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A Study on Use of Tranexamic Acid to Reduce Blood Loss in Cemented Hip Arthroplasty

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KEYWORDS : tranexamic acid, total hip arthroplasty, blood loss

INTRODUCTION

Tranexamic acid has been found to reduce blood loss and the need for blood transfusions in knee arthroplasty. In hip arthroplasty, the benefit of tranexamic acid is not as clear. According to earlier studies, tranexamic acid given before hip arthroplasty reduces perioperative blood loss and drainage (Ekbäck et al. 2000) or drainage alone (Duquenne et al. 1999, Ido et al. 2000, Benoni et al. 2001, Husted et al. 2003), but has no effect when given afterwards (Benoni et al. 2000). This study is aimed at studying the relationship between use of tranexamic acid and subsequent reduced blood loss in total hip arthroplasty surgeries.

CASE STUDY

50 patients underwent total hip arthroplasties under our study 25 patients were administered tranexamic acid and 25 were not and resulting blood loss was assessed in terms of intraop blood loss by collection of suction container and postop drain output A posterior approach was used. The posterior capsule was closed and a 10-ch closed suction drain was placed under the gluteal muscle. The same antithrombotic prophylaxis during hospitalization, low-molecular-weight heparin (dalteparin) and elastic leg dressing were used for all patients. Patients with rheumatoid arthritis and osteonecrosis, and with known coagulation disturbances including thromboembolic events, were not considered eligible for the study. Patients using warfarin related preparations, or with allergy to tranexamic acid, or with signs of renal insufficiency were also excluded. The use of acetylsalicylic acid was discontinued a week before the operation. All other pain-relieving drugs were allowed according to how the patients usually took them. Half of the patients received 3 doses of tranexamic acid (100 mg/mL, Cyklokapron, Pharmacia, later Pfizer) 10 mg/kg of body weight mixed in 100 mL saline. The first injection was given intravenously over 5–10 min, immediately before the operation. The next two doses of tranexamic acid or placebo were given 8 h and 16 h after the first injection. The primary outcome variables were blood loss during the operation and the amount of drainage after the operation. Secondary variables were the amount of transfused units of red cells, wound leakage postoperatively, swelling and ecchymoses of the thigh, hematocrit, and possible complications. Intraoperative blood loss was estimated from the swabs and sucker bottle content minus irrigation fluid, with accuracy within 50 mL. Even though we had an indicative 0.28–0.30 level of hematocrit for blood transfusions, it was the clinical situation that determined the need for blood transfusions. Hematocrit was measured on the first and third postoperative days, and additional measurements were performed when required clinically. The lowest value was used for the comparison. The drainage was measured using the intervals at which the injections were delivered, i.e. after 8 h and 16 h. The last measurement was done after 24 h, when the drain was removed. Swelling was measured at the level of 1 cm by comparing the circumference of the thigh 15 cm from the upper pole of the patella before the operation, and on the fifth postoperative day. Ecchymoses were noted. Ultrasound was performed for detection of deep thrombosis, but only if thrombosis was suspected clinically.

CONCLUSIONS

The total measurable blood loss was less in the tranexamic acid group ($p = 0.03$). Most bleeding occurred during the first 6 postoperative hours

The circumference of the thigh increased on

average 2.9 cm in the tranexamic acid group and 4.2 cm in the placebo group ($p = 0.09$). Ecchymosis

was noted in 10 thighs of the tranexamic acid

The patients were discharged 2-3 days postoperatively, without any differences between the groups. No untoward reactions to tranexamic acid were noticed.

DISCUSSION:

In this study, patients receiving tranexamic acid had slightly less bleeding and patients in both groups recovered similarly. Previous studies in hip arthroplasty have used different dosages, single injections or even continuous infusion after the first injection. The biological half-time of tranexamic acid is about 3.5 h in the serum and about 3 h in the joint fluid (Ahlberg et al. 1976). Benoni et al. (1995) have also noticed that the therapeutical level of the tranexamic acid is maintained only for 3 hours, but with a larger dose (20 mg/kg) the level is maintained for 8 h. In spite of this, we used the dosage (10 mg/kg) and interval (8 h) recommended by the manufacturer. Reducing allogeneic blood transfusions brings straight economic benefits and minimizes the risk of virus transmission. One other consideration which is given less attention is the fact that allogeneic blood transfusion itself may elevate the risk of serious infections and fluid overload through an immunomodulating effect.

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