SPURIOUSLY LOW PULSE OXIMETRY MEASUREMENT CAUSED BY HEMOGLOBIN LANSING

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Background

Low peripheral capillary oxygen saturation (SPO2) readings can be caused by pre-analytical factors such as motion artifact, poor perfusion, venous pulsations, nail polish or signal artifact from ambient light. We describe a case of spuriously low pulse oximetry readings due to Haemoglobin (Hb) Lansing in Hospital Pakar Sultanah Fatimah Muar.

Case report:

A four years old boy, with no known medical illness presented with shortness of breath on exertion. He has a history of allergy towards seafood. On examination, SPO2 was 88%, with high respiratory rate and ronchi present. Further lab investigations revealed a Hb level of 11.6g/ dL, mean cell volume (MCV) of 72.5 fL, mean cell haemoglobin (MCH) of 23.2 pg and red blood cell count (RBC) of 4.99X10(3)/L. Peripheral blood film shows hypochromic microcytic cells with target cells and features to rule out thalassemia trait. Hb analysis was done, capillary electrophoresis revealed a small unmeasurable abnormal peak at Zone 8. High performance liquid chromatography demonstrated an abnormal peak at retention time 1.96 minutes. This peak accounted for 8.1% of the total hemoglobin. A DNA analysis of the alpha globin gene identified a heterozygous state of α2 Codon 87 (CAC>CAG) corresponding to the Hb Lansing mutation. Further family screening confirmed that his father and aunt are also heterozygotes for Hb Lansing.

Conclusion:

Hb Lansing is a type of alpha hemoglobin variant that can cause spuriously low oxygen saturation. This is mainly due to the different absorption spectrum of the abnormal hemoglobin that cannot be detected by pulse oxymeter. Arterial blood gas studies will show normal SaO2 reflect the lack of hypoxaemia and given a clue to proceed with hemoglobin variant testing. This step is frequently missed and only done after extensive cardio-pulmonary evaluation failed to reveal a cause for presumed hypoxemia. There are many other variant hemoglobins that can cause low SpO2 as well. Some results in concordantly low SpO2 and SaO2 while some cause low SpO2 and discordant SaO2. The latter shows no clear trend in oxygen affinity among the variants and the reason is unknown. Hence, hemoglobin analysis should be considered in the investigation of asymptomatic patients with persistently low SpO2 readings.