

The efficacy of tranexamic acid (TXA) in total hip arthroplasty with minimally invasive anterior and anterolateral approach

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ABSTRACT

Introduction: It has been proved during the last years, that the administration of tranexamic acid (TXA) in orthopedics surgery is of significant importance in reducing the blood loss during and after total hip arthroplasty. The purpose of this research is to find out if actually the pre-/postoperative use of tranexamic acid reduce the percentage of blood transfusions after total hip arthroplasty with minimally invasive anterior and anterolateral approach.

Methods: In the research were included 50 patients. They were separated in 3 groups: Group A (18 patients) took TXA just before begin of the surgery, Group B (17 patients) took 1g TXA at the beginning und 1g at the end of the surgery, Group C (15 patients) did not take TXA. The surgeries were performed by 2 experienced surgeons of the clinic. The number of patients and the number of blood units that were transfused postoperatively were documented. The limit for blood transfusion was: Hb<8g/dl.

Results: In total only 2 patients needed blood transfusion postoperatively. One from Group B and the other from Group C. Each of them received 1 blood unit.

Conclusion: The tranexamic acid in total hip arthroplasty with minimally invasive anterior and anterolateral approach has not the same value as in the conventional non-minimally invasive approaches. We have to take into consideration the experience of the surgeon on these minimally invasive approaches.

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INTRODUCTION

Tranexamic acid is in a class of medications called antifibrinolytics. It works to improve blood clotting. The tranexamic acid was invented from Utako Okamoto et al. in the early 1960s at Kobe and Keio Medical Schools in Japan, who proved its clinical value as haemostatic agent. The agent now features on the WHO list of essential medicines¹.

The average blood loss after a normal total hip arthroplasty is 1600ml. It is estimated that in average for the 40% of the cases is needed postoperatively a blood transfusion. Furthermore that can cause an extended immobilization and hospitalization. Additionally the blood transfusion is associated with some risks (periprosthetic infection, HIV/HBV/HCV infection, Allergy, costs etc.). The minimally invasive anterior and anterolateral approaches are associated with a need for blood transfusion in about 20% of the patients. The administration of TXA has been used since many years in dental and cardiac surgery.

The TXA can be oral (20mg/Kg 2h preoperatively), intravenous (1g bolus) or local (3g in 100ml NaCl) administrated. Possible side effects could be allergic reaction, nausea, vomiting, hypotension, diarrhoea. The costs of administration of TXA is significantly lower in comparison to blood transfusion and possible side effects of it (2g TXA cost 20euro, 1 blood unit costs 140-230euro)

METHODS AND MATERIALS

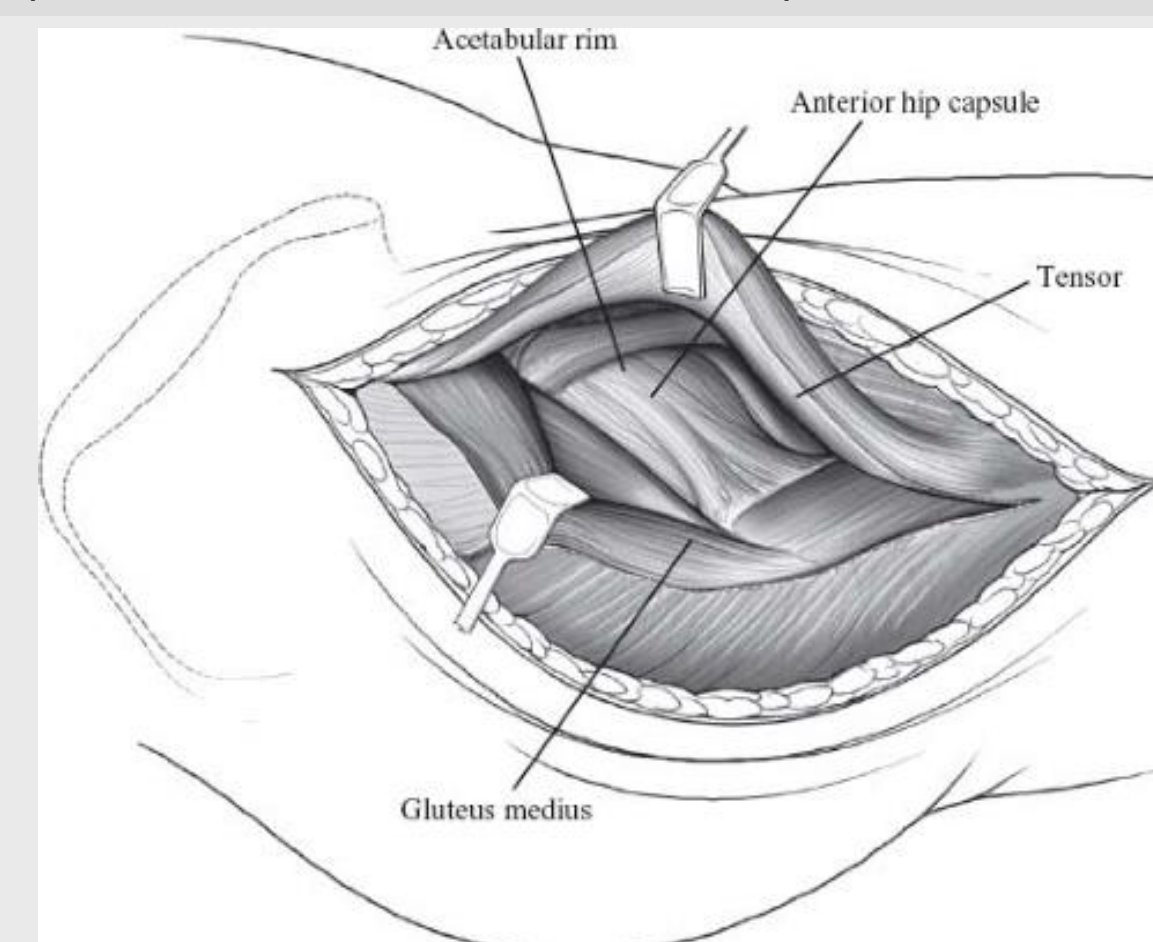
- The number of patients that were included in the research until now is 50 patients. They were separated in 3 groups:
Group A (18 patients): 1g TXA preoperatively (10 minutes before incision)

Group B (17 patients): 1g TXA preoperatively and 1g after surgery
Group C (15 patients): no administration of TXA

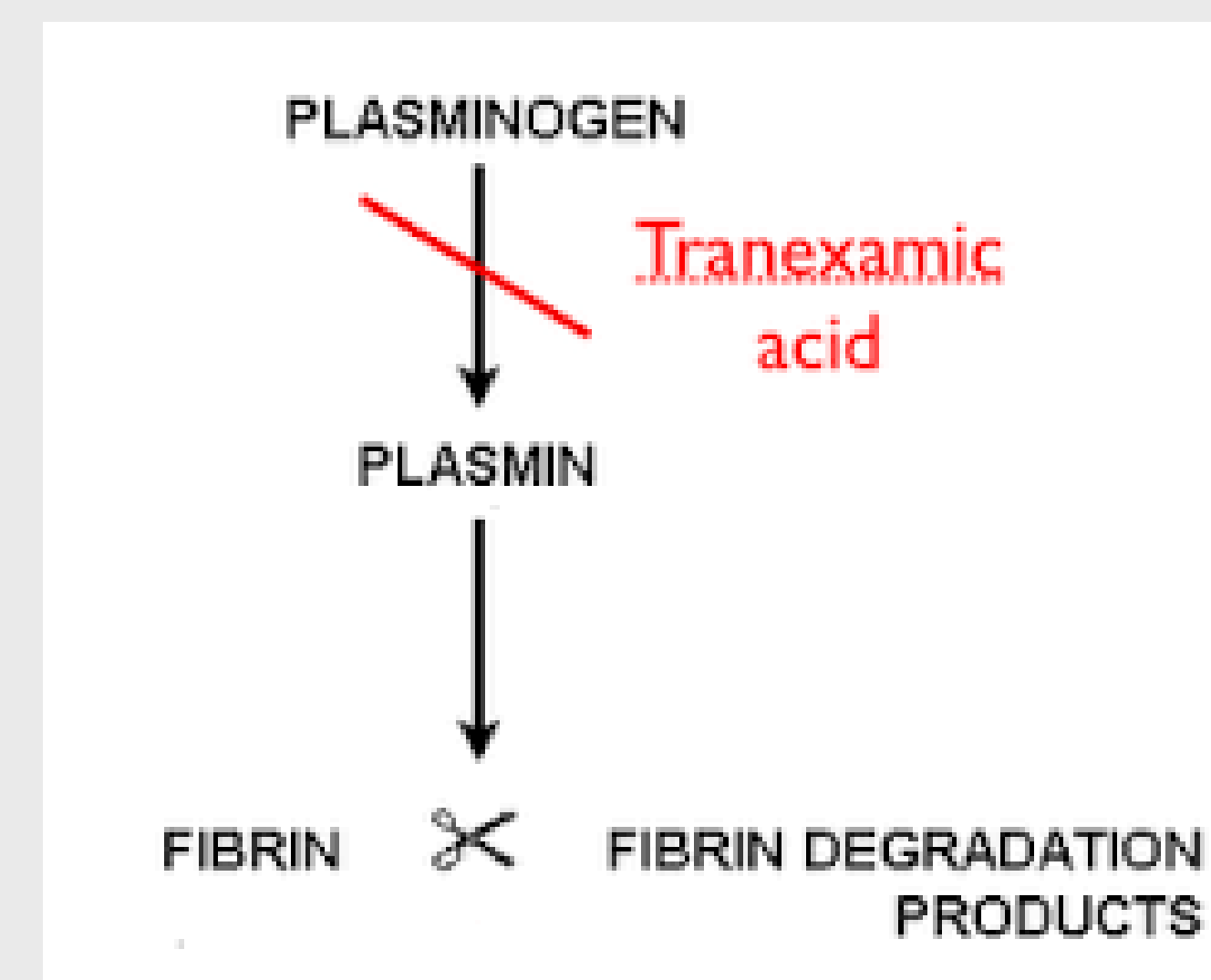
- No remarkable deviation of the preoperative Hematocrit and Hemoglobin was noted.
- The average age was 66 years old.
- A femoral cementing technique was for patients older than 75 years old preferred. By all patients was preferred a non-cemented press-fit technique for implantation of the acetabular cup.
- All surgeries were performed from clinic director and consultant in chief of department of Orthopedics in Marienhospital-Arnsberg.
- 2 types of prothesis were used, depending on the Dorr-Classification and the need of cementing technique femoral: Optimus & Vitamys Fa Mathys, ExciaT cemented & Plasmafit Fa Aesculap.
- Exclusions criteria:
 - Patients with anticoagulant treatment
 - Preoperative anemia
 - TXA-Allergy
 - Chronic Kidney Disease
 - Epilepsy
 - Recent stroke or thromboembolic event
- The number of patients, that needed a blood-transfusion, and the number of blood-units, that was transfused per patient, were reported.
- Criterion for blood transfusion: Hb<8g/dl or Hb<8,5g/dl for patients with anemia symptoms or cardiovascular disease.

MINIMALLY INVASIVE APPROACHES

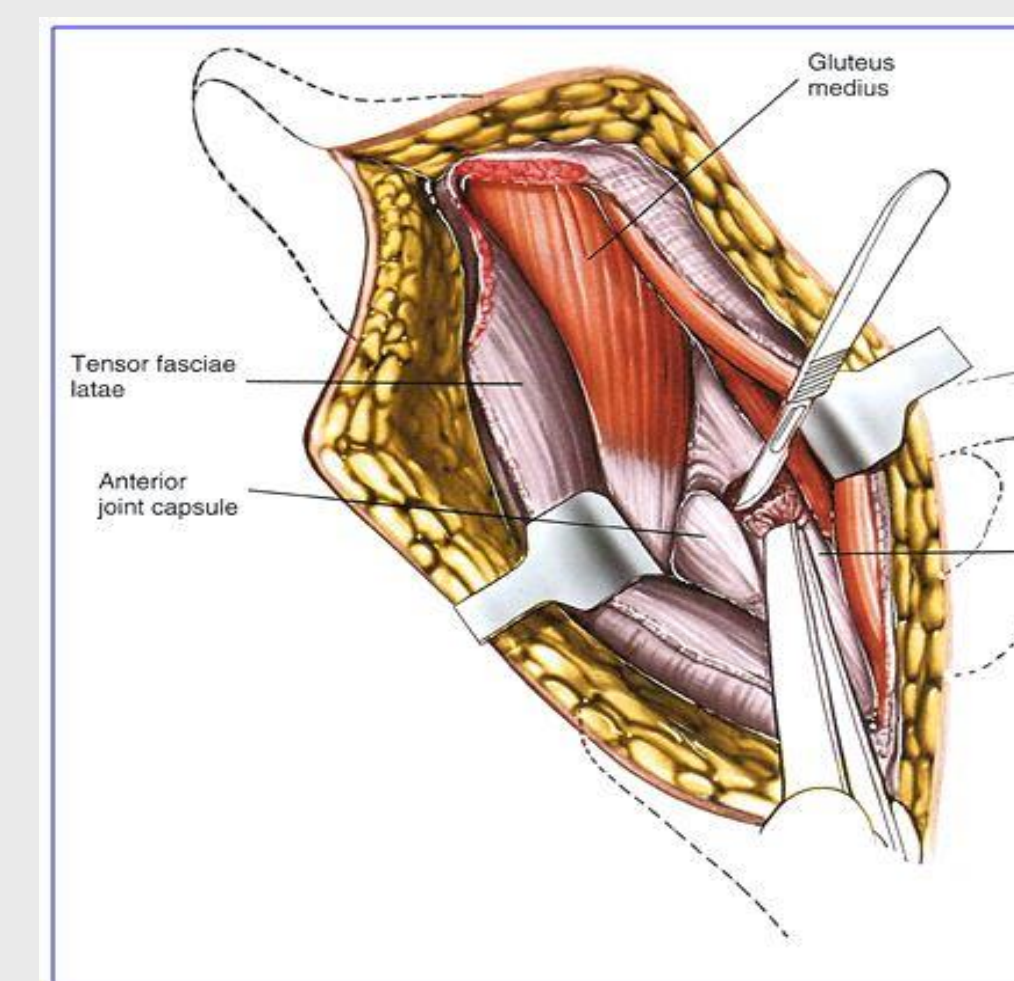
The majority of the researches for using tranexamic acid in total hip arthroplasty, that have been published until now, refer to the conventional approaches of the hip. The minimally invasive approaches find the latest years more acceptance and are being used more frequently. These techniques are related not only with smaller skin incision (6-10cm), but also with more respect for the soft tissues, with less injury of the muscles and rapid recovery. The greatest advantage is the maintenance of the hip abductors muscles that results to quicker mobilization of the patients postoperatively. The experience of the surgeon with the techniques is more determining than the length of the incision. The small skin incisions can result to failure of the prothesis because of incorrect implantation.



ALMIS (modified Watson/Jones approach)³



Tranexamic acid as haemostatic agent

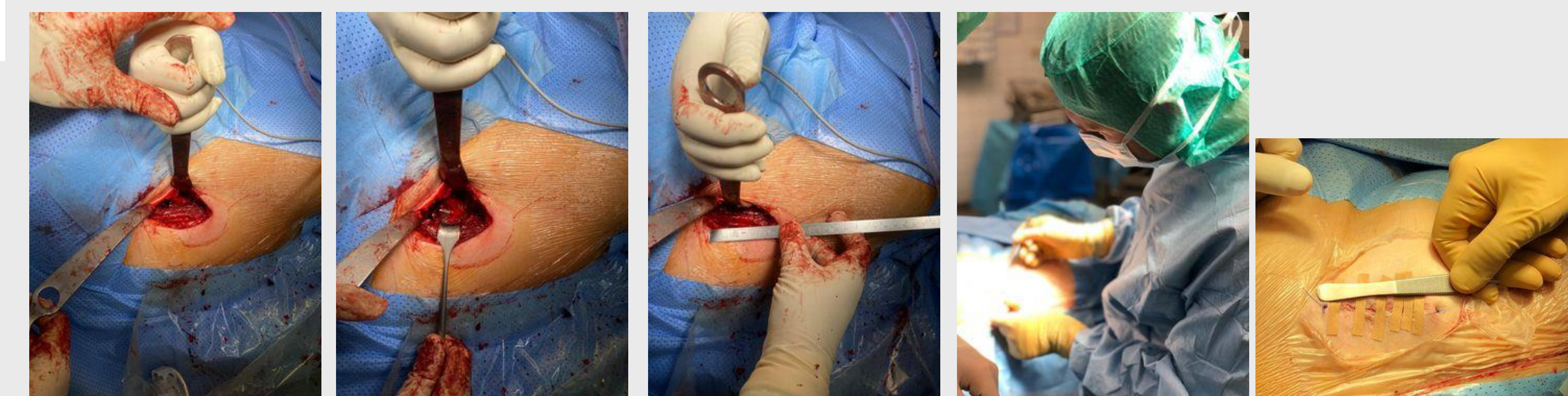


Anterior ((ASI) Approach)²

RESULTS

- The number of patients that needed postoperatively blood transfusion was 2. The one was from group B (2x1g TXA) and the other from group C (without administration of TXA). Both of them received 1 blood unit.
- The average fall of Hemoglobin was 2,7g/dl for group A, 2,01g/dl for group B and 3,2 g/dl for group C.
- Complications: local hematoma (4 patients of group A, 2 patients for group B, 6 Patients for group C), no deep vein thrombosis, no postoperative infection.

Group	A	B	C
Dosage of TXA	1x2g i.v.	2x1g i.v.	-
Blood transfusions (blood units)	-	1(1)	1(1)



DISCUSSION

A lot of studies have proven that there is strong evidence that supports the use of TXA to reduce blood loss and risk of transfusion after primary total hip arthroplasty⁴. The majority of the studies, that have been published until now, refer to total hip arthroplasty without minimally invasive approaches.

Our research is still in early stage (50 patients). The results until now show that there is no significant advantage of the administration of TXA in total hip arthroplasty with minimally invasive anterior and anterolateral approach, as it has in total hip arthroplasty with conventional approaches. Naturally the experience of the surgeon with these minimally invasive approaches and the respect of the soft tissue intraoperatively are of great importance.

However, further studies, with bigger cohort of patients, are needed to draw safer conclusions.

CONCLUSIONS

- The administration of tranexamic acid in total hip arthroplasty with minimally invasive arthroplasty is very promising.
- The first results of our studies did not show any relevant advantage of the TXA, but further studies with a significant bigger cohort of patients are needed.

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