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# Topical TRANeXamic acid in total Knee replacement

**Submission date**
22/04/2012

**Recruitment status**
No longer recruiting

**Registration date**
30/04/2012

**Overall study status**
Completed

**Last Edited**
18/02/2015

**Condition category**
Musculoskeletal Diseases

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[X] Results
[ ] Individual participant data

## Plain English summary of protocol

Background and study aims
It is common to lose blood after a total knee replacement and a blood transfusion may be required. Although safer than ever, blood transfusion is still associated with risks, hence the desire to find new ways to reduce blood loss and blood transfusion. Tranexamic acid is a drug used to stop bleeding. It has been successfully used to stop bleeding after dental operations, removal of tonsils, prostate surgery and heavy menstrual bleeding. It works by preventing the blood clot from dissolving. This study is designed to find out if tranexamic acid can reduce blood loss and subsequent need for blood transfusion in patients undergoing primary TKR.

Who can participate?
Patients undergoing a primary total knee replacement.

What does the study involve?
Participants will be randomly allocated to one of two groups. One group will receive the tranexamic acid solution sprayed into the knee wound during the operation. The other group will receive a placebo solution (a dummy solution which looks like tranexamic acid but contains no active ingredient). The operation is conducted in the standard way and the only difference is squirting the solution into the wound at the end of the operation and before the tourniquet is released and wound is closed. We will measure any differences in blood loss, blood transfusion, length of stay, knee function, quality of life and number of complications between the two groups.

What are the possible benefits and risks of participating?
There is increasing evidence that tranexamic acid can reduce blood loss and the need for blood transfusion significantly after intravenous use in TKR (i.e., injected into a vein). It is anticipated that topical application into the wound may have a more profound effect in reducing blood loss and even lower side effects; however, this remains to be demonstrated by this study. The following side effects have been reported with the use of tranexamic acid: nausea, vomiting, diarrhoea and disturbance in colour vision. These are usually temporary and much less likely to happen after one dose applied directly into the wound. There is a theoretical increased risk of developing deep vein thrombosis and pulmonary embolism. However, some similar studies to this one where tranexamic acid was injected into a vein have not found an increase in this risk.

Moreover, one study showed that applying tranexamic acid directly to the wound does not lead to absorption into the blood, minimising the systemic side effects.

Where is the study run from?
The James Cook University Hospital (UK).

When is the study starting and how long is it expected to run for?
The study is expected to start in August 2008 and run for two years.

Who is funding the study?
University Hospital of North Tees and Hartlepool (UK).

Who is the main contact?
Sattar Alshryda (sattar26@doctors.org.uk)
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# Contact information

### Type(s)
Scientific

### Contact name
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# Additional identifiers

### EudraCT/CTIS number

### IRAS number

### ClinicalTrials.gov number

### Secondary identifying numbers
TRANX-K version 6-19/5/2008

# Study information

### Scientific Title
Topical (intra-articular) TRANeXamic acid reduces blood loss and transfusion rates following total Knee replacement: a randomised controlled trial

## Acronym
TRANX-K

## Study objectives
Total knee replacement (TKR) is one of the commonest operations in orthopaedic practice, with 65,979 total knee replacements reported in England and Wales in 20081. Typically one third of patients required blood transfusion of 1-3 units of blood although the reported range of transfusion is large (20-70%) 2-6. Allogeneic transfusion retains small risks of haemolysis, infection, immunosuppression, transfusion-related acute lung injury (TRALI) and even death. Various techniques have been utilised to reduce blood loss and / or the need for allogeneic blood transfusion with various success.

Tranexamic acid (TXA) is a synthetic antifibrinolytic agent has been used successfully to stop bleeding after dental operation, removal of tonsils, prostate surgery, heavy menstrual bleeding, eye injuries and in patients with haemophilia. Numerous studies have confirmed the efficacy of tranexamic acid in reducing blood loss and transfusion requirements in total knee replacement when used intravenously.

Baric-Daver et al showed that topical use of either tranexamic acid or aprotinin efficiently reduces postoperativen bleeding in cardiac surgery. De Bonis and colleagues showed that there was no detectable blood level of tranexamic acid after topical application. We hypothesised that topical tranexamic acid would provide a high concentration at the bleeding site, effectively limiting blood loss, with little or no systemic side effects. Thus, we investigated the use of tranexamic acid sprayed topically into the exposed tissue around the knee joint prior to the wound closure and tourniquet release.

## Ethics approval required
Old ethics approval format

## Ethics approval(s)
1. National Research Ethics Service June 2008, ref: 08/H0906/57
2. Medicine and Health Products Regulatory Authority (MHRA) July 2008

## Study design
Double-blind randomised placebo-controlled trial

## Primary study design
Interventional

## Secondary study design
Randomised controlled trial

## Study setting(s)
Hospital

## Study type(s)
Treatment

## Participant information sheet
Not available in web format, please use the contact details below to request a patient information sheet

## Health condition(s) or problem(s) studied
Osteoarthritis of the knee

## Interventions
The operation will be performed in the standard manner. Normally, there is no chemical intervention to reduce blood loss. In our study, at the end of the operation and before closing the wound, the study drug, Tranexamic acid (1 gram) or Placebo is squirted in the wound. The wound is closed and dressed in the normal way then tourniquet is released. Drains are released after one hour in recovery as per routine.

## Intervention Type
Drug

## Phase
Not Applicable

## Drug/device/biological/vaccine name(s)
Tranexamic acid

## Primary outcome measure
Blood transfusion required (number of patients needed blood transfusion and number of units of blood transfused until patient is discharged)

## Secondary outcome measures
1. The visible drain blood loss (First 48 hour)
Total knee replacement is performed in bloodless field. The blood is exsangunated from the limb and tourniquet applied higher up to keep the limb bloodless. After suturing the skin and applying the pressure dressing, the tourniquet is released allowing the blood to flow into the limb. Any bleeding will be sucked out by the vacuum drain. Hence drain blood loss is good reflection of total blood loss after total knee replacement.
2. Blood loss in recovery room (visible drain blood loss just before patient leaves the recovery room)
3. Haemoglobin and haematocrit drops (on day 2 postoperatively)
4. General quality of life measure (EUROQOL) preoperative and at 3 months postoperative. This will be completed as per EuroQol group recommendation in their user guide version 1.0 November 2007.20]
5. Oxford knee score preoperative and at 3 months postoperative. This will be completed as per authors recommendation in their paper The use of the Oxford hip and knee scores published in the Journal of Bone and Joint Surgery 2007 . Each of the 12 questions is scored from 4 to 0, with 4 representing the best outcome/least symptoms. The scores from each question were added so that the overall figure lies between 48 and 0, with 48 being the best possible outcome.There are several studies confirmed the validity, consistency and sensitivity of the above two outcome measures.
6. Length of stay
7. Cost effectiveness analysis
8. Cost analysis reflecting changes in resources utilisation (length of stay, blood transfusion, and complications treatment costs)
9. Complications

## Overall study start date

15/08/2008

### Completion date
15/08/2010

## Eligibility

### Key inclusion criteria
Undergoing unilateral primary cemented total knee replacement

### Participant type(s)
Patient

### Age group
Adult

### Sex
Both

### Target number of participants
150

### Key exclusion criteria
1. Undergoing unilateral primary total knee replacement for trauma or tumour
2. Allergic to tranexamic acid
3. Bleeding tendency (e.g. Haemophilic and platelets disorders)
4. Warfarin, treatment dose of low molecular weight heparin (LMWH) or conventional heparin
5. History of deep vein thrombosis (DVT) and pulmonary embolism
6. Renal failure with creatinine > 250 micromole/l
7. Female subjects of child bearing potential must have a negative pregnancy test

### Date of first enrolment
15/08/2008

### Date of final enrolment
15/08/2010

## Locations

### Countries of recruitment
England

United Kingdom

### Study participating centre

**The James Cook University Hospital**
Middlesbrough
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# Sponsor information

**Organisation**
University Hospital of North Tees and Hartlepool (UK)

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**Sponsor type**
Hospital/treatment centre

**ROR**
https://ror.org/04zzrht05

# Funder(s)

**Funder type**
Hospital/treatment centre

**Funder Name**
University Hospital of North Tees and Hartlepool (UK)

# Results and Publications

**Publication and dissemination plan**
Not provided at time of registration

**Intention to publish date**

**Individual participant data (IPD) sharing plan**

## IPD sharing plan summary

Not provided at time of registration

## Study outputs

| Output type | Details | Date created | Date added | Peer reviewed? | Patient-facing? |
|---|---|---|---|---|---|
| Results article | results | 06/11/2013 | | Yes | No |