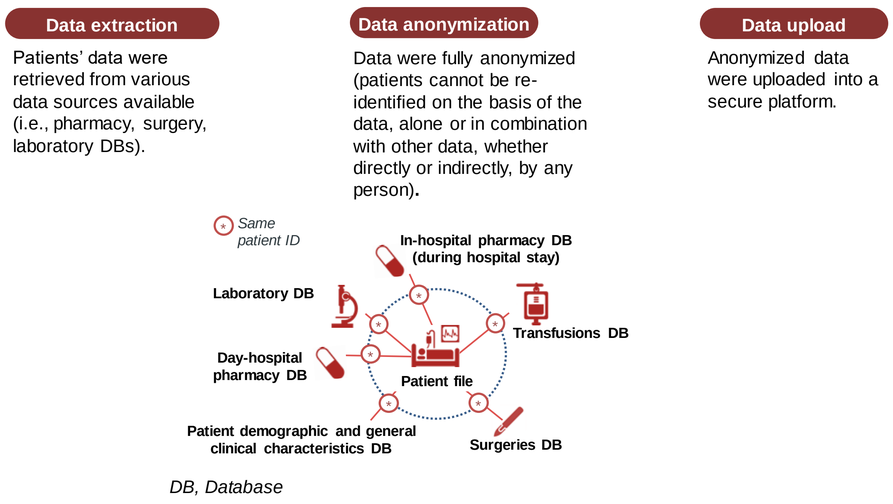


PBM, Patient Blood Management

THE VARIABLES. For all surgeries included in the study, patient's demographics, surgery details, iron deficiency anemia, treatments received, RBC transfusions, LOHS and other clinical outcomes were collected. Transfusion policy applied by the hospital was also collected.

DATA SOURCE. The collection approach consisted of retrieving data of patients who underwent surgery before or after the PBM program implementation from hospital Databases (DB) (Figure 2). Data collected were fully anonymized at hospital-level and uploaded into a platform.

Figure 2. Data collection and management process



DB, Database

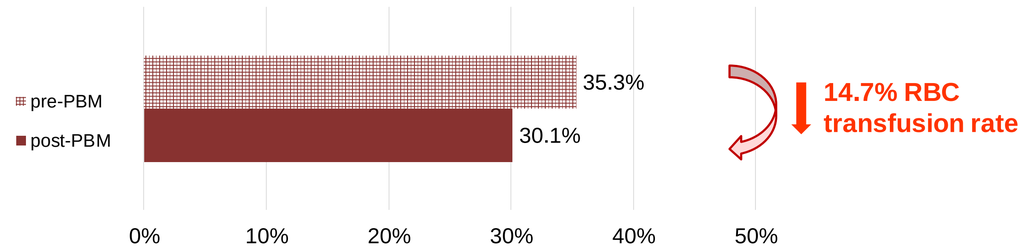
DATA ANALYSIS. Descriptive analysis of demographic and clinical characteristics of surgeries performed in both study cohorts was performed. Logistic regression models were performed to assess the impact of PBM program on post-surgery RBC transfusion rate, including age, period, pre-existing conditions as potential confounders. LOHS was compared between study cohorts using the Student t test.

RESULTS

PBM implementation and impact on the RBC transfusion rates.

- RBC transfusion rate after the surgery was 35.3% (n=1,336) for pre-PBM cohort, decreasing to 30.1% (n=1,296) for post-PBM cohort (p<0.0001), globally showing a reduction of 14.7% in the RBC transfusion rate between pre- and post-PBM (Figure 3).

Figure 3. Post-surgery RBC transfusion rates before and after the implementation of PBM



PBM, Patient Blood Management; RBC, Red Blood Cells

- The logistic regression model, which included analysis with additional potential confounders (age, period, pre-existing chronic conditions or comorbidities that may lead to anemia), showed that PBM implementation was associated with a lower need for RBC transfusions [Odds Ratio, OR of 0.854 (Confidence Interval, CI 95%: 0.754-0.966)] (Table 1).

Table 1. Impact of PBM implementation on RBC transfusion rate after surgery (logistic regression model)

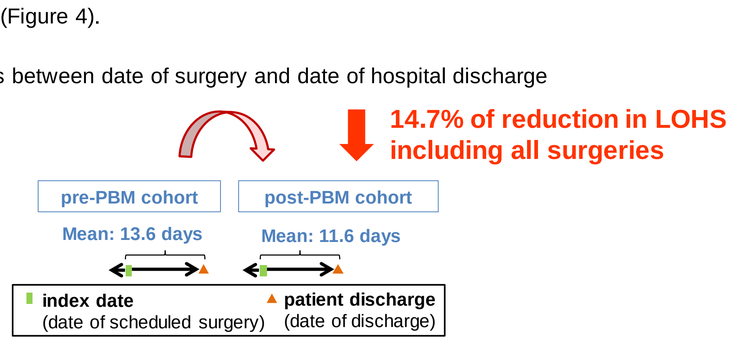
	OR (95% CI)	p-value
Post-PBM period (reference pre-PBM period)	**0.854 (0.754-0.966)**	**0.0121**
Pre-existing chronic conditions or comorbidities that may lead to anemia	4.371 (2.111-9.050)	<0.0001

CI, Confidence Interval; OR, Odds Ratio; PBM, Patient Blood Management; RBC, Red Blood Cells

PBM implementation and impact on the LOHS

- LOHS was also reduced after PBM implementation from a mean (standard deviation, SD) of 13.6 (13.6) days to 11.6 (12.1) (p<0.0001) (Figure 4).

Figure 4. Number of days between date of surgery and date of hospital discharge



LOHS, Length Of Hospital Stay; PBM, Patient Blood Management

Hospital characteristics. Both sites implemented a restrictive transfusion policy (i.e., when Hemoglobin concentration was <7 g/dL to 8 g/dL) after PBM implantation.

Patient demographics.

- Overall, data from 8,080 surgeries were included (3,780 surgeries included in the pre-PBM cohort and 4,300 in the post-PBM).
- Mean (SD) age at surgery was 70.5 (11.4) years [70.4 (11.7) pre-PBM, 70.6 (11.1) post-PBM]; 53.6% were female (54.8% pre-PBM, 52.5% post-PBM).

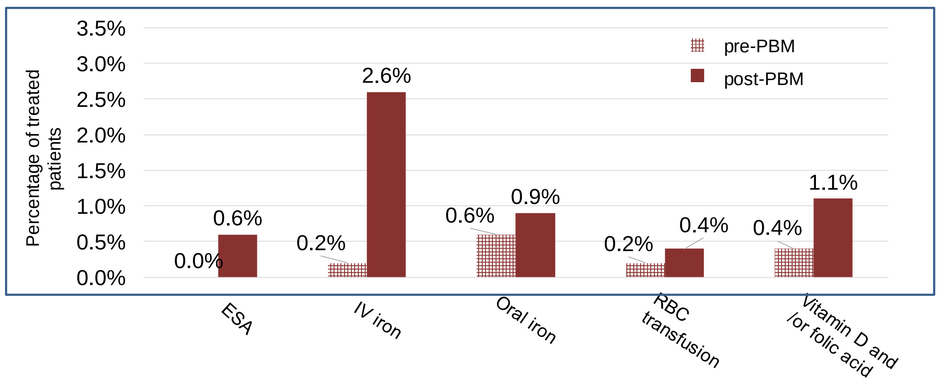
Surgery characteristics.

- Mean (SD) time surgery duration was 3.1 (1.9) and 2.8 (1.8) hours in pre- and post-PBM cohorts, respectively.
- In 26.5% of patients, overall, spinal anesthesia was used.

Change in optimization after PBM implementation

- Intravenous (IV) iron was used in a higher percentage of patients in the post-PBM cohort compared with pre-PBM cohort (Figure 5).

Figure 5. Anemia treatments used pre-surgery in pre-PBM and post-PBM cohorts, at patient level



ESA, Erythropoiesis-stimulating agents; IV, Intra Venous; RBC, Red Blood Cells

CONCLUSIONS

The current study showed how implementation of the PBM program for major elective surgeries was associated with a reduction of post-surgery RBC transfusion rate and of the LOHS, resulting in the improvement of safety and quality, and in the reduction of healthcare costs.

REFERENCES.
(1) Meybohm P, Richards T, Isbister J, Hofmann I, Shander A, Goodnough LT et al. Patient Blood Management Bundles to Facilitate Implementation. Transfus Med Rev, 2017 Jan;31(1):62-71. doi: 10.1016/j.tmrv.2016.05.012.
(2) Franchini M, Marano G, Veropalumbo E, Masiello F, Pati I, Candura F et al. Patient Blood Management: a revolutionary approach to transfusion medicine. Blood Transfus 2019; 17: 191-5. doi: 10.2450/2019.0109-19.
(3) Shander A, Javidroozi M, Lobel G. Patient Blood Management in the Intensive Care Unit. Transfus Med Rev, 2017 Oct;31(4):264-271. doi: 10.1016/j.tmrv.2017.07.007.
(4) World Health Organization. 2021. The urgent need to implement patient blood management: policy brief. https://apps.who.int/iris/handle/10665/346655

DISCLOSURES. This study was supported by Vifor (International) AG, a CSL Vifor Company. ARA and NM are full time employees of CSL Vifor. IQVIA, employer of NL, CI and MR, received consulting fees from Vifor (International) AG.

ACKNOWLEDGEMENTS. Medical writing support was provided by IQVIA and was funded by Vifor (International) AG.

Poster presented at the ISPOR Europe 2022, 6-9 November 2022, Vienna, Austria