[NM-146] Anxiety Related Hyperventilation and Consequent Apnea

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17-year-old otherwise healthy male (65 kg) with history of photophobia and bilateral optic nerve central pallor was planned to get MRI brain and orbits. After discussing anesthesia options, the patient expressed some anxiety about the scan; however, he decided to proceed with MRI without sedation or anesthesia. Approximately 20 minutes into the procedure, the patient became extremely anxious and requested to be taken out of the scanner. He was alert with a heart rate of 125, SpO2 of 100% and a respiratory rate of 30. He was complaining of perioral tingling and had bilateral carpopedal spasm. After a discussion with the patient and his mother, the decision to continue the scan under general anesthesia was made. MRI compatible monitors were placed and nasal canula oxygen was started at 3 L/min. After administration of 150 mg IV propofol, the patient was talking and disinhibited, and an additional 50 mg was administered followed by an infusion of propofol 150 mcg/kg/min. The patient became unresponsive and apneic with stable heart rate, blood pressure and SpO2 >99%. The MRI was restarted and the patient remained apneic for approximately 10 minutes before the SpO2 dropped to 92% at which time 3 breaths of 100% oxygen were administered with bag mask ventilation and the SpO2 rose to 100%. The patient remained apneic for another 10 minutes before spontaneous ventilation resumed. Hemodynamics and SpO2 remained stable throughout the procedure. MRI was completed uneventfully and the patient recovered and was discharged home with no complaints of perioral tingling or carpopedal spasm.

The cause of prolonged apnea in this patient is not known; however, given the patients anxiety and signs/symptoms of hypocalcemia, this might be due to anxiety related hyperventilation resulting in respiratory alkalosis and subsequent respiratory inhibition. Post hyperventilation apnea has been described in patients with hyperventilation syndrome. Usually these episodes are short lasting but few reports of persistent apnea with hypoxemia and cyanosis have been documented in literature. [1] Mechanism of apnea has been proposed to be due to hypocapnia and consequent alkalosis, which inhibits respiratory center. Hypoxia has been described during apneic periods and can be the cause of mortality. [2] This is caused by reduced delivery of oxygen to vital organs due to hypocapnia-induced vasoconstriction. Also, hemoglobin's oxygen binding affinity is inversely related to PaCO2 (Bohr effect) and hence decrease in PaCO2 results in less oxygen delivery to tissues. Use of propofol in this patient might have also contributed to apnea because of its effect on respiratory drive.

Pre-procedure anxiety is common among patients and hence anesthesiologists are likely to encounter hyperventilation before induction of anesthesia. [3]

References

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