

Nasocardiac Reflex: A Rare Potentially Fatal Complication of a Common Procedure

Mohamad A^{1,2*},
Azhar Rajet MK²,
Ahmad MZ²,
Nik Abd Ghani NMS²,
Yusuf S²,
Wan Mohamad WE²,
Baharun SB⁴, Ramli RR^{1,3} and
Mohamad I^{1,3}

Abstract

The nasocardiac reflex is a little known reaction of nasomucosal origin. The nasocardiac reflex itself may lead to severe bradycardia or can even result in cardiac arrest following irritation or stimulation of the nerves in the nasal cavities or paranasal sinuses. We highlight an event whereby nasocardiac reflex was observed in a patient during a common examination, which was the nasoendoscopy, manifesting as bradycardia and hypotension. After resuscitation, the vital signs improved. He was closely monitored in the ward and able to discharge home well on the same day after eight-hour of monitoring.

Keywords: Nasocardiac; Reflex; Nasoendoscopy; Bradycardia

Received: February 02, 2021; **Accepted:** March 15, 2021; **Published:** March 22, 2021

Introduction

Vagally-mediated reflex bradycardic responses such as trigemino-cardiac reflex during nasal surgery has been previously reported [1]. This disturbance occurred due to profound parasympathetic stimulation which can cause intense bradycardia and to some extent resultant in asystole. The afferent pathway of these reflexes is mediated by any of the branches of the trigeminal nerve, and the efferent pathway is via the vagus nerve. The reflex is one of the subtypes of Trigemino-Cardiac Reflex (TCR), but it is not well-described as the commonest subtype of Trigemino-Cardiac Reflex (TCR) which is the oculo-cardiac reflex. It is rarely encountered during nasoendoscopy with the reported incidence of only 0.16% [2].

Case Report

A 36-year-old gentleman underlying obstructive sleep apnea, had underwent modified cauter-assisted palatal stiffening operation, uvulectomy and septoturbinoplasty a week earlier came for follow-up assessment. He was generally well and upon nasoendoscopy, noted presence of crusting in the left nasal cavity.

When we were about to remove the crusts with the tilley forceps, under endoscopic view, the patient suddenly became less responsive, cold clammy and pale. Vital signs assessment revealed blood pressure of 50/32 mmHg and heart rate of 46 Beats per Minute (bpm). His oxygen saturation otherwise 100%

under room air and his random blood sugar was 8.7 mmol/L. He was brought to the treatment room and one pint of normal saline was given. Immediately, he regained his consciousness and his blood pressure picked-up to 101/67 mmHg and heart rate of 60 bpm.

- 1 Department of Otorhinolaryngology-Head and Neck Surgery, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia
- 2 Department of Otorhinolaryngology-Head and Neck Surgery, Hospital Tengku Ampuan Afzan, Kuantan, Pahang, Malaysia
- 3 Hospital Universiti Sains Malaysia, Health Campus, Kubang Kerian, Kelantan, Malaysia
- 4 Department of Emergency Medicine, Hospital Tengku Ampuan Afzan, Kuantan, Pahang, Malaysia

*Corresponding author:

Dr. Adam Mohamad

✉ persona522115@gmail.com;
mohamadmuhammadi@yahoo.com

Tel: 60199213516

Department of Otorhinolaryngology-Head and Neck Surgery, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia.

Citation: Mohamad A, Rajet MKA, Ahmad MZ, Ghani NMSNA, Yusuf S, et al. (2021) Nasocardiac Reflex: A Rare Potentially Fatal Complication of a Common Procedure. Arch Med Vol.13 No.3:14

The patient was sent to emergency department for close observation. Serial echocardiography and vital signs were normal during the period of eight-hour monitoring, and he was discharged well after clinically showed good improvement.

Discussion

Baxandall and Thorn had previously described nasocardiac reflex whereby bradycardia was observed during introduction of nasal speculum into nares under general anaesthesia [3]. Besides that, it has also been observed in a patient who underwent cocaine nasal packing prior to outpatient nasoendoscopy procedure who subsequently developed angina pectoris [4]. A study by Betlejewski found significant decrease of heart rate in 80 healthy volunteers who underwent the experiment after stimulation of nasal mucosa using 25% ammonia [5]. Besides that, Wong et al. also noticed rapid drop of heart rate upon endoscope insertion and recovery of heart rate after its withdrawal [6].

From anatomical point of view, the nasal septum and lateral wall of nose receives extensive sensory supply from the trigeminal nerve via its ophthalmic [V1] and via its ophthalmic maxillary [V2] branches. The afferent limb of a reflex arc is formed involving the pterygopalatine ganglion, gasserian ganglion, trigeminal nerve, sensory nucleus of trigeminal nerve, short internuncial fibers, motor nucleus of the vagus nerve and finally the vagus nerve which supplies the heart.

References

- 1 Lang S, Lanigan DT, Van der Wal M (1991) Trigemino-cardiac reflexes: maxillary and mandibular variants of the oculocardiac reflex. *Can J Anaesth* 38: 757-760.
- 2 Radvansky BM, Husain Q, Cherla DV, Choudhry OJ, Eloy JA (2013) In-office vasovagal response after rhinologic manipulation. *Int Forum Allergy Rhinol* 3: 510-514.
- 3 Baxandall M, Thorn J (1988) The nasocardiac reflex. *Anaesthesia* 43: 480-481.
- 4 Hashim HZ, Hassan NFHN, Ramli RR, Mohamad I, Johan KB (2014) Angina pectoris induced by cocaine nasal packing: A report of rare but fatal complication. *Int Medi J* 21: 432-433.
- 5 Betlejewski S, Betlejewski A, Burduk D, Owczarek A (2003) Nasal-cardiac reflex. *Otolaryngol Pol* 57: 613-618.
- 6 Wong A, Bakar MZA (2021) The nasocardiac reflex during nasoendoscopy: A commonly overlooked risk. *Am J Otolaryngol* p. 42.
- 7 Panneton WM (1990) Controlled bradycardia induced by nasal stimulation in the muskrat, *Ondatra zibethicus*. *J Auton Nerv Syst* 30: 253-263.

Therefore, stimulation of branches of trigeminal nerve or the areas they innervate, can provoke a complex physiological response characterized by bradycardia, vasoconstriction and inhibition of respiratory drive which involves the integration of afferent impulses carried on fibers innervating somatic receptors, baroreceptors and chemoreceptors [7].

In our patient, what would have happened was that during the insertion of rigid nasoendoscopy and attempt to remove the nasal crusting could have stimulated the nasal mucosa of septum or turbinate which were richly innervated by the trigeminal nerve and subsequent nasocardiac reflex and bradycardia and have prevented the incidence from happening.

We would like to emphasize that this reflex could occur even during simple nasal procedure in our daily clinical work, while other series reported such reflex occurred while most of their patients ventilated in intensive care units and even under general anaesthesia; our patient developed this condition while in clinic setting. Wong et al recommended the establishment of electrical cardiac monitoring, ECG as well as emergency trolley upon encountering patients with nasocardiac reflex during in-office endonasal procedure.

Conclusion

Clinicians should aware of the existence of such a phenomenon and should anticipate its occurrences.