Assessment of anaemia in elective pre-operative orthopaedic patients


Summary

The transfusion of components made from human blood carries a small risk to the recipient. Pre-operative preparation, ensuring that the patient is not anaemic before surgery, is important to ensure that blood is not transfused unnecessarily. This article highlights that pre-operative anaemia is often not effectively managed in patients presenting for elective total hip replacement surgery, putting them at risk of unnecessary transfusion. A national comparative audit conducted by the authors suggests that there is a role for nurses who manage pre-operative assessment clinics to ensure that patients with anaemia are managed effectively before surgery. Nurses managing these clinics have an opportunity to decrease the need for peri-operative transfusion. The management of patients attending pre-operative assessment clinics should be reviewed to ensure that mechanisms are in place to allow the identification, investigation and treatment of anaemia.

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Keywords

Anaemia, blood transfusion, hip replacement surgery, pre-operative assessment

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of blood and to use alternatives to red blood cell transfusions where possible.

The findings of a national comparative audit conducted by the authors show that patients presenting for elective hip replacement surgery are not having their pre-operative anaemia managed, putting them at risk of unnecessary transfusion. The findings suggest that there is a role for nurses who manage pre-operative assessment clinics to ensure that patients with pre-operative anaemia are managed effectively before surgery.

Audit

In 2007, NHS Blood and Transplant, in collaboration with the Royal College of Physicians, reported on an audit carried out in 2006 on the use of blood in elective primary unilateral total hip replacement surgery. The aim of this prospective audit was to measure hospital transfusion practice against practice standards. The audit was conducted as part of a national programme of audits, the National Comparative Audit of Blood Transfusion. Information about the way service delivery was organised – including the number of operations performed, whether a hospital has a pre-operative assessment clinic and whether cell salvage techniques are used – was collected by sending a questionnaire to the consultant haematologist with responsibility for blood transfusion at 203 hospital sites (with a 100% response rate). Patient data were collected over a 12-week period using an online audit data entry tool. The results are discussed below.

The results of two standards matched against two performance indicators were reviewed (Box 1). These standards were set by the authors as part of the national comparative audit and used to evaluate performance in all hospitals taking part in the audit.

Results

When questioned on the practice standards outlined in Box 1, 202 out of 203 (99%) respondents stated that the hospital had a pre-operative assessment clinic and facilities for taking a full blood count. A smaller number of respondents (183 out of 192, 95%) stated that they had a system for referring low haemoglobin results to a doctor for the correction of anaemia.

A total of 223 hospitals submitted data on 7,552 operations performed between January 2006 and March 2007. Data were available on 7,341 patients for the period from 28 days before until 14 days after surgery. Of these 7,341 patients, 1,823 (25%) received a red cell transfusion. Of the 1,823 transfused patients, details of the number of units transfused was available in 1,803 cases (99%), of which two thirds received two units of blood. The audit results showed that 2,177 out of 7,414 (29%) patients did not have a haemoglobin estimation pre-operatively and that 795 out of 5,237 (15%) individuals were admitted for surgery with a haemoglobin level below 12 g/dl. The collated data showed that 454 out of 790 (57%) patients with a pre-operative haemoglobin level below 12 g/dl were given a blood transfusion, compared with 869 out of 4,409 (20%) individuals with a pre-operative haemoglobin level of greater than 12 g/dl. For the American Association of Anesthesiologists scores – a five-category physical status classification system for assessing a patient before surgery – age and gender were similar between these two groups, and indicated that, within this cohort, a patient is twice as likely to be transfused if his or her haemoglobin level is less than 12 g/dl.

The results of the audit are summarised in Table 1. Results indicate that while the majority of hospitals reported having a pre-operative assessment clinic and a system for referring patients found to be anaemic at the clinic, 795 out of 5,237 patients (15%) going for elective surgery had anaemia, with a haemoglobin lower than 12 g/dl. One study concluded that a pre-operative haemoglobin level below 12 g/dl increased the likelihood of the patient having a blood transfusion (Aderinto and Brenkel 2004).

Discussion

It is acknowledged that this audit has a number of limitations. Information was not collected on the number of patients per month per hospital, mortality rates, or what other factors affected the risk of blood transfusion. This is because it is...
in the nature of a clinical audit only to collect information about the performance of healthcare professionals against clearly defined standards, or if unavailable, against published guidance.

The audit demonstrated a wide variation in the transfusion rate among hospitals. Breakdown of blood transfusion practice by the American Association of Anesthesiologists grade, comorbidity, length of surgery and use of heparin are all explored in the audit report (NHS Blood and Transplant and Royal College of Physicians 2007). Pre-operative anaemia was only one contributory factor for this variation, but was significant. Although virtually all hospitals stated that they have a mechanism for identifying and correcting anaemia pre-operatively, it was disappointing to find that the audit results showed that haemoglobin levels were not estimated pre-operatively in 2,177 out of 7,414 (29%) patients and that 795 out of 5,237 (15%) patients went to surgery with a haemoglobin level below 12g/dl.

A national audit of elective orthopaedic surgery in the United States (Goodnough et al 2005) found that 35% of patients at pre-admission testing were found to have a haemoglobin concentration below 13g/dl. Of 1,142 elective admissions to a single Scottish hospital, 210 (18%) patients were anaemic, defined as males with haemoglobin levels below 13g/dl and females with haemoglobin levels below 11.5g/dl. 76 out of 210 (36%) patients had a haemoglobin value below 11g/dl and 13 out of 210 (6%) individuals had a haemoglobin value below 10g/dl (Saleh et al 2007). Of patients with anaemia, 65% showed normochromic normocytic anaemia indices of red blood cell colour and size, consistent with anaemia of chronic disease, but 23% showed hypochromic indices indicating that they may have responded to iron therapy alone. Of the patients admitted with anaemia, 42% were transfused with blood peri-operatively (Saleh et al 2007).

Morbidity and mortality after surgery is significantly associated with the presence of pre-operative anaemia (Carson et al 1996). A panel of multidisciplinary physicians recommended that elective surgical patients should have a haemoglobin value determined a minimum of 30 days before the surgical procedure, allowing time for treatment before surgery (Goodnough et al 2005). Further, unexplained anaemia should be a reason to defer elective surgery pending an evaluation of the cause and subsequent correction of the anaemia. Goodnough et al (2005) concluded that the implementation of a clinical care pathway for anaemia management in elective surgical patients could improve their outcome.

A number of authors have suggested that nurses managing pre-operative assessment clinics have an opportunity to decrease the need for peri-operative transfusion by identifying and treating patients with anaemia (Keating and Meding 2002, Rosencher et al 2003, Slappendel et al 2003).

In some patients pre-operative interventions, such as improving diet, prescribing oral iron or intravenous iron and erythropoietin, can correct anaemia, thus increasing the haemoglobin concentration and reducing the patient’s chance of needing a blood transfusion. Clinics should review the management of patients attending pre-assessment clinics to ensure that mechanisms are in place to allow the identification, investigation and treatment of anaemia (Laupacis and Fergusson 1998, Feagan et al 2000, Weber et al 2005).

**Conclusion**

This article has cited a number of publications that identify the importance of pre-operative assessment for anaemia. There is also a need to ensure the appropriate use of red blood cells,
since they are a valuable, but not limitless, resource. The clinical audit discussed identified that the commitment to improving the appropriate use of red cells is reflected by the majority of hospitals indicating that they have a protocol in place, which states that patients with low haemoglobin levels are to be referred for the correction of anaemia. However, audit of clinical practice showed that a significant number of patients had not been assessed for anaemia before surgery. It also showed that some patients were going for surgery with a haemoglobin level low enough to almost guarantee red cell transfusion, when that transfusion was probably avoidable.

This then raises the question of whether other tests are being omitted. A number of patients are being unnecessarily exposed to the risks of blood transfusion, and although this audit did not measure other risks, they possibly include extended length of stay and post-operative complications of recovery, placing an unwanted burden on orthopaedic nurses. It is not possible for the authors to speculate why there is such a difference between protocol and practice, but it is hoped that by making the audit results widely available, nurses managing pre-operative assessment clinics will have the opportunity to reduce the need for peri-operative transfusion. It is recommended that clinics should review the management of patients attending pre-assessment clinics to ensure that mechanisms are in place to allow the identification, investigation and treatment of anaemia in these patients NS

References


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