



## Evaluation of Iron Deficiency Anemia in Elderly

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### ABSTRACT

*Introduction: Anemia in the elderly (age > 65 years), is defined as hemoglobin concentration below 12 gm/dl and 13 gm/dl in females and males respectively. Anemia should never be considered as a normal physiological response to ageing, the etiology must always be investigated. Iron deficiency anemia is one of the most common anemia in old age.*

*Chronic occult blood loss from the Gastro-intestinal (GI) tract is the main cause of iron deficiency anemia. GI malignancy may also present as Iron Deficiency Anemia (IDA) in elderly patients. Patients were subjected to detailed history, thorough clinical examination and relevant investigations including serum iron studies, bone marrow examination and gastrointestinal endoscopies. 47 elderly patients with IDA were selected and investigated. Gastrointestinal blood loss was found to be the most common form of blood loss with 44.7% patients having positive fecal occult blood test and 68% patients revealing some or the other lesion on gastrointestinal endoscopies. 51% patients had upper GI lesions and 21% had lower GI lesions leading to blood loss. 21% patients had normal endoscopies and termed as having purely nutritional iron deficiency, whereas 10% had non GI source of blood loss and multi-factorial causes of IDA.*

*IDA requires extensive investigation especially of the gastrointestinal tract to diagnose underlying lesion. There is possible association of IDA with GI malignancies, which makes it imperative to thoroughly investigate IDA in elderly, rather than blind iron replacement therapy without exhaustive efforts to diagnose the underlying cause.*

**KEYWORDS :** Iron Deficiency Anemia, serum iron study, bone marrow examination, gastrointestinal endoscopy

**Introduction-** Anemia is a common problem in the elderly and its prevalence increases with age. Chronic diseases and iron deficiency are the most common causes of anemia in elderly patients. [Smith DL, 2000] Among patients aged 85 years or more, the prevalence of anemia ranges from 27-40% in men and from 16-21% in women. [Ania BJ 1997]. In India the proportion of population above 65 years is increasing. The percentage of elderly population in India is 4.8%. [Park K 2005]. Mean hemoglobin falls with age in both the sexes, but remains well within the normal range. Therefore, anemia should never be accepted as physiological response to aging, the etiology must always be investigated. [Murphy PT 1994] Chronic occult blood loss from the GIT is the main cause of iron deficiency anemia. GIT malignancies may also manifest itself as IDA in elderly patients. [Moses PL 1995]

This study was designed to determine the causes of iron deficiency anemia in elderly. Gastro intestinal endoscopy may facilitate an early diagnosis of malignancy and prompt treatment of underlying disease. [Kepezyk T 1995] Therefore, gastro intestinal tract was investigated endoscopically in patients with IDA regardless of fecal occult blood loss.

**Material & Methods:** This hospital based study was conducted in geriatric patients (>65 years) attending Medicine OPD or admitted in medical wards at Himalayan Institute of Medical Sciences, Dehradun over a period of 12 months. Catchment area of hospital includes Garhwal region of Uttarakhand and parts of western UP.

Inclusion criteria include all IDA patients above 65 years of age. 47 patients were included for the current study. All patients were subjected to detailed history, thorough clinical examination and investigations to ascertain the etiology of IDA in the study group.

Anemia was categorized according to WHO criteria, that is, hemoglo-

bin (Hb) concentration <12g/dl in females and <13g/dl in males. If low serum ferritin levels (<15mcg/L) were associated with microcytic hypochromic anemia, IDA was confirmed. Patients with normal serum ferritin (>100mcg/L) were excluded from the study. In cases where serum ferritin came to be between 15-100mcg/L, bone marrow iron stores were measured by perls' staining and those with low iron stores in bone marrow were considered to be having IDA.

**Investigations:** Lab investigation includes complete hemogram with blood indices, ESR, (by automated counters), general blood picture, reticulocyte count, fecal occult blood test, routine urine examination, Liver function tests, Kidney function tests, Bone marrow aspiration (the posterior iliac crest was used for both marrow aspiration and biopsy under local anesthesia), Serum Ferritin (determined by immunometric enzyme immunoassay using the ORG5 FE ferritin kit, which could measure serum ferritin from 05-7100mcg/L).

**Other investigations:** chest X-Ray, ultrasound abdomen, CT abdomen, intestinal endoscopy (upper/lower), biopsies in certain cases to ascertain the etiology of IDA.

For hematological investigations, values given in Wintrobe's clinical hematology were taken as standard.

Patients with microcytic anemia (MCV<80fl) were evaluated on the basis of serum ferritin levels. Patients with serum ferritin levels of <15mcg/L were included as IDA and >100mcg/L were excluded (8,9,10,11). Those with serum ferritin level between 15 and 100mcg/L, bone marrow iron stores were assessed and patients with low bone marrow iron stains on perls' staining (grade 0 to 2+) were classified as IDA (12) and included in the study.

Anemia was classified as mild, moderate, severe based on hemoglobin levels according to WHO criteria: Mild anemia: 10gm% to below

cut-off level, Moderate: 7-10gm% and Severe: <7gm% (13). Gastro-intestinal endoscopies were done for all patients of IDA irrespective of fecal occult blood test. Exclusion criteria for GI endoscopy were an obvious cause of blood loss or involvement of other systems (hemoptysis, urogenital bleed, CKD, severe cardiovascular disease, cirrhosis).

**Statistical analysis:** Data entry and analysis were carried out using software SPSS 16. Results were expressed as means $\pm$ SD,  $p < 0.05$  was considered to be statically significant.

**Result:** A total number of 47(n=47, 28 males/19 females) patients above the age of 65 years suffering from IDA, were included in the study. According to severity of anemia, 32(68%) had moderate anemia, 10(19%) had severe anemia and 7(13%) had mild anemia.

The mean age was 66.1 $\pm$  5.6 years, with a range of 65 to 84 years. The mean hemoglobin was 7.3  $\pm$  2.28 g/dl, the mean corpuscular volume was 68.68  $\pm$  9.60fl, the mean corpuscular hemoglobin was 21.88 $\pm$  3.97 pg, and mean serum ferritin level was 12.38  $\pm$  8.6 mg/ml in patients with IDA (table 1).

**Table 1:** Characteristics of our IDA patients (n=47).

Age	66.1 $\pm$ 5.6 years
Gender (male/ female)	28/19
Hemoglobin (gm %)	7.3 $\pm$ 2.28
MCV (fL)	68.68 $\pm$ 9.6
MCH (pg)	21.88 $\pm$ 3.97
MCHC (g/dl)	32.29 $\pm$ 2.88
Serum ferritin (ng/ml)	17.38 $\pm$ 11.75

The main cause of IDA is chronic intestinal blood loss. In the present study 21(44.7%) patients were found to have positive fecal occult blood test. Gastro intestinal endoscopies, upper and/or lower endoscopies were performed in 42(89.33%) patients of IDA. 5(10.63%) patients were excluded as the cause of IDA in these cases was non gastro-intestinal in origin (table 2).

**Table 2.** Distribution of patients of IDA according to etiology.

Causes	Number of patients (n=47)
GI blood loss	32 (68%)
Nutritional anemia	10 (21.2%)
Non-GI blood loss	05 (10.63%)

According to etiological causes of IDA, 32(68%) patients had GI source of chronic blood loss leading to IDA, as detected on endoscopy. 38(80.85%) patients of IDA had upper and/or lower gastro intestinal symptoms like nausea, dyspepsia, pain abdomen, altered bowel habits, hematochezia, worms in stools. History of smoking and/or tobacco intake was elicited in 31(65.9%) patients of IDA and history of chronic steroid and/or NSAIDs intake was found in 15(31.9%) patients of IDA, all of these patients had some or the other UGI lesion detected on UGI endoscopy. In 10(21.2%) patients no lesion was detected on endoscopy. Radiological investigations like ultrasound abdomen and barium meals and tests for mal-absorption also did not reveal any abnormality in these cases and anemia was therefore considered to be purely nutritional in these cases.

Of the 32 patients with gastro-intestinal lesions on endoscopy, 22(68.7%) patients had only upper GI lesions, 8 (25%) patients had only lower GI lesions and 2(6%) patients had both upper and lower GI lesions. Therefore, the UGI causes of blood loss leading to IDA were found in a total of 24(75%) patients.UGI endoscopy was done in a total of 31 patients, and lesions were found in 24 cases. The causes of UGI bleed were erosive gastritis in 6, duodenal ulcer in 5, gastric ulcer with pan-gastritis in 4, carcinoma esophagus in 4, carcinoma stomach in 2, esophagitis with gastro-esophageal reflux disease in 2 patients and gastric polyp in 1patient (table 3). Suspicious lesions were biopsied and labeled as carcinoma only after the histo-pathological confirmation.

Anemia due to lower GI blood loss was found in 10(31.2%) out of the 32 patients with chronic GI blood loss. LGI endoscopy was done in a total of 13 patients. Lesions were found in 10 cases, whereas 3

came out to be normal. The lesions detected were colon carcinoma in 4 patients, colonic polyp, diverticulitis, hemorrhoids  $\pm$  anal fissure in 2 patients each (table 3).2 patients had both upper and lower GI lesions, one had both gastric and colonic polyp and the second had duodenal ulcer along with internal hemorrhoids.

**Table 3:** Findings in the 44 IDA patients evaluated by upper gastrointestinal endoscopy

Lesion	n
Upper GI Endoscopy	31
Erosive gastritis	06
Duodenal ulcer	05
Gastric ulcer	04
Carcinoma esophagus	04
Carcinoma stomach	02
Esophagitis with reflux	02
Gastric polyp	01
Normal	07
Colonoscopy	13
Carcinoma colon	04
Colon polyp	02
Diverticulitis	02
Hemorrhoids $\pm$ fissure	02
Normal	07

A GI source could not be found in 15 patients with IDA. Out of which 10 patients did not reveal any significant abnormality after extensive investigations and hence considered to be having IDA as a consequence of poor nutritional status. 5 patients had other causes of IDA. 2 of these patients had hemoptysis and diagnosed as having pulmonary Koch's and carcinoma lung respectively. 1 case had IDA with CKD, and hence multi-factorial cause of anemia. One patient each of IDA was diagnosed as having hematological malignancies namely, Multiple Myeloma and NHL. Generally, anemia related to hematological diseases and chronic diseases is anemia of chronic disease and characterized by high serum ferritin levels and adequate bone marrow iron stores. However anemia is multifactorial in such cases and could be attributed to anorexia and concomitant iron deficiency. Further, differentiation between ACD and IDA can be done by estimating sTfR and log of sTfR/ ferritin ratio which is out of the scope of our study.

**Discussion:** Anemia is a common health problem in the elderly and its prevalence increases with age. [Ania BJ 1994] Chronic diseases and iron deficiency are the main causes of anemia in the elderly. In a study by Joosten et al, the prevalence of anemia was 24% in a geriatric hospitalized population, and the commonest causes of anemia were chronic disease in 35% patients and IDA in 15%patients. In US, IDA occurs in upto 4% of elderly patients. [Looker AC 1997] Similarly, in the UK, the incidence of IDA was 3.5-5.3% in the elderly. [Mukhopadhyay D 2002] In Turkey, the incidence of IDA in outpatients >65 years was found to be 7.6%. IDA in elderly almost always leads to an evaluation of GIT as a possible cause of bleed, in 20-40% of patients, the source in upper gastro intestinal tract from peptic ulcer diseases, gastritis, esophagitis or gastric carcinoma [Guyatt GH 1992] the site of blood loss is in the colon in 15-30% cases, most often caused by carcinoma, polyps, colitis, angiodysplasia and hemorrhoids. The source is not found in the remaining 10-40%of elderly patients with GI blood loss. Long term follow up of elderly patients in whom GI source is not identified indicates that most often the anemia resolves or remains stable with iron replacement.[Kis AM 1998]

The main cause of IDA is chronic gastro intestinal blood loss. In the present study, fecal occult blood loss was detected in 44.7% of our patients. All of them had gastro intestinal lesions on endoscopy. 11 patients had negative stool occult blood test yet, were diagnosed to have at-least one lesion demonstrated by endoscopy. Therefore, in elderly patients, upper gastrointestinal endoscopy and/or colonoscopy should be performed regardless of fecal occult blood test result.

Upper gastrointestinal endoscopy and colonoscopy combined resulted in a diagnosis of gastrointestinal pathology in 80-85% of patients with IDA. [Zuckerman G 1992] Patients with GI symptoms suggestive of upper and/or lower GI tract pathology should be evaluated for with UGI Endoscopy and/or Colonoscopy. In the absence of GI symptoms,

colon should be examined first in the elderly. [Rockey DC 1993]

In our study, endoscopy revealed the origin of blood loss in 68% of IDA cases. The majority of elderly patients disclosed upper GI lesions identified by upper GI endoscopy. Peptic ulceration is the most common lesion identified in the upper gastrointestinal tract. In the lower GI system, colon carcinoma was the most common lesion. Malignant disease of the GI tract was found in 21% of our patients. An association between IDA and an increased incidence of gastrointestinal malignancy is also stated. [Joosten E 1992] In our study, we diagnosed gastrointestinal malignancy in 10 patients ( 04 colon, 04 esophageal and 02 gastric cancers). All of the patients with GI malignancy showed positive fecal occult blood test, suggesting the importance of this test in malignancies. In patients with negative gastrointestinal endoscopic investigations, radiographic examination of the small intestine is recommended. [Rockey DC 1993] In our study, patients with negative endoscopic findings did not reveal any pathological lesion by radiologic examination.

In our study, history of NSAIDs intake and/or smoking was noted in 71% patients with positive upper GI lesions. NSAID intake is associated with an increased risk of clinical upper gastrointestinal tract events. [El-Serag HB 2002] Cigarette smoking is also associated with an increased incidence of gastric and duodenal ulceration, impaired ulcer healing, and more frequent ulcer healing. [Domschke S 1984]

**Conclusion:** It can be concluded IDA requires extensive investigations regardless of GI symptoms and fecal occult blood test results, especially in the elderly patients because of its possible association with GI malignancies. Therefore, comprehensive assessment of geriatric patients with anemia must include clinical review of symptoms and signs to reflect possible etiology. It is crucial to evaluate the etiology and treat the cause of IDA in addition to symptomatic treatment by iron replacement.

**Acknowledgment:** I would like to express my profound gratitude to all the participants for their co-operation and for their immense faith they reposed in me.

## REFERENCES

- Ania BJ, Suman VJ, Fairbanks VF, Melton LJ 3rd: Incidence of anemia in older people: an epidemiologic study in a well defined population. *J Am Geriatric Soc* 1997;45:825-831. | 2. Ania BJ, Suman VJ, Melton LJ 3rd: Prevalence of anemia in medical practice: Community versus referral patients. *Mayo Clin Proc* 1994;69:730-735. | 3. Cash JM, Sears DA., The anemia of chronic disease: spectrum of associated diseases in a series of unselected hospitalized patients. *Am J Med* 1989;87: 638-44. | 4. De-Meyer EM. Preventing and controlling iron deficiency anemia through primary health care, WHO, Geneva 1989. | 5. Daly MP: Anemia in the elderly. *Am Fam Physician* 1989;39:129-136. | 6. Domschke S, Domschke W: Gastroduodenal damage due to drugs, alcohol and smoking. *Clin Gastroenterol* 1984;13:405-436. | 7. El-Serag HB, Graham DY, Richardson P, Inadomi JM: Prevention of chronic ulcer disease in users of nonsteroidal anti-inflammatory drugs: The use of a nomogram in cost-effectiveness analysis. *Arch Intern Med* 2002;162:2105-2110. | 8. Freedman ML, Sutin DG: Blood disorders and their management in old age; in Tallis R, Fillit H, Brocklehurst JC (eds): *Brocklehurst's textbook of geriatric medicine and Gerontology*, ed 5. London, Churchill Livingstone, 1998, pp1247-1291 | 9. Gordon SR, Smith RE, Power GC: The role of endoscopy in the evaluation of iron deficiency anemia in patients over the age of 50. *Am J Gastroenterol* 1994; 89: 1963-1967. | 10. Guyatt GH, Patterson C, Ali M, Singer J, Levine M, Turpic J et al. Diagnosis of iron deficiency anemia in elderly. *Am J Med* 1990;88:205-209. | 11. Guyatt GH, Patterson C, Ali M, William A, Mellroy W. Laboratory diagnosis of iron deficiency anemia: an overview. *J Gen Intern Med* 1992;7:145-153. | 12. Joosten E, Pelemans W, Hiele M, Noyen J, Verhaeghe R, Boogaerts MA: Prevalence and causes of anemia in a geriatric hospitalized population. *Gerontology* 1992; 38:111-117. | 13. Kepezyk T, Kadakia SC: Prospective evaluation of gastrointestinal tract in patients with iron-deficiency anemia. *Dig Dis Sci* 1995;40:1283-1289. | 14. Kent S, Weinberg ED, Macadam P. The etiology of the anemia of chronic disease and infection. *J Clinical Epidemiol* 1994; 47:23-33. | 15. Kis AM, Carnes M. Detecting iron deficiency anemia in patients with concomitant medical problems. *J Gen Intern Med* 1998;13: 455-461 | 16. Looker AC, Dallman PR, Carroll MD, Gunter EW, Johnson CL: Prevalence of iron deficiency in the United States. *JAMA* 1997; 277: 973-967. | 17. Loannou GN, Spector J, Scott K, Rockey DC. Prospective evaluation of a clinical guideline for the diagnosis and management of iron deficiency anemia. *Am J Med* 2002; 113:281. | 18. Murphy PT, Hutchinson RM: Identification and treatment of anemia in older patients. *Drugs Aging* 1994;4:113-127. | 19. Moses PL, Smith RE: Endoscopic evaluation of iron deficiency anemia. A guide to diagnostic strategy in older patients. *Post grad Med* 1995;98:213-216. | 20. Mukhopadhyay D, Mohanaruban K: Iron deficiency anemia in older people: Investigation, management and treatment. *Age, Ageing* 2002;31:87-91 | 21. Park K, editor. *Demography and family planning*. In Park's textbook of preventive and social medicine. 19th ed. Jabalpur: Banarasi Das Bhanot;2005:379-413 | 22. Rockey DC, Cello JP: Evaluation of the gastro intestinal tract in patients with iron deficiency anemia. *N Engl J Med* 1993;329:1691-1695. | 23. Shine JW. Microcytic anemia. *Am Fam Physician* 1997; 55: 245-262. | 24. Smith DL: Anemia in the elderly. *Am Fam Physician* 2000;62:1565-1572. | 25. Salive ME, Cornoni-Huntley J, Guralnik JM, Phillips CL, Wallace RB, Ostfeld AM, Cohen HJ: Anemia and hemoglobin levels in older persons: Relationship with age, gender, and health status. *J Am Geriatr Soc* 1992;40:489-496. | 26. Smieja MJ, Cook DJ, Hunt DL, Ali MA, Guyatt GH. Recognizing and investigating iron deficiency anemia in hospitalized elderly. *CMAJ* 1996;156:691-696. | 27. Walsh JR. Hematological problems. In: Cassel CK, et al eds. *Geriatric medicine*, New York, NY: Springer 1997: 627-36. | 28. Zuckerman G, Benitez J: A prospective study of bidirectional endoscopy (Colonoscopy and Upper GI Endoscopy) in the evaluation of patients with occult gastro intestinal bleeding. *Am J Gastroenterol* 1992; 87: 62-66.