

Local anaesthetics: a case report

A 23-year-old male patient presented to his general dental practice complaining of toothache from the LL6. The patient appeared noticeably pale on entering the surgery, with lips that appeared cyanosed. An examination was carried out, revealing a neglected dentition and generalized bleeding on probing, with the blood taking on an unusual, 'melted-chocolate'-like appearance. A diagnosis of a peri-apical abscess affecting the unrestorable LL6 was made, and it was agreed with the patient that extraction of this tooth would be required.

The patient completed a standard medical history form on which he stated he had congenital methaemoglobinemia. When questioned about this condition, the patient stated it was 'a blood disorder from birth' and that he knew that this disorder had affected a family member's dental treatment in the past, but did not know more about his condition. After discussion with colleagues, a decision was made to contact the local special care dentistry department, and more light was shed on the situation. They advised that we were right to be concerned about the administration of local anaesthetics in this patient. Administering prilocaine to this patient could potentially have resulted in a serious medical emergency. Further liaison with our special care colleagues has resulted in arrangements to have a 'local anaesthetic test' carried out in a secondary care environment. In this setting, standard dental formulations of lidocaine would be administered under anaesthetist supervision, with methylene blue on hand should it be required. Should it be deemed that this can be administered safely, the patient would be discharged back to general dental practice.

Methaemoglobinemia is a rare blood disorder, which exists in both congenital and acquired forms, and occurs when red blood cells contain methaemoglobin at higher-than-normal levels.¹ Methaemoglobin results from the presence of iron in the oxidized

ferric form (Fe^{3+}) as opposed to the reduced ferrous form (Fe^{2+}), resulting in a reduced oxygen-carrying capacity of the circulating haemoglobin.¹ Congenital methaemoglobinemia results from a deficiency in the NADPH methaemoglobin reductase enzyme, and under normal conditions, affected individuals can have circulating methaemoglobin levels of 10–50%.²

Acquired methaemoglobinemia arises as an acute, potentially severe, adverse reaction to various substances, and can be caused by the administration of oxidizing drugs, including dental local anaesthetics. There have been multiple reports of acquired methaemoglobinemia in response to administration of prilocaine in otherwise healthy individuals^{3,4} and in medically compromised patients.⁵ Patients with congenital methaemoglobinemia are at significantly increased risk of acute symptoms in response to local anaesthetics,⁶ and as a result, manufacturers of prilocaine include a warning that its use is contraindicated in 'those rare patients with congenital or acquired methaemoglobinemia'.⁷ Infusion of methylene blue is the primary emergency treatment for acute methaemoglobinemia, and its use is recommended when methaemoglobin levels rise above 30%.⁸ Patients experiencing long-term symptoms as a result of congenital methaemoglobinemia may be prescribed high-dose vitamin C and riboflavin, or hyperbaric oxygen therapy.⁵

In this case, it is important to reflect that in an emergency appointment situation, it would have been all too easy to carry on with local anaesthetic administration and an extraction without further investigation of the patient's condition, especially considering how unconcerned the patient was with his own medical history. This case reinforces the importance of taking a thorough medical history, and of seeking advice from specialist colleagues when necessary. Acute methaemoglobinemia is a rare, but potentially serious, adverse reaction to commonly used dental anaesthetics and is a condition with which clinicians should be familiar. It is also important to be familiar with the manufacturer's instructions for any drugs we administer. Being diligent in our patient assessment in this case avoided a potential medical emergency.

References

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