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Letter to Editor

Anaesthesia Section

Vancomycin Anaphylaxis under Anaesthesia: Expeditious Diagnosis and Management

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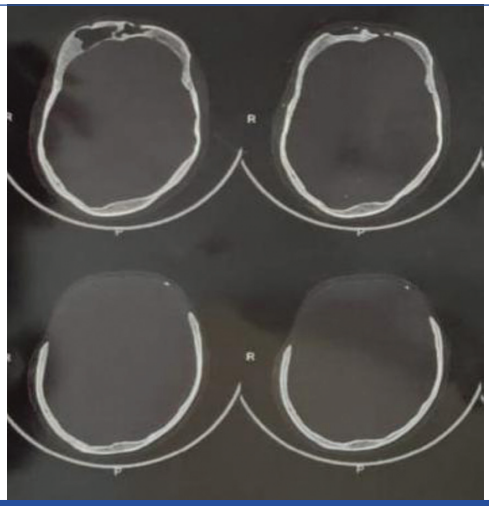
Dear Editor,

The anaesthetist should be prepared to address any irreversible issues during the perioperative period. While one might be more relaxed when anaesthetising American Society of Anaesthesiologists (ASA) grade I or ASA grade II patient, readiness for unforeseen problems is crucial. Anaphylaxis is one such condition, and dealing with it requires timely recognition and focused management for a safe outcome. Hereby, authors report a severe allergic reaction to the antibiotic vancomycin.

A 15-year-old girl was scheduled for cranioplasty. She had undergone a bifrontal craniotomy following a Road Traffic Accident (RTA) one year ago. Her general and systemic examinations were normal. Blood investigations, Electrocardiogram (ECG), and Chest X-ray (CXR) were normal. A Computed Tomography (CT) brain scan showed a bifrontal craniotomy defect [Table/Fig-1]. The patient had an ASA grade I.

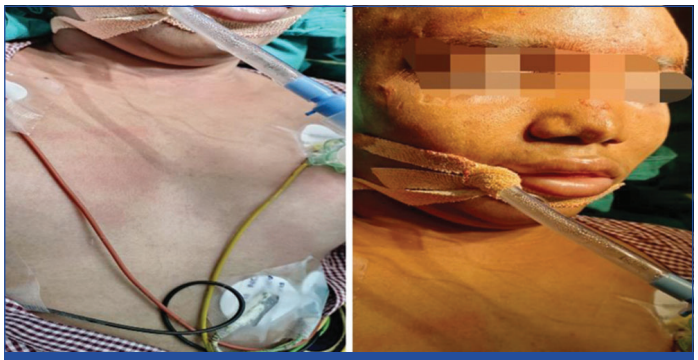


[Table/Fig-1]: Preoperative CT brain scan showing bifrontal craniotomy defect.

Written informed consent was obtained from the patient's father. On the day of surgery in the operation theatre, a pulse oximeter, Non Invasive Blood Pressure (NIBP), and End-tidal Carbon Dioxide ($ETCO_2$) monitors were attached. The patient was premedicated with fentanyl (2 micrograms/kg), and General Anaesthesia (GA) was induced with injection propofol (2 mg/kg) and injection Vecuronium (0.08 mg/kg). The patient was intubated with cuffed Endotracheal Tube (ETT) no. 7 and placed on a ventilator. Anaesthesia was maintained on injection vecuronium, inhalational agent sevoflurane (1-1.5%), oxygen, and air. Haemodynamic remained stable throughout the procedure. The surgeon requested the administration of the antibiotic vancomycin before securing the implant. After a test dose, 1 gm vancomycin infusion was started in 100 mL of Normal Saline (NS).

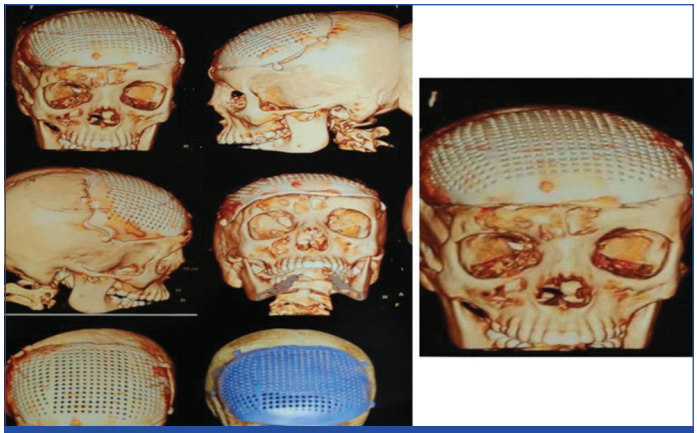
Approximately 15-20 minutes later, the blood pressure suddenly dropped to 54/34 mmHg with a heart rate of 132/min. A 6 mg bolus of Inj Mephentermine was administered, followed by a 250 mL bolus of normal saline. Despite this, the blood pressure remained at 60/36 mmHg, prompting the initiation of a Nor adrenaline infusion at 0.08 mcg/kg, along with the administration of 200 mL of hydroxyl ethyl starch 6% over the next 10 minutes. However, the blood pressure did not improve, leading to the decision to halt the surgery in order to re-evaluate the surgical site. Upon examination, no issues were found at the surgical site, and the brain was found to be relaxed. To investigate the possibility of anaphylaxis, the patient was uncovered, revealing redness over the left arm, which may have been an allergic reaction to vancomycin. Consequently, 200 mg of Inj. Hydrocortisone, 8 mg of Inj. Dexamethasone, and 22.5 mg of Inj. Phenaramine maleate were administered intravenously (i.v.).

After some time, the blood pressure started to improve, reaching 120/70 mmHg within the next 10 minutes, with a heart rate of 90/min. The surgery was then resumed and successfully completed. Nor adrenaline was tapered and stopped after 30 minutes. The patient's SpO_2 remained at 100%, and $ETCO_2$ levels were normal throughout the procedure. Following the surgery, a secondary survey revealed that despite antiallergy measures, the patient had developed swollen lips (angioedema), erythema, and a rash over the chest and both upper arms [Table/Fig-2,3]. A clear chest examination was conducted, and a video laryngoscopy was performed to rule out vocal cord oedema, which revealed normal cords. Subsequently, the patient was given Suggamadex at 2 mg/kg for the reversal of the muscle relaxant vecuronium. All necessary measures for reintubation were prepared, and the patient was then successfully extubated. The neurophysician moved the patient to a CT scan to rule out any intracerebral bleeding, which was found to be absent [Table/Fig-4,5]. Consequently, the patient was transferred to the SICU for monitoring. The following day, the patient was transferred to the ward.



[Table/Fig-2,3]: Intraoperative findings redness over chest, erythema, and rash suggestive of anaphylaxis. (Images from left to right).

Vancomycin can cause two types of hypersensitivity reactions: Red Man Syndrome or Vancomycin Flush Syndrome (VFS) and anaphylaxis after rapid infusion [1]. VFS is a common infusion-related adverse reaction seen with i.v. vancomycin use [2], but it rarely occurs with oral or intraperitoneal vancomycin. Signs of VFS typically appear about 4-10 minutes after an infusion or soon after its completion, more often with a rapid (<1 hour) infusion of the first dose of vancomycin. Hypersensitivity reactions can arise due to vancomycin's effect on mast cells. The reaction may not be severe



[Table/Fig-4,5]: Post-craniotomy 3D CT scan showing implant in-situ.

with successive exposures, but it can occur for the first time after several doses or with a slow infusion [3,4].

The following are the principal side-effects of vancomycin-fever, chills, red man syndrome, phlebitis, nephrotoxicity, ototoxicity, hypersensitivity responses, neutropenia, and interstitial nephritis [5]. The signs and symptoms of VFS include the following-erythematous rash on the face, neck, and upper torso (rash on the extremities may occur but is typically less severe than the rash on the face, neck, and upper torso), bronchospasm, angioedema, tachycardia, an unanaesthetised patient, fever, chills, nausea, vomiting, weakness, dizziness, and chest or back pain. Hypotension results from a negative inotropic and vasodilator effect produced in part by histamine, and angioedema can occur [6,7]. Hypotension due to anaphylaxis can be a life-threatening situation under General Anaesthesia (GA), as patients are unconscious and covered, which delays the recognition of cutaneous signs. Most severe reactions occur in patients younger than the age of 40 years, particularly in children [4]. It is recommended to administer vancomycin safely with respect to the rate of infusion and possible interactions [1,2]. Vancomycin substitutes should be utilised if they are available. If vancomycin needs to be continued, patients should receive i.v. Diphenhydramine 50 mg and Cimetidine 300 mg one hour before each dose, and vancomycin should be given over the course of four hours while being closely monitored. The best preventive measure to avoid VFS is maintaining infusion rates below 10 mg/min [7-10].

CONCLUSION(S)

Diagnosing VFS during general anaesthesia can be challenging due to the presence of multiple medications. However, this can be prevented by administering vancomycin through a slow infusion method. It is crucial to maintain a high level of suspicion if any abnormal events occur. Prompt identification of adverse drug reactions and timely intervention plays a vital role in effectively managing VFS.

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