The Effect of Implementation of Peri Operative Blood Management Guidelines on Transfusion Rate of Patients Undergoing Primary Hip & Knee Replacement Surgery

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Introduction

In 2011 / 2012 The Royal Melbourne Hospital (RMH) had an average length of stay (LOS) of 6.7 (5.3) days for elective primary hip replacements (THR) and total knee replacements (TKR) which compared unfavourably with exemplar organisations.

A retrospective data analysis of 288 consecutive patients undergoing THR & TKR surgery between July 2011 – March 2013 identified patients who received a red blood (RBC) transfusion had a statistically longer LOS than patients not requiring transfusion (p<0.001).

Aim

The aim of this project was to reduce post operative RBC transfusion rates through the establishment of a multidisciplinary, multimodal peri operative patient blood management program.

It was hypothesised that a reduction in transfusion rates would positively contribute to a reduction in the LOS following THR and TKR surgery.

Methods

Strategies to reduce transfusion rates were generated in accordance with National Blood Authority guidelines\textsuperscript{2} and in consultation with the the Orthopaedic Unit, Department of Anaesthesia and Pain Management, and the Transfusion Committee.

The blood program (Fig. 1) focussed on;
- preoperative optimisation of red cell mass and coagulation status;
- minimisation of peri operative blood loss, including meticulous attention to surgical haemostasis; and
- tolerance of postoperative anaemia

Patients were required to have blood tests performed at a Melbourne Health Pathology Collection Centre or local medical centre within two weeks prior to their pre admission clinic (PAC) appointment to minimise the number of clinic consultations and improve efficiencies with the process.

The pilot commenced in November 2013 and included all consecutive patients attending PAC for planned joint replacement surgery and patients undergoing a THR / TKR.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig1.png}
\caption{Peri-operative Orthopaedic Patient Blood Management Guidelines}
\end{figure}

\begin{itemize}
\item 1. Managing Pre Operative Anaemia
  Patients with identified pre operative anaemia in PAC were referred to a dedicated rapid access haematology clinic for further management by the haematologists.
  Anaemia was defined as:
  \begin{itemize}
  \item Hb <120 g/l females
  \item Hb <130 g/l males \textsuperscript{2}
  \end{itemize}
\item 2. Minimising Intra Operative Blood Loss
  \begin{itemize}
  \item Tranexamic acid (1g IV): THR - at incision
  \item TKR - tourniquet release (or incision without tourniquet)
  \item Maintaining normothermia
  \begin{itemize}
  \item Forced air warming blanket
  \item Theatre temperature ≥22 C
  \item Appropriate warming of IV fluids
  \end{itemize}
\end{itemize}
\item 3. Indications for Post Operative Transfusion
  \begin{itemize}
  \item No transfusion Hb ≥100g/l
  \item Inappropriate if Hb ≥80g/l & no acute myocardial or cerebrovascular ischaemia
  \item Hb 70-100g/l & acute myocardial or cerebrovascular ischaemia, single unit of RBC & then re assess
  \end{itemize}
\end{itemize}

Results

The pilot was conducted from November 2013 – April 2014 and included 85 patients. There was a significant reduction in LOS of 2.1 days (p<0.001).

The results related to blood management were also positive as detailed below:
- The overall RBC transfusion rate decreased from 16.9% (n=49) at baseline to 9.4% (n=8) during the pilot (p = 0.09).
- All post operative RBC transfusions met the guidelines and were clinically indicated.
- 74% of patients (n=63) who attended PAC had blood tests completed in the community prior to their PAC appointment.
- 7 patients were managed pre operatively by the haematology clinic for anaemia, none of which required a post operative transfusion.
- 76.5% (n=65) of patients were administered intra operative tranexamic acid.

Conclusion

The implementation of a peri operative blood management program has reduced the post operative RBC transfusion rate following primary elective hip and knee replacement surgery therefore contributing to the reduced LOS.

We expect the reduction in RBC transfusion to reach significance as the cohort of patients increases.

Acknowledgments

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References

2. www.who.int/vmnis/indicators/haemoglobin.pdf