CASE REPORT

Monomorphic Ventricular Tachycardia during the Insertion of the Nasogastric Tube via the Nasal Route

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ABSTRACT

Naso gastric tubes are used to administer medications or nutrition in patients who have a functional gastrointestinal tract but are unable to tolerate oral intake. Cardiac arrhythmias like asystole, and polymorphic ventricular tachycardia have been seen, but they remain rare complications of Nasogastric tube insertion. Here, we bring to you a case of Intracranial Haemorrhage post craniotomy and evacuation of hematoma who developed monomorphic ventricular tachycardia during the insertion of the nasogastric tube via the nasal route.

KEY WORDS: Monomorphic Ventricular Tachycardia, Neuroanaesthesia, Nasogastric tube, Arrhythmia, Critical Care Medicine.

Background

Naso gastric tubes are used to administer medications or nutrition in patients who have a functional gastrointestinal tract but are unable to tolerate oral intake. This is commonly seen in patients who have suffered a cerebrovascular accident or other conditions, which have left them unable to swallow effectively.[1]

The most common complications related to the placement of nasogastric tubes are discomfort, sinusitis, or epistaxis, all of which generally resolve spontaneously with the removal of the nasogastric tube.[2]

Other rare complications of NG tube placement are oesophageal perforation, inadvertent intracranial placement, pneumothorax, and trachea bronchopleural fistulas.[3]

Cardiac Arrhythmias like Asystole[4], and Polymorphic Ventricular Tachycardia[5] have been seen, but they remain rare complications of Nasogastric tube insertion. Here, we bring to you a case of Intracranial Haemorrhage post-evacuation of hematoma who developed monomorphic ventricular tachycardia during the insertion of the nasogastric tube.

Case Report

A 78-year-old female patient presented with chief complaints of decreased verbal output associated with inability to comprehend, difficulty walking and urinary continence since 6 days. She had a history of a trivial fall 6 weeks ago and came with complaints of drowsiness and altered sensorium.

The patient was diagnosed with Left Fronto-temporo-parietal Acute on Chronic SDH with midline shift and mass effect and underwent Burr-hole evacuation of the hematoma. She had comorbid conditions like Diabetes Mellitus, Hypertension, and ischemic heart disease post coronary artery stenting to the left anterior descending artery three years ago.

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The patient was shifted to the Neurointensive care unit and was being monitored and treated there. On the first post-operative day, the patient had a GCS of E4V4M6. The patient was advised oral feeds and medications, but the patient was not co-operative. A plan of introducing a nasogastric tube was made and the insertion of Nasogastric Tube was attempted. As soon as the Nasogastric tube was introduced into the nasopharyngeal cavity and further into the oesophagus, the patient developed monomorphic ventricular tachycardia during the procedure. The patient was administered Inj. Lignocaine 2% 40 mg intravenously, after which the Ventricular Tachycardia gradually reverted to sinus rhythm.

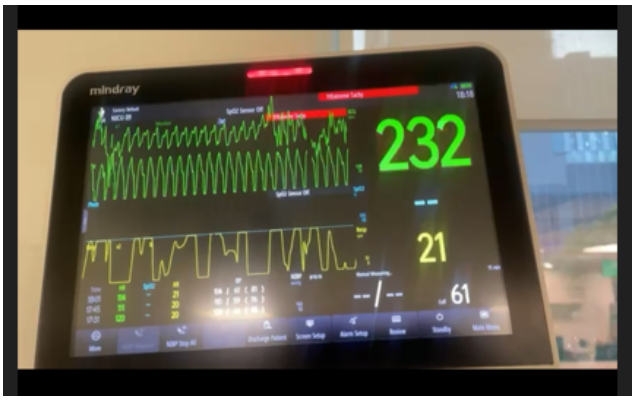

Figure 1: Monomorphic Ventricular Tachycardia as captured on the Cardiac Monitor during the insertion of the Nasogastric Tube

Discussion

Cardiovascular reactions have been reported during Laryngoscopy, tracheal intubation, dental anaesthesia, oral surgery, bronchoscopy and endoscopy of the gastrointestinal system. These cardiovascular responses may have clinical significance for the patient suffering from severe heart disease.

In a study by Fassoulaki et al, eighty female patients free of cardiovascular disease who underwent excision of breast lesions were randomly allocated to one of two groups. In the first group a nasogastric tube was inserted blindly during the surgical procedure, while in the second group the tube was inserted under direct laryngoscopy, using Magill forceps. Ventricular extrasystoles were found to occur only in the second group ($p < 0.05$).[6]

Another case of Paroxysmal Atrial Fibrillation with Rapid Ventricular Response Following COVID-19 Nasopharyngeal Swab insertion for collection of the nasopharyngeal sample for testing has been seen.[7]

A possible explanation of the same would be an imbalance within the key components of the cardiac autonomic nervous system, particularly an exaggerated stimulation of either the sympathetic or parasympathetic nervous system. Increased sympathetic tone leads to focal ectopic firing and consequent Atrial Fibrillation (AF) via enhanced early after depolarizations (EADs) or delayed after depolarizations (DADs). Augmented vagal stimulation may trigger AF facilitating the development and maintenance of re-entry mechanisms by shortening the atrial effective refractory period.[8]

Another cause could be the mechanical stimulation of the left atrium by oesophageal distention as reported by Cohen L et al.[9]

However, the afore–mentioned mechanisms are postulated to explain atrial fibrillation. A review of the innervation of the nasopharynx and oesophagus are noteworthy to identify the possible mechanisms of occurrence of Ventricular Tachycardia by stimulation of both these structures.

Nerve supply to the nasopharynx is derived from branches of the glossopharyngeal (IX), vagus (X), and the sympathetic nerves and the maxillary (V2) branch of the trigeminal (V) nerve which supplies the roof and floor of the nasopharynx.[10]

The oesophagus is innervated by the sympathetic and parasympathetic nervous systems primarily by the vagus nerve and spinal nerves (from segments T1 to T10) via the thoracic and cervical sympathetic trunk.[11]

Animal studies have shown that both parasympathetic vagal cardiac nerves and sympathetic cardiac nerves are activated during the nasopharyngeal reflex, with increased vagal effects in the sinoatrial node and increased sympathetic effects in the ventricular myocardium.[12] This may be the possible explanation for ventricular tachycardia in our patient.

Patients with coronary artery disease and Intracerebral Hemorrhage (ICH) are more susceptible to developing cardiac dysfunction after ICH and have extended hospitalization. Approximately 4% of ICH patients encounter serious cardiac complications

such as acute myocardial infarction, ventricular fibrillation, acute heart failure, and cardiac death within two days after stroke.[12]

Conclusion

The intensivist should take measures to decrease the incidence of adverse effects occurring due to the cardiac ailment and prepare for anti-arrhythmic measures while conducting procedures on the patient. Pharmacological cardioversion in the form of anti-arrhythmic drugs should be prepared in advance. Synchronized direct cardioversion should be given using a defibrillator in cases where the patient does not respond to pharmacological manoeuvres. Coating the nasogastric tube with lignocaine jelly is advised while inserting the nasogastric tube via the nasal or oral route to allay the effect of the offending structure on the nasal or the gastrointestinal tract.

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