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Writing Sample (edited)

Needs Assessment for a Continuing Medical Education activity on Blood Management

Description of the Target Audience

The primary target audience of this continuing medical education activity is clinicians at ABC Community Health Center, particularly physicians and surgeons who make final decisions on whether to order blood transfusions for patients. A secondary target audience consists of nurses, residents, physician's assistants, and other clinicians who implement the instructions of prescribing physicians and surgeons.

Introduction

Patient Blood Management (PBM) is an evidence-based multidisciplinary approach to optimize the care of patients who may need a blood transfusion.[1,2] The rationale for giving blood transfusions, especially to surgical patients, is to reduce ischemia (i.e. restriction of blood flow to tissues in need of oxygen for cellular metabolism) which could increase postsurgical complications; in the past these perioperative transfusions were given relatively indiscriminantly.[3] However clinical evidence collected over the past two decades increasingly shows that transfusion carries its own risks, including postoperative infection, systemic inflammatory response syndrome, multiple organ failure, and death,[4] and that the decision of whether or not to transfuse blood, and how much blood to transfuse, needs to be made judiciously.[5] In addition, transfusion decisions should be made with the understanding that donated blood is a limited resource. Transfusion of a single unit can cost $300-$1000[6,7] and shortages in the availability of blood occur frequently.[8]

PBM is an international initiative intended to help health care systems manage the supply and delivery of blood products and guide clinicians to prescribe blood products appropriately.[9] The practice of PBM is described as resting on three pillars: maximizing total red cell mass (i.e. minimizing anemia), minimizing blood loss, and enhancing the patients' ability to tolerate anaemia.[10] The end goal is to improve health outcomes and concomitantly reduce blood transfusions.[11]

The World Health Organization has endorsed PBM for action on global, national and hospital levels.[12] Attendees at a 2018 Consensus Conference in Frankfurt developed a series of recommendations for PBM practice and further needed research.[13] These systemic initiatives must be complemented with clinician education to ensure that PBM is implemented at the clinical level. The need for education is highlighted in "Simplified International Recommendations for the Implementation of Patient Blood Management," which was authored by key opinion leaders and published in 2017 "to provide clinicians with a working template to start or improve the implementation of PBM practices".[14]

Current practice in transfusion-related care

PBM improves outcomes for patients and reduces costs.[7] However, the practice of PBM has been slow to penetrate into clinical practice, and a high barrier has been the absence of clinician knowledge on PBM.

An important aspect of PBM is reducing the need for blood transfusions. Our organization, ABC Community Health Center, recently implemented an electronic alert to warn clinicians when they order blood transfusions in excess of established guidelines. In 55% of reviewed cases, the clinicians ignored the alert and ordered a blood transfusion anyway.[15] The comments entered by the clinicians during the override process indicate that the reasons for override are "symptomatic anemia" (63%), "perioperative transfusion" (28%), and "other" (9%).

While these comments may not be entirely representative of practice at ABC Community Health Center, we can look to clinical practice surveys from other health care systems around the world to understand current practice patterns that fail to follow best practices.

Some clinicians practice routine preoperative prophylactic allogenic blood transfusion, even if hemoglobin levels exceed guideline recommended maximum thresholds (i.e. they practice a liberal transfusion strategy).[16] This practice suggests a basic understanding that preoperative anemia is associated with poor surgical outcomes and that it can be mitigated with blood transfusion,[3] but it does not account for transfusion risks or for each patient's specific risk factors.[17] Many surveyed clinicians were unaware of alternative ways to treat anemia or to enhance patients' tolerance of anemia, such as by prescribing erythropoietin or intravenous iron.[18,19] Yet other clinicians were unaware of a correlation between preoperative anemia and perioperative morbidity and mortality, and did not routinely treat anemia prior to surgical procedures.[18] Among some clinicians, an understanding of the physiology of blood transfusion was limited, and they erroneously suggested that increasing blood volume, rather than oxygen carrying capacity, is a reason for recommending transfusion.[20] Transfusions were also unnecessarily prescribed when non-bleeding patients were misdiagnosed as bleeding.[21]

In summary, reasons for poor PBM in clinical practice worldwide include understatement of the benefits and overstatement of the risks and costs of preoperative anemia management, suboptimal use of alternative anemia management techniques (e.g. preoperative iron supplementation and erythropoietin administration), and overreliance on blood transfusion measures to offset anemia. Comparison of the current practice data with the comments collected through ABC Community Health Center's electronic alert indicates that these practices also occur in our organization.

Best practices in PBM

PBM guidelines recommend limiting the need for blood transfusion prior to, during, and after surgical procedures in order to improve patients' clinical outcomes and reduce costs,[11] through three approaches: improving red blood cell mass (thereby improving oxygen carrying capacity), minimizing the patient's blood loss, and optimizing the patient's tolerance to anemia.

Several randomized clinical trials have been conducted to compare patients' outcomes after restrictive (hemoglobin concentration (Hb) <7-8 g/dL) and liberal (Hb <9-10 g/dL) thresholds are used to trigger the decision to transfuse blood. From reviews and meta-analyses from these studies, we find evidence that in hemodynamically stable patients without serious cardiac disease, restrictive blood transfusion strategies reduce negative outcomes, including mortality.[22] The advantage of one strategy over another is less clear in patients with certain cardiovascular or hematologic diseases.[23] Based on these studies, several scientific and medical professional societies have issued clinical practice guidelines.[24]

The 2018 PBM Consensus Conference in Frankfurt brought together a committee of experts and established 10 evidence-based clinical recommendations[13]:

Management and alleviation of preoperative anemia

1. Detection and management of preoperative anemia early enough before major elective surgery
2. Use of iron supplementation to reduce red blood cell transfusion rate in adult preoperative patients with iron-deficient anemia undergoing elective surgery
3. Do not use erythropoiesis-stimulating agents routinely in general for adult preoperative patients with anemia undergoing elective surgery
4. Consider short-acting erythropoietins in addition to iron supplementation to reduce transfusion rates in adult preoperative patients with hemoglobin concentrations <13 g/dL undergoing elective major orthopedic surgery

Selection of RBC transfusion thresholds

5. Restrictive RBC transfusion threshold (hemoglobin concentration <7 g/dL) in critically ill but clinically stable intensive care patients
6. Restrictive RBC transfusion threshold (hemoglobin concentration <7.5 g/dL) in patients undergoing cardiac surgery
7. Restrictive transfusion threshold (hemoglobin concentration <8 g/dL) in patients with hip fracture and cardiovascular disease or other risk factors
8. Restrictive transfusion threshold (hemoglobin concentration 7-8 g/dL) in hemodynamically stable patients with acute gastrointestinal bleeding

Implementation of PBM programs

9. Implementation of PBM programs to improve appropriate RBC utilization
10. Computerized or electronic decision support systems to improve appropriate RBC utilization

Additional valuable recommendations have been made in the literature:

1. Use of autologous blood whenever practicable[25]
2. Review of medical records and interview of the patient to identify previous transfusion history, history of coagulopathy, history of thrombotic events, and risk factors for ischemia[26]
3. Education of patients about the potential risks versus benefits of blood transfusion, and efforts to elicit their preferences[26]
4. Diagnosis and management of postoperative anemia and iron deficiency[27]

5. Implementation of a health systemwide PBM program with a clinical community approach, including support from leadership, electronic decision support, and guideline compliance audits with feedback to providers[28]

The practice gaps and their impact

There are four notable gaps between current and optimum clinical practice: (1) clinicians order prophylactic perioperative blood transfusions without considering if the risks are outweighed by the expected benefits,[4,16] (2) they mitigate preoperative anemia, whether confirmed or presumed, through blood transfusion,[3] (3) they do not implement measures to minimize preoperative anemia, such as prescribing erythropoeitins or intravenous iron in advance of surgery,[19] and (4) they opt for blood transfusion without considering the appropriate hemoglobin concentration threshold for the patient's condition.[23]

The current suboptimal clinical practices pose an unnecessarily heavy burden on patients and society. According to a study using a national database of patient chart data, low-risk patients receiving transfusions could have an 8- to 10-fold excess risk of adverse outcomes when they receive a blood transfusion.[29]

The estimated number of transfusions performed in the United States in 2017 was 11,349,000 units.[30] At an estimated cost of $300 per unit,[6,7] the total cost of transfusions in a year is approximately $3,400,000,000.

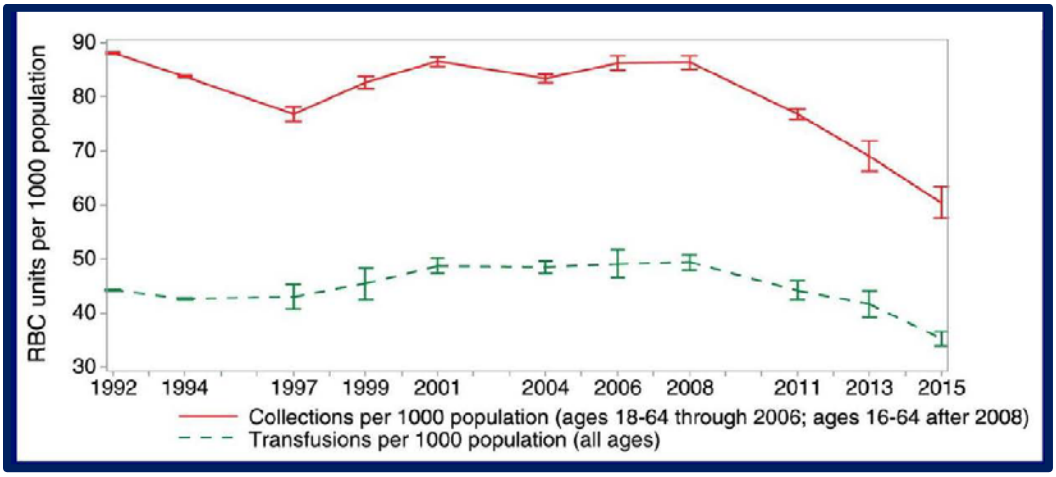

Figure 1 - Trends in estimated rates of whole blood and red blood cell collection and transfusion in the US, 1992-2015

Fortunately, data presented at the AABB Annual Meeting in 2018 from the National Blood Collection and Utilization Survey (shown in Figure 1) shows that between 1992 and 2015, a period in which PBM programs have increasingly been implemented, the collection and transfusion of whole blood and red blood cell products has been decreasing.[30] The trend indicates the PBM initiatives are effective at reducing transfusions (and the associated costs and risks), and implementing PBM measures at our organization would be beneficial.

An assessment of other institutions' implementations of PBM suggests that we should expect barriers in our attempts to encourage optimum practices. Some common barriers are

knowledge and beliefs about blood transfusion, access to knowledge and information, and the absence of tension (or a sense of urgency or need) for change.[31] Examples of erroneous beliefs about blood transfusion include the idea that two units should always be transfused because one is never enough[31], that transfusion is a quick and effective remedy for surgical anemia,[16] and that intravenous iron is not necessary/safe/cost-effective for reducing anemia.[16] Such barriers are best removed through education and outreach.

Other barriers can be systemic, for instance institutional policies or protocols on transfusion decision-making may be absent.[31] In a hierarchical environment, the clinician placing the transfusion order may be under instructions from a more senior clinician and may not feel comfortable challenging the instruction.[32] These barriers are likely to be location specific and should be identified through observation.

Conclusion

In order to implement optimum PBM practices, it is necessary to complement policy and infrastructure changes with an intensive program of clinician education to dispel myths that promote liberal blood transfusion practices and to encourage clinicians to base transfusion decisions on evidence and best-practice guidelines. Clinicians should also be empowered to speak up and question transfusion decisions that don't appear to meet practice guidelines.

Continuing medical education (CME) is an effective method to introduce up-to-date knowledge to clinicians and facilitate the implementation of best practice guidelines, and has been recommended as part of institution-wide PBM implementation procedures.[14,33] In combination with audits and reminders, education about guidelines has shown a reduction in the use of blood units (9%-77%) and in the proportion of patients receiving transfusions (17%-79%).[33]

The proposed CME activity is intended to bridge the clinical practice gaps in PBM at ABC Community Health Center as described in this Needs Assessment. It is directed toward physicians and surgeons who make decisions about perioperative blood management but will also be helpful for clinicians who support and carry out PBM tasks under the instructions of the physicians and surgeons. The activity will use active learning strategies such as case studies in which clinicians need to make transfusion decisions based on patient histories, best practice guidelines, and systemic limitations. The case studies will be followed by breakout session for clinicians in different roles and disciplines to discuss the challenges and barriers they anticipate. The groups will finally reunite to share their perceived challenges with one another and identify points where interdisciplinary processes can facilitate the implementation of PBM. Participants will be asked to complete surveys before, immediately after, and 1 year after the activity to help organizers assess the effectiveness of the CME activity.

Our goal is to have 90% of transfusion decisions be made in compliance with best practice guidelines by one year after the CME activity.

Table 1 - Table of gaps, learning objectives, and desired outcomes

	Gap in Practice	Learning Objective	Desired Outcome
1	Clinicians order prophylactic perioperative blood transfusions without considering if the risks are outweighed by the expected benefits	Assess the risks and benefits of perioperative blood transfusion versus its alternatives, with reference to guidelines and patient history	Patients receive perioperative blood transfusions according to guidelines and based on a risk-benefit ratio based on their medical histories.
2	Clinicians mitigate preoperative anemia, whether confirmed or presumed, through blood transfusion	Recognize the risks of preoperative anemia and describe methods to manage it without blood transfusion	Patients' preoperative anemia is managed through alternative interventions. Their surgical procedures are delayed if their hemoglobin levels are too low.
3	Clinicians do not implement timely measures to minimize preoperative anemia, such as prescribing erythropoeitins or intravenous iron in advance of surgery	Prescribe appropriate and timely doses of erythropoietin and/or iron to mitigate preoperative anemia	Patients' preoperative anemia is managed with erythropoetins and intravenous iron supplements, and these measures are initiated sufficiently in advance of surgical procedures to allow patient hemoglobin to reach safe levels
4	Clinicians opt for blood transfusion without considering the appropriate threshold of hemoglobin concentration to trigger a transfusion decision given the patient's condition	Recall the maximum hemoglobin concentrations that trigger the need for perioperative transfusions in different categories of patients	Patients' hemoglobin concentrations are measured and compared to guideline-recommended thresholds, and the decision for preoperative transfusion is triggered only when the appropriate conditions are met. The minimum necessary volume of blood is used.

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