

Dapsone Induced Methaemoglobinaemia: A reminder of the iatrogenic causes of cyanosis

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Dear Editor,

Methaemoglobinaemia is an uncommon presentation to the ED, however it can cause significant morbidity or death if untreated. It arises from the oxidation of iron in circulating haemoglobin, reducing its ability to bind oxygen resulting in tissue hypoxia despite adequate oxygen supply. Methaemoglobinaemia presenting to ED is more commonly acquired than congenital and is often iatrogenic, the result of occupational exposure, or misuse of recreational substances. Many medications are known to cause methaemoglobinaemia with some readily utilised in the ED such as local anaesthetic agents and metoclopramide. However it is also important to be aware of less frequently encountered causative medications such as dapsone, chlorquine, and sulfonamides¹.

A 26 year old woman attended our ED with two days of exertional dyspnoea. On examination, she had oxygen saturations of 85% despite high-flow supplemental O₂. There was perioral cyanosis and dusky discolouration of her nailbeds. At rest she was not dyspnoeic and could complete sentences however she became dyspnoeic on mobilisation. Her past medical history included chronic Lyme disease for and had been commenced on Dapsone three days prior to presentation.

Methaemoglobinaemia was suspected and an arterial blood gas was obtained. This confirmed the diagnosis, with a MetHb level of 20.1% (0.0 – 1.5%) and PO₂ of 58.0 kPa (11.0 – 14.4 kPa), demonstrating the predicted disparity between measured saturations by pulse oximetry and arterial PO₂. ECG, Chest X-ray, renal and liver profile were unremarkable.

The clinical presentation of methaemoglobinaemia is related to the % of total haemoglobin affected, with patients often asymptomatic with MetHb levels below 10%. As levels rise, so too does the symptomatic burden with patients reporting dyspnoea, chest pain, confusion, anxiety and nausea. Severe cases, reflected by a level greater than 50% often present with reduced consciousness, acidosis or seizures. Levels greater than 70% are often fatal. It is important to consider that underlying pathology which impairs oxygen delivery to tissues such as anaemia, heart failure or COPD may cause more severe symptoms at lower MetHb concentrations¹.

Treatment with Methylene Blue reduces iron back to the ferrous state and restores its oxygen carrying ability, however the decision to treat is largely dependent on the MetHb level, comorbidities and symptoms. Generally speaking, levels greater than 30% will require intervention. However if there is coexisting cardiac or respiratory disease, or notable symptomatic burden, levels less than 30% may also require treatment. Potential complications include CNS effects such as serotonin syndrome due to its MAOI properties; or precipitation of haemolytic anaemia in those with underlying G6PD.²

Considering this patient's level was less than 30%, with the absence of underlying cardiorespiratory disease and no evidence of end organ dysfunction, a decision was made not to treat. The patient was admitted for observation and Dapsone withheld. Daily ABGs demonstrated a falling MetHb level of 3.6% the following day and 1.0% on the day of discharge. While multiple cases have been reported secondary to amyl nitrate misuse in recent Irish literature^{3,4}, it is important also to consider iatrogenic causes as in this case.

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