# **'Tranexamic Acid Changed my Practice'**

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> > Disclosures – nil

## Hip Replacement Surgery



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1980/1990s

Traditional fluid management included 1-2 unit Tx In the north of England, the most common surgical indication for Tx was THR - 4.6% of all blood transfused. *Wells, A W et al. BMJ.* 2002; 325(7368):803

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#### 2000's

Per-op and post-op cell salvage (esp for TKR 80% reduction in transfusion requirement)

2010's

Pre-op preparation, 'anaesthesia' and Tranexamic Acid

## 'War and Peace' Transfusion

- Manageable blood loss (trauma)
- Sarajevo 1992
- Transfusion threshold

(Lavy, Keene, Begovic, Strauss, Ann R Coll Surg Eng 1996)

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## War and Peace Transfusion

- Manageable blood loss (trauma)
- Sarajevo 1992
- Transfusion threshold
- Pre-war Hct < .27
- Post-war Hct < .21 (p<0.001)
- Pre-war Tx 2.6 units
- During-war Tx 1.1 units (p<0.001)</li>

Transfusion Triggers in THR pre-Tranexamic Acid (Keene & Lawrence 2008)

Aim

Analyse data for all THRs over 1 year
To establish what patient factors can be measured to predict the need for post-op Tx
Produce a scoring model to enhance prediction

## **Transfusion Triggers in THR**

- Number of Patients; 233
- Number of Exclusions; 14
  - 12 Missing Data
  - 1 Gaucher's Disease
  - 1 Jehovah's Witness
- Data complete for;
  - 166 Primary THR
  - 33 Birmingham Resurfacing Arthroplasty
  - 20 Revision THR

## Results

Primary THR analysed more closely (due to greater numbers) 166 Primary Hip Arthroplasty patients 25 patients (15.1%) transfused

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- Gender
- BMI (Height & Weight)
- Pre-operative Hb
- Pre-operative PCV
- Age
- ASA grade

#### Results; Male vs. Female

Risk of post-operative transfusion 4 times > for women than men (p=0.0019)



## Results; comparing height

- Patients <1.6m in height were more likely to require transfusion than those >1.6m
- 40% vs 8.4% (p=0.00002)



# Results; comparing weight

- 4 times increased risk of transfusion for those patients <60 kg compared to those over 40.9%vs 11.1%(p=0.0013)
- Only 2 patients over 115kg both required transfusion



# Results; comparing BMI

- Mean BMI not significantly different between transfused and nontransfused (p=0.280)
- Risk of transfusion in patients with BMI <25 double that of patients >25;

- 24.1% vs. 10.2% (p=0.000413)



# Results; pre-op Haemoglobin

- Pre-operative Hb significantly > in non-transfused patients compared with transfused patients
  - 13.6g/dl vs. 11.8g/dl (P<0.00000)
- Pre-op Hb <12g/ dl 47.7% required transfusion
- Pre-op Hb >14g/dl 2% required transfusion



## Results; Packed Cell Volume

- Pre-operative PCV significantly > in non-transfused patients compared with transfused patients
  - -39.9 vs. 34.2 (P<0.00000)
- 28% of patients with PCV less than the average (39.0) required transfusion vs. 4.4% of those above average (p=0.00002)



# Results; Comparing Age

- Average age significantly > in transfused patients compared to those not
  - 76yrs vs. 68.8yrs (p=0.0045)
- < 80yrs, transfusion risk = 11.4%
- > 80yrs. transfusion risk = 29.4% (p=0.0092).



# Results; comparing ASA

No significant difference between transfused and non transfused groups



## SCORING SYSTEM

- Simple system of 0,1 or 2 given to significant factors
- Scores relate to relative risk of Transfusion
- Total score equals Sex+Hb+PCV+Age+Height+Weight

- Range = 0 - 11

Score	Sex	Hb (g/dl)	PCV (%)	Age (years)	Height (m)	Weight (kg)
0	Male	≥14	≥42	<80	≥1.80	≥70
1	Female	12-13.9	36-41.9	80-89	1.6-1.79	60-69.9
2		<12	<36	≥90	<1.6	<60

# Scoring System; Results

- A score of <5 (99 patients) transfusion risk = 1.0%,
- A score of >8 risk = 58.8%
- A score of >9 risk = 75%



#### Conclusion

- Combination of risk factors gives a better prediction of transfusion than any one individual factor
- Very low risk of transfusion in average weight, average height, young men who are not anaemic
- It returns the largest scores for underweight, anaemic females over 80 yrs with short stature
  - These cases should be targeted for optimisation preop and early transfusion post-operatively

# Tranexamic acid in Total Hip Arthroplasty (2013)



Pierre Nasr Graham Keene James Bamber



## The Aim

The assess the effectiveness of tranexamic acid on:

- 1. Drain output do we need to use drains?
- 2. Post op Hb and Transfusion requirements

#### **Previous papers**

- BMJ systematic review in 2012
  - Reliable evidence that Tranexamic Acid reduces
     Tx, with a varying effect being seen across
     surgical specialities
- 42 papers on Pubmed literature search regarding THR
  - Most agree that Tranexamic Acid decreases transfusion requirements

### Inclusion criteria

All primary total hip arthroplasty

Pre use of tranexamic acid
Post use of tranexamic acid
Patients were of similar average age, BMI and pre op Hb

### **Exclusion criteria**

- Hip resurfacings
- Liver/Renal transplants
- Patients on Warfarin pre-op
- Patients with a contraindication to Tranexamic acid (previous stents, previous DVT)

# Our Tranexamic Acid Regime

- 1g IV on induction
- 2g PO 8 and 16 hours post op

### Data collection

- Intraoperative collection and retransfusion
- Superficial and deep drain output
- Post operative drop in Hb
- Units transfused

## Results

	Pre Tranexamic acid	Post Tranexamic acid
Patient number	163	77
Average age (range)	70 (25-94)	65 (17-91)
Female:Male	93:70	53:24
Average BMI	27.0	27.4 (18.5-42.9)
Average Pre op Hb (g/dL)	13.3 (9.2-16.9)	13.6 (11.0-16.5)
Average Post op Hb	10.1 (6.4-13.6)	10.9(8.1-13.7)
Average Hb fall	3.1	2.7
Average deep drain	128mls (5-1400)	33.3mls (0-170)
Average superficial drain	20mls (0-140)	10.5mls (0-50)
Average retransfused	175mls (100-400) 43/164 patients (26.2%)	3.2mls (0-150) 2/77 patients (2.6%)
Average units transfused post op	0.3 21/163 patients (12%)	0.06 3/77 patients (3.9%)

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Average units transfused	0.3	0.06
post op	21/163 patients (12%)	3/77 patients (3.9%)

## Conclusion

- Do not need to use a drain
- Do not need to use a retransfusion system
- Decreases need for a post op transfusion
- Less of a fall in Hb

# **'Tranexamic Acid Changed my Practice'**

- Stop using drains reduce pain and reduce cost
- Transfusion risk small
- Less wound ooze (less dressing changes & ? less infections)
- Less limb swelling
- Earlier mobilisation & discharge
- 'No harm'

