IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 24, Issue 8 Ser. 3 (August. 2025), PP 66-69
www.iosrjournals.org

Silent Savior- Crucial Role Of Onco-Anaesthesiologist In Anesthetic Management Of A Patient With Sick Sinus Syndrome Undergoing Trans-Oral Robotic Surgery- A Case Report.

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Abstract-
Sick sinus syndrome is a type of heart rhythm disorder. It affects the heart's natural pacemaker (sinus node), which controls the heartbeat. Sick sinus syndrome causes slow heartbeats, pauses (long periods between heartbeats) or irregular heartbeats (arrhythmias). Sick sinus syndrome is relatively uncommon. The risk of developing it increases with age. Many people with sick sinus syndrome eventually need an implanted device called a pacemaker to keep the heart in a regular rhythm. Sick sinus syndrome may also be called sinus node dysfunction or sinus node disease.(1) In this case report we highlight the challenges faced by the anesthesiologist in securing a difficult airway, on table transcutaneous pacing placement along with temporary sheath placement via internal jugular vein in a patient posted for Trans-oral robotic surgery with marginal mandibulectomy + facial artery myo-mucosal flap, anticipating potential risk of Brady-tachyarrhythmia's , prolonged asystole associated with sick sinus syndrome.

Keywords- *SSS (sick sinus syndrome), Difficult airway, Temporary pacing, TORS (Trans-oral robotic surgery), Transcutaneous pacing, CA tongue, Awake Fibreoptic intubation, Radiated neck.*

Date of Submission: 04-08-2025 Date of Acceptance: 14-08-2025

I. Introduction-

Sick sinus syndrome (SSS) is a generalized abnormality of cardiac impulse formation. Abnormalities encompassed by this syndrome include sinus bradycardia, sinus arrest or exit block, combinations of sinoatrial and atrioventricular nodal conduction disturbances, and atrial tachyarrhythmia's. The treatment for symptomatic Brady arrhythmias in patients with SSS is pacemaker placement. We describe the management of a patient with SSS who required temporary sheath placement during general anesthesia for Trans-oral robotic surgery.(2) Prompt anesthetic intervention and planning is needed to ensure patients safety during the peri-operative period. Diagnosis of sick sinus syndrome can be difficult because of its nonspecific symptoms and elusive findings on an electrocardiogram (ECG) or a Holter monitoring. The mainstay of treatment is atrial or dual-chamber pacemaker placement, which generally provides effective relief of symptoms and lowers the incidence of atrial fibrillation, thromboembolic events, heart failure and mortality, compared with ventricular pacemakers.(3) Anesthetic management of a patient with SSS posted for Trans-oral Robotic Surgery (TORS) requires careful consideration due to potential risks of bradycardia and other arrhythmias. The primary concern is the impact of anesthetic agents and surgical stimulation on the patient's already compromised cardiac conduction system. Close cardiac monitoring, including temporary pacing sheath placement, and a tailored anesthetic plan are crucial for a safe outcome during the peri-operative period. We report a case of a 67-year-old man who required temporary cardiac pacing sheath placement posted for trans-oral robotic surgery.

II. Case Presentation-

A 67-year-old male, presented to our institution with abnormal growth in the left lateral border of the tongue. He was a known case of systemic hypertension on Angiotensin receptor blockers and a few episodes of syncope which were left unevaluated elsewhere. A wedge biopsy in 2022 was suggestive of well differentiated infiltrating squamous cell carcinoma of tongue. He underwent wide local excision of the lesion with left extended supra-Omohyoid neck dissection in 2022. He then received 25 fractions of 50Gy dose for the same. Follow-up

PET-CT in 2023 was unremarkable. In 2025 a follow-up imaging revealed FDG avid enhancing lesion in the left border of the tongue at the junction of anterior 2/3rd and posterior 1/3rd. A biopsy was taken and it was suggestive of recurrence, squamous cell carcinoma grade 2. He was admitted for further management.

Diagnostic Assessment-

Initial vital signs showed a pulse rate of 90 beats per minute, blood pressure of 110/70mmhg, room air saturation of 98%, respiratory rate of 14 breaths per minute. The airway was difficult due to previous surgeries, mouth opening approximately 2 Finger breadth, radiotherapy to neck, facial asymmetry, restricted range of motion and extension at neck. Laboratory values were within normal limits. A specialist opinion was sorted in view of Poor effort tolerance, previous syncopal attacks and was advised temporary cardiac pacing in view of sinus pause, multiple premature ventricular complexes and right bundle branch block on electro-cardiogram. 2-D Echo and LV function were unremarkable. He was suggested to undergo Holter- monitoring and it was consistent with significant pauses. He was cleared for surgery under high cardiac risk and peri-operative major adverse cardiac event possibility.

Plan- Plan – Right nasal intubation under awake Fibreoptic Bronchoscopic technique with Controlled mechanical ventilation under general anesthesia with all standard ASA monitors and hemodynamic monitoring.

Therapeutic Intervention- The patient was categorized as ASA III, informed written consent obtained for high risk procedure, outlining post-operative management, peri-operative hemorrhage control if any, major adverse cardiac event risk, prolonged ICU Care, post- operative pulmonary complications. Primary goal was to maintain Normothermia, avoid Hypoxia, Normoglycemia, Normocapnia and avoid Aspiration.

Premedication for Awake Fibreoptic intubation was given at the holding area which included, topicalisation of both nostrils using Navision (Oxymetazoline Hydrochloride 0.05%), Intravenous Glycopyrolate 0.2mg, Nebulization with 4% Lignocaine. Trans-tracheal injection of 4% Lignocaine couldn't be given as the anatomy of neck was distorted due to radiation therapy. Before wheeling in the patient, the right nostril was dilated using A 28fr Nasopharyngeal airway lubricated with lignocaine topical jelly. Patient was counselled well before the procedure about Awake Fibreoptic Intubation in his native language of understanding. Airway was secured using Pentax FB-15 RBS 4mm Bronchoscope and Size 7.5mm flexometallic tube was placed. After confirmation of End Tidal Co2 and Visual Method, the patient was given Inj Remifentanil 1mcg/Kg Slow IV, Inj Propofol 2mg/Kg, Inj Atracurium 0.5mg/Kg and was connected to the Ventilator. 20g 3fr Leader cath was secured in Left radial artery, 18 G Venflon in left lower limb. Patient Was maintained on Inj Remifentanil 0.1mcg/Kg/Min as Infusion, with Inj Atracurium at 0.25mg/Kg/Hr and Propofol was started at 1mg/kg/hr. The Ventilator settings were as follows- Tidal volume – 7ml/Kg, Respiratory Rate 12-16/Min, Positive End Expiratory Pressure of 5cm of H2O, Fio2- 50% With Total Flow of 2 Liter/Minute, Inhalational Agent desflurane at 3-4% targeting minimum alveolar concentration of 0.6-0.8. Right internal jugular vein was cannulated and a 6fr temporary pacing sheath was placed to ensure adequate and effective trans-venous pacing if required. Transcutaneous pacing paddles were also placed as back-up. Throughout the procedure Bi-spectral index was monitored and maintained within a range of 40-60U. During the peri-operative period there was no hemodynamic instability which required prompt cardiac pacing or resuscitation. Procedure was uneventful.

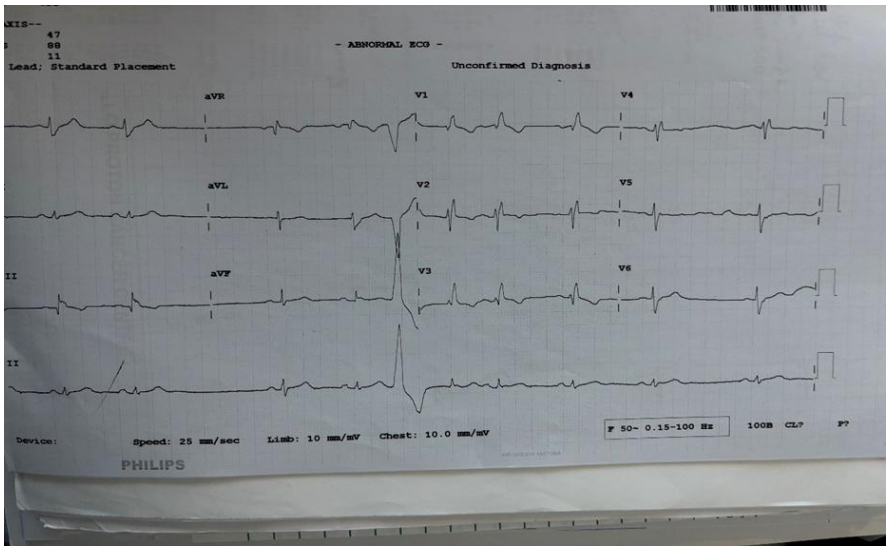

Image-1 showing long pause and multiple VPC'S with Sinus Rhythm.

Parameter	Result
Hb	15.3g/dl
Wbc	4600cells/cum
Platelets	2.35 lakhs
Urea	17mmol/L
Creatinine	0.8mmol/L
Sodium	141mmol/L
Potassium	4.6mmmol/L
Chloride	101mmol/L
Bicarbonate	22mmol/L
Liver function	Normal
Chest x-ray	Normal

Table-1 Showing baseline investigations.

Post-operative period and follow-up- Following end of the procedure the patient was given Neostigmine and Glycopyrolate titrated to the patient's weight. Remifentanil was stopped just prior to removal of sterile drapes and atracurium was discontinued before 30 Minutes. Extubation was rapid and the patient was wide awake, obeying commands. He was pain free. patient was able to maintain airway reflexes with Ramsay Sedation Score of 3. The patient was followed up for 48 Hrs., and was given weaker opioids like Tramadol 50mg SOS and NSAID, Paracetamol 750mg Iv TDS. No other rescue analgesic was given and the patient was discharged after 3 Days.

III. Discussion-

Patients with sick sinus syndrome are often asymptomatic or have symptoms that are mild and nonspecific. Symptoms are related to the decreased cardiac output that occurs with the Brady-arrhythmias or tachyarrhythmia's. Most of the symptoms are caused by decreased cerebral perfusion, and 50% of patients have syncope or pre-syncope. Sick sinus syndrome can produce a variety of ECG manifestations consisting of atrial Brady-arrhythmias, atrial tachyarrhythmia's and alternating Brady-tachyarrhythmia's. Due to age-related degenerative fibrosis of the SA node, SSS has been linked to aging (mean age of 68 years).(4) Pharmacological treatment of sick sinus syndrome is usually unsuccessful.(5) Sick sinus syndrome in its chronic form runs an erratic course, with periods of normal SA node function and periods of abnormal function. If episodes of sinus bradycardia are frequent or symptoms such as dizzy spells, unexplained congestive cardiac failure, syncope or cardiac arrest occur, permanent pacing should be instituted.(6) This patient had a few syncopal attacks but there were no other symptoms and the left ventricular function was unremarkable. Anesthesiologist should be aware of the drugs and dosing which could potentially worsen the situation. To avoid such circumstances from recurring it is advisable to do preparation for a cardiac surgery even though it is a non-cardiac surgery which includes the presence and involvement of both the anesthesiologist and a cardiologist. Hence, it is a challenge to anaesthetize a cardiac patient coming for a non-cardiac surgery. Coming to Trans-oral robotic surgery (TORS) was first introduced in the mid-2000s. TORS uses a robotic operating system to perform minimally invasive surgery on the airway via the oral cavity. TORS is becoming increasingly popular for the treatment of benign and malignant conditions of the head and neck. Robotic surgery, in addition to the problems of a shared airway, poses a new challenge for the anesthetist.(7) Airway management for TORS can be challenging in view of the nature or extent of the cancerous growth and the possibility of airway obstruction. Standard ASA (American Society of Anesthesiologists) guidelines for difficult airway (DA) management must be meticulously followed. All preparations for DA management must be ensured preoperatively, including availability of Fibreoptic bronchoscope, video laryngoscope, cricothyroidotomy and tracheostomy sets. Adequate nasal preparations (xylometazoline drops followed by packing with ribbon gauze soaked in 4% lignocaine) must be carried out and the more patent nostril should be selected for nasotracheal intubation, after preoxygenation. An armored (flexometallic) endotracheal tube prevents kinking of the tube due pressure from robotic arms or patient side surgeon.(8) If there is an airway issue whilst the robot is docked, access to the patient will be significantly restricted because of the position of the patient, loss of spatial orientation, and dark environment. It is crucial that in the event of airway compromise the anesthetist takes charge and declares loudly, to the entire team, that the robot needs to be undocked immediately to allow adequate access to manage the airway. Whilst remifentanil is the mainstay of intraoperative analgesia, a multimodal approach is advocated, with intravenous paracetamol and administration of a longer-acting strong opioid towards the end of surgery (usually fentanyl). Antiemetic prophylaxis should be routinely administered, with ondansetron and dexamethasone often given in combination. Clearly, it is desirable to minimize postoperative nausea and vomiting in all patients, but it is especially important in TORS, since retching and vomiting are associated with increased venous pressure and possible disruption of delicate surgical sutures/hemostasis—causing bleeding/hematoma formation. In addition to its antiemetic properties, dexamethasone is especially beneficial in reducing edema, and if given prior to skin incision and continued regularly into the postoperative period (short course, 2–3 days), has also been shown to decrease length

of hospital stay and reduce time to resumption of solid diet.(9) In this case we avoided ondansetron due to its possible QT prolongation. Following TORS there may be impaired pharyngo-laryngeal reflexes. It's better to put in a nasogastric tube or PEG tube.

IV. Conclusion-

In this case report we highlight the preparedness of anesthesiologist which is absolutely necessary to ensure uneventful peri-operative period. Even after diagnosis from the cardiologist as SSS, with weak evidence on considering permanent pacing as the first option before surgery, the case was taken up with utmost preparedness, anticipating potential challenges. The team had developed a comprehensive strategy to maximize and ensure successful peri-operative outcome.

Declaration of patient consent

The authors confirm that they have gotten the necessary consent from the patient involved. In the form, the patient's parent/guardian has given consent for his images and other clinical information to be reported in the journal. The patient and his parent/guardian understand that his name and initials will not be published, and due efforts will be made to conceal his identity; however, anonymity cannot be guaranteed.

Financial support/sponsorship/Funding - ***No funding was received for this research***

Conflicts of interest

There are no conflicts of interest.

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