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# Transfusion thresholds in hip fracture

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# Declarations of interest

- Member:
  - Topic Expert Group, NICE
  - Editorial Board, BJA

BJA British Journal of Anaesthesia

- Research funding:
  - NIHR
  - NIAA
  - Nexfin (loan equipment)

NIAA
National Institute of Academic Anaesthesia

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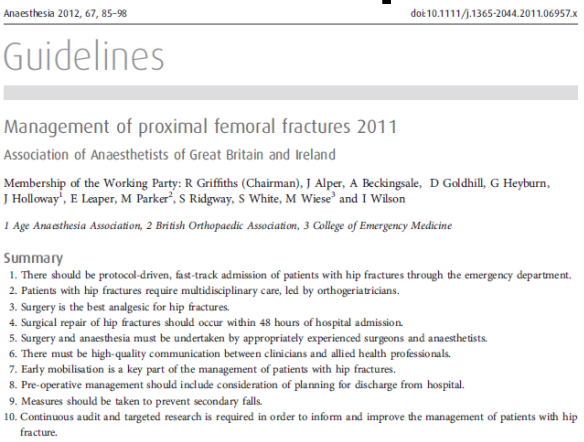
# Transfusion thresholds in hip fracture

- NICE
  - CG124
- AAGBI
  - Hip fracture guidelines


Anaesthesia 2012, 67, 85–98 doi:10.1111/j.1365-2044.2011.06957.x

Guidelines

Management of proximal femoral fractures 2011

Association of Anaesthetists of Great Britain and Ireland

Membership of the Working Party: R Griffiths (Chairman), J Alper, A Beckingsale, D Goldhill, G Heyburn, J Holloway[1], E Leaper, M Parker[2], S Ridgway, S White, M Wiese[3] and I Wilson

*1 Age Anaesthesia Association, 2 British Orthopaedic Association, 3 College of Emergency Medicine*

Summary

1. There should be protocol-driven, fast-track admission of patients with hip fractures through the emergency department.
2. Patients with hip fractures require multidisciplinary care, led by orthogeriatricians.
3. Surgery is the best analgesic for hip fractures.
4. Surgical repair of hip fractures should occur within 48 hours of hospital admission.
5. Surgery and anaesthesia must be undertaken by appropriately experienced surgeons and anaesthetists.
6. There must be high-quality communication between clinicians and allied health professionals.
7. Early mobilisation is a key part of the management of patients with hip fractures.
8. Pre-operative management should include consideration of planning for discharge from hospital.
9. Measures should be taken to prevent secondary falls.
10. Continuous audit and targeted research is required in order to inform and improve the management of patients with hip fracture.

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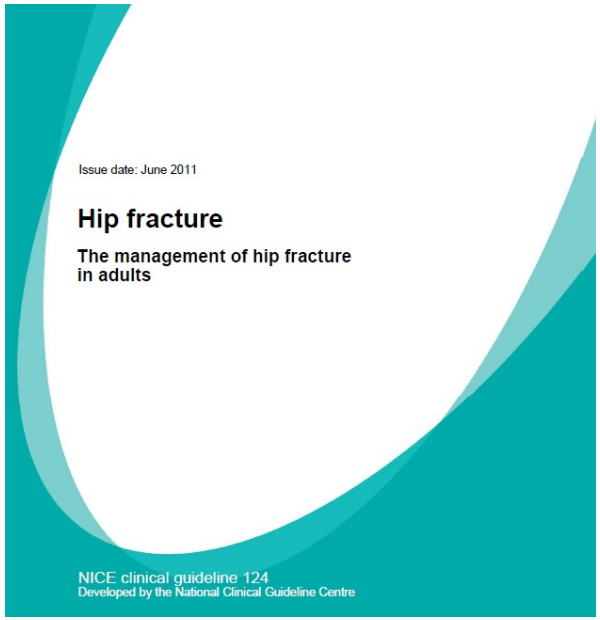
National Institute for
Health and Clinical Excellence


The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 DECEMBER 29, 2011 VOL. 365 NO. 26

Liberal or Restrictive Transfusion in High-Risk Patients after Hip Surgery

Jeffrey L. Carson, M.D., Michael L. Terrin, M.D., M.P.H., Helaine Noveck, M.P.H., David W. Sanders, M.D., Bernard R. Chaitman, M.D., George G. Rhoads, M.D., M.P.H., George Nemo, Ph.D., Karen Dragert, R.N., Lauren Beaupre, P.T., Ph.D., Kevin Hildebrand, M.D., William Macaulay, M.D., Courtland Lewis, M.D., Donald Richard Cook, B.M.Sc., M.D., Gwendolyn Dobbin, C.C.R.P., Khwaja J. Zakriya, M.D., Fred S. Apple, Ph.D., Rebecca A. Horney, B.A., and Jay Magaziner, Ph.D., M.S.Hyg., for the FOCUS Investigators*



# NICE - CG124

- Identify and treat correctable comorbidities immediately so that surgery is not delayed by:
  - Anaemia
  - Anticoagulation
  - Volume depletion
  - Electrolyte imbalance
  - Uncontrolled diabetes

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# AAGBI guidance for delay

## Acceptable

- Haemoglobin concentration $< 8\ g.dl^{-1}$
- Plasma sodium concentration $< 120$ or $> 150\ mmol.l^{-1}$ and potassium concentration $< 2.8$ or $> 6.0\ mmol.l^{-1}$.
- Uncontrolled diabetes.
- Uncontrolled or acute onset left ventricular failure.
- Correctable cardiac arrhythmia with a ventricular rate $>120\ .min^{-1}$
- Chest infection with sepsis.
- Reversible coagulopathy.

## Unacceptable

- Lack of facilities or theatre space.
- Awaiting echocardiography.
- Unavailable surgical expertise.
- Minor electrolyte abnormalities.

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# Why all the fuss?

- Admission Hb
  - < 10 g/dl
    - Mortality:
      - 30-day: OR 1.87
      - 12 months: OR 4.5
    - Readmission

Maxwell 2008
Gruson 2002
Halm 2004

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# Why all the fuss?

- Post-op Hb
  - Associated with mobility
- Discharge Hb
  - <12 g/dl – non-predictive of outcome

Foss 2008
Su 2004

# Why all the fuss?

- Preventing blood loss
  - Tranexamic acid
    - Probably effective but ? Increased CVS complications
    - Ongoing studies
  - Regional anaesthesia
    - Not much evidence
    - Clopidogrel!

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# Why all the fuss?

- Erythropoiesis
  - Oral iron
    - Ineffective
  - IV iron
    - Possibly effective
    - Most data from single Spanish group
    - ?Need EPO as well
    - Ongoing studies

Parker 2010
Serrano-Trenas 2011
Bernabeu-Wittel 2012

# Why all the fuss?

- Transfusion
  - Expensive
  - Limited resource
  - Limited evidence of benefit
    - Observational studies
    - Bias
    - Lack of standardisation

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# FOCUS

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# FOCUS

*Hypothesized, ...that a higher haemoglobin level might facilitate more active participation in rehabilitation, leading to more successful recovery of ambulation.*

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# FOCUS

- 2016 patients
  - Age > 65
  - 'Risk factors' for CVD
  - Walking unaided
- Randomised post-op
  - Hb < 10 g / dL
  - Within 3 days of surgery

# FOCUS

- Liberal trigger – 10 g / dL
- Restrictive trigger – 8 g / dL
  - Caveat of 'symptomatic' transufsion

# FOCUS

- Primary outcome:
  - death or an inability to walk 10 ft (or across a room) without human assistance at 60-day follow-up.
- Secondary outcomes:
  - combined outcome of in-hospital myocardial infarction, unstable angina, or death for any reason

# FOCUS

- No difference in primary outcome
  - Liberal: 459/995
  - Restrictive: 481/1000
- Death alone:
  - Liberal: 52/995
  - Restrictive: 43/1000
- Higher rate of CCF and tachycardia / hypotension in restrictive group

# FOCUS

- Relevance to clinical practice?
  - Post-op trial
  - 25% transfused before trial entry
  - Thresholds?

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# FOCUS

| Transfusions before randomization | | | |
|---|---|---|---|
| 0 units — no./total no. (%) | 754/1006 (75.0) | 720/1008 (71.4) | |
| ≥1 unit — no./total no. (%) | 252/1006 (25.0) | 288/1008 (28.6) | 0.07 |
| Total no. of units | 452 | 531 | |
| **Transfusions after randomization** | | | |
| 0 units — no./total no. (%) | 33/1003 (3.3) | 594/1007 (59.0) | |
| 1 unit — no./total no. (%) | 420/1003 (41.9) | 246/1007 (24.4) | |
| 2 units — no./total no. (%) | 346/1003 (34.5) | 127/1007 (12.6) | |
| 3 units — no./total no. (%) | 132/1003 (13.2) | 24/1007 (2.4) | |
| ≥4 units — no./total no. (%) | 72/1003 (7.2) | 16/1007 (1.6) | <0.001 |

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# FOCUS

- Relevance to clinical practice?
  - Post-op trial
    - 25% transfused before trial entry
  - Walking unaided as inclusion criterion
  - 60-day mortality 9%
    - Unrepresentative of UK/ Europe

# FOCUS

- Supports TRICC data
- Stronger evidence than previous observational studies
  - But narrower inclusion criteria

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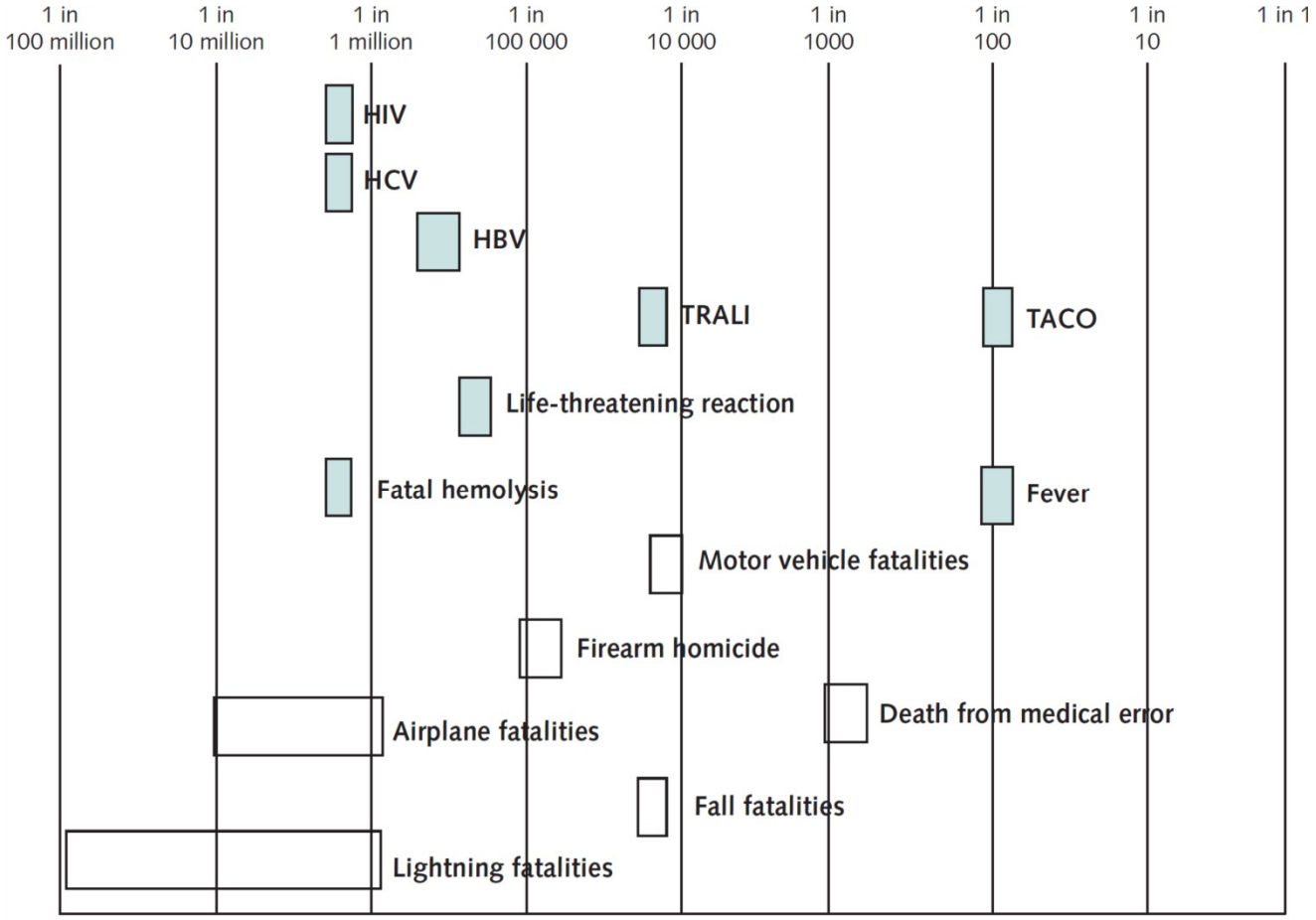
# Risks from Transfusion




**Red Blood Cell Transfusion: A Clinical Practice Guideline From the AABB**
Jeffrey L. Carson, MD; Brenda J. Grossman, MD, MPH; Steven Kleinman, MD; et al. *Ann Intern Med*. 26 March 2012

# Haemoglobin management

- Stop the bleeding
- Encourage erythropoiesis
- Think hard before transfusing post-op

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