

Anesthesia management of a case of hyperhomocysteinemia induced mesenteric venous thrombosis and short review of literature

Dear Editor,

Homocystinuria is an inherited metabolic disorder associated with cystathionine beta-synthase deficiency leading to accumulation of homocysteine. Hyperhomocysteinemia (HHC) is a separate but related entity, associated with multisystem disorders. It's a strong, graded, independent and modifiable risk factor for atherosclerotic vascular diseases affecting coronary, cerebral and peripheral vascular systems ultimately leading to stroke and other vascular events.^[1] Mesenteric venous thrombosis (MVT) is an uncommon cause of HHC, and is associated with high mortality rate. Here we describe the anesthesia management of case of MVT for laparotomy.

A 44-year-old male patient, vegetarian by diet, non-smoker with no known co-morbidities, presented with subacute extensive MVT and was subsequently posted for laparotomy. Prior to the surgery, a complete screening for risk factors of thrombosis was carried out as there was no significant history of prothrombotic factors

like sedentary life style, dyslipidemia, diabetes, smoking, major trauma, or major surgeries. He was started on aspirin, atorvastatin, carvedilol, Vit B 12, folic acid, pyridoxine, methylcobalamine and enoxaparin. Hematological investigations were essentially normal. However, biochemistry revealed homocysteine level of 66.69 $\mu\text{mol/L}$ (Lab normal: $<15 \mu\text{mol/L}$). Coagulation profile were within normal limits. On arrival, his vitals were stable. In operation theatre, all standard monitors were attached and basal vital parameters were recorded. Epidural catheter was fixed for postoperative analgesia. The patient was induced with standard drugs as per the institutional protocol. Anesthesia was maintained with oxygen, sevoflurane and propofol infusion at the rate 100–200 $\mu\text{gkg}^{-1} \text{min}^{-1}$ and vecuronium. Nitrous oxide was avoided. Intermittent pneumatic compression devices were applied to prevent thromboembolic event intraoperatively. Emergency exploratory laparotomy with resection of ischemic bowel, and end jejunostomy was carried out uneventfully. Episodes of hypoglycaemia at end of surgery were noted despite continuous infusion of 25% dextrose. Euvolemia and hemodynamics were maintained. Patient was kept on ventilator in view of prolonged surgery and was extubated on the morning of next day. Adequate hydration and ambulation commenced post-extubation. After four weeks of stay in the ICU, he was shifted to the ward. Monthly follow-up with homocysteine level was advised.

In Indians, the mean homocysteine level is higher as compared to global averages.^[2] Reasons for higher incidence in Indians

subpopulation are attributed to the vegetarian diet and the deficiency of Vit B12 naturally present in milk which is destroyed by boiling before consumption. The ideal goal is to target lower levels of homocystinuria ($<50 \mu\text{mol/L}$) pre-operatively in such patients. Thus, recommendations are to normalize the levels of homocysteine through adequate vitamin substitution prior to surgery. As these patients are at increased risk of osteoporosis by metalloproteinase-mediated extracellular matrix degradation and decrease in bone blood flow, care should be taken to ensure gentle handling of the patient to avoid inadvertent injuries.^[3] Most of the intravenous, volatile and local anesthetics have been linked to the inhibition of platelet function to varying extents. Nitrous oxide should be avoided as it irreversibly inactivates the enzyme methionine synthase and leads to accumulation of homocysteine.^[4] HHC patients are at a higher risk of thromboembolic episodes. It is associated with vascular injury through oxidative damage, vascular smooth muscle proliferation, promotion of platelet activation and aggregation, and disruption of normal procoagulant-anticoagulant balance favouring thrombosis.^[1] The risk can be reduced by dietary control of serum methionine and homocysteine, adequate perioperative hydration, administration of drugs such as aspirin, and pneumatic compression devices applied to both lower limbs.^[1,4] Hypoglycemia is a known complication as methionine causes insulin release.^[5] Hence close monitoring of the blood sugar profile in the perioperative period is warranted. Early ambulation in the postoperative period is of utmost importance.

Our case is peculiar because of simple presentation, sudden onset, fast deterioration, major surgical interventions, and difficulty in ascertaining the diagnosis, complications due to resection of bowel, malnutrition despite adopting multiple methods of nutritional support, varied culture-sensitivity results over extensive hospital stay and short bowel syndrome in the post-operative period. The major anesthetic and critical care challenges related to our case were, a prothrombotic state necessitating perioperative anticoagulation, increased risk of perioperative adverse cardiovascular or cerebrovascular events and bringing down homocysteine levels prior to subsequent surgeries to decrease thrombotic complications. Additional challenges encountered were the novel nutritional support, inotrope support, prevention of infection, and prevention of ICU psychosis/delirium due to prolonged ICU stay.

MVT is a rare but potential complication associated with HHC. This case highlights the need of high suspicion in cases of masquerading pain abdomen and keeps this entity as a differential diagnosis. It can be a sinister if not identified promptly as rapid sequence of events and fast deterioration of the clinical condition can be catastrophic.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient

consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

Shalendra Singh, Pothireddy Sreenivasulu,

Subhasish Patnaik, Deepak Dwivedi

Department of Anaesthesiology and Critical Care, Armed Forces Medical College, Pune, Maharashtra, India

Address for correspondence: Dr. Shalendra Singh, Department of Anaesthesiology and Critical Care, Armed Forces Medical College, Pune - 411 040, Maharashtra, India.
E-mail: drsinghafmc@gmail.com

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