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Are we scientifically ready to adopt tranexamic acid as a routine in arthroplasty?

Traneksamik asidi bir artroplasti rutini olarak benimsemeye bilimsel olarak hazır mıyız?

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The orthopedic literature is abundant in studies on use of tranexamic acid (TXA); most showing its effectiveness in reducing blood loss and transfusion requirement leading to better outcome, shorter length of hospital stay and reduced costs.[1,2] History of TXA dates back to 1960s and TXA is a relatively cheap agent. However, being old and cheap have not restrained TXA to revolutionize the perioperative blood management in the last decade of orthopedic practice, particularly in arthroplasty procedures which make up for a big portion of elective surgeries.[3-5] However, despite the great interest in and the enthusiasm surrounding this agent, its pharmacokinetic characteristics, dosing and optimal modality of administration for different clinical scenarios still remain largely unknown. Tranexamic acid is a fibrin clot stabilizer and not actually a pro-coagulant agent, but it is still commonly associated with increased risk of venous thromboembolic events (VTEs) (e.g. stroke, deep venous thromboembolism, pulmonary embolism), myocardial infarction and to a lesser extent, retinal injury, seizures and nausea. Although this increased risk profile has not been demonstrated, neither it has been totally ruled out in arthroplasty procedures. Considering that even the meta-analyses including data from highest quality randomized controlled trials struggle to provide concrete evidence on safety of TXA use and, for prospective studies, there is need for at least 5,000 patients in each group even to detect a 1% difference with an 80% power, TXA's widespread adoption seems to continue lacking strong scientific background.[6,7] It has also not been approved by the U.S. Food and Drug Administration for uses other than dental bleeding prophylaxis in hemophilic patients and menorrhagia.[8,9]

Despite the aforementioned negativity about TXA's use, available studies with highest quality demonstrate successful results without detecting increased risk, which makes the agent a good option for managing blood loss in selected patients,[10,11] to the extent that it has recently been suggested that relinquishing tourniquet use can improve total knee arthroplasty outcome by utilizing TXA.[12,13] However, there is great heterogeneity in the literature, where different intravenous (IV), topical, oral or combinations of TXA regimens do not clearly outweigh the others.[7,14] Although topical administration is theoretically thought to have less risk for systemic complications, this effect has also not been clinically demonstrated. Single or multiple dose IV administrations of 10 to 30 mg/kg TXA before and/or after the procedure, topical administration of 1 to 3 g TXA in 50 mL of saline at the end of the procedure, multi-dose 650 mg tablets of oral TXA, and combination of these are the commonly reported administration modalities.[11,12,15,16] Furthermore, the literature has not shown an increased risk of VTE in low-risk patients while there are no reliable data on high-risk patients with positive VTE history.

It should be considered that VTE prophylaxis for arthroplasty patients by itself hosts many controversies;

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therefore, it seems unlikely that data on TXA use in high-risk patients will be available in the near future.[17] In addition, it should not be forgotten that available data on safety inevitably rely on statistically underpowered trials. Until the literature provides concrete data, use of TXA in arthroplasty procedures should be limited to selected patients and efforts should be focused on utilizing the lowest TXA dose possible and determining the optimal administration route while patients should be instructed in detail about current scientific uncertainty.

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