Tranexamic acid

Uncontrolled bleeding is the leading cause of preventable deaths among soldiers. Doctors in Afghanistan normally use a tourniquet; a band that is tied around the bleeding area to stop bleeding or a drug known as Tranexamic acid, which helps to stop bleeding. A 2010 study showed that if injected within 8 hours of injury tranexamic acid reduced deaths by 10% (robins, 2011). The US military has, however, been hesitant to administer this drug as the study conducted was on crash victims and has not been tested in the battle field. Robins reports that a study conducted by the United States and the United Kingdom showed that the drug saved the lives of soldiers who were suffering from uncompressible bleeding. Uncompressible bleeding refers to bleeding that cannot be controlled by a tourniquet.

Tranexamic acid is a synthetic derivative of lysine that prevents the collapsing of the bloods natural clotting response by preventing fibrin degradation. Fibrinotic agents can lead to hyper-fibrinolysis which is fatal; however, antifibrinolytic agents such as tranexamic acid reduce hemorrhage while not exposing the patient to the extremities of fibrinolytic responses to surgery. The FDA approved the use of Tranexamic acid intravenously for patients with hemophilia. Tranexamic acid was approved by the FDA in oral form to control menorrhagia (a condition where a woman suffers from heavy menstrual bleeding). The drug despite being FDA approved and clinically tested is not approved for use to stop bleeding in severe trauma patients.

In a certain study, a sample population of 896 casualties was selected; the results showed the patients also had reduced mortality than the group with no TXA administered to them; however, the casualties to whom TXA was

administered required more blood, had a lower incidence of Glasgow coma score and an initial systolic blood pressure. Statistical analysis of the relationship between TXA use and survival and the results indicated that TXA use in cases of massive bleeding was independently associated with survival at an odds ratio of 7. 28 with a 95% confidence interval.

TXA is more effcient than its predecessor, aminocaproic acid. In addition, when TXA is administered in vitro and in adjusted concentrations, it does not cause coagulation of parameters or alter the platelet count. TXA is excreted in urine and does not need to be adjusted for hepatic impairment; however, it needs to be adjusted for renal impairment. TXA should be administered at 10 mg/kg of body weight and infused at 1ML per minute; a faster rate of administration causes hypotension. The use of TXA with procoagulant drugs leads to an increased risk of developing thrombotic complications.

TXA cannot be used to treat subarachnoid hemorrhage despite the fact that it reduces bleeding. Its positive effects were countered by the increase of cerebral ischemia due to vasospasm or increased microvascular thrombosis. TXA, in this population, neither had an increase in the quality of life nor an effect on mortality. It thus remains unclear if TXA can be used in the treatment of traumatic brain injuries although thrombosis is a well documented risk.

The safety profile of TXA was possibly exaggerated in the Lancet study due to bias in the accrual of patients. TXA is antifibrinolytic; therefore, it cannot be used in patients suffering from thrombosis which is a contraindication for TXA.

The benefits associated with the use of Tranexamic acid are not only clinical but also budgetary. Tranexamic acid is used to stop heavy bleeding; in the absence of TXA, packed red blood cells are used. Records from the armed services Blood Program office show that the cost of a packet of red blood cells is $100. This price is not inclusive of transport, storage and other logistical costs incurred in the process; therefore, the costs of using TXA are relatively lower than that of one unit of red blood cells. Some patients, on the other hand, to whom TXA is administered may not derive any benefits burdening the health industry with unnecessary costs.

Negative side-effects have been reported with the use of TXA; the common ones are gastrointestinal complications, blurred vision, deep venous thrombosis and pulmonary embolism. The use of TXAA to control urinary tract bleeding should be done reservedly as an extreme reaction may cause obstruction due to bleeding. Increased seizure activity had been noted with the use of TXA in patients who were under-going a pulmonary endarterectomy.

The use of TXA in combat situations, however, remains doubtful due to its administration requirements. In order to accrue the entire benefits of the drug it should be administered within three hours of injury; however, this would be difficult in a deployed setting where evacuation process may increase the time taken to reach the military base. In order for the Tranexamic acid to work effectively in combat cases, then administration of Tranexamic acid has to be succeeded by homeostatic resuscitation. Findings from the above study also indicate that until the 48-hour point, there is no difference in the number of deaths between the group to which TXA was

administered and the group to which TXA was not administered. After the 48-hour point the cause of death is likely to be due to other purposes besides the bleeding.

Conclusion

Three million people die annually from uncontrolled bleeding after injury; this is according to a review carried out by the Cochrane Database of systematic reviews. This review went ahead to recommend that the drug should be added to the World Health Organization’s (WHO) list of essential drugs. Thousands of soldiers die from bleeding in the battle field. Loss of life due to uncontrollable bleeding should not happen in the 21st century given the giant steps that the field of medicine has made. The use of tranexamic acid has its pros and cons, and additional research is needed to minimize its side effects and to increase usage in combat casualties. Research and development could see the drug save thousands of lives of soldiers in battle zones as well as save the tax payers’ money as it is cheaper than its alternative, which is packed red blood cells. The use of Tranexamic acid also involves less logistical processes as it requires relatively lower standard of specialized storage equipment than the packed red blood cells.