Hind limb hyperexcitability following the application of fibrin sealants containing tranexamic acid to the lumbar spinal cord in rats.

Authors: Schlag M.G., Hopf R., Redl H.

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Abstract:

Background: Fibrin sealants (FS) are frequently used in trauma surgery. Typically, they contain aprotinin (APO), a natural fibrinolysis inhibitor, to prevent premature clot degradation. Tranexamic acid (tAMCA), a synthetic fibrinolysis inhibitor, has been discussed as substitute for APO. Several studies have indicated that tAMCA may induce convulsions when applied to the central nervous system. In the present study, we elucidate whether tAMCA retains its convulsive nature when incorporated into an FS. Material and Methods: A laminectomy at T<inf>13</inf> was carried out in male anesthetized rats (n = 25). FS containing either APO or different concentrations of tAMCA (0.5, 5, 47.5 mg/ml) was applied to the pial surface of the lumbar spinal cord. One group of rats (control; n = 4) underwent laminectomy only. The response to noxious stimulation of the hind paw was assessed 5 min after application using a semiquantitative score. Results: Application of FS containing 5 or 47.5 mg/ml tAMCA resulted in severe hind limb (HL) convulsions leading to generalized convulsions in the tAMCA-47.5 group. In this group all animals died, while four of six survived in the tAMCA-5 group. No convulsions were noted in the APO and the tAMCA-0.5 groups, and all animals survived. All surviving animals showed normal HL motor function. Conclusions: tAMCA is able to induce convulsions when incorporated into an FS. Thus, use of FS containing tAMCA within or in vicinity of the central nervous system may pose a substantial risk for the patient.