VKA induced catastrophic bleeding management with Prothrombin Complex Concentrate (PCC): a practice changer

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Background

Vitamin K antagonists (VKA), which were once used as rodenticides decades ago, became lifesaving drugs later in managing thromboembolic disorders. However, they have a narrow therapeutic window and may lead to bleeding if not used or monitored cautiously. At times bleeding might be catastrophic costing the life of the patient. Over ages, bleeding due to supratherapeutic anticoagulation reversal has been done with Vitamin K and fresh frozen plasma. Prothrombin Concentrates (PCC) have revolutionized such scenario and have become the standard of care.

Case Presentation

A 42-year-old male was evaluated for headache and left eye pain lasting for two weeks at an eye hospital from 10th March 2021. Examination at that time had revealed florid optic disc oedema with blurring of margins. MRI brain also had indicated posterior interhemispheric subdural haemorrhage, sub-acute venous infarct and venous thrombosis involving superior sagittal sinus. Patient was further referred to neurological services for further evaluation and management.

However, patient was admitted to Kauvery Hospitals, Tennur, Trichy on 18th March 2021 with worsening headache and vomiting. MRI with Magnetic Resonance Venography (MRV) confirmed a cortical venous thrombosis (CVT). He had no neurological deficits and etiology for CVT turned out to be antiphospholipid antibody syndrome (APLA) based on serology for beta 2 glycoprotein and anticardiolipin antibodies.

He was managed then with low molecular weight heparin (LMWH), overlapped with a vitamin K antagonist, with therapeutic INR monitoring to maintain between 2.0 and 3.0. He was also found to have hyperthyroidism, and was started on antithyroid agent for the same. Antinuclear and antihistone antibodies were also positive. He was advised to avoid vitamin K rich foods and was on regular follow up.

He came with intense headache on 12th Nov 2021 at 6 PM. Examination by neurologist at ER revealed a worsening sensorium with eye opening to pain, seemed confused, could not verbalize and showed a flexor response to pain. Pupils were 2 mm on both sides and were sluggishly reacting to light. He could move all 4 limbs. Tone was normal but deep tendon reflexes were exaggerated. He had bradycardia and hypertension suggestive of raised intracranial pressure. Anticoagulation induced bleed was suspected, an urgent CT brain done revealed left frontotemporal acute subdural and subarachnoid haemorrhages. Neurosurgeon was called urgently. Within an hour of admission, he developed anisocoria with worsening bradycardia.

Meanwhile laboratory parameters were followed up. Haemogram and hepatorenal functions were within normal limits. INR was 10.3 suggesting a marked prolongation. Inj. Vitamin K 10 mg IV was administered, FFP units were ordered and an urgent haematology consultation was sought. 4 factor prothrombin complex concentrate (PCC) was advised. Patient was rushed to the operating room after assessment by anaesthetist. 500 IU PCC was administered from 7:38 PM over 15 min and simultaneously neurosurgical procedure was started after an informed consent for a very high risk of bleeding. Though he did not have undue blood loss,

intraoperative transfusion of fresh frozen plasma (4 units) was also administered as PCC dose administered was suboptimal for him weighing approx 80 kg. Frontotemporal decompressive craniectomy was done swiftly and carefully by neurosurgeon without any complications and completed by 9:30 PM. Patient was shifted to recovery room and then to intensive care unit. The next morning, he was conscious, oriented and could move all 4 limbs. INR repeated was normal. There were no deficits and he was extubated within 24 h of admission.

Discussion

VKA induced bleeding has been managed with cessation of the drug, administration of Inj. Vitamin K by IV and transfusion of FFP. However, FFP availability may take time, needs a hospital with a 24 h blood bank with FFP storage facility, urgent blood grouping and cross matching facility. Then it may take 2 h for transfusion. Chances of allergic, anaphylactic reactions, transfusion associated lung injury (TRALI) and circulatory overload (TACO) are possible. Vitamin K may take 6–8 h for factors to get replenished. PCC reverses INR within 15 min if administered optimally. Presurgical INR and weight of the patient will be needed to decide on the PCC dose. In emergencies a dose of 2000 IU can be administered to an average weighting adult for INR rapid reversal. Pediatric dosing in emergency based on weight has also been published. PCC cost may be a limiting factor however it may score better than FFP in overall cost benefit analysis by stopping the bleed early, allowing early interventional procedures, reducing morbidity & mortality, short ICU stay and short overall hospital stay.

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