ORIGINAL ARTICLE

PREVALENCE, EVALUATION AND MANAGEMENT OF PREOPERATIVE ANAEMIA IN THE ELECTIVE GENERAL SURGICAL PATIENTS

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Background: Anaemia is the commonest haematological problem in the preoperative patients. Often it is a sign of underlying disease or associated co-morbid condition. A low haemoglobin level is associated with an excess risk in surgical procedure and its outcome. Therefore an understanding of any cause, evaluation and any potential treatment is crucial in the preoperative setting. Our objective was to determine prevalence, evaluation and management of preoperative anaemia in the elective general surgical patients. **Methods:** Prospective observational study in Surgical Unit-II, Liaquat University Hospital Jamshoro from July 2008 to June 2009. One hundred and twenty-five anaemic cases were included in the study, with haemoglobin level <10 g/dl. Their age ranged from 13 to 70 years. They were evaluated for preoperative anaemia in relation to surgical problems and associated any co-morbid conditions. **Results:** Out of 830 patients during the study period, 125 patients were anaemic with haemoglobin level 2.1–9.9 g/dl. Fifty-six (44.8%) were male and 69 (55.2%) were female, and 68.5% patients were from rural areas. Hypochromic microcytic was seen in 101 (80.8%) cases. Commonest surgical problem associated with anaemia was malignancies (27.2%) followed by haemorrhoids (20%) and tuberculosis of abdomen (14.4%). Majority of patients (52%) were managed on oral iron supplements while 48% received blood transfusions.

Keywords: Pre-operative, Anaemia, causes, evaluation, management, malignancy, haemorrhoids

INTRODUCTION

Anaemia is the commonest haematological problem in the pre operative patients in third world countries.[1] Traditionally, anaemia is believed to increase the risk of surgery and it is common practice for non urgent surgery to be postponed if a patient is anaemic. The level of circulating haemoglobin below which such an effect exists is however unknown, nor is it known whether the risk is real. The presence of anaemia increases the risk of depletion of available oxygen.[2–4] Thus some anaesthetists have set an arbitrary level of haemoglobin below which they regard the risk of elective surgical anaesthesia as unjustifiable.[5–7] It may, therefore, be that either surgery is occasionally postponed unnecessarily because of anaemia or that surgery is occasionally undertaken in patients who should first had treatment for anaemia. This study is designed to determine causes, evaluation and to design a local guideline to manage preoperative anaemia in these patients for a better postoperative outcome.

PATIENTS AND METHODS

It was a prospective observational study done in Surgical Unit-II, Liaquat University Hospital Jamshoro from July 2008 to June 2009. Patients with <10 g/dl Hb were included in the study after a written consent. Children under 12 years of age were excluded from the study. All patients were evaluated with a thorough detailed history, such as menstrual blood loss, haemotochezia, melena, haematemesis, haemoptysis or haematuria. Social history included occupational hazards, dietary habits, and illicit drug use.

A complete physical examination was focused on manifestations and potential aetiologies of anaemia, such as pallor of stain ad mucous membranes, jaundice signs of bleeding, purpura, petechiae, hepatospleenomegaly and lymphadenopathy. The laboratory testing included a complete blood count (CBC) and serum ferritin. Stool DR & Endoscopic testing were advised in selected cases.

RESULTS

Out of 830 patients during the study period, 125 (15.06%) patients had haemoglobin level between 2.1 and 9.9 g/dl. Fifty-six (44.8%) were male and 69 (55.2%) were female, and 68.5% patients were from rural areas. Age ranged from 13 years to 70 years (Table-1). Commonest surgical problem associated with anaemia was malignancies (27.2%) followed by haemorrhoids (20%) and abdominal tuberculosis (14.4%) (Table-2). Haemoglobin level of most of the patients (80.8%) was between 6.1 g/dl and 9.9 g/dl. Hypochromic microcytic anaemia was seen in 101 (80.8%) followed by normochoromic normocytic anaemia in 22 (17.6%), and hypochromic normocytic in 2 (1.6%) cases. No patient with megaloblastic anaemia was seen in our series (Table-3). Serum ferittin level was between 1 and 49 ηg/ml, in majority (44%) of women (Table-4). Gastrointestinal endoscopy was performed in 4 (3.2%) patients. Two patients (1.6%) with haemorrhoids were having associated ulcerative

colitis. Two (1.6%) patients with cholelithiasis were having severe gastritis. Majority of patients (52%) were managed on oral iron supplements while 48% received blood transfusions. Intravenous iron therapy was not given to any of our patient (Table-5). There was no mortality recorded.

Table-1: Distribution of patients

Parameters	Number (%)
Urban	39 (31.5)
Rural	86 (68.5)
Male	56 (44.8)
Female	69 (55.2)
Age range (in years)	13–70 years

Table-2: Surgical problems in anaemic patients

Diagnosis	Number (%)
Malignancies	34 (27.2)
Haemorrhoids	25 (20)
Intestinal Tuberculosis	18 (14.4)
All others	48 (38.4)
Total	**125**

Table-3: Haemoglobin level and types of anaemia in anaemic patients [n(%)]

Haemoglobin	
2.1–6 g/dl	24 (19.2)
6.1–9.9 g/dl	101 (80.8)
Type of anaemia	
Hypochromic microcytic	101 (80.8)
Normochoromic Normocytic	22 (17.6)
Hypochromic Normocytic	2 (1.6)
TOTAL	**125**

Table-4: Serum ferittin level

Serum Ferittin	Number (%)
Women	
1–49 ηg/ml	55 (44)
50–150 ηg/ml	14 (11.2)
Men	
1–29 ηg/ml	34 (27.2)
30–400 ηg/ml	22 (17.6)
TOTAL	**125**

Table-5: Management of Anaemia

Management	Number	%
Oral Iron Supplements	65	52
Blood transfusions	60	48
Intra venous iron therapy	00	00
Total	**125**	**100**

DISCUSSION

Patients coming for elective surgeries are mostly healthy adults and symptomatic anaemia in these patients is rare. According to the international standard preoperative period is not an appropriate setting to screen and investigate the cause of a symptomatic anaemia, but in 3rd world countries where iron deficiency is common, it is generally required to evaluate and manage low haemoglobin level prior to any surgical intervention in order to prevent morbidity.[8,9]

Low haemoglobin level is associated with an excess risk in surgical procedure as the ability of tissues to with stand hypoxia is likely to be impaired by low level of circulating haemoglobin. A blood transfusion very shortly before or after operation is not likely to remove this effect completely. Possibly a low haemoglobin level in a patient may simply indicate an underlying condition of greater severity than in a patient with a normal haemoglobin level. However, study of possible association between severity of the condition requiring surgery and haemoglobin level is not easy. In women on the other hand, menstrual blood loss has most disturbing effect on iron balance and anaemia is common. A level of haemoglobin may therefore be obscured to some extent in women.[10,11]

We found 15.06% prevalence of anaemia in patients admitted in surgical ward for elective surgery with haemoglobin <10 g/dl. Khan *et al*[1] reported a little higher prevalence of 19.2% locally. However a higher prevalence of 35–75% has been reported in certain populations.[12] In our study female prevalence (55.2%) is higher than male as also reported from a local study.[1] Lee *et al*[13] also reports a high prevalence of anaemia in female gender. Our patients' age ranged from 13 to 70 years, similar age range (18–60 years) has also been considered in a local study.[1] Majority of the patients as expected were from rural areas due to poverty and low socioeconomic status. Commonest surgical problem associated with anaemia was malignancies followed by haemorrhoids and abdominal tuberculosis. Knight *et al*[14] report less than 9 g/dl haemoglobin level in patients with malignancies. They also report a high prevalence (80%) of anaemia in patients with advance malignancies. Kluiber *et al*[15] have reported prevalence of anaemia as 50% in his series of haemorrhoids patients with the haemoglobin less than 9 g/dl. Lee *et al*[13] reports a prevalence of 31.9% of anaemia in his study of 281 diagnosed cases of abdominal tuberculosis.

Haemoglobin level was 6.1–9.9 g/dl in 80.8% of our patients. Khan *et al*[1] and Kluiber *et al*[15] also reported a similar prevalence of haemoglobin in their study. Only 24 (19.2%) of our patients were having a very low haemoglobin level between 2.1 and 6.0 g/dl. Our patients had mostly microcytic hypochromic anaemia followed by Normochoromic Normocytic. Lee *et al*[13] and Knight *et al*[14] also reported a high incidence of microcytic hypochromic anaemia.

The serum ferittin level is an evaluation index of iron stores. In our study serum ferittin level was between 1–49 ηg/ml in majority of the women. Lipschitz *et al*[16] also reports mean value of 4 ηg/ml serum ferittin level in their 32 female patients with iron deficiency anaemia.

Oral iron supplements were recommended in 52% cases, and 48% patients received whole blood/pack cells transfusions in our study. Intravenous iron therapy was not recommended to any of our patient during the study period. Iron is most conveniently given in oral form. Adult should receive 150 to 200 mg of elemental iron per day in deficiency states. Oral iron is readily absorbed in an acidic gastric environment and is often given with ascorbic acid and avoiding antacids. Haemoglobin level should increase by 1 g/dl over 2 to 3 weeks on oral iron therapy. If patients fail to take oral iron therapy or if iron loss exceeds capacity for oral iron

absorption, intravenous therapy may be necessary.[17,18] The American Society of Anaesthesiology recommend transfusion if haemoglobin level is less than 6 g/dl, and that transfusion is rarely necessary when the Hb level is 10 g/dl. When haemoglobin concentration falls below 10 g/dl transfusion decision should be based on risk for bleeding, intravascular volume status, and susceptibility to complications of inadequate oxygenation.

Appearance of acquired immunodeficiency syndrome and the evidence that homologous blood can induce immunosuppression and thereby impair the host resistance of surgical patients has led to reconsideration of the indication for transfusion.[3] Blood transfusion is never a definite therapy but is a correction of deficiency caused by patient's disease. It neither hastens convalescence nor improves nutritional status or counteracts infection.[2,5] The main aim of blood transfusion in surgical patients is to correct the temporary deficits in oxygen carrying capacity and/or deficiencies in cellular and plasmatic components of the coagulation system.[11,12] The presence of anaemia and preoperative blood transfusion have different potential effects on surgical outcome. The evidence suggests that decision for transfusion in preoperative patients should be individualised.[1,4,6]

Anaemia resulting from vitamin B_{12} or folate deficiency is also easily treated with supplementation. Folate deficiency should be treated with folic acid 1 mg/day for up to 4 months or until the patients anaemia is corrected.[3,10,11] Vitamin B_{12} deficiency is usually treated with intramuscular cobalamin injections. The dosage may vary depending on the severity of anaemia and symptoms, from 1,000 µg daily for 7 days to 1,000 µg, every to 4 weeks. Studies have also shown that oral cobalmin supplementation of 1,000 to 2,000 µg/day for 4 months may be at least as effective as parenteral cobalmin but this requires patient compliance. Reticulocytosis may be expected in 3 to 5 days and haemoglobin levels should rise within 10 days.[4,6]

Goodnough *et al*[2] suggest evaluating and treating preoperative anaemia, especially within 28 days before surgery and transferrin saturation should be less than 20%. They also suggests that it is helpful to analyse the reticulocyte count and mean corpuscular volume to further refine the type of anaemia, for example, thalassaemia, myelodysplasia and haemolysis and to refer the patient to a haematologist if needed.[1,4,6]

We follow the guidelines of American Society of Anaesthesiology and Goodnough *et al* in our university hospital. Patients who were not in need for urgent surgical intervention were discharged on the oral treatment for correction of anaemia. Patients with haemoglobin level <6 g/dl were transfused pack cells, and patients with >6 g/dl were transfused whole blood.

CONCLUSION

Iron deficiency is a common problem in our country. A thorough evaluation of anaemic patients followed by scientific management is suggestive.

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