ESTIMATING THE CLINICAL AND ECONOMIC IMPACT OF IMPLEMENTING PREOPERATIVE ANEMIA MEASURES IN THE GERMAN HEALTHCARE SYSTEM: THE HEALTH ECONOMIC FOOTPRINT OF PATIENT BLOOD MANAGEMENT (PBM)

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Research aims

- The aim of this study is to estimate the clinical and economic impact of addressing iron deficiency anemia in preoperative elective surgery patients in Germany. A German database (DRG Statistics, 2015) is used to extract and analyze data from 4.6 million elective surgery patients. We estimate the patient outcomes and the direct hospital cost-savings of implementing preoperative anemia measures (PAM).

Background

- Preoperative anaemia, detected in up to 40% of patients[1,2],is associated with an increased length of hospital stay, a higher probability of infection, kidney injury, an increase in the rate of blood transfusions and higher mortality[1,3,4].
- Erythrocyte concentrate blood transfusion (ECBT), with which anaemia is frequently treated in hospitals, is associated with increased morbidity, mortality and hospital length of stay[5,6].
- Patient blood management (PBM) is an approach to the management of anaemia developed to face these increased risks.

Data & Methods

- The analysis of the clinical characteristics (ICD-10-GM) and the Diagnostic Related Groups (DRGs) from the German database allows to identify the target population (Figure 1) and allocate groups of patients and their costs on the basis of two risk factors: Iron Deficiency Anemia and risk of undergoing blood transfusions (Table 1).
- An estimated 13.5% of patients undergoing elective surgery are thought to be undiagnosed and untreated for preoperative IDA. This estimated figure was subsequently applied to the patient group who were undiagnosed for IDA and had received an ECBT.
- A health economic model simulates the new distribution of patients after the implementation of PAM. The estimated average cost per patient for each group, and the comparison of the distribution of patients between the two scenarios (i.e. before and after implementing PAMs) gives rise to potential hospital cost-savings.

Figure 1: Identifying the target population in the German Database (DRG-Statistic, 2015)

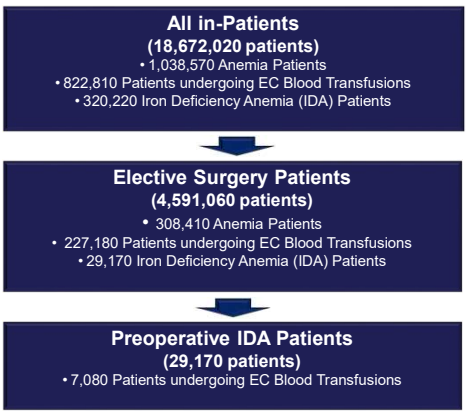


Table 1: Original and final allocation of patients on the basis of risk factors after the implementation of PAM

Scenario BEFORE Implementing PAM

RISK FACTOR	Blood Transfusion	No Blood Transfusion	Total
Iron Deficiency Anemia	7,080	22,090	29,170
No Iron Deficiency Anemia	220,100	4,341,790	4,561,890
Total	227,180	4,363,880	4,591,060

Scenario AFTER Implementing PAM

RISK FACTOR	Blood Transfusion	No Blood Transfusion	Total
Iron Deficiency Anemia	3,657	25,785	29,442
No Iron Deficiency Anemia	194,043	4,367,575	4,561,618
Total	197,700	4,393,360	4,591,060

Results

- When comparing the original and final distribution of patients after implementing PAM in existing and newly diagnosed IDA patients results in an annual hospital direct cost-saving of €479 million.
- The mean cost of a hospital day for an elective surgery patient in Germany in 2015 was €844 per day[7]. The number of annual hospital days for patients having elective surgery was projected to be reduced by 528,531 days following implementation of PAM. Mean costs multiplied by number of hospital days saved results in €446 million.
- The aggregated impact on hospital cost-savings is €925 million (€479 + €446). The annual cost of implementing PAM in Germany was estimated to be €10.4 million. Therefore, the net direct hospital cost-saving in Germany would be €914.6 million. This accounts for approximately 1.4% of total hospital direct costs in Germany.
- It was projected that a total 2773 hospital deaths would have been avoided if PAM were implemented in Germany in 2015.

Figure 2: Macro impact of implementing preoperative anemia measures in the German Healthcare System



914 mil.€
Net Direct Hospital Cost Savings/year

2,773
Hospital Deaths Avoided/year

528,531
Hospital Days Avoided/year

Conclusions

This study shows that implementing preoperative anemia measures, the first pillar of PBM, represents an efficient public health intervention. In the German healthcare system it would lead to the prevention of deaths and a net potential direct hospital costs-savings of 914 million €. This accounts for 1.4% of total hospital direct cost in the German Healthcare System.

References

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