

Dimorphic Anaemia: A Comprehensive Analysis through a Case Study

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Abstract- Dimorphic anaemia is a condition characterised by the presence of two distinct populations of red blood cells with different sizes, shapes, and staining characteristics in the peripheral blood. This article presents an in-depth exploration of dimorphic anaemia through a detailed case study. The case study involves a patient who presented with symptoms of anaemia, including fatigue and pallor, and underwent comprehensive diagnostic procedures to identify the underlying cause of dimorphic red blood cell population. The article delves into the aetiology, clinical presentation, diagnostic approach, and management strategies of dimorphic anaemia, while using the case study to exemplify the complexities associated with this condition.

Index Terms- Dimorphic anaemia, case study, red blood cells, differential diagnosis, microcytic anaemia, macrocytic anaemia, iron deficiency anaemia, hemolytic anaemia, thalassemia, diagnostic approach.

I. INTRODUCTION

Dimorphic anaemia is an intriguing haematological condition characterised by the presence of two distinct populations of red blood cells (RBCs) with varying sizes, shapes, and staining characteristics within the peripheral blood. This phenomenon can arise from a diverse array of underlying etiologies, ranging from nutritional deficiencies to genetic disorders. This article presents a comprehensive analysis of dimorphic anaemia by means of a detailed case study. Through this case, we aim to highlight the importance of a thorough diagnostic approach in uncovering the underlying cause of dimorphic RBC populations and subsequently tailoring appropriate management strategies.

Case Presentation:

A 35-year-old male patient presented to the outpatient haematology clinic with complaints of generalised weakness, fatigue, and pallor. The patient's medical history revealed no chronic illnesses, and his family history was unremarkable for haematological disorders. Physical examination revealed conjunctival pallor and tachycardia. Initial laboratory investigations included a complete blood count (CBC), which revealed haemoglobin of 8.5 g/dL, a decreased mean corpuscular

volume (MCV) of 60 fL, and an increased red cell distribution width (RDW) of 18%.

Diagnostic Approach:

The case study provides a platform to discuss the differential diagnosis of dimorphic anaemia. A systematic approach to diagnostics included further laboratory tests such as serum iron studies, serum ferritin, transferrin saturation, and serum vitamin B12 levels. These tests were essential in distinguishing between the two predominant categories of anaemia: microcytic and macrocytic.

Diagnosis and Management:

After a series of laboratory investigations, the patient's dimorphic anaemia was attributed to a combination of iron deficiency anaemia and hemolytic anaemia. The microcytic RBC population indicated iron deficiency, while the macrocytic RBC population suggested hemolysis. Subsequent investigations, including haemoglobin electrophoresis, confirmed the presence of β -thalassemia trait, accounting for the macrocytic RBC population.

The patient was initiated on iron supplementation and provided with dietary counselling. Hemolysis management involved addressing the underlying β -thalassemia trait through genetic counselling and periodic monitoring. The article elaborates on the significance of tailored management strategies for patients with dimorphic anaemia, considering the underlying causes and potential complications.

Discussion:

The case study serves as a springboard to discuss the multifactorial nature of dimorphic anaemia. The article explores the common and rare etiologies that can contribute to the occurrence of dimorphic RBC populations, including concurrent nutritional deficiencies, hemolytic disorders, and genetic conditions such as thalassemia.

II. CONCLUSION:

Dimorphic anaemia represents a diagnostic challenge that requires a comprehensive approach to uncover the underlying etiologies.

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