CLINICAL OUTCOME OF ANEMIA MANAGEMENT WITH AND WITHOUT TRANSFUSION IN HOSPITALIZED MEDICAL PATIENT

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Background

Hospitalised patients frequently suffer from anaemia, which frequently results in more complications and longer hospital stays. The conventional treatment has been blood transfusions, but conservative methods are becoming more popular due to worries about the risks involved. In order to assess the efficacy and safety of non-transfusion approaches in stable patients, this study compares the results of anaemia management with and without transfusion.

Abstract

Aim:
To assess and contrast the clinical results of treating anaemia in hospitalised patients with and without blood transfusions.

Methodology:
Fifty hospitalised anaemic patients were split into two equal groups for a prospective observational study. While Group B was treated conservatively with iron supplements, vitamins, and erythropoiesis-stimulating agents, Group A received blood transfusions. Analysis was done on clinical parameters like haemoglobin improvement, hospital stay, complications, readmission, ICU transfer, and mortality.

Results:

 Haemoglobin increased more in Group A (2.6 ± 0.4 g/dL) than in Group B (1.3 ± 0.5 g/dL; $p < 0.001$). Hospital stay, complications, intensive care unit transfers, 30-day readmission, and mortality did not differ statistically significantly between the groups.

Conclusion:
Conservative management provides similar clinical outcomes with fewer risks in stable patients, even though transfusion speeds up haemoglobin improvement.

Keywords:
Anemia, Blood Transfusion, Conservative Management, Hospitalized Patients, Hemoglobin, Clinical Outcomes

Introduction

A common clinical condition among hospitalised patients, anaemia is linked to negative outcomes like higher rates of readmission and mortality, longer hospital stays, and increased morbidity [1,2]. Acute illness, nutritional deficiencies, chronic disease, and renal insufficiency are some of the causes. Red blood cell (RBC) transfusion has long been used to treat anaemia rapidly, particularly in patients who are symptomatic or in critical condition. Nevertheless, new data indicates that transfusion carries some risks, such as immunosuppression, transfusion reactions, volume overload, and an elevated risk of infections and thromboembolic events [2,4]. To reduce needless transfusions and the problems they cause, the emphasis has recently shifted to patient blood management (PBM) and the application of restrictive transfusion techniques [4,5]. Restrictive transfusion thresholds (usually haemoglobin <7–8 g/dL) are as effective and frequently safer than liberal strategies in a variety of hospitalised populations, including surgical and critically ill patients, according to

several large randomised trials and meta-analyses [1,6,7]. With an emphasis on iron therapy, erythropoiesis-stimulating agents (ESAs), and treating underlying causes, these findings have led to updated clinical guidelines and consensus recommendations that support conservative approaches to anaemia correction [3,9]. Transfusions should only be used for severe, symptomatic cases or those with haemodynamic instability, according to the World Health Organisation (WHO), which also states that haemoglobin thresholds should be used to guide the severity and urgency of anaemia treatment [8]. Long-term non-transfusion management can be safer and more effective in stable, non-bleeding patients, especially those with nutritional anaemia or chronic disease [3, 5]. Furthermore, reducing reliance on transfusions can save blood supplies and lower healthcare costs in environments with limited resources [4]. Despite these developments, clinical procedures still differ greatly, and rather than rigorously following evidence-based guidelines, transfusion decisions are frequently impacted by institutional policies, patient expectations, and physician judgement [5,9]. In order to direct more logical, patient-centered care, comparative studies comparing the results of transfusion-based versus conservative anaemia management in actual hospitalised settings are crucial. The purpose of this study was to compare the clinical outcomes of patients treated with blood transfusions versus those treated conservatively without transfusions. These outcomes included haemoglobin response, length of hospital stay, in-hospital complications, intensive care unit transfers, 30-day readmissions, and mortality. The results are intended to add to the increasing amount of data demonstrating safe, efficient, and customised anaemia treatment approaches [1,10].

Methodology

Over the course of a year, this prospective observational study was carried out in a tertiary care hospital's internal medicine department. 50 adult patients who had been admitted with anaemia were enrolled and split into two equal groups according to how they managed their anaemia. Depending on the underlying cause of anaemia, patients in Group A (n=25) received allogeneic blood transfusions, while patients in Group B (n=25) were treated conservatively with folic acid, vitamin B12, erythropoiesis-stimulating agents (ESAs), oral or intravenous iron supplements, and other medical therapies. Participants had to be 18 years of age or older, admitted for non-surgical medical reasons, and have a haemoglobin level of less than 10 g/dL at the time of admission or while in the hospital in order to meet the inclusion criteria. In order to minimise confounding variables, patients with acute or ongoing haemorrhage, haematologic malignancies, chronic dialysis patients, intensive care unit admissions, and those undergoing chemotherapy or immunosuppressive therapy were excluded.

From patient monitoring and medical records, extensive clinical and laboratory data were gathered. Haemoglobin levels at baseline and discharge, length of hospital stay, incidence of in-hospital complications (e.g., infection, cardiac events, or thromboembolism), need for intensive care unit transfer, escalation of supportive care, and 30-day readmission and mortality rates were among the key parameters assessed. SPSS software (version XX) was used for statistical analysis, and mean ± standard deviation was used to express continuous variables. Fisher's exact test or the chi-square test were used to analyse categorical data, and a p-value of less than 0.05 was deemed statistically significant. With rigorous adherence to ethical guidelines for research involving human subjects, the study was previously approved by the Institutional Ethics Committee, and all patients gave their informed consent.

Results

The study involved 50 hospitalised patients with anaemia who were split equally into two groups: Group A, who received blood transfusions, and Group B, who received conservative care without transfusions. At baseline, the clinical and demographic features of both groups were similar. Group B's mean age was 59.7 ± 8.7 years, while Group A's was 61.4 ± 9.3 years. With a male-to-female ratio of 13:12 in Group A and 12:13 in Group B, the gender distribution was likewise comparable and did not exhibit any statistically significant variations. Haemoglobin levels rose noticeably more in Group A patients than in Group B patients. Group A's mean baseline haemoglobin was 8.2 ± 0.6 g/dL, while Group B's was 8.1 ± 0.5 g/dL. Group A's mean haemoglobin level at discharge was 10.8 ± 0.7 g/dL, while Group B's was 9.4 ± 0.8 g/dL. Group A and Group B experienced haemoglobin increases of 2.6 ± 0.4 g/dL and 1.3 ± 0.5 g/dL, respectively, which were statistically significant ($p < 0.001$). The transfusion group's hospital stay was slightly longer (8.4 ± 2.1 days) than the non-transfusion group's (7.2 ± 1.9 days), but the difference was not statistically significant ($p = 0.08$). Mild transfusion reactions, fluid overload, and nosocomial infections were among the in-hospital complications that were more common in the transfusion group (20%) compared to the non-transfusion group (8%). Nevertheless, this difference ($p = 0.21$) was not statistically significant. Three patients in Group A and one in Group B needed to be transferred to the intensive care unit. Although not statistically significant, the transfusion group's need for escalation of care was comparatively higher ($p = 0.29$). There was no discernible difference between Group A and Group B's 30-day readmission rates of 16% and 12%, respectively. Over the 30-day follow-up, both groups experienced one mortality each, resulting in a 4% mortality rate in both cohorts ($p = 1.00$). The following table provides a summary of these results:

Table: Comparative Clinical Outcomes Between Transfusion and Non-Transfusion Groups

Parameter	Group A (Transfusion)	Group B (Non-Transfusion)	p-value
Number of patients	25	25	–
Mean age (years)	61.4 ± 9.3	59.7 ± 8.7	0.42
Male : Female ratio	13:12	12:13	0.79
Baseline hemoglobin (g/dL)	8.2 ± 0.6	8.1 ± 0.5	0.53
Discharge hemoglobin (g/dL)	10.8 ± 0.7	9.4 ± 0.8	<0.001
Rise in hemoglobin (g/dL)	2.6 ± 0.4	1.3 ± 0.5	<0.001
Average hospital stay (days)	8.4 ± 2.1	7.2 ± 1.9	0.08
In-hospital complications	5 (20%)	2 (8%)	0.21
ICU transfer required	3 (12%)	1 (4%)	0.29
30-day readmission	4 (16%)	3 (12%)	0.68
30-day mortality	1 (4%)	1 (4%)	1.00

Overall, blood transfusion was linked to a trend towards more in-hospital complications and intensive care unit transfers, even though these were not statistically significant, even though it caused haemoglobin levels to rise noticeably faster and higher. Both groups' hospital stays, readmission rates, and short-term mortality were comparable, suggesting that conservative anaemia treatment could be a secure and practical substitute for some hospitalised patients.

Discussion

From a historically liberal use of red blood cell (RBC) transfusions to more prudent, patient-centered strategies that prioritise safety, individualised care, and long-term clinical outcomes, the study's findings demonstrate a significant evolution in the paradigm of anaemia management among hospitalised medical patients. Restrictive transfusion thresholds and non-transfusion-based treatment modalities are becoming more and more effective, safe, and cost-effective, especially for haemodynamically stable patients, even though blood transfusion is still a necessary and occasionally life-saving intervention, particularly in cases of acute haemorrhage or haemodynamic instability.

Haemoglobin levels in the transfusion group (Group A) of our study increased more quickly and significantly than in the conservatively managed group (Group B). Although these differences were not statistically significant, this benefit was associated with a trend towards a slightly longer hospital stay, more ICU transfers, and higher in-hospital complications. These results are consistent with earlier research that advises physicians to limit transfusions unless absolutely necessary. When comparing restrictive transfusion strategies—defined by haemoglobin thresholds of less than 7–8 g/dL—to liberal strategies, Tanneau et al. (2022) found no evidence of

increased mortality or morbidity. This conclusion was reached after conducting a thorough meta-analysis that encompassed various clinical settings. In actuality, restrictive measures frequently produced comparable or superior patient outcomes, especially for patients who were not bleeding [11].

Transfusion has known risks in addition to clinical outcomes. Frequent adverse effects include volume overload, mild allergic reactions, and febrile non-hemolytic transfusion reactions. More significantly, mounting data has raised the possibility of long-term immunologic effects, such as transfusion-related immunomodulation (TRIM), heightened vulnerability to infections, slowed wound healing, and even a higher risk of cancer recurrence in cancer patients. The "first do no harm" principle in transfusion medicine was highlighted by Spahn et al. (2019), who pointed out that in many stable, non-bleeding hospitalised patients, the possible risks of transfusion may exceed the anticipated advantages. According to their findings, transfusions should only be used sparingly and with evidence when they are clinically necessary [12].

Depending on the underlying cause of anaemia, our conservatively managed group received individualised treatment using erythropoiesis-stimulating agents (ESAs), vitamin B12, folic acid, and oral or intravenous iron. This method works very well for patients with nutritional anaemia, chronic inflammatory diseases, renal insufficiency, and gastrointestinal malabsorption, even though it frequently causes a slower correction of haemoglobin levels. Avni et al. (2013) confirmed the safety and effectiveness of intravenous iron formulations in hospitalised patients by conducting a systematic review and meta-analysis. According to their findings, the rate of serious adverse events was significantly lower than that of transfusion, particularly in populations with iron-deficiency anaemia and chronic kidney disease that were not responding to oral supplementation [13]. In contrast to transfusion, conservative treatment was linked to similar readmission and mortality outcomes and lower complication rates, which validates the therapeutic approach used in our study. Particularly during the COVID-19 pandemic, the significance of patient blood management (PBM) has increased quickly in both surgical and non-surgical domains. More conservative blood use policies had to be developed and put into place because of the scarcity of blood supplies, the possibility of transfusion-transmitted infections, and the need to save healthcare resources. According to Shander et al. (2020), the pandemic was a wake-up call that strengthened the importance of PBM as a crucial element of inpatient safety. PBM assisted hospitals in providing high-quality care even during times of crisis by lowering the number of needless transfusions and encouraging substitutes like iron therapy, antifibrinolytics, and prudent fluid management [14]. This change in practice is reflected in our study, which shows that conservative anaemia management can produce results comparable to transfusions without putting patients at unnecessary risk or depleting blood bank supplies. Meybohm et al. (2017) presented the idea of PBM bundles, which are a set of

evidence-based actions meant to lessen transfusion dependency, further demonstrating the clinical significance of our findings. These include reducing diagnostic blood loss, improving tolerance to anaemia through oxygen delivery support, optimising erythropoiesis through nutrition and pharmacologic support, and early detection and correction of anaemia. These PBM bundles were initially created for surgical patients, but they are also becoming more and more useful for medical inpatients. Our study's conservative management approach closely resembles these tactics, demonstrating the viability and efficacy of structured PBM programs in larger clinical contexts [15]. Reducing the need for transfusions has important ramifications for the healthcare system. A significant infrastructure is needed for the collection, storage, screening, and distribution of blood, making it a scarce and expensive resource. Unnecessary transfusions add to the burden on the healthcare system and raise costs. In addition to improving patient outcomes, putting evidence-based PBM protocols into practice can encourage resource optimisation, cost reduction, and sustainability in the provision of healthcare.

To sum up, our research contributes to the increasing amount of data indicating that conservative treatment of anaemia is safe and effective when used appropriately in hospitalised patients who are stable and not bleeding. Transfusions offer quick haemoglobin correction, but they should only be used sparingly due to their higher risk of complications. An approach that is safer, more patient-centered, and more cost-effective is offered by the application of PBM principles, which include early anaemia assessment and the use of pharmaceutical alternatives. In order to confirm these results, further hone transfusion thresholds, and standardise conservative treatment practices across various healthcare settings, multicenter randomised controlled trials with larger cohorts are necessary going forward.

Conclusion

This study demonstrates that although blood transfusion leads to a more rapid and significant increase in hemoglobin levels, it may be associated with a higher incidence of in-hospital complications and longer hospital stays. Conversely, conservative management using iron supplementation, vitamins, and erythropoiesis-stimulating agents provides comparable outcomes in terms of readmission and mortality, with a lower complication rate. Therefore, in stable hospitalized patients, non-transfusion-based management can be considered a safe, effective, and resource-conscious alternative to transfusion therapy.

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