The Journal of Emergency Medicine, Vol. 50, No. 3, pp. 394–402, 2016

0736-4679/$ - see front matter

ELSEVIER

http://dx.doi.org/10.1016/j.jemermed.2015.08.010

Original Contributions

CrossMark

FACTORS ASSOCIATED WITH HOSPITALIZATION AMONG EMERGENCY DEPARTMENT PATIENTS REFERRED FOR QUICK INVESTIGATION OF IRON-DEFICIENCY ANEMIA

Xavier Bosch, MD, PHD, Ester Monclús, MD, Alexy Inciarte, MD, Pedro Moreno, MD, Anna Jordán, NS, and Alfonso López-Soto, MD, PHD

Department of Internal Medicine, Hospital Clínic, Institut d'Investigacions Biomèdiques August Pi i Sunyer, University of Barcelona, Barcelona, Spain
Corresponding Address: Xavier Bosch, MD, PHD, Department of Internal Medicine, Hospital Clínic, University of Barcelona, Villarroel 170, 08036-Barcelona, Spain

☐ **Abstract—Background: Although patients with anemia are frequently seen in emergency departments (EDs), studies on patients presenting there with symptomatic chronic anemia—usually iron-deficiency anemia (IDA) caused by occult gastrointestinal bleeding—are lacking. Awareness of predictors of hospitalization could direct the ED triage to the appropriate diagnostic setting. Objective: Based on initial observations that some patients with IDA were hospitalized after ED referral and initial evaluation at a quick diagnosis unit (QDU), a new cost-effective alternative to hospitalization for diagnostic workup, this study aimed to determine the patient factors associated with hospitalization after the first QDU visit. Methods: An 8-year prospective cohort study of patients with IDA referred from the ED to the QDU of a third-level university hospital was conducted. Patients with a baseline hemoglobin level of <9 g/dL in the ED, proven iron deficiency, and no overt bleeding were included. The primary outcome was hospitalization after the initial QDU assessment. Results: Two hundred eighty-four (7.7%) of 3692 patients were hospitalized. Inter-rater agreement of appropriateness of admissions was 90.6% (κ = 0.82). Overall, 90% of study patients presented to the ED with symptomatic anemia, and 87% were transfused there. On multivariate analysis, age ≥65 years, living alone, a post-transfusion hemoglobin level of <9 g/dL, higher age-adjusted overall comorbidity, heart failure, and poor physical health-related quality of life at first QDU visit independently predicted hospitalization. Conclusion: While these predictors do not necessarily reflect the need for hospitalization, they are easily evaluated during the initial ED visit and can guide the triage of similar IDA patients to the suitable setting for timely investigation.** © 2016 Elsevier Inc.

☐ **Keywords—emergency department; hospitalization; iron-deficiency anemia; occult gastrointestinal bleeding; quick diagnosis units**

INTRODUCTION

Patients with anemia are frequently seen in emergency departments (EDs), and emergency physicians may play an essential role in their evaluation and initial management (1). However, data on the frequency of anemia in the general ED population are limited (2). Notably, apart from reports on the occurrence and management of anemia in pediatric, obstetric, and gynecologic (i.e., abnormal uterine bleeding) patients, ED patients with sickle cell disease, and ED management, including red blood cell (RBC) transfusion strategies in patients with acute gastrointestinal (GI) hemorrhage or in trauma and critical care, no studies on adult subjects presenting to EDs with symptomatic chronic anemia—most commonly corresponding to microcytic, iron-deficiency anemia (IDA) caused by occult GI bleeding—have been reported (1–3).

Reprints are not available from the authors.

RECEIVED: 26 February 2015; FINAL SUBMISSION RECEIVED: 13 July 2015;
ACCEPTED: 13 August 2015

In Spain, a country with a publicly funded health system, physicians at primary care centers (PCCs) commonly refer patients with moderate to severe IDA (hemoglobin <10 g/dL) to EDs to gain quicker access to GI investigations via emergency admission (4,5). While the standard operating procedure has been to hospitalize these patients, even the young ones, for speeding diagnostic workup, the recent creation of hospital-based outpatient quick diagnosis units (QDUs) has represented a shift in PCC referrals and ED admission practices (4). In patients with different potentially serious conditions, frequently associated with cancer, QDUs have proven a solution to diagnostic delays and an efficient, cost-saving alternative to hospitalization for diagnostic workup (4–8). While referral criteria for anemia vary among QDUs, our unit assesses anemic patients, mostly with new, uninvestigated IDA, with an index hemoglobin value measured at the time of presentation to the ED ("baseline hemoglobin") of <9 g/dL and no acute GI bleeding. Although the optimal hemoglobin threshold warranting quick investigation of IDA has not been elucidated, the rationale for using this cutoff is evidence showing that risk of GI (mainly colorectal) malignancy in IDA patients is significantly increased when the hemoglobin level is <9 g/dL (9–12). Initial observations showed, however, that some patients with IDA presenting to the ED with baseline hemoglobin <9 g/dL who were referred to QDU were unpredictably hospitalized shortly after starting the QDU assessment.

The delineation of risk factors has permitted us to systematize the care, including the appropriate management setting (inpatient vs. outpatient setting) of patients presenting with acute overt GI hemorrhage and secondary anemia, and improved decision-making at the early triage level has led to improved outcomes, resource use, and overall management (13). In contrast, factors associated with hospitalization of patients presenting to EDs with significant chronic IDA are unknown, meaning that early care and triage to the proper level of care for evaluating these patients for diagnostic purposes relies primarily on the judgment of referring physicians or on institution practices or guidelines.

To elucidate this evidence gap, the goal of this study was to determine, among ED adults referred to the QDU of a third-level university hospital for investigation of IDA, the patient factors associated with hospitalization after the initial QDU visit.

METHODS

Study Design

This was a prospective cohort study of patients with IDA who were consecutively referred from the ED to the QDU between September 2005 and October 2013. The primary outcome was hospitalization after initial QDU consultation. The research ethics committee of the hospital approved the study, and informed consent was obtained from all patients.

Study Setting and Population

The QDU is located in an 870-bed third-level university hospital in Barcelona (Spain) with a reference population of almost 550,000. The main requirements for evaluation are similar to other QDUs—namely, patients should be well enough to travel to the hospital for several visits and investigations, and well-defined referral criteria must be agreed upon (5,8). While patients were referred from the ED to the QDU at the discretion of emergency physicians, at the QDU patients were managed at the discretion of QDU physicians, comprising a staff attending physician (a consultant internist) and senior internal medicine resident physicians. While no standardized hospitalization criteria were used, the QDU attending physician directed clinical decisions regarding admission. Repeat consultations by individual patients were excluded.

Inclusion criteria were age ≥18 years; a baseline hemoglobin level at the ED of <9 g/dL; iron deficiency based on low serum ferritin levels, supported, if equivocal, by low transferrin saturation, raised total iron-binding capacity, and increased soluble transferrin receptor; unknown cause of IDA at the time of presentation to the ED or at PCCs before referral to the ED; and ability to provide informed consent. Exclusion criteria were acute GI bleeding; current or recent history of significant overt extraintestinal blood loss (e.g., abnormal uterine bleeding or blood donations); and death or loss to follow-up before finishing the outpatient study. Fecal occult blood testing was not systematically performed, nor was it a criterion for enrollment. As reported by the British Society of Gastroenterology in its guidelines for the management of IDA, fecal occult blood testing is of "no benefit in the investigation of IDA [grade of recommendation: B], being insensitive and nonspecific" (14).

Study Protocol

Hospital admission was defined as admission to the internal medicine department.

Because no relevant literature exists, patient factors potentially associated with admission were defined according to clinical experience. Variables of interest were tabulated using standardized forms.

At the time of the first visit, QDU physicians performed a complete anamnesis and physical examination and interviewed patients about their history of IDA;