PO 16 - METHEMOGLOBINEMIA: A CHALLENGE FOR THE ANESTHETIST?

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INTRODUCTION: Methemoglobinemia presents as a high methemoglobin (MetHb) concentration, low oxyhemoglobin (HbO_2) saturation and a low PaO_2. If severe, it leads to hypoxia. Methemoglobinemia occurs when hemoglobin is oxidized becoming incapable of O_2 transport. Delivery of O_2 to the tissues may be compromised by the decreased HbO_2 concentration and by the shift of its dissociation curve to the left.[1] Congenital form occurs due to a rare cytochrome-b_5 reductase deficiency which leads to accumulation of MetHb. Acquired form can arise after exposure to some local anesthetics (benzocaine, lidocaine and prilocaine), nitrous oxide and metoclopramide. As MetHb levels increase, tachycardia, confusion, coma and cardiopulmonary collapse may occur.[2]

CLINICAL CASE: A 45 years-old male patient was scheduled to undergo an elective knee arthroscopic surgery due to meniscus and anterior cruciate ligament tears. His background included a rare inherited cytochrome-b_5 reductase deficiency, manifested as methemoglobinemia. During preoperative evaluation, the patient was asymptomatic and the physical examination showed a mild lip cyanosis. Transthoracic echocardiogram and pulmonary function test were innocent. Arterial blood gas test: Hb 19.0 g/dL, MetHb 17.8%, HbO_2 73.7%, carboxyhemoglobin 1.1%, $SatO_2$ 90.9%, PaO_2 46.0 mmHg, $PaCO_2$ 50.0 mmHg, pH 7.360.

A neuraxial subarachnoid block was performed using 12.5 mg of hyperbaric bupivacaine 0.5% combined to an ultrasound guided femoral nerve single shot block with 150 mg of ropivacaine 0.75%. Continuous ASA standard monitoring was used. The patient remained hemodynamically stable with FiO_2 37% and pulse oximetry saturation 92-96%, and no metabolic acidosis was found. Thus, perioperative O_2 carrying capacity appeared to be adequate. The whole procedure went uneventful. Post-operative laboratory tests performed in Post-Anesthesia Care Unit without alterations were consonant with no significant impairment of O_2 delivery.

DISCUSSION: Preoperative supplementation of oxygen, determination of MetHb and avoidance of oxidizing agents were fundamental in the anesthetic management of this patient. Levels of MetHb > 15% frequently lead to cyanosis, which is consistent with this patient's case. When MetHb is < 20% and oxygenation is adequate, conservative treatment could be applied. Symptoms generally appear with levels of MetHb > 30%. When symptoms are present, other

therapeutic strategies should be applied - administration of 100% oxygen, correction of metabolic acidosis, methylene blue, and exchange blood transfusion. Methylene blue use in congenital methemoglobinemia is still controversial.[3]

Hence, it is essential a thorough approach by a team with a good knowledge of this rare condition to a patient with methemoglobinemia.

REFERENCES

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