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Anaemia in Cancer

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Introduction

Anaemia is one of the most common conditions associated with cancer, with 50% to 60% of cancer patients experiencing anaemia at some time during the course of their illness and treatment.

The blood in our body is composed of three types of cells (red blood cells, white blood cells, and platelets) that circulate throughout the body. Red blood cells contain haemoglobin (Hb), a red, iron-rich protein that carries oxygen from the lungs to all of the body muscles and organs. Oxygen provides the energy that body needs for all of its normal activities. Anaemia occurs when number of red blood cells (or the Hb in them) falls below normal and the body gets less oxygen and therefore has less energy than it needs to function properly.

When number of red blood cells decreases, the heart works harder, pumping more blood to send more oxygen throughout the body. If heart works too hard, it can develop a rapid heartbeat and / or another serious condition known as left ventricular hypertrophy (LVH), an enlargement of the heart muscle that in turn can lead to heart failure.

Epidemiology

Prevalence of anaemia due to cancer progression varies based on the definition of anaemia and the type of cancer involved. It ranges from 5% (prostate cancer) to as high as 90% (Multiple Myeloma). Prevalence of anaemia appears to be high in patients with Head & neck cancers, uterine-cervical cancers, advanced multiple myeloma, lymphoma, lung, ovarian, other genitourinary cancers and those suffering from cancer related renal impairment.

A broad review of clinical trial noted that mild anaemia after chemotherapy can occur in 100% patients and incidence of more severe anaemia can reach 80%. Radiation therapy can also increase the incidence of anaemia in cancer patients.

Causes: Cancer related anaemia falls into three distinct categories–

1. Anaemia as a result of the malignancy; Red blood cell survival is frequently shortened and the production is impaired, possibly because of the action of immune and inflammatory cytokines (TNF, INTERFERON, INTERLEUKIN-1) activated by presence of tumour, which in turn results in – impaired iron utilization, suppression of precursor cells of RBCs and inadequate erythropoietin production.



2. **Anaemia attributed to the form of cancer therapy applied:** Many cancer chemotherapeutic agents result in anaemia as their toxic effects e.g. Cisplatin, Etoposide, Cytarabine, Mercaptopurine, Topotecan, Irinotecan, Doxorubicin etc. severe anaemia may result in 16-55% patients. Bleeding from tumour bed or bleeding due to systemic coagulopathy may also contribute to anaemia in these patients.
3. **Anaemia resulting from one or more contributing factors:** such as intercurrent infections, Nutritional deficiencies-Iron, Folic acid, Vit-B12 Deficiency Underlying chronic disorder, excessive marrow fibrosis and displacement renal impairment.

Symptoms & Signs

“It is common for people to ignore Symptoms of Anaemia or attribute them to other Causes...”

Anaemia can be difficult to identify because early symptoms may be mild. Major symptoms & signs of anaemia include:

- Extreme Fatigue
- Weakness
- Nausea, Anorexia
- Shortness of breath
- Confusion or loss of concentration
- Dizziness or fainting
- Pale skin, including decreased pinkness of lips, gums, lining of eyelids, nailbeds and palms
- Palpitation (Thumping in the heart)
- Feeling cold
- Apathy, sluggishness
- Sadness or depression
- Loss of libido

Particularly for a person with serious disease, fatigue, weakness and other symptoms associated with anaemia can compound challenges of coping with the serious disease, and fatigue being the most common and important clinical manifestation of anaemia in cancer patients. Accurate assessment of anaemia and fatigue is important to ensure that patients are optimally managed. Assessment should incorporate laboratory parameters, physical symptoms, and Quality of Life (QOL) indicators. Brief assessment composed of a few simple questions in the form of questionnaires, which evaluate fatigue, and QOL in patients of cancer related anaemia.

Patient-reported areas of daily life negatively affected by fatigue:

- Ability to work
- Physical well being
- Ability to enjoy life in the moment
- Emotional well being
- Intimacy with partner
- Ability to take care of the family
- Relationships with family and friends
- Concerns about mortality and survival

Diagnosis: Anaemia is diagnosed by –

- Reduction in Hb level, Normal range (13.5g/dl-17.5g/dl in males), (11.5g/dl-15.5g/dl in females)
- Reduction in Number of RBCs or Erythrocytes, normal range (4.5 to 5.5 Million/mm³)
- Reduction in Packed cell volume (hematocrit) Normal range 30-36%

Based on Hb levels, anaemia is classified as–

- Mild (10 g/dl–11 g/dl)
- Moderate (8 g/dl–10 g/dl)
- Severe (< 8 g/dl)

Management: The management of anaemia in patients with cancer should be based on severity of associated symptoms and also to supplement the ongoing anti cancer treatment e.g. radiotherapy requires oxygen in the tissues. In anaemic patients, due to less O₂ in the tissue, radiotherapy (RT) will be less effective. Therefore, those patients who are going for radiotherapy, correction of anaemia and to maintain Hb level above 10.0 gm% is very essential throughout treatment.

Corrections of nutritional deficiencies: like Iron, Folic acid, Vit-B12. As well as correction of underlying cause of occult blood loss, or infections.

Non Pharmacological Interventions like exercise for the management of cancer related fatigue, restorative therapy, sleep, hygiene, nutritional consultation and education.

Red blood cell transfusions: Red blood cell transfusions are a rapid and reliable method of correcting anaemia, especially in life threatening situations. This rapidly raises the RBC count and Hb concentration and is effective mode of treatment virtually in all patients. **But, in addition, transfusion is associated with potential risks, including transmission of infectious agents, (like hepatitis B, Hepatitis C, HIV), which may further cause delay in cancer treatment, allergic, febrile and haemolytic reactions, iron and circulatory overload. And possibly an unfavourable effect on overall outcome of cancer management.**



Erythropoietin (growth factor for RBCs)

The introduction of recombinant human erythropoietin (rHu EPO) has proven to be a major advance in the therapeutic options available for managing anaemia in cancer patients. The use of erythropoietic agents is recommended in cancer patients with chemotherapy related anaemia and a Hb level <10 g/dl. Erythropoietic therapy should be strongly considered in patients with symptomatic anaemia and Hb level <10 g/dl, and considered in patients with Hb levels 10 – 11 g/dl.

The recommended starting dose of erythropoietin for adults is 150 Units/kg subcutaneously (SC) thrice in week. The hematocrit and Hb levels should be monitored on weekly basis in patients receiving erythropoietin therapy until becoming stable. Usually rise in 1g/dl of Hb level in one month, is considered as positive response. Erythropoietin is available as prefilled syringes, may be given as an IV or SC injection.

SC injections can also be self-administered, as prescribed for the length of time specified by your physician.

Erythropoietin is generally well tolerated and producing stable Hb levels, avoid the fluctuation associated with RBC transfusions as well as reduce RBC transfusion requirements in anaemic cancer patients receiving chemotherapy. The adverse events reported are frequent sequelae of disease and are not necessarily attributable to erythropoietin therapy. The adverse event reported with use of erythropoietin are minimal increase in blood pressure, headache, joint pain, nausea, edema, fatigue, diarrhoea, vomiting, chest pain, skin reaction at administration site, dizziness, Constipation, deep vein thrombosis.

The demonstrated efficacy of Epoetin (erythropoietin) Alfa for increasing Hb levels, reducing transfusion requirements and improving patient (QOL) have made this agent a rationale choice for management of cancer related anaemia.

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