CLINICAL FEATURES OF IRON DEFICIENCY ANEMIA IN INTERNAL MEDICINE PRACTICE

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1. RELEVANCE

Iron deficiency anemia (IDA) is the most common hematological disorder worldwide, affecting approximately 1.2–1.6 billion people globally and accounting for nearly 50% of all anemia cases (WHO, 2023). In internal medicine practice, IDA is encountered across virtually all patient categories — women of reproductive age, pregnant women, elderly patients, individuals with chronic gastrointestinal pathology, and those with inadequate nutritional intake. Despite its high prevalence, IDA remains significantly underdiagnosed: a substantial proportion of patients present to the internist with non-specific complaints — fatigue, dyspnea on exertion, reduced cognitive performance — without a definitive hematological diagnosis having been established at the primary care level.

The clinical significance of IDA extends beyond hemoglobin reduction. Iron deficiency in non-hematopoietic tissues produces a distinct spectrum of organ-specific manifestations — including pica, restless legs syndrome, koilonychia, glossitis, and neuropsychiatric symptoms — that are frequently overlooked in routine clinical evaluation. Furthermore, IDA in adult males and postmenopausal women may represent the presenting manifestation of serious underlying gastrointestinal pathology, including colorectal carcinoma, mandating systematic etiological investigation. The growing evidence base supporting alternate-day oral iron dosing, the expanding role of intravenous iron formulations, and the emerging understanding of hepcidin-mediated iron regulation collectively necessitate regular reassessment of IDA management protocols in internal medicine practice.

2. AIM

The aim of this study is to analyze the clinical features, diagnostic characteristics, and treatment outcomes of iron deficiency anemia in patients managed in an internal medicine setting, with particular focus on the prevalence of IDA-specific clinical manifestations, the frequency of etiological diagnosis establishment, and the comparative efficacy of oral versus intravenous iron supplementation regimens.

3. MATERIALS AND METHODS

A prospective observational cohort study was conducted at the Department of Internal Medicine, Samarkand State Medical University Clinical Hospital, over a 12-month period (January–December 2023). The study included 120 adult patients (aged 18–75 years) with confirmed IDA, defined as hemoglobin below WHO thresholds (Hb <130 g/L in males; <120 g/L in non-pregnant females) combined with serum ferritin <30 µg/L and/or transferrin saturation <20%.

Patients with concurrent hemolytic anemia, thalassemia, aplastic anemia, active malignancy under chemotherapy, or chronic renal failure requiring dialysis were excluded. All patients underwent standardized evaluation including complete blood count (CBC), peripheral blood smear morphology, serum ferritin, serum iron, total iron-binding capacity (TIBC), transferrin saturation, C-reactive protein (CRP), reticulocyte count, and vitamin B12/folate levels to exclude mixed deficiency states. Etiological workup included Helicobacter pylori antigen testing, celiac disease serology (anti-tTG IgA), upper and lower gastrointestinal endoscopy in patients with clinical indications, and gynecological consultation in premenopausal women.

Patients were stratified by anemia severity: mild (Hb 100–119/129 g/L), moderate (Hb 80–99 g/L), and severe (Hb <80 g/L). Treatment was assigned based on severity and etiology: oral ferrous sulfate 100 mg elemental iron twice daily (n=72), alternate-day oral ferrous sulfate (n=28), or intravenous ferric carboxymaltose 500–1000 mg (n=20) for patients with malabsorption, intolerance to oral therapy, or severe symptomatic anemia. Hemoglobin response was assessed at 4 and 12 weeks. Statistical analysis was performed using SPSS v.26.0; continuous variables were compared using Student's t-test or Mann-Whitney U-test as appropriate; $p<0.05$ was considered statistically significant.

4. RESULTS

Among 120 study participants, 78 (65.0%) were female and 42 (35.0%) were male. Mean age was 41.3 ± 14.7 years. By severity, 38 patients (31.7%) had mild IDA, 54 (45.0%) moderate IDA, and 28 (23.3%) severe IDA. Mean baseline hemoglobin was 89.4 ± 14.2 g/L; mean serum ferritin was 8.3 ± 5.6 µg/L; mean transferrin saturation was 9.7 ± 4.3%.

The most prevalent IDA-specific clinical manifestation was fatigue and reduced exercise tolerance (96.7%), followed by pallor of mucous membranes (84.2%), palpitations (61.7%), dyspnea on exertion (58.3%), and angular stomatitis or glossitis (24.2%). Pica (predominantly pagophagia — compulsive ice consumption) was identified in 18.3% of patients, predominantly in women of reproductive age, representing a highly specific symptom of chronic iron depletion. Restless legs syndrome was reported in 22.5% of patients. Koilonychia was documented in 11.7% of cases.

Etiological investigation established a definitive underlying cause in 103 patients (85.8%). In females (n=78), the leading etiology was menorrhagia or uterine pathology (44.9%), followed by nutritional deficiency (23.1%), and gastrointestinal blood loss (17.9%). In males (n=42), gastrointestinal blood loss was the dominant etiology (66.7%), with H. pylori-associated gastroduodenal pathology identified in 38.1% and colorectal pathology in 14.3%. Celiac disease was newly diagnosed in 7 patients (5.8%) who had presented with refractory IDA and no prior gastrointestinal diagnosis.

At 4 weeks, IV iron achieved significantly greater mean hemoglobin increment compared with daily oral iron (27.4 ± 6.2 g/L vs. 18.6 ± 5.8 g/L; $p<0.001$) and alternate-day oral iron (27.4 ± 6.2 vs. 19.8 ± 6.1 g/L; $p<0.001$). At 12 weeks, hemoglobin normalization was achieved in 90.0% of IV iron recipients, 80.6% of daily oral iron recipients, and 82.1% of alternate-day oral iron recipients ($p=0.21$ for oral groups comparison). Gastrointestinal adverse effects were significantly lower in the alternate-day group (21.4%) compared with the daily oral group (47.2%; $p=0.018$).

5. CONCLUSION

1. IDA in internal medicine practice presents a clinically heterogeneous syndrome extending beyond classical anemia symptoms. IDA-specific manifestations — including pica (18.3%), restless legs syndrome (22.5%), koilonychia (11.7%), and glossitis/angular stomatitis (24.2%) — were identified in a substantial proportion of patients and should be systematically sought in clinical evaluation.

2. Etiological investigation is essential in all IDA patients: a definitive cause was identified in 85.8% of cases. Gastrointestinal blood loss was the leading etiology in males (66.7%), with colorectal pathology found in 14.3%, underscoring the diagnostic imperative of endoscopic evaluation. Celiac disease was newly diagnosed in 5.8% of patients presenting with refractory IDA.

3. Intravenous ferric carboxymaltose achieved significantly faster hemoglobin recovery at 4 weeks compared with oral regimens ($p<0.001$) and is indicated in malabsorption, intolerance, and severe symptomatic IDA. Alternate-day oral iron demonstrated equivalent 12-week efficacy to daily dosing with a significantly lower rate of gastrointestinal adverse effects (21.4% vs. 47.2%; $p=0.018$), supporting its preferential use in appropriately selected patients.

4. Systematic screening for IDA in high-risk groups — women of reproductive age, elderly patients, and individuals with chronic gastrointestinal pathology — combined with mandatory etiological workup upon IDA confirmation, should be implemented as standard practice in internal medicine departments.

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