

Topical Adrenaline Induced Ventricular Tachycardia in Craniopharyngioma Patient Posted for TNTS

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Abstract

Topical application of adrenaline is commonly used in ENT (Ear Nose Throat) surgeries and some neurosurgical procedures such as sellar or suprasellar mass excision by transnasal route. Cardiac adverse effects such as arrhythmias are not commonly reported complication of topical adrenaline application by nasal packs. Here we present a case report of topical adrenaline induced ventricular tachycardia in a Craniopharyngioma patient posted for Transnasal transsphenoidal excision of lesion (TNTS) excision of lesion.

Keywords: Adrenaline; Arrhythmias; Craniopharyngioma; Cortisol.

INTRODUCTION

Adrenaline soaked nasal packs are used routinely for most sellar and suprasellar lesion excision by transnasal route, and is a time tested procedure. Adrenaline is used with or without local anesthetic for its properties such as constricting capillaries, hemostatic agent and hence better visualization of surgical field.¹ There are reports of adverse cardiovascular effects during infiltration of adrenaline,² but rare encounter with the placement

of Adrenaline soaked nasal packs used for nasal decongestion. Here we present a case report of induction of ventricular tachycardia in patient after placement of adrenaline soaked nasal pack for nasal decongestion for trans nasal transsphenoidal excision of Craniopharyngioma.

CASE PRESENTATION

A mid 20's man presented with history of blurring of vision since 1 month, was diagnosed as Craniopharyngioma and posted for TNTS excision of lesion. Routine pre-operative investigations were within normal limits. The endocrine workup revealed raised Serum cortisol of 28 mcg/dl and prolactin levels. Other investigations were normal. After confirming NPO, On the day the day of surgery, standard anesthesia monitors were attached and induction of anesthesia achieved with injection fentanyl 100 microgram, propofol 100 mg, vecuronium 6 mg intravenously (IV). Maintenance of anesthesia done with sevoflurane and boluses

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of fentanyl and muscle relaxants. Right subclavian vein and left radial artery cannulation was secured for fluid management and intra-arterial blood pressure monitoring respectively.

As a part of surgical preparation, 4 mg of adrenaline in 16 ml of saline soaked swabs were placed in nasal cavity for decongestion after anesthesia handover. Immediately there was tachycardia and hypertension followed by ventricular tachyarrhythmias with heart rate up to 170 bpm (beats per minute). During this period, the blood pressure went upto 290/160 mmHg. The steps taken were

- Immediately informed the surgeon to stop the stimulus and remove the nasal pack.
- Deepened the plane of anesthesia with fentanyl and propofol boluses.
- Inj. amiodarone 150 mg IV given by central line slowly over 10 minutes.
- Adequate fluids given to maintain the intravascular volume.

Arrhythmias settled eventually and heart rate returned to baseline after 5 minutes. There was persistent hypotension and hence blood pressure was maintained with noradrenaline infusion. There was significant ST elevation on ECG (Electrocardiogram) in lead V5 on monitor. 12 lead ECG was taken and Cardiology opinion done. His 12 lead ECG showed broad QRS complexes and ST elevation in only lead V5 on monitor. Surgery was deferred in view of hemodynamic instability after consultation with the surgical team. Arterial blood gas analysis and was within normal limits. Patient was shifted to Neuro-Intensive care unit and smooth extubation was done after 2 hours. Hemodynamics were stable and later patient shifted to ward on the next day. His 2D Echo was done on the second day and follow up ECG were within normal limits.

DISCUSSION

Local application of adrenaline either infiltration or by nasal pack is commonly used to achieve hemostasis and improve the surgical field view. Although 4 mg of adrenaline with 16 ml of saline soaked nasal pack is routinely used by ENT Surgeons for better nasal decongestion and improved view and hence decrease the chances of bleeding during endoscopic surgeries. The studies have been done and it is advised to use adrenaline in such concentration for improved quality of surgical field and the associated hemodynamic changes could be controlled without much clinical

consequences,³ but in our case, we had ventricular tachycardia which is rare after topical adrenaline. Use of topical Moffett's solution, containing 1 ml of 1:1000 epinephrine, the peak levels of epinephrine were 2-4 times higher than the baseline epinephrine values. This increase is mainly by rapid absorption by nasal mucosa and the incidence of hypertension and tachycardia is dose dependent.⁴

It has been shown that acute low potassium levels can cause ventricular tachy arrhythmias even in the absence of cardiac disease and circulating adrenaline can induce hypokalemia in a dose dependent manner.⁵ A case report of cardiovascular crisis with adrenaline infiltration and induced hypokalemia is available in literature.⁶ However in our case, there was no hypokalemia as seen in arterial blood gas analysis and in post-operative period.

Inhalational anesthetics such as Isoflurane, Sevoflurane can increase the sensitivity and arrhythmogenic potential of adrenaline via synergistic effects between the adrenoceptors. It can also decrease the automaticity leading to atrial or ventricular arrhythmias.⁷ In our case, we have used sevoflurane up to 0.8 MAC (Minimum Alveolar Concentration), which may be one of the contributing factor for adrenaline induced ventricular tachycardia. The role of raised serum cortisol levels and cardiovascular risk is documented.⁸ In our patient, there was only borderline elevation of serum cortisol of level 28mcg/dl which may or may not be the contributing factor.

A few factors were presumed to be contributing to the cardiovascular changes in this patient which includes:

- Increased sensitivity to adrenaline.
- Raised serum cortisol levels, though borderline elevation was present.
- Simultaneous Sevoflurane use in this patient which may increase the sensitivity of arrhythmogenic potential of adrenaline.

Considering the complexity of the individual variations of each patient and different underlying pathologies, further studies regarding the safety dose and route of administration of adrenaline for TNTS surgeries are warranted.

CONCLUSION

The sensitivity to adrenaline is different

for each individual, and may have severe cardiovascular consequences. Hence the clinician and anesthesiologist should be vigilant during the adrenaline administration even in normal doses and should be careful especially in patients with raised serum cortisol levels.

REFERENCES

1. Al-Shehri AM. The haemostatic and hemodynamic effects of Epinephrine in septoplasty. *Life Science Journal*. 2015;12(8).
2. Ahmad K, Parveen S, Gilani S (2020) Fatal Ventricular Arrhythmias after Local Adrenaline Infiltration during a Case of Hemithyroidectomy. *Int J Clin Anesthesiol* 8(1): 1103.
3. Panda N, Verma RK, Panda NK. Efficacy and safety of high-concentration adrenaline wicks during functional endoscopic sinus surgery. *Journal of Otolaryngology-Head & Neck Surgery*. 2012 Apr 1; 41(2).
4. Sarmiento Junior KM, Tomita S, Kós AO. Topical use of adrenaline in different concentrations for endoscopic sinus surgery. *Braz J Otorhinolaryngol* 2009;75:280-9.
5. Darbar D, Smith M, Morike K, *et al.* Epinephrine-induced changes in serum potassium and cardiac repolarization and effects of pretreatment with propranolol and diltiazem. *Am J Cardiol* 1996; 77:1351-5.
6. Ren Y, Wang Y, Yan H, Chen L, Mao Q. Cardiovascular crisis after use of epinephrine: a case report and review of the literature. *AME Case Reports*. 2021;5.
7. Atlee JL, 3rd, Bosnjak ZJ. Mechanisms for cardiac dysrhythmias during anesthesia. *Anesthesiology* 1990;72:347-74.
8. Fraser R, Ingram MC, Anderson NH, Morrison C, Davies E, Connell JM. Cortisol effects on body mass, blood pressure, and cholesterol in the general population. *Hypertension*. 1999 Jun;33(6):1364-8.

