Management of Postoperative Complications: Anemia

Laura Rees Willett, MD[a,*], Jeffrey L. Carson, MD[b,*]

KEYWORDS

• Anemia • Hip fracture • Blood transfusion

KEY POINTS

- Anemia is extremely common following hip fracture surgery.
- Evaluation should include important comorbidities, symptoms, and vital signs in addition to hemoglobin level.
- Consistent evidence from randomized trials favors a restrictive transfusion strategy, leading to utilization of less blood with at least equivalent clinical outcomes.
- The optimal restrictive transfusion threshold is unknown, but there is a preponderance of published experience using a hemoglobin threshold of 8 g/dL in the elderly hip fracture population.
- The most common serious risk of transfusion in this population is circulatory overload.
- Further work is needed to define the optimal transfusion threshold for general postoperative elderly patients, as well as those with comorbid acute coronary syndrome or chronic kidney disease.

INTRODUCTION

Anemia is extremely common following hip fracture. More than 80% of patients have a hemoglobin concentration less than 11 g/dL.[1] Most hip fracture patients are elderly and suffer from multiple comorbidities. In decades past, standard postoperative practice was to maintain hemoglobin levels of greater than 10 g/dL, especially in elderly patients or those with coexisting cardiovascular disease. Over the past several years, new data from randomized trials evaluating thresholds for transfusion have become available, resulting in new guidelines,[2] which recommend lower, or more restrictive, hemoglobin thresholds than those used in the past. Randomized trials of transfusion therapy were necessary because the results of observational studies are confounded by severity of underlying illness.[3]

[a] Division of Education, Rutgers Robert Wood Johnson Medical School, 1 RWJ Place, MEB-486, New Brunswick, NJ 08903, USA; [b] Division of General Internal Medicine, Rutgers Robert Wood Johnson Medical School, 125 Paterson Street, New Brunswick, NJ 08901, USA
* Corresponding authors.
E-mail addresses: willetlr@rwjms.rutgers.edu; jeffrey.carson@rutgers.edu

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PATIENT EVALUATION

In addition to the current hemoglobin level, the following should be assessed:

- Preinjury hemoglobin level
- Cardiac and renal comorbid conditions
- Signs of continuing active bleeding
- Cardiovascular symptoms
- Vital signs
- Coagulation abnormalities

Although unproven, these factors could play a role in choosing a transfusion threshold, deciding to transfuse despite a hemoglobin level over the threshold, or considering alternative or adjunctive therapies for anemia.

MANAGEMENT GOALS

The randomized controlled trials of transfusion compare the outcomes of patients randomized to more restrictive (ie, lower) transfusion thresholds to those assigned more liberal or traditional thresholds. **Table 1** summarizes the data from selected large trials of transfusion thresholds in adults. The largest trial (FOCUS) is of greatest applicability, because it included adult hip fracture patients with a hemoglobin level less than 10 g/dL.[4] All patients had either cardiovascular disease or multiple cardiac risk factors. Patients (n = 2016) with an average age of 82 years were randomized to a restrictive hemoglobin threshold of 8 g/dL or a liberal threshold of 10 g/dL. The protocol allowed for patients to be transfused at a hemoglobin level higher than their assigned threshold in the event of serious symptoms attributed to anemia, including chest pain due to cardiac ischemia, congestive heart failure, or hypotension or tachycardia unresponsive to fluid challenge. Patients randomized to the restrictive threshold (vs the liberal threshold)

- Received a median of 0 units (vs 2 units) of blood
- Had a hemoglobin before transfusion of 7.9 g/dL (vs 9.2 g/dL)
- Experienced a 30-day mortality of 4.3% (vs 5.2%)
- Experienced a 60-day rate of inability to walk unassisted of 28.1% (vs 27.6%)

No important clinical outcomes were significantly different between the 2 groups. Importantly, about one-fifth of patients in the restrictive group received transfusion despite having a hemoglobin level greater than 8 g/dL, due to symptoms, signs, or protocol violations. The most common indication for such a transfusion was hypotension or tachycardia unresponsive to fluid replacement.

The other large trials summarized in **Table 1**[5–8] are less applicable to the typical after-hip fracture population. Each of these had a patient population with an average age between 58 and 70 years and varying clinical scenarios. However, all of these trials as well as a recent Cochrane review[9] and guidelines[2] reached the same overall conclusion: a restrictive threshold is preferable to the more traditional liberal threshold. Although exposing patients to the lower risk and lower cost of fewer transfusions, the restrictive strategy achieves similar or even improved[8] clinical outcomes.

Several caveats come along with this conclusion. Important subgroups of patients are not well represented in these trials:

- Acute coronary syndrome (generally excluded)
- Chronic kidney disease (11% or fewer)

Further data will be needed to assess the transfusion needs of these populations.[10,11] The rates of transfusion at hemoglobin levels higher than the assigned