



The benefit of early identification of anemia preoperatively in patients undergoing hip and knee joint arthroplasty

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Iron deficiency anemia

Abstract Aim: The primary objective of this study was to establish the frequency of preoperative anemia (Hb < 130 g/L) in patients undergoing hip and knee arthroplasty. The secondary objective was to improve anemia optimization by identifying anemia earlier in the preoperative phase.

Methods: The study was a prospective analysis of preoperative patients undergoing joint arthroplasty. A CBC was done at the first clinic visit (as opposed to the usual second visit). Patients were asked about any history of anemia. A ferritin was added if there was a history of anemia. Anemic patients were referred to the blood conservation clinic for treatment of anemia.

Results: 782 patients were seen during the nine month study period. 365 patients were enrolled. 65% were female. The incidence of anemia was 21%. 68 patients had ferritins measured: 10 patients (15%) had iron deficiency (ferritin <30 µg/L). Overall, the transfusion rate for all procedures during the study period was 3.6% (52/1439 cases) compared to 5.1% (75/1463 cases) in the previous year.

Conclusions: Anemia is common in patients undergoing hip and knee replacement surgery. Early identification of preoperative anemia allows more time for hemoglobin optimization and may contribute to fewer transfusions perioperatively. Crown Copyright © 2013 Published by Elsevier Ltd. All rights reserved.

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Editor comments: Blood loss during major elective orthopaedic surgery can be substantial. Traditionally the effects of this on recovery have been ameliorated by the administration of allogeneic blood transfusion in the early postoperative period. Careful thought is now being given to ways to avoid this risky and expensive practice. This includes a better understanding of the patient's haemoglobin at a timely point pre-operatively to enable alternative measures to be considered and put into place. This study provides an important example of an approach to better preparation of the patient which results in a reduction in need for transfusion. JS-T

Introduction

For many decades fairly liberal transfusion practice was the standard of care for anemic patients in the majority of hospitals throughout the world – despite a lack of evidence showing benefit. This practice was allowed to continue because blood transfusion can be life-saving in bleeding patients and there were few studies showing that transfusions caused harm.

However, in the last decade many studies have reported adverse outcomes associated with transfusion, especially when given at the most vulnerable time – during or immediately post surgical interventions. (Marik and Corwin, 2008; Bernard et al., 2009). Blood transfusion is also associated with known risks such as transfusion related acute lung injury (risk 1 in 10,000), bacterial sepsis (risk 1 in 10,000) and circulatory overload (risk 1 in 700) (Callum et al., 2011) which are far greater than the current estimated risks of transfusion transmitted viral infections, (e.g. Hepatitis B risk 1 in 1.7 million; Hepatitis C risk 1 in 6.7 million; HIV risk 1 in 8 million) (O'Brien et al., 2012), which is often voiced as the biggest fear in the minds of patients. Transfusion is also associated with increased financial costs. The estimated cost of transfusion for a single unit of red blood cells when all activities associated with transfusion are included is \$760 (Shander et al., 2010).

The biggest independent predictor of whether a patient will require a transfusion during their perioperative course is their preoperative hemoglobin level. (Faris et al., 1999; Freedman et al., 2008) In fact, recent reports estimate that approximately one third of orthopedic patients undergoing hip and knee surgery are anemic preoperatively as defined by a hemoglobin level of less than 130 g/L (Goodnough et al., 2011).

At our centre surgical candidates are seen at the Holland Centre Hip and Knee Arthritis Program-Assessment Centre (HKAP-AC) more than six weeks prior to surgery. The purpose of this study was to determine if adding a routine complete blood count (CBC) at the HKAP-AC visit, rather than waiting until the preoperative clinic visit at

2–3 weeks prior to surgery, could detect anemia earlier and allow more time for anemia optimization. The primary research question was to determine the frequency of anemia in preoperative patients undergoing hip or knee total joint replacement at our centre. The secondary research questions were to determine how often anemia was due to iron deficiency and whether increased anemia identification at an earlier preoperative time point could lead to increased referrals to the blood conservation clinic (BCC) and decreased transfusion rates compared to a similar time period prior to the change.

Methods

This was a prospective observational study conducted between April 2011 and January 2012 in patients presenting to their first visit to the Holland Centre HKAP-AC. All patients being assessed for hip or knee joint replacement surgery (whether single, bilateral or revision procedure) who provided informed consent were eligible to be included. The study was approved by the Sunnybrook Health Sciences Centre Research Ethics Board.

Patients present to the HKAP-AC to be assessed for readiness for surgery by a physiotherapist and a nurse typically 6–12 weeks prior to surgery. The process requires all patients to complete a questionnaire documenting their general health at the first visit to the HKAP-AC. This includes a question on whether the patient had a history of anemia. However, prior to April 2011 anemia was not routinely addressed or managed until the second patient visit at the Preoperative Orientation Program Visit (POP) where the first preoperative CBC was drawn. The POP visit typically occurs 2–3 weeks before the surgical date. All patients undergoing revision hip or bilateral hip or bilateral knee replacement surgeries are routinely referred to the blood conservation clinic regardless of hemoglobin level.

In this study anemia assessment was moved earlier to the HKAP-AC visit and performed by the nurse. If the patient was deemed to be ready for

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