Iron Deficiency Anemia—Bridging the Knowledge and Practice Gap

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ABSTRACT

Despite its high prevalence, anemia often does not receive proper clinical attention, and detection, evaluation, and management of iron deficiency anemia and iron-restricted erythropoiesis can possibly be an unmet medical need. A multidisciplinary panel of clinicians with expertise in anemia management convened and reviewed recent published data on prevalence, etiology, and health implications of anemia as well as current therapeutic options and available guidelines on management of anemia across various patient populations and made recommendations on the detection, diagnostic approach, and management of anemia. The available evidence confirms that the prevalence of anemia is high across all populations, especially in hospitalized patients. Anemia is associated with worse clinical outcomes including longer length of hospital stay, diminished quality of life, and increased risk of morbidity and mortality, and it is a modifiable risk factor of allogeneic blood transfusion with its own inherent risks. Iron deficiency is usually present in anemic patients. An algorithm for detection and management of anemia was discussed, which incorporated iron study (with primary emphasis on transferrin saturation), serum creatinine and glomerular filtration rate, and vitamin B_{12} and folic acid measurements. Management strategies included iron therapy (oral or intravenous), erythropoiesis-stimulating agents, and referral as needed.

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Anemia management and its relationship to improved patient outcomes are gaining recognition in the health care community [1,2]. Iron deficiency anemia (IDA) occurs across all populations and is associated with diminished quality of life, physical and cognitive performance, and unfavorable clinical outcomes [3]. In addition, presence of anemia greatly increases the likelihood of allogeneic blood transfusions in hospitalized patients and the associated adverse events and outcomes related to blood transfusions [3]. Hospital-acquired anemia can develop in 3 of every 4 hospital admissions, and it is associated with increased resource utilization and mortality [4].

Although data (some discussed here) indicate the high prevalence of the condition across many patient populations, the data on how widely and successfully the anemia is managed by the clinicians are succinct, and the available studies are often indicative of limited treatment of anemia [5,6]. This suggests that the detection, evaluation, and management of IDA and iron-restricted erythropoiesis (formerly known as functional iron deficiency) are unmet medical needs [7,8]. Practice guidelines for management of anemia are a step toward providing the needed information and closing the gap between physician knowledge and practice. The Society for Advancement of Blood Management (SABM) and Network for Advancement of Transfusion Alternatives (NATA) have developed guidelines for detection, evaluation, and management of anemia in patients scheduled for elective orthopedic surgery [9,10], but new guidelines for other populations are lacking. Awaiting much needed future works on formulating formal practice guidelines, a multidisciplinary panel of clinicians with expertise in anemia management convened to review the existing evidence on prevalence and significance of anemia across patient populations, to discuss clinical strategies for management of anemia, and to identify areas in need of future research.

Methods

The project was planned to feature a narrative overview of the evidence followed by unstructured discussions of an expert panel. For the purpose of the panel discussion and given its widespread acceptance, the World Health Organization (WHO) definition of anemia (Table 1) [11] was used unless otherwise indicated. The Panel was organized by the SABM (http://www.sabm.org), using a modified RAND Delphi method, as previously described [12]. In this method, candidates were selected based on their expertise in various aspects of the subject (as indicated by their publication records, academic positions, prior membership in expert/advisory boards, etc) by SABM leadership, and

the final 8 panelists were determined by their willingness to participate in the study. All the panelists are listed as authors of this manuscript with the exception of the third author (MJ) who was not a panelist and was primarily responsible for literature search and synthesis. The meeting took place on May 31, 2012, in Santa Monica, CA. During the meeting, panelists reviewed and addressed recent published data on prevalence, etiology, and health implications of anemia as well as current therapeutic options and available guidelines on management of anemia across various patient populations.

Articles indexed in PubMed were searched using the following primary Medical Subject Heading search term: "Anemia, Iron-Deficiency"[Mesh] OR ("Anemia"[Mesh] AND ("Chronic Disease"[Mesh] OR "Inflammation"[Mesh] OR "Aged"[Mesh] OR "Neoplasms"[Mesh] OR "Kidney Diseases"[Mesh] OR "Heart Diseases"[Mesh] OR "Outpatients"[Mesh] OR "Pregnancy"[Mesh] OR "Lung Diseases"[Mesh] OR "Cerebrovascular Disorders"[Mesh] OR "Cardiac Surgical Procedures"[Mesh] OR "Organ Transplantation"[Mesh] OR "Critical Illness"[Mesh] OR "Orthopedics"[Mesh])). Given the narrative nature of the review and available resources, the literature search was not intended to be all-inclusive and focused on the most recent primary research manuscripts as well as review and practice guidelines published from 2010 to 2012. Additional studies and publications were included and reviewed as suggested by the panelists. The panelists made recommendations on the detection, diagnostic approach, and management of anemia with emphasis on populations that are deemed at significant risk for anemia and its consequences. A summary of the discussions made by the panelists on significance of anemia and management strategies is provided here.

Results

Current Status of Anemia Across Populations

Summary of data on prevalence of anemia in various patient populations and the reported consequences of anemia is provided in Table 2. These data were reviewed and discussed by the panelists.

Panel Discussions

Significance of Anemia

The prevalence of anemia is high across all reviewed populations, especially in hospitalized patients, and emphasized anemia is associated with worse clinical outcomes including longer length of hospital stay, reduced survival, diminished quality of life, and increased risk of morbidity and mortality. Anemia is a modifiable risk factor of allogeneic blood transfusion with its own inherent risks. Anemia can also be a warning sign for underlying serious diseases (eg, colorectal cancer) [3]. Anemia can be acquired or exacerbated during hospital stay, and the issue of hospital-acquired/exacerbated anemia is often ignored, underattended, and underappreciated and can lead to worse outcomes. Lastly, effective treatment modalities for anemia that can greatly help improve health and clinical outcomes are available.

Table 1
World Health Organization definition of anemia [11]

Population	Hb diagnostic of anemia (g/dL)[a]
Children aged 6 months to 6 years old	<11.0
Children aged 6-14 years old	<12.0
Adult men	<13.0
Adult nonpregnant women	<12.0
Adult pregnant women	<11.0

[a] Values obtained from venous blood samples obtained at sea level.