

[GA2-49] Taking a Look at Gaze

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General anesthetics cause misalignment of the eyes in the second stage of anesthesia, known as disconjugate gaze. The divergence of the eyes has been thought to be a brief event with few sequelae outside of the operating room. New pediatric ophthalmologic techniques, such as the use of an adjustable suture for final correction of strabismus, require an early exam in the immediate postoperative period to adjust the suture, mandating pediatric anesthesiologists have a better understanding of anesthetic effects on eye gaze.

We present a case of a healthy boy who presented for strabismus repair under general anesthesia. After a mask induction, he was maintained with a total intravenous anesthetic(TIVA) of remifentanyl and propofol. The patient underwent an uneventful strabismus repair with placement of an adjustable suture. An eye exam was performed in the recovery room fifteen minutes after extubation, with movement of the adjustable suture prior to discharge from the PACU.

The effect of various anesthetic agents on pupillary reflexes has been described by Larson(1). Yet, many anesthesiologists have only a basic understanding of these agents on the movements of the eyes. Every anesthesiologist learns that patients under anesthesia progress through Guedel's stages of anesthesia. The third stage of anesthesia is made up of four planes, each which is associated with effects on the eye. As patients emerge from general anesthesia there is a reverse progression through the stages, with the eyes moving into a divergent position during stage II. The exact pathway causing the eye to progress to this position is unclear but it is thought to be due to motor neurons acting on the rectus muscles. These muscles are affected by tonic and burst neurons in the mesencephalic (midbrain) reticular formation which have input from the frontal lobe and cerebellum(2). Anesthetics are known to enhance inhibitory receptors such as GABA and inhibit excitatory receptors such as nicotinic, serotonin and glutamate. It is possible that these same inhibitory effects inhibit a conjugate position of the eyes in the second stage of anesthesia. Children undergoing strabismus repair with an adjustable suture require an early ophthalmologic exam in the PACU to fix the suture in its final place with appropriate alignment of the eyes. All anesthetics affect the movements of the eyes, especially the rapid conjugate eye movements called saccades, potentially altering a postoperative exam. TIVA with remifentanyl and propofol can hasten the resolution of saccade latency, as compared to an inhaled anesthetic, leading to a more rapid and accurate exam(3).

Although anesthetic effects on eye movements are not commonly considered when administering an anesthetic, it is important for the anesthesiologist to remember that anesthetic effects may have implications for patient undergoing ophthalmologic interventions.

1) Larson MD: Mechanism of opioid-induced pupillary effects. Clin Neurophysiology. 2008 Jun;119(6).

2) Leigh R. Neurology of Eye Movement. 3rd ed. Oxford Press, 1999.

3) Baraka et al: Propofol-remifentanyl based anesthesia vs sevoflurane for immediate postoperative evaluation following strabismus surgery. Eur J Anes. 2006 Sep;23(9).

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