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Is local infiltration of Tranexamic acid efficacious in reducing blood loss after simultaneous bilateral total knee Arthroplasty? A prospective randomized study

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Abstract:

Background Total knee arthroplasty (TKA) is one of the most successful and effective surgical strategy to enhance the quality of life in patients with end-stage arthritis of knee. Significant blood loss occurring in TKA due to bone cuts, results in wound haematoma, postoperative pain, seroma formation and arthrofibrosis thus leading to impaired final outcome. TKA performed bilaterally under single anesthesia results in substantial perioperative blood loss. Many strategies, including the use of Platelet rich plasma (PRP) and Tranexamic acid (TXA), have been employed to minimize perioperative blood loss and the resultant demand of allogeneic blood transfusion [1-3]. Some researchers have reported the beneficial effects of TXA in TKA when used in an injectable form [4]. But issue of the safety of intravenous (IV) TXA has been raised by arthroplasty surgeons due to the risk of deep vein thrombosis (DVT) or pulmonary thromboembolism in high-risk patients. Even though few studies have highlighted the efficacy of local Tranexamic Acid [2, 5, 6], it is still not very well accepted route of administration amongst the clinicians.

Aim of present study was to compare the efficacy of local infiltration versus intravenous administration of Tranexamic acid in reducing perioperative blood loss.

Methods Seventy consecutive ages-, sex- and BMI-matched patients of advanced knee arthritis with tricompartmental involvement undergoing simultaneous bilateral TKA were enrolled for this prospective, randomized, double-blinded comparative study. Patients were allocated randomly by a computer generated random number table into 2 groups: Group I (IVTXA; n=35) Two doses of TXA injected intravenously (15 mg/kg 30 minutes before tourniquet deflation and repeated after 2 hours) and Group II (TTXA; n=35) Local infiltration of TXA (15 mg/kg of TXA in 100 mL of normal saline solution applied locally on to the joint surface for 10 minutes). The primary outcome measures were: total blood loss and total drain output. Blood loss was calculated from the differences between the preoperative Hemoglobin (Hb) and the lowest postoperative Hb during hospital stay or before blood transfusion. The secondary outcome measures were: number of blood units transfused and clinical and functional outcomes as evaluated by Knee Society Score (KSS), Western Ontario and McMaster Universities Arthritis Index (WOMAC) score, Visual Analogue Score (VAS) and Wound Score.

Results All 70 patients were included in the study. Perioperative blood loss in group2 (561.42

± 248.99) was reduced significantly as compared to group1 (1037.04 ± 506.65) with a p-value of <0.001. There was a mean reduction of blood loss by about 45% in local infiltration group as compared to intravenous group. Postoperative Hb in group2 (10.30 ± 1.11) was also significantly higher as compared to group1 (9.66 ± 1.47; p <0.001). The mean drop of hemoglobin in intravenous group was 2.6886 ±1.1636 as compared to 1.6057 ±0.6791 mg/dl in topical tranexamic acid group. This finding was statistically significant with a p-value of

<0.001. Total drain output in group2 (269.14 ± 120.98) was significantly reduced as compared to group1 (574.14 ± 269.03; p <0.001). None of the patient in topical group received any allogeneic blood transfusion whereas 7 patients in intravenous group received allogeneic blood transfusion out of total 35 patients (20%). Thus statistically significant difference was observed in allogeneic blood transfusion between the two groups (p=0.000). Topical tranexamic acid was more effective in maintaining higher post-operative hemoglobin, lesser need of blood transfusion and decreased total drain output as compared to intravenous tranexamic acid administration in bilateral total knee Arthroplasty with a statistically significant result. No complication was observed in either group. Significant difference was observed in WOMAC score at 12weeks and 6months (p=0.015, 0.007) and KSS score at 6 and 12months (p=0.050, 0.045) respectively. However no significant difference was found at 6weeks. VAS score was significant only at 6 month with a p-value of 0.010 when both groups were compared. However, both the groups showed decrease in VAS score values as compared to their pre-operative values.

Conclusion:

Local infiltration of tranexamic acid significantly decreases the blood loss and improves clinical outcome following bilateral total knee arthroplasty performed under single anesthesia as compared to intravenous administration.

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