

Review article

The scientific basis for patient blood management[☆]

L'approche scientifique de la gestion du sang des patients[◇]

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Abstract

Patient blood management is an increasingly used term to describe an evidence-based, multidisciplinary approach to optimising the care of patients who might need transfusion. It encompasses measures to avoid transfusion such as anaemia management without transfusion, cell salvage and the use of anti-fibrinolytic drugs to reduce bleeding as well as restrictive transfusion. It ensures that patients receive the optimal treatment, and that avoidable, inappropriate use of blood and blood components is reduced. This paper provides an overview of the scientific basis for patient blood management with a focus on the increasing evidence for restrictive rather than liberal transfusion practice and the use of electronic blood ordering and decision support to facilitate its implementation.

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Keywords: Blood utilisation; Blood transfusion; Clinical decision support; Electronic medical records; Physician order entry

Résumé

La gestion du sang pour le patient est une expression de plus en plus utilisée pour décrire une approche multidisciplinaire fondée sur des preuves à l'optimisation de la prise en charge des patients qui pourraient avoir besoin de transfusions. Elle comprend des mesures pour éviter une transfusion, par exemple la gestion de l'anémie sans transfusion, la récupération de sang et l'utilisation de médicaments anti-fibrinolytiques pour réduire le saignement, ainsi que la transfusion restrictive. Elle veille à ce que les patients reçoivent le traitement optimal, et que l'utilisation non nécessaire ou inappropriée du sang et des composants sanguins soit réduite. Cette revue donne un aperçu de la base scientifique de la gestion du sang pour les patients en mettant l'accent sur l'intérêt croissant d'une stratégie transfusionnelle restrictive plutôt que libérale, et sur l'utilisation de moyens informatisés pour la commande de sang et le support d'aide à la décision pour faciliter sa mise en œuvre.

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Mots clés : L'utilisation du sang ; Transfusion sanguine ; Aide à la décision clinique ; Dossier médicaux électroniques ; La saisie des commandes médecin

1. Introduction

Blood transfusions have been identified as one of the most over-used therapies both in the United States by Choosing Wisely, an initiative which supports evidence-based care to minimize the harms of over treatment highlighting five recommendations to minimise blood use (Box 1) [1], and in England where the use of transfusion has been audited by the National Comparative Audit of Blood Transfusion programme (Table 1) [2]. One of the audits showed considerable variation in the use

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Table 1
Summary of the inappropriate use of blood from audits of blood use in England [2].

| Audit | Year | N ^o of hospitals | N ^o of cases audited | Inappropriate use | Relevant guidelines for audit standards |
|---------------------------------|------|--------------------------------------|---------------------------------|---|---|
| Red cell transfusion | 2002 | All 13 hospitals in Northern Ireland | 360 | 19% of patients inappropriately transfused and 29% overtransfused | BCSH, 2001: the clinical use of red cell transfusion |
| Red cells in hip replacement | 2007 | 139/167 (83%) | 7465 | 48% of patients | British Orthopaedic Association, 2005 |
| Upper gastrointestinal bleeding | 2007 | 217/257 (84%) | 6750 | 15% of RBCs, 42% of platelets, 27% of FFP | British Society of Gastroenterology, 2002 |
| Red cell transfusion | 2008 | 26/56 (46%) hospitals in two regions | 1113 | 19.5% of transfusions | BCSH, 2001: the clinical use of red cell transfusion |
| Fresh frozen plasma | 2009 | 186/248 (75%) | 5032 | 43% of transfusions to adults, 48% to children, 62% to infants | BCSH, 2004: guidelines for the clinical use of fresh frozen plasma, cryoprecipitate and cryosupernatant |
| Platelets in haematology | 2011 | 139/153 (91%) | 3296 | 27% of transfusions | BCSH, 2003: guidelines for the use of platelet transfusions |
| Cryoprecipitate | 2012 | 43/82 (52%) from 3 regions | 449 | 25% of transfusions | BCSH, 2004: guidelines for the clinical use of fresh frozen plasma, cryoprecipitate and cryosupernatant |

BCSH: British Committee for Standards in Haematology (guidelines available on <http://www.bcsghguidelines.org>).

of transfusion in patients undergoing cardiac surgery (Fig. 1), and studies over 20 years indicate that a substantial amount of blood is being transfused inappropriately in these patients [3,4].

Variation has also been observed in transfusion rates among patients undergoing major non-cardiac surgery [5], as well as in transfusions among developed countries worldwide (Fig. 2). This variation in the use of transfusion has persisted, despite the publication of numerous clinical practice guidelines, which might have been expected to standardise practice (Table 2) [6].

The development of the Choosing Wisely statement is intended to assist with the promotion of better *Patient Blood Management*, which is an increasingly used international term to describe an evidence-based, multidisciplinary approach to optimising the care of patients who might need transfusion. It encompasses measures to avoid transfusion such as anaemia

management without transfusion, cell salvage and the use of anti-fibrinolytic drugs to reduce bleeding as well as restrictive transfusion. It ensures that patients receive the optimal treatment, and that avoidable, inappropriate use of blood and blood components is reduced. This paper provides an overview of the scientific basis for patient blood management; much of the text has been previously published elsewhere, and is reproduced here with permission [7].

2. Restrictive transfusion practice

Restrictive transfusion practice is blood transfusion therapy given only when the potential benefits are deemed to outweigh potential risks, and in which there is a goal of minimizing the use of blood [8].

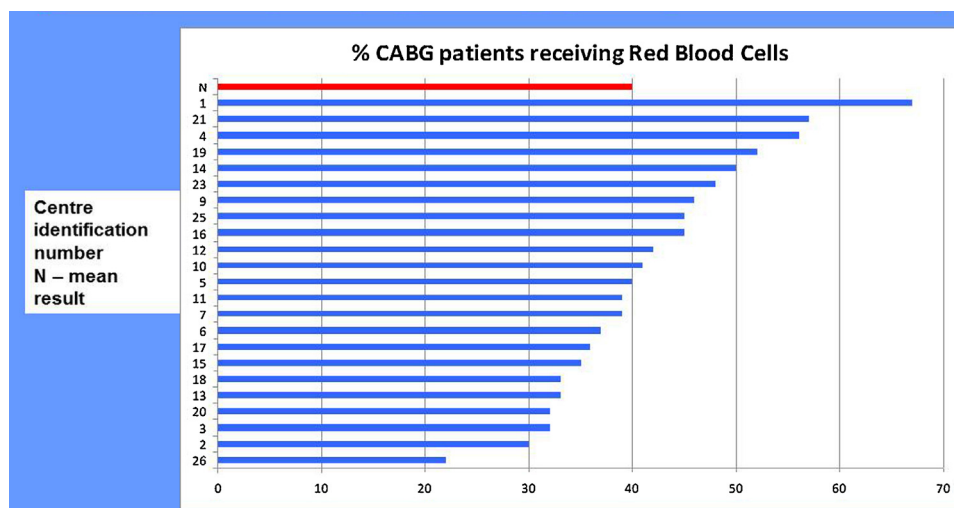


Fig. 1. Variation in use of RBC transfusions between centres undertaking primary coronary artery bypass surgery (CABG) in England, 2011. The variation in RBC transfusion is indicated by a three-fold range (from 22% to 66%) in the percentage of patients receiving a RBC transfusion after undergoing primary coronary artery bypass surgery between centres undertaking cardiac surgery in England.

Data provided by the National Audit of Blood Transfusion programme: http://hospital.blood.co.uk/safe_use/clinical_audit/National_Comparative/index.asp.

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