Anaesthesia & The Hip Fracture Patient

Richard Griffiths MD FRCA
Peterborough & Stamford Hospitals

Declarations of Interest

- Honorary Secretary of the Association of Anaesthetists of Great Britain & Ireland

- Trustee Wothorpe Towers Preservation Trust

The Association of Anaesthetists of Great Britain & Ireland

18-20 Sept 2013

ANNUAL CONGRESS DUBLIN

THE CONVENTION CENTRE DUBLIN

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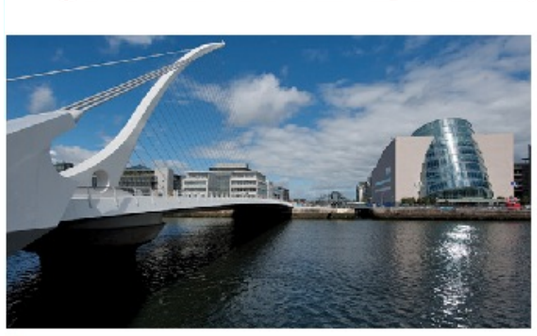

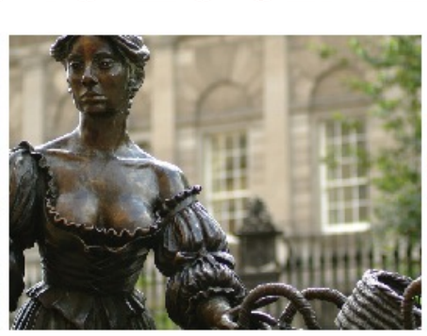

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OF GREAT BRITAIN & I
YOU MAY N
ME LATE


ENDURA
AAGBI
IN SOMNO SECURITAS


ENDURA
lifebox

Time to Surgery

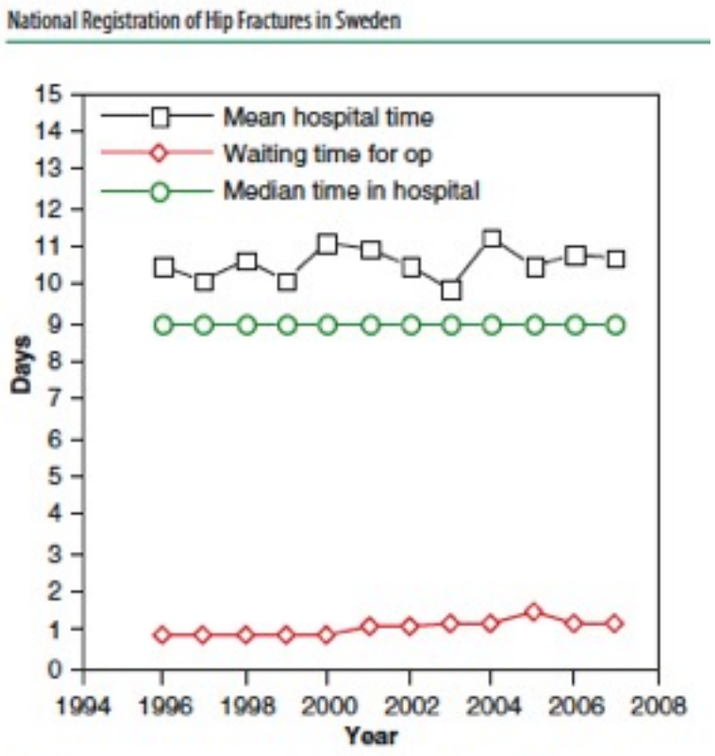


Fig. 2 Mean and median time in the acute hospital and waiting time (time from admittance to operation)

Even in 1996 patients were only waiting one day in Sweden

Median length of stay is also good at 9 days

Time to Surgery

Probably reduces morbidity and mortality if operation done early

The evidence?

Time to Surgery

1. Shiga T, Wajima Z, Ohe Y. Is operative delay associated with increased mortality of hip fracture patients? Systematic review, meta-analysis and meta-regression. Canadian Journal of Anaesthesia 2008; **55**: 146-54.
2. Khan SK, Kalra S, Khanna A, Thiruvengada MM, Parker MJ. Timing of surgery for hip fractures: A systematic review of 52 published studies involving 291, 413 patients. Injury 2009; **40**: 692-7
3. Nicole Simunovic, P. J. Devereaux, Sheila Sprague, Gordon H. Guyatt, Emil Schemitsch, Justin Debeer, Mohit Bhandari**. Effect of early surgery after** hip fracture on mortality and complications: systematic review and meta-analysis. *Canadian Medical Association Journal, 2010, 182 (15);1602-1616*

Reports of Original Investigations

Is operative delay associated with increa tality of hip fracture patients? Systemati meta-analysis, and meta-regression

[Le délai opératoire est-il associé à une mortalité accrue chez les pati fracture de la hanche ? Synthèse systématique, méta-analyse et méta-

Toshiya Shiga MD PhD,* Zen'ichiro Wajima MD PhD,† Yoko Ohe MD PhD*

Purpose: Mortality associated with hip fracture is high in elderly patients. Surgical repair within 24 hr after admission is recommended by The Royal College of Physicians' guidelines; however, the effect of operative delay on mortality remains controversial. The objective of this study was to determine whether operative delay increases mortality in elderly patients with hip fracture.

anesthesiologists must be aware harmful to hip fracture patients low risk or those who are young

Early release, published at www.cmaj.ca on September 13, 2010. Subject to revision.

CMAJ RESEARCH

Effect of early surgery after hip fracture on mortality and complications: systematic review and meta-analysis

Nicole Simunovic MSc, P. J. Devereaux MD, Sheila Sprague MSc, Gordon H. Guyatt MSc MD, Emil Schemitsch MD, Justin DeBeer MD, Mohit Bhandari PhD MD

Abstract

Background: Guidelines exist for the surgical treatment of hip fracture, but the effect of early surgery on mortality and other outcomes that are important for patients remains unclear. We conducted a systematic review and meta-analysis to determine the effect of early surgery on the risk of death and common postoperative complications among elderly patients with hip fracture.

Methods: We searched electronic databases (including MEDLINE and EMBASE), the archives of meetings of orthopedic associations and the bibliographies of relevant articles and questioned experts to identify prospective studies, published in any language, that evaluated the effects of early surgery in patients undergoing procedures for hip fracture. Two reviewers independently assessed methodologic quality and extracted relevant data. We pooled data by means of the DerSimonian and Laird random-effects model, which is based on the inverse variance method.

Results: We identified 1939 citations, of which 16 observational studies met our inclusion criteria. These studies had a total of 13 478 patients for whom mortality data were complete (1764 total deaths). Based on the five studies that reported adjusted risk of death (4208 patients, 721 deaths), irrespective of the cut-off for delay (24, 48 or 72 hours), earlier surgery (i.e., within the cut-off time) was associated with a significant reduction in mortality (relative risk [RR] 0.81, 95% confidence interval [CI] 0.68–0.96, $p = 0.01$). Unadjusted data indicated that earlier surgery also reduced in-hospital pneumonia (RR 0.59, 95% CI 0.37–0.93, $p = 0.02$) and pressure sores (RR 0.48, 95% CI 0.34–0.68, $p < 0.001$).

Interpretation: Earlier surgery was associated with a lower risk of death and lower rates of postoperative pneumonia and pressure sores among elderly patients with hip fracture. These results suggest that reducing delays may reduce mortality and complications.

Among elderly patients, hip fracture is associated with a one-year mortality rate ranging from 14% to 36%[1] and also with profound temporary and sometimes permanent impairment of independence and quality of life.[2] As the elderly population increases, the annual number of hip fractures globally is expected to exceed 7 million over the next 40 to 50 years.[3]

Current guidelines[4] indicate that surgery for hip fracture should be performed within 24 hours of injury, as earlier surgery has been associated with better functional outcome, shorter hospital stay, shorter duration of pain and lower rates of nonunion, postoperative complications and mortality.[5,6]

Proponents of early treatment argue that this approach minimizes the length of time a patient is confined to bed rest, thereby reducing the risk of associated complications, such as pressure sores, deep vein thrombosis and urinary tract infections.[5] However, those favouring a delay believe it provides the opportunity to optimize patients' medical status, thereby decreasing the risk of perioperative complications.[7] A further challenge to resolving the debate is the lack of an accepted definition of early surgery.[8] Uncertainty exists about whether 24, 48 or 72 hours, or a longer period, should be considered to represent an "unacceptable delay" for hip fracture surgery.

We undertook a systematic review and meta-analysis to inform this debate. More specifically, we addressed the following question: Among patients 60 years of age or older who underwent surgery for hip fracture, what was the effect of early surgery, relative to delayed surgery, on all-cause mortality and postoperative complications?

Methods

Eligibility criteria

Studies fulfilling the following criteria were eligible for inclusion: target population consisting of patients 60 years of age or older who underwent surgery for a low-energy hip fracture, evaluation of preoperative surgical delay, consideration of all-cause mortality as an outcome and prospective design. We imposed no language restrictions.

From the Department of Clinical Epidemiology and Biostatistics (Simunovic, Devereaux, Sprague, Guyatt, Bhandari) and the Department of Surgery (Sprague, DeBeer, Bhandari), Division of Orthopaedic Surgery, McMaster University, Hamilton, Ont.; and the Department of Surgery, Division of Orthopaedic Surgery (Schemitsch), University of Toronto, Toronto, Ont.

CMAJ 2010. DOI:10.1503/cmaj.092229

Lancet. 2008 May 31;371(9627):1839-47. doi: 10.1016/S0140-6736(08)60601-7. Epub 2008 May 12.

Effects of extended-release metoprolol succinate in patients undergoing non-cardiac surgery (POISE trial): a randomised controlled trial.

POISE Study Group, Devereaux PJ, Yang H, Yusuf S, Guyatt G, Leslie K, Villar JC, Xavier D, Chrolavicius S, Greenspan L, Pogue J, Pais P, Liu L, Xu S, Málaga G, Avezum A, Chan M, Montori VM, Jacka M, Choi P.

Collaborators (366)

McMaster University, Faculty of Health Sciences, Clinical Epidemiology and Biostatistics, Room 2C8, 1200 Main Street West, Hamilton, ON, L8N 3Z5, Canada. philipj@mcmaster.ca

Abstract

BACKGROUND: Trials of beta blockers in patients undergoing non-cardiac surgery have reported conflicting results. This randomised controlled trial, done in 190 hospitals in 23 countries, was designed to investigate the effects of perioperative beta blockers.

METHODS: We randomly assigned 8351 patients with, or at risk of, atherosclerotic disease who were undergoing non-cardiac surgery to receive extended-release metoprolol succinate (n=4174) or placebo (n=4177), by a computerised randomisation phone service. Study treatment was started 2-4 h before surgery and continued for 30 days. Patients, health-care providers, data collectors, and outcome adjudicators were masked to treatment allocation. The primary endpoint was a composite of cardiovascular death, non-fatal myocardial infarction, and non-fatal cardiac arrest. Analyses were by intention to treat. This trial is registered with ClinicalTrials.gov, number NCT00182039.

FINDINGS: All 8351 patients were included in analyses; 8331 (99.8%) patients completed the 30-day follow-up. Fewer patients in the metoprolol group than in the placebo group reached the primary endpoint (244 [5.8%] patients in the metoprolol group vs 290 [6.9%] in the placebo group; hazard ratio 0.84, 95% CI 0.70-0.99; p=0.0399). Fewer patients in the metoprolol group than in the placebo group had a myocardial infarction (176 [4.2%] vs 239 [5.7%] patients; 0.73, 0.60-0.89; p=0.0017). However, there were more deaths in the metoprolol group than in the placebo group (129 [3.1%] vs 97 [2.3%] patients; 1.33, 1.03-1.74; p=0.0317). More patients in the metoprolol group than in the placebo group had a stroke (41 [1.0%] vs 19 [0.5%] patients; 2.17, 1.26-3.74; p=0.0053).

INTERPRETATION: Our results highlight the risk in assuming a perioperative beta-blocker regimen has benefit without substantial harm, and the importance and need for large randomised trials in the perioperative setting. Patients are unlikely to accept the risks associated with perioperative extended-release metoprolol.

Hospital Stay and Mortality Are Increased in Patients Having a "Triple Low" of Low Blood Pressure, Low Bispectral Index, and Low Minimum Alveolar Concentration of Volatile Anesthesia

Daniel I. Sessler, M.D.,* Jeffrey C. Sigl, Ph.D.,† Scott D. Kelley, M.D.,‡ Nassib G. Chamoun, M.S.,§ Paul J. Manberg, Ph.D.,‖ Leif Saager, M.D.,# Andrea Kurz, M.D.,** Scott Greenwald, Ph.D.††

ABSTRACT

Background: Low mean arterial pressure (MAP) and deep hypnosis have been associated with complications and mortality. The normal response to high minimum alveolar concentration (MAC) fraction of anesthetics is hypotension and low Bispectral Index (BIS) scores. Low MAP and/or BIS at lower MAC fractions may represent anesthetic sensitivity. The authors sought to characterize the effect of the triple low state (low MAP and low BIS during a low MAC fraction) on duration of hospitalization and 30-day all-cause mortality.

Methods: Mean intraoperative MAP, BIS, and MAC were determined for 24,120 noncardiac surgery patients at the Cleveland Clinic, Cleveland, Ohio. The hazard ratios associated with combinations of MAP, BIS, and MAC values greater or less than a reference value were determined. The authors also evaluated the association between cumulative triple low minutes, and excess length-of-stay and 30-day mortality.

Results: Means (±SD) defining the reference, low, and high states were 87 ± 5 mmHg (MAP), 46 ± 4 (BIS), and 0.56 ± 0.11 (MAC). Triple lows were associated with prolonged length of stay (hazard ratio 1.5, 95% CI 1.3–1.7). Thirty-day mortality was doubled in double low combinations and quadrupled in the triple low group. Triple low duration ≥60 min quadrupled 30-day mortality compared with ≤15 min. Excess length of stay increased progressively from ≤15 min to ≥60 min of triple low.

Conclusions: The occurrence of low MAP during low MAC fraction was a strong and highly significant predictor

What We Already Know about This Topic

- Anesthesiologists continue to refine factors associated with morbidity and mortality after surgery.
- It is hoped identification of such factors will lead to treatments that may greatly reduce adverse outcomes during the perioperative period.

What This Article Tells Us That Is New

- In this retrospective review of a large database from a single institution, the occurrence of low mean arterial pressure during low minimum alveolar concentration fraction was a strong and highly significant predictor for mortality, and when combined with low bispectral index, the mortality risk was even greater. Additional studies are needed to validate the triple low as an indicator of perioperative mortality.

* Michael Cudahy Professor and Chair, # Assistant Professor, ** Professor and Vice-chair, Department of Outcomes Research, Cleveland Clinic, Cleveland, Ohio. † Director, Analytical Research, ‡ Chief Medical Officer, Respiratory and Monitoring Solutions, †† Senior Director, Advanced Research, Covidien, Inc., Dublin, Ireland. § Chair, Lown Cardiovascular Research Foundation, Boston, Massachusetts; Adjunct Staff, Department of Outcomes Research, Cleveland Clinic. ‖ Vice President, Clinical Research and Regulatory Strategy, Covidien. Currently: Corolla Clin-Reg Consulting, Corolla, North Carolina.

Received from the Department of Outcomes Research, Cleveland Clinic, Cleveland, Ohio; Covidien, Inc., Dublin, Ireland; Lown Cardiovascular Research Foundation, Boston, Massachusetts. Submitted for publication June 1, 2011. Accepted for publication March 6, 2012. Supported by Aspect Medical Systems, Norwood, Massachusetts. Aspect was recently acquired by Covidien, Dublin, Ireland. The study was designed and conducted collaboratively by investigators from both organizations. Covidien employees have a financial interest in their company, but none of the Cleveland Clinic authors has a personal financial interest in this research. Covidien loaned some bispectral index monitors to the Cleveland Clinic.

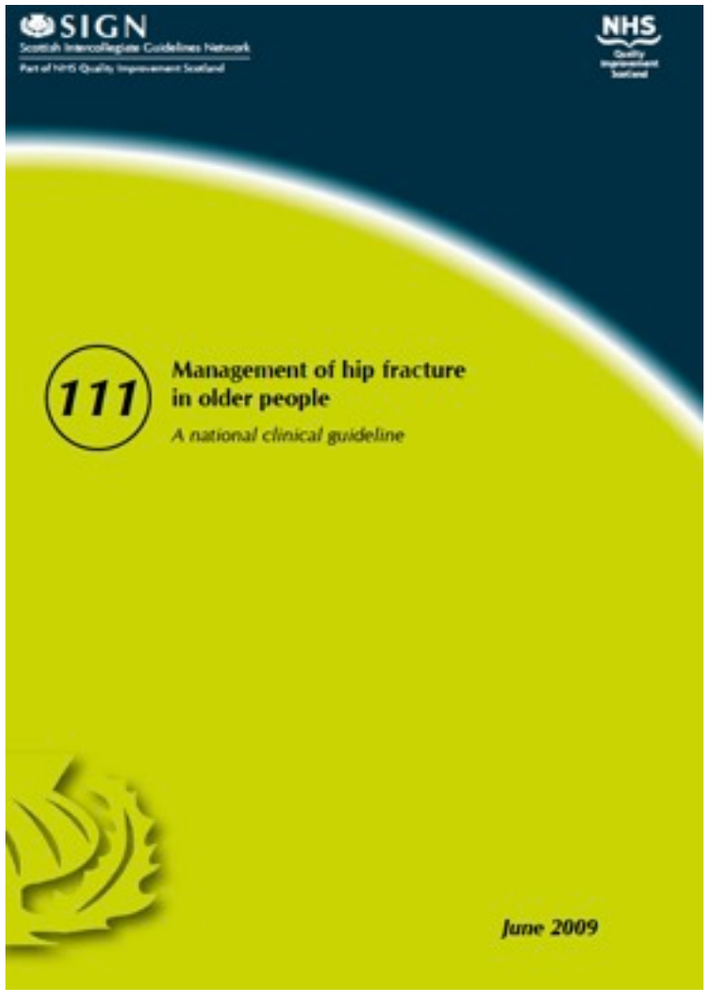
Address correspondence to Dr. Sessler: Department of Outcomes Research, Anesthesiology Institute, The Cleveland Clinic—P77, Cleveland, Ohio 44195. ds@or.org. *Anesthesiology* 2012; 116:1195–203

◇ This article is featured in "This Month in Anesthesiology." Please see this issue of Anesthesiology, page 9A.

◆ This article is accompanied by an Editorial View. Please see: Kheterpal S, Avidan MS: "Triple low": Murderer, mediator, or mirror. *Anesthesiology* 2012; 116:1176–8.

Pilot Study

- Acute management of fractured femurs
- Immediate repair
- Ontario and Cleveland Clinic


SIGN
Scottish Intercollegiate Guidelines Network
Part of NHS Quality Improvement Scotland
NHS
Quality Improvement Scotland
111
Management of hip fracture in older people
A national clinical guideline
June 2009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Scottish Intercollegiate Guidelines Network
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NHS
111
Management of
in older people
A national clinical gu
British Orthopaedic Association
PATRON: H.M.H. THE PRINCE OF WALES
BRITISH GERIATRICS SOCIETY
THE CARE OF PATIENTS WITH
FRAGILITY FRACTURE
Published by the British Orthopaedic Association September 2007

SIGN
Scottish Intercollegiate Guidelines Network
Part of NHS Quality Improvement Scotland

NHS
Quality Improvement Scotland

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Management of
in older people

A national clinical gu

British Orthopaedic Association

PATRON: H.R.H. THE PRINCE OF WALES

THE CARE OF
FRAGILITY

Published by the British Orthop

NHS
National Institute for
Health and Clinical Excellence

Issue date: June 2011

Hip fracture

The management of hip fracture in adults

NICE clinical guideline 124
Developed by the National Clinical Guideline Centre

SIGN
Scottish Intercollegiate Guidelines Network
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FRAGILITY

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Health

IN SOMNO SECURITAS

Issue date: June 2011

Hip fracture

**The management of hip fractu
in adults**

NICE clinical guideline 124
Developed by the National Clinical Guideline C

Management of Proximal Femoral Fractures 2011

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info@aagbi.org
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April 2012

Anaesthesia 2013, 68, 159–166 doi:10.1111/anae.12076

Original Article

A comparison of clinical practice guidelines for proximal femoral fracture

R. J. Kearns,[1] L. Moss[2] and J. Kinsella[3]

1 Consultant Anaesthetist, 2 Clinical Physicist and Honorary Lecturer, 3 Head of Section, Academic Unit of Anaesthesia, Pain & Critical Care Medicine, University of Glasgow, Glasgow Royal Infirmary, Glasgow, UK

Summary

Clinical practice guidelines are designed to assist clinical decision-making by summarising evidence and forming recommendations. The number of available guidelines is vast and they vary in relevance and quality. We reviewed guidelines relevant to the management of a patient with a fractured neck of femur and explored similarities and conflicts between recommendations. As guidelines are often produced in response to an area of clinical uncertainty, recommendations differ. This can result in a situation where the management of a particular clinical problem will depend upon which guideline is followed. We explore the reasons for such differences.

Correspondence to: R. Kearns
Email: rachelkearns@nhs.net
Accepted: 2 October 2012

More on this later

Dilemmas

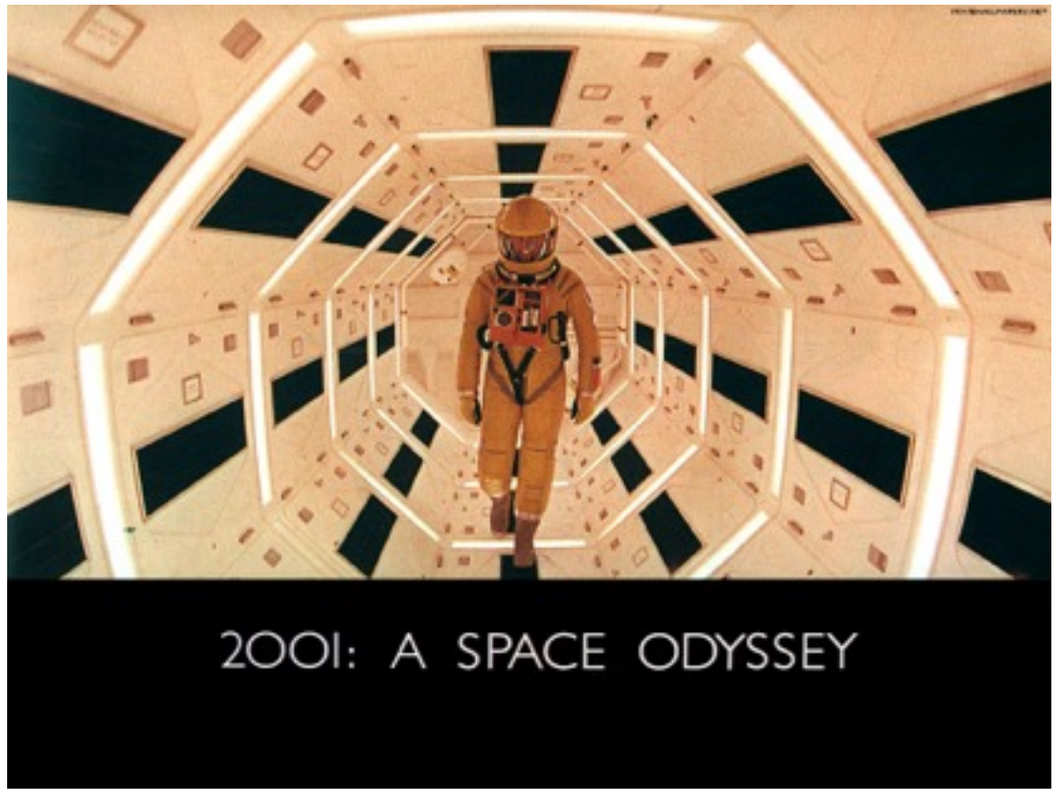
- Type of Anaesthesia
- Clopidogrel
- Blood transfusion trigger
- Heart murmur

Hip Fractures

- Started talking about hip fracture anaesthesia in 2001

- The Cochrane Review of anaesthesia for hip fracture

- The Cochrane Review of nerve block and hip fracture



Hip Fractures

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- Mayday Hospital in Croydon
- Orthogeriatrics was a new specialty
- Only database in England was in Peterborough
- Scotland was ahead of the game

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Hip Fractures Time Line

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- 1984 Last U.K. study GA v Spinal

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- 1997 SIGN 15
- 1999 BGS/BOA Blue Book appears
- 2001 Cochrane Review
- 2001 CEPD article Jandziol AK, Griffiths R. The anaesthetic management of patients with hip fractures. BJA CEPD Reviews 2001; 1: 52–5

Hip Fractures Time Line

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- 2002 SIGN 56

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- 2009 SIGN 111

Hip Fractures Time Line

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- 2010 Hip Fracture Anaesthesia Network becomes Hip Fracture Perioperative network

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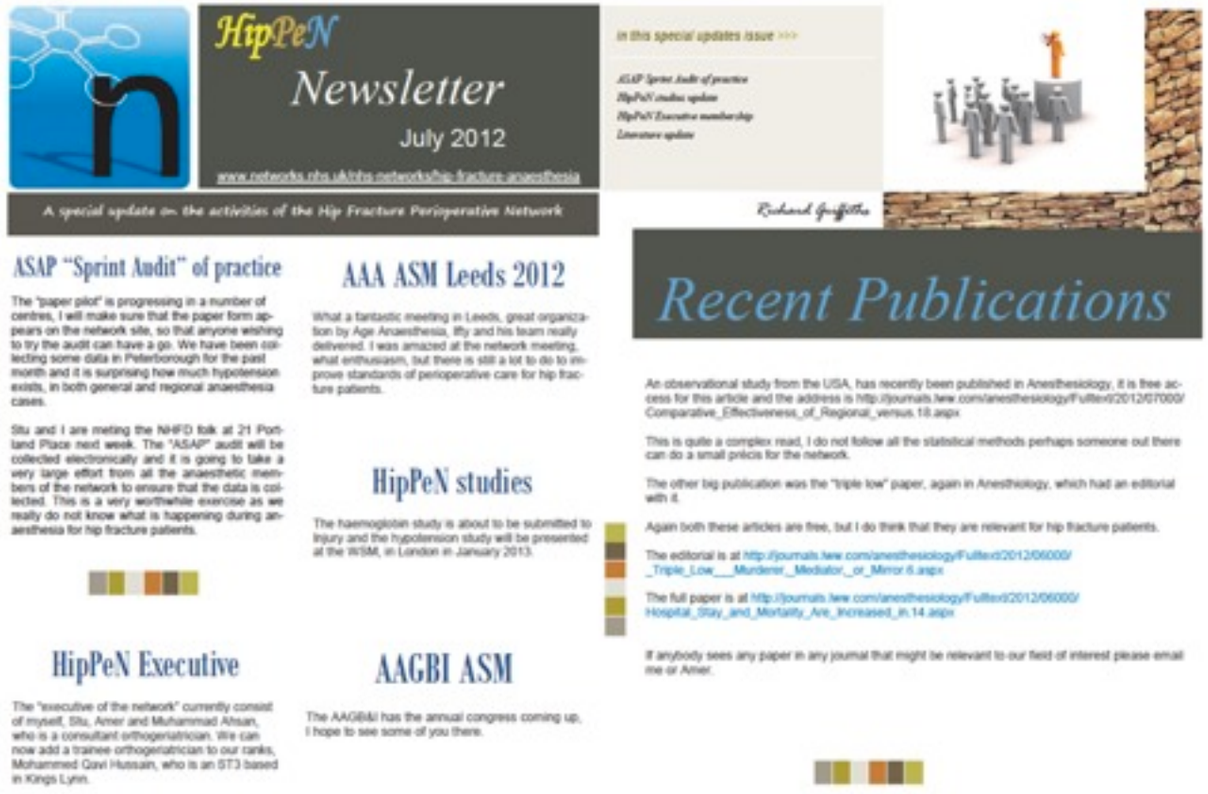
- 2011 NICE 124

Hip Fractures Time Line

- 2010 Hip Fracture Anaesthesia Network becomes Hip Fracture Perioperative network
- 2011 NICE 124
- 2012 AAGB&I Guidelines First ever document specifically for anaesthetists

Hip Fracture Perioperative Network



HipPeN Newsletter

July 2012

www.networks.nhs.uk/nhs-networks/hip-fracture-anaesthesia

A special update on the activities of the Hip Fracture Perioperative Network

ASAP "Sprint Audit" of practice

The "paper pilot" is progressing in a number of centres, I will make sure that the paper form appears on the network site, so that anyone wishing to try the audit can have a go. We have been collecting some data in Peterborough for the past month and it is surprising how much hypotension exists, in both general and regional anaesthesia cases.

Stu and I are meting the NHFD folk at 21 Portland Place next week. The "ASAP" audit will be collected electronically and it is going to take a very large effort from all the anaesthetic members of the network to ensure that the data is collected. This is a very worthwhile exercise as we really do not know what is happening during anaesthesia for hip fracture patients.

HipPeN Executive

The "executive of the network" currently consist of myself, Stu, Amer and Muhammad Ahsan, who is a consultant orthogeriatrician. We can now add a trainee orthogeriatrician to our ranks, Mohammed Qavi Hussain, who is an ST3 based in Kings Lynn.

AAA ASM Leeds 2012

What a fantastic meeting in Leeds, great organization by Age Anaesthesia, Ify and his team really delivered. I was amazed at the network meeting, what enthusiasm, but there is still a lot to do to improve standards of perioperative care for hip fracture patients.

HipPeN studies

The haemoglobin study is about to be submitted to Injury and the hypotension study will be presented at the WSM, in London in January 2013.

AAGBI ASM

The AAGBAI has the annual congress coming up, I hope to see some of you there.

in this special updates issue >>>

ASAP Sprint Audit of practice
HipPeN studies update
HipPeN Executive membership
Literature update

Richard Griffiths

Recent Publications

An observational study from the USA, has recently been published in Anesthesiology, it is free access for this article and the address is http://journals.lww.com/anesthesiology/Fulltext/2012/07000/Comparative_Effectiveness_of_Regional_versus.18.aspx

This is quite a complex read, I do not follow all the statistical methods perhaps someone out there can do a small précis for the network.

The other big publication was the "triple low" paper, again in Anesthiology, which had an editorial with it.

Again both these articles are free, but I do think that they are relevant for hip fracture patients.

The editorial is at http://journals.lww.com/anesthesiology/Fulltext/2012/06000/_Triple_Low___Murderer,_Mediator,_or_Mirror.6.aspx

The full paper is at http://journals.lww.com/anesthesiology/Fulltext/2012/06000/Hospital_Stay_and_Mortality_Are_Increased_in.14.aspx

If anybody sees any paper in any journal that might be relevant to our field of interest please email me or Amer.

www.networks.nhs.uk/nhs-networks/hip-fracture-anaesthesia

richardgriffiths1@nhs.net

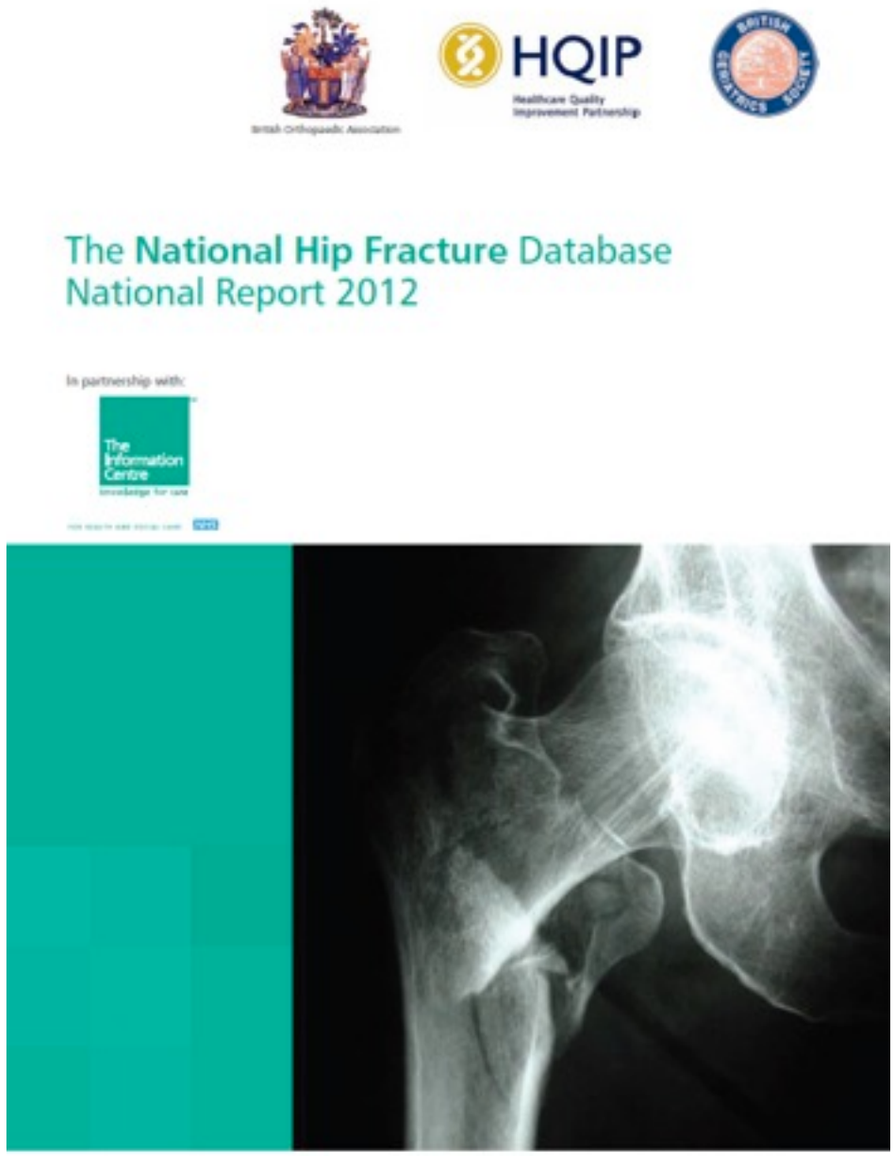
Hip Fractures

Hip Fractures

Hip Fractures

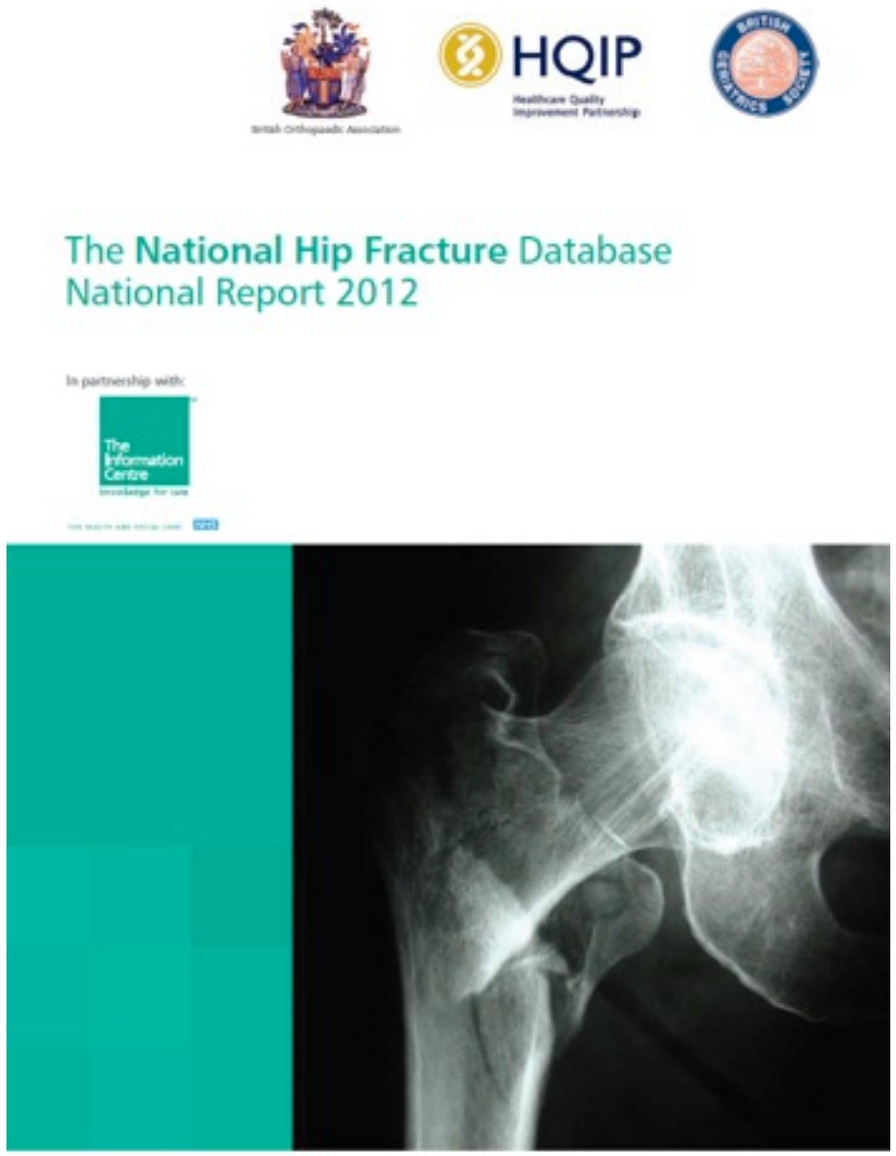
Hip Fractures

- National Audit
- Linked to tariff (England, N. Ireland, not Wales)
- Lots of data
- Anaesthesia?



NHFD 2001-2012

- Mortality (30 day)
- 9.3% to 8.4%
- return to normal residence (30 day) 40%
- data on 300,000 patients



British Journal of Anaesthesia **84** (4): 450–5 (2000)

General *versus* regional anaesthesia for hip fracture surgery: a meta-analysis of randomized trials

S. C. Urwin*, M. J. Parker[2] and R. Griffiths[1]

[1]Anaesthetic Department and [2]Orthopaedic Department, Peterborough District Hospital, Thorpe Road, Peterborough PE3 6DA, UK

**Corresponding author: Anaesthetic Department, Addenbrooke's Hospital, Hills Road, Cambridge CB2 2QQ, UK*

Hip fracture surgery is common and the population at risk is generally elderly. There is no consensus of opinion regarding the safest form of anaesthesia for these patients. We performed a meta-analysis of 15 randomized trials that compare morbidity and mortality associated with general or regional anaesthesia for hip fracture patients. There was a reduced 1-month mortality and incidence of deep vein thrombosis in the regional anaesthesia group. Operations performed under general anaesthesia had a reduction in operation time. No other outcome measures reached a statistically significant difference. There was a tendency towards a lower incidence of myocardial infarction, confusion and postoperative hypoxia in the regional anaesthetic group, and cerebrovascular accident and intra-operative hypotension in the general anaesthetic group. We conclude that there are marginal advantages for regional anaesthesia compared to general anaesthesia for hip fracture patients in terms of early mortality and risk of deep vein thrombosis.

Br J Anaesth 2000; **84**: 450–5

Keywords: anaesthesia, general; anaesthesia, regional; surgery, hip fracture; meta-analysis

Accepted for publication: November 11, 1999

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2000

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- Studies were old

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- Was there DVT prophylaxis in 1980's?

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- Confusion greater in GA group, but numbers very small

2000

- Studies were old
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- Confusion greater in GA group, but numbers very small
- N.B. There has never been a study using spinal anaesthesia with no sedation

2000 to 2011

2000 to 2011

- No new RCT's

2000 to 2011

- No new RCT's
- But do they give the correct answer?

2000 to 2011

- No new RCT's
- But do they give the correct answer?
- Observational studies?

2000 to 2011

- No new RCT's
- But do they give the correct answer?
- Observational studies?
- Audit data?

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- But do they give the correct answer?
- Observational studies?
- Audit data?
- What has appeared since 2000?

BMJ

BMJ 2011;343:d7020 doi: 10.1136/bmj.d7020 (Published 7 November 2011)

EDITORIALS

Why do the results of randomised and observational studies differ?

Statistical theory conflicts with empirical findings in several areas of research

Jan P Vandenbroucke *professor of clinical epidemiology*

Department of Clinical Epidemiology, Leiden University Medical Centre, 2300 RC Leiden, Netherlands

BMJ

BMJ 2011;343:d7020 doi: 10.1136/bmj.d7020 (Published 7 November 2011)

Why do the results of
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Anaesthesia
Journal of the Association of Anaesthetists of Great Britain and Ireland

Anaesthesia, 2010, 65, pages 243–248 doi:10.1111/j.1365-2044.2009.06208.x

ORIGINAL ARTICLE

Anaesthesia for proximal femoral fracture in the UK: first report from the NHS Hip Fracture Anaesthesia Network*

S. M. White,[1] R. Griffiths,[2] J. Holloway[3] and A. Shannon[4]

1 Consultant Anaesthetist, Brighton and Sussex University Hospitals NHS Trust, Brighton, UK
2 Consultant Anaesthetist, Peterborough & Stamford Hospitals, Peterborough, UK
3 Consultant Anaesthetist, Poole Hospital NHS Foundation Trust, Poole, UK
4 Specialist Registrar Anaesthetist, Manchester Royal Infirmary, Manchester, UK

Summary

The aim of this audit was to investigate process, personnel and anaesthetic factors in relation to mortality among patients with proximal femoral fractures. A questionnaire was used to record standardised data about 1195 patients with proximal femoral fracture admitted to 22 hospitals contributing to the Hip Fracture Anaesthesia Network over a 2-month winter period. Patients were demographically similar between hospitals (mean age 81 years, 73% female, median ASA grade 3). However, there was wide variation in time from admission to operation (24–108 h) and 30-day postoperative mortality (2–25%). Fifty percent of hospitals had a mean admission to operation time < 48 h. Forty-two percent of operations were delayed: 51% for organisational; 44% for medical; and 4% for 'anaesthetic' reasons. Regional anaesthesia was administered to 49% of patients (by hospital, range = 0–82%), 51% received general anaesthesia and 19% of patients received peripheral nerve blockade. Consultants administered 61% of anaesthetics (17–100%). Wide national variations in current management of patients sustaining proximal femoral fracture reflect a lack of research evidence on which to base best practice guidance. Collaborative audits such as this provide a robust method of collecting such evidence.

Correspondence to: Dr Stuart M. White
E-mail: igasbest@hotmail.com
**Presented in part at the Euroanaesthesia Meeting, Milan, June 2009.*
Accepted: 11 November 2009

Hip Fracture Anaesthesia

- Regional Anaesthesia 49%
- General Anaesthesia 51%
- nerve block to 19%

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Neuroaxial versus general anaesthesia in geriatric patients for hip fracture surgery: does it matter?

Authors: Luger, T.[1]; Kammerlander, C.[2]; Gosch, M.[3]; Luger, M.[4]; Kammerlander-Knauer, U.[5]; Roth, T.[6]; Kreutziger, J.[7]

Source: Osteoporosis International, Volume 21, Supplement 1, December 2010 , pp. 555-572(18)

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< previous article | view table of contents | next article >

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< previous article | view table of contents | next article >

For hip fracture surgery, the choice of anaesthesia (general or neuroaxial) is made by the anaesthesiologist and is based on the patient's preference, comorbidities, potential general postoperative complications and the clinical experience

Ranhoff et al. BMC Geriatrics 2010, 10:65
http://www.biomedcentral.com/1471-2318/10/65

BMC Geriatrics

RESEARCH ARTICLE Open Access

Older hip fracture patients: three groups with different needs

Anette H Ranhoff[1*], Kristin Holvik[2], Mette I Martinsen[2], Kirsti Domaas[2], Ludvig F Solheim[2]

3 Distinct Groups

Group 1

Group 1

- Those who are relatively fit and have fallen outside **(17%)**

Group 1

- Those who are relatively fit and have fallen outside **(17%)**

Group 2

Group 2

- Frail community dwellers who have fallen inside **(59%)**

Group 2

- Frail community dwellers who have fallen inside **(59%)**

Group 3

Group 3

- Patients from long term care institutions **(24%)**

Group 3

- Patients from long term care institutions **(24%)**

3 Distinct Groups

- Often those in the last 2 groups have some cognitive impairment and are excluded from any randomised controlled studies
- However, they can be included in large observational studies

Comparative Effectiveness of Regional *versus* General Anesthesia for Hip Fracture Surgery in Adults

Mark D. Neuman, M.D., M.Sc.,* Jeffrey H. Silber, M.D., Ph.D.,† Nabil M. Elkassabany, M.D.,‡ Justin M. Ludwig, M.A.,§ Lee A. Fleisher, M.D.‖

ABSTRACT

Background: Hip fracture is a common, morbid, and costly event among older adults. Data are inconclusive as to whether epidural or spinal (regional) anesthesia improves outcomes after hip fracture surgery.

Methods: The authors examined a retrospective cohort of patients undergoing surgery for hip fracture in 126 hospitals in New York in 2007 and 2008. They tested the association of a record indicating receipt of regional *versus* general anesthesia with a primary outcome of inpatient mortality and with secondary outcomes of pulmonary and cardiovascular complications using hospital fixed-effects

What We Already Know about This Topic

- Some prospective and observational studies demonstrate reduced major morbidity and mortality with regional compared with general anesthesia for hip fractures
- No large observational study in the general, nonveteran population, has examined this issue

What This Article Tells Us That Is New

- In a review of more than 18,000 patients having surgery for hip fracture in New York in 2007 and 2008, use of regional anesthesia was associated with a 25–29% reduction in major pulmonary complications and death

Anesthesiology 2012 117:72-92

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Results: Of 18,158 patients, 5,254 (29%) received regional anesthesia. In-hospital mortality occurred in 435 (2.4%). Unadjusted rates of mortality and cardiovascular complications did not differ by anesthesia type. Patients receiving regional anesthesia experienced fewer pulmonary complications (359 [6.8%] *vs.* 1,040 [8.1%], $P < 0.005$). Regional anesthesia was associated with a lower adjusted odds of mortality (odds ratio: 0.710, 95% CI 0.541, 0.932, $P = 0.014$) and pulmonary complications (odds ratio: 0.752, 95% CI 0.637, 0.887, $P < 0.0001$) relative to general anesthesia. In subgroup analyses, regional anesthesia was associated with improved survival and fewer pulmonary complications among patients with intertrochanteric fractures but not among patients with femoral neck fractures.

Conclusions: Regional anesthesia is associated with a lower odds of inpatient mortality and pulmonary complications among all hip fracture patients compared with general anesthesia; this finding may be driven by a trend toward improved outcomes with regional anesthesia among patients with intertrochanteric fractures.

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SIGNAL emerging from the "noise"

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SIGNAL emerging from the "noise"

Perioperative Comparative Effectiveness of Anesthetic Technique in Orthopedic Patients

Stavros G. Memtsoudis, M.D., Ph.D., F.C.C.P.,* Xuming Sun, M.S.,† Ya-Lin Chiu, M.S.,† Ottokar Stundner, M.D.,‡ Spencer S. Liu, M.D.,§ Samprit Banerjee, Ph.D., M.Stat.,‖ Madhu Mazumdar, Ph.D., M.A., M.S.,# Nigel E. Sharrock, M.B., Ch.B.§

CME This article has been selected for the Anesthesiology CME Program. Learning objectives and disclosure and ordering information can be found in the CME section at the front of this issue.

ABSTRACT

Background: The impact of anesthetic technique on perioperative outcomes remains controversial. We studied a large national sample of primary joint arthroplasty recipients and

What We Already Know about This Topic

- Several small studies have suggested better outcomes when lower extremity joint replacement surgery is performed with neuraxial anesthesia, but how well these results can be generalized to a broad population is uncertain

GA v Spinal

GA v Spinal

- Studies done have been:

GA v Spinal

- Studies done have been:
- single centre

GA v Spinal

- Studies done have been:
- single centre
- OLD

GA v Spinal

- Studies done have been:
- single centre
- OLD
- small

GA v Spinal

- Studies done have been:
- single centre
- OLD
- small
- badly designed

GA v Spinal

- Studies done have been:
- single centre
- OLD
- small
- badly designed
- never been a pure spinal v GA comparison

GA v Spinal

GA v Spinal

- Primary hip & knee arthroplasty operations

GA v Spinal

- Primary hip & knee arthroplasty operations
- 400 US hospitals

GA v Spinal

- Primary hip & knee arthroplasty operations
- 400 US hospitals
- 528,495 indentified

GA v Spinal

- Primary hip & knee arthroplasty operations
- 400 US hospitals
- 528,495 indentified
- 2006-2010

GA v Spinal

- Primary hip & knee arthroplasty operations
- 400 US hospitals
- 528,495 indentified
- 2006-2010
- 382,236 had anaesthesia information

GA v Spinal

GA v Spinal

- 382,236

GA v Spinal

- 382,236
- 11.1 % neuraxial anaesthesia

GA v Spinal

- 382,236
- 11.1 % neuraxial anaesthesia
- 14.2 % GA plus neuraxial

GA v Spinal

- 382,236
- 11.1 % neuraxial anaesthesia
- 14.2 % GA plus neuraxial
- 74% GA

GA v Spinal

- 382,236
- 11.1 % neuraxial anaesthesia
- 14.2 % GA plus neuraxial
- 74% GA
- (no mention of sedation)

GA v Spinal

- All types of anaesthesia
- 50% of the patients were covered by Medicare
- Outcomes were 30 day mortality and complications

GA v Spinal

- Results
- 30 day mortality was lower in neuraxial group, GA + neuraxial compared with just GA
- 0.10% v 0.10% v 0.18%

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journal homepage: www.JournalofSurgicalResearch.com

Accumulating deficits model of frailty and postoperative mortality and morbidity: its application to a national database

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ABSTRACT

Background: Frailty has been associated with a number of adverse outcomes. One model of frailty is the "accumulating deficits" concept. We hypothesized that this model can be applied to a national database to predict postoperative mortality and morbidity.

Methods: We accessed the National Surgical Quality Improvement Program (NSQIP) Participant Use File for the years 2005–2009 for inpatient surgical patients who had undergone cardiac, general, gynecologic, neurosurgical, orthopedic, otolaryngologic, plastic, general thoracic, urologic, and vascular surgical operations. Items of the Canadian Study of Health and Aging-frailty index (FI) were compared with preoperative clinical variables recorded by NSQIP. Eleven items were matched, and a simplified FI, defined as the number of deficits present divided by the number of deficits matched, using the number of items present was determined for each patient. The 30-d morbidity and mortality were correlated to this simplified FI and stratified by operation complexity based on the operation's relative value units.

Results: Of the 971,434 patients identified, there was a stepwise increase in risk of both mortality (odds ratios ranged from 1.33 to 46.33) and morbidity (odds ratios ranged from 1.24 to 3.36) for each unit increase in FI for each specialty and each level of operation complexity (trend of odds P value <0.0001 for all comparisons).

Conclusions: A simple 11-point FI correlated with both mortality and morbidity for all surgical specialties. This may be applicable to other national databases and clinical practice.

1. Introduction

Aging is a global phenomenon [1]. The older adults carry an increasing burden of chronic illnesses which affect their overall health and well-being. Frailty is commonly associated with older adults and is identified by decreased reserves in multiple organ systems because of disease, lack of activity, inadequate nutrition, stress, and the physiological changes of aging [2]. In the frail, there is *homeostenosis*—that is, a decreased ability to maintain homeostasis in times of acute stress [2,3].

Frailty has been associated with a number of adverse events. These include increased risk of cardiovascular disease, hypertension, cancer, and death, even after adjusting for chronic conditions and disability [4,5]. Surgery is a form of "acute stress," and frailty has been associated with higher complication rates and prolonged recovery [6–9].

Most measures of frailty include some combination of history, physical examination, and determination of physical capability, such as walking speed and grip strength [2,8]. The Canadian Study of Health and Aging (CSHA) has developed

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http://dx.doi.org/10.1016/j.jss.2013.01.021


The Contiguous United States
Visualized by distance to the nearest McDonald's
Created by Stephen Von Worley
http://www.weatherwatch.com/tags/maps/
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HQIP
Healthcare Quality Improvement Partnership

BRITISH GERIATRICS SOCIETY

The **National Hip Fracture** Database National Report 2012

In partnership with:

The Information Centre
knowledge for care

FOR HEALTH AND SOCIAL CARE NHS

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BRITISH GERIATRICS SOCIETY

Information on 59,000 anaesthetics

The **National Hip Fracture** Database National Report 2012

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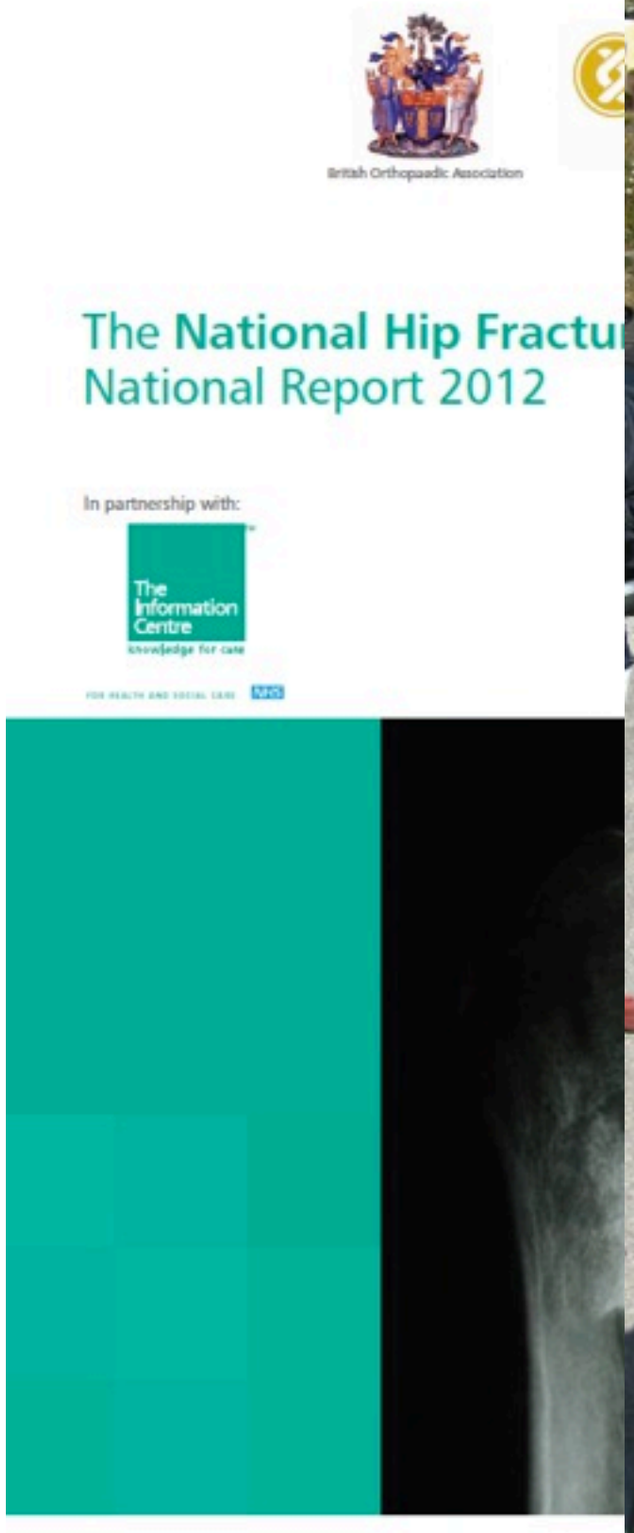
The Information Centre
knowledge for care

FOR HEALTH AND SOCIAL CARE NHS

tion on aesthetics



Nerve blocks (subcostal, lateral cutaneous, femoral, triple, psoas) for hip fractures (Review)

Parker MJ, Griffiths R, Appadu B

THE COCHRANE COLLABORATION®

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2009, Issue 2

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REVIEW | Annals of Internal Medicine

Comparative Effectiveness of Pain Management Interventions for Hip Fracture: A Systematic Review

Ahmed M. Abou-Setta, MD, PhD; Lauren A. Beaupre, PT, PhD; Salfee Rashiq, MB, MSc; Donna M. Dryden, PhD; Michele P. Hamm, MSc; Cheryl A. Sadowski, BSc(Pharm), PharmD; Matthew R.G. Menon, MD, MHSc; Sumit R. Majumdar, MD, MPH; Donna M. Wilson, RN, PhD; Mohammad Karkhaneh, MD; Shima S. Mousavi, MD; Kai Wong, MSc; Lisa Tjosvold, MLIS; and C. Allyson Jones, PT, PhD

Background: Pain management is integral to the management of hip fracture.

Purpose: To review the benefits and harms of pharmacologic and nonpharmacologic interventions for managing pain after hip fracture.

Data Sources: 25 electronic databases (January 1990 to December 2010), gray literature, trial registries, and reference lists, with no language restrictions.

Study Selection: Multiple reviewers independently and in duplicate screened 9357 citations to identify randomized, controlled trials (RCTs); nonrandomized, controlled trials (non-RCTs); and cohort studies of pain management techniques in older adults after acute hip fracture.

Data Extraction: Independent, duplicate data extraction and quality assessment were conducted, with discrepancies resolved by consensus or a third reviewer. Data extracted included study characteristics, inclusion and exclusion criteria, participant characteristics, interventions, and outcomes.

Data Synthesis: 83 unique studies (64 RCTs, 5 non-RCTs, and 14 cohort studies) were included that addressed nerve blockade ($n = 32$), spinal anesthesia ($n = 30$), systemic analgesia ($n = 3$), traction ($n = 11$), multimodal pain management ($n = 2$), neurostimulation ($n = 2$), rehabilitation ($n = 1$), and complementary and alternative medicine ($n = 2$). Overall, moderate evidence suggests that nerve blockades are effective for relieving acute pain and reducing delirium. Low-level evidence suggests that preoperative traction does not reduce acute pain. Evidence was insufficient on the benefits and harms of most interventions, including spinal anesthesia, systemic analgesia, multimodal pain management, acupressure, relaxation therapy, transcutaneous electrical neurostimulation, and physical therapy regimens, in managing acute pain.

Limitations: No studies evaluated outcomes of chronic pain or exclusively examined participants from nursing homes or with cognitive impairment. Systemic analgesics (narcotics, nonsteroidal anti-inflammatory drugs) were understudied during the search period.

Conclusion: Nerve blockade seems to be effective in reducing acute pain after hip fracture. Sparse data preclude firm conclusions about the relative benefits or harms of many other pain management interventions for patients with hip fracture.

Primary Funding Source: Agency for Healthcare Research and Quality.

Ann Intern Med. 2011;155:234-245. www.annals.org
For author affiliations, see end of text.
This article was published at www.annals.org on 17 May 2011.

PLAIN LANGUAGE SUMMARY

Local anaesthetic nerve blocks for people with a hip fracture

To reduce pain after a hip fracture and subsequent surgery, various nerves may be blocked using local analgesics (pain killers). This review examined the evidence from randomised trials that evaluated the use of local anaesthetic nerve blocks for people with hip fractures. Seventeen trials, involving 888 mainly female and old people who had been admitted to hospital with hip fracture, were included in the review. In nine trials, nerve blocks were applied at the time of admission with the hip fracture, and in the other eight trials, application was at the time of surgery. Most studies were small with limited reporting of outcomes. Most studies found that a nerve block will reduce pain and the need for other painkillers for people with a hip fracture. There were few reported complications associated with nerve blocks. However, the available evidence is insufficient to determine whether nerve blocks have other clinical benefits and to what extent adverse effects may occur.

Nerve blocks do seem to reduce the pain after a hip fracture and hip fracture surgery, but more evidence is needed.

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PLAIN LANGUAGE SUMMARY

Local anaesthetic nerve blocks for people with a hip fracture

To reduce pain after a hip fracture and subsequent surgery, various nerves may be blocked using local analgesics (pain killers). This review examined the evidence from randomised trials that evaluated the use of local anaesthetic nerve blocks for people with hip fractures. Seventeen trials, involving 888 mainly female and old people who had been admitted to hospital with hip fracture, were included in the review. In nine trials, nerve blocks were applied at the time of admission with the hip fracture, and in the other eight trials, application was at the time of surgery. Most studies were small with limited reporting of outcomes. Most studies found that a nerve block will reduce pain and the need for other painkillers for people with a hip fracture. There were few reported complications associated with nerve blocks. However, the available evidence is insufficient to determine whether nerve blocks have other clinical benefits and to what extent adverse effects may occur.

Nerve blocks do seem to reduce the pain after a hip fracture and hip fracture surgery, but more evidence is needed.

Fascia Iliaca Blocks and Non-Physician Practitioners

AAGBI POSITION STATEMENT 2013

Fascia Iliaca Blocks and Non-Physician Practitioners

Proximal femoral fractures are often very painful, and the prompt administration of analgesia is both a humanitarian necessity and likely to be associated with improved clinical outcomes. Fascia iliaca block, which has been shown to be more effective than opioids in treating hip fracture pain [1], is a technique that has rightly gained popularity in Accident & Emergency Departments.

Regional Anaesthesia UK (RA-UK), in its 2010 position statement on the performance of local and regional techniques by non-physician practitioners [2], defines *regional anaesthesia* techniques as those that place local anaesthetic "around the major plexuses or identifiable peripheral nerve trunks", and asserts that only appropriately trained physicians should perform these techniques. The AAGBI and RA-UK have agreed that fascia iliaca block can be considered to be a "local anaesthetic " and not a "regional anaesthetic " technique under this definition, because when the correct technique is used, the needle trajectory is not likely to encroach on nerve trunks or major blood vessels (Figure 1). The two organisations have agreed the following statement with regard to fascia iliaca blocks:

> Ideally, appropriately trained physicians should perform fascia iliaca blocks but, in many circumstances, they are not immediately available to administer the blocks. Other registered health professionals who have received appropriate training and are following agreed clinical governance procedures may perform these blocks. This extended role of non-medically qualified personnel should be closely monitored by the hospital's Department of Anaesthesia, and such practices should be subject to regular audit and review.

Dr Richard Griffiths MD FRCA, Honorary Secretary, AAGBI

Dr Sean Tighe FRCA, President, RA-UK


NHS

Predictions for Anaesthesia

Predictions for Anaesthesia

- Regional ?

Predictions for Anaesthesia

- Regional ?
- 70%

Predictions for Anaesthesia

- Regional ?
- 70%
- Nerve blocks?

Predictions for Anaesthesia

- Regional ?
- 70%
- Nerve blocks?
- 60%

Predictions for Anaesthesia

- Regional ?
- 70%
- Nerve blocks?
- 60%
- reduced use of benzodiazepines

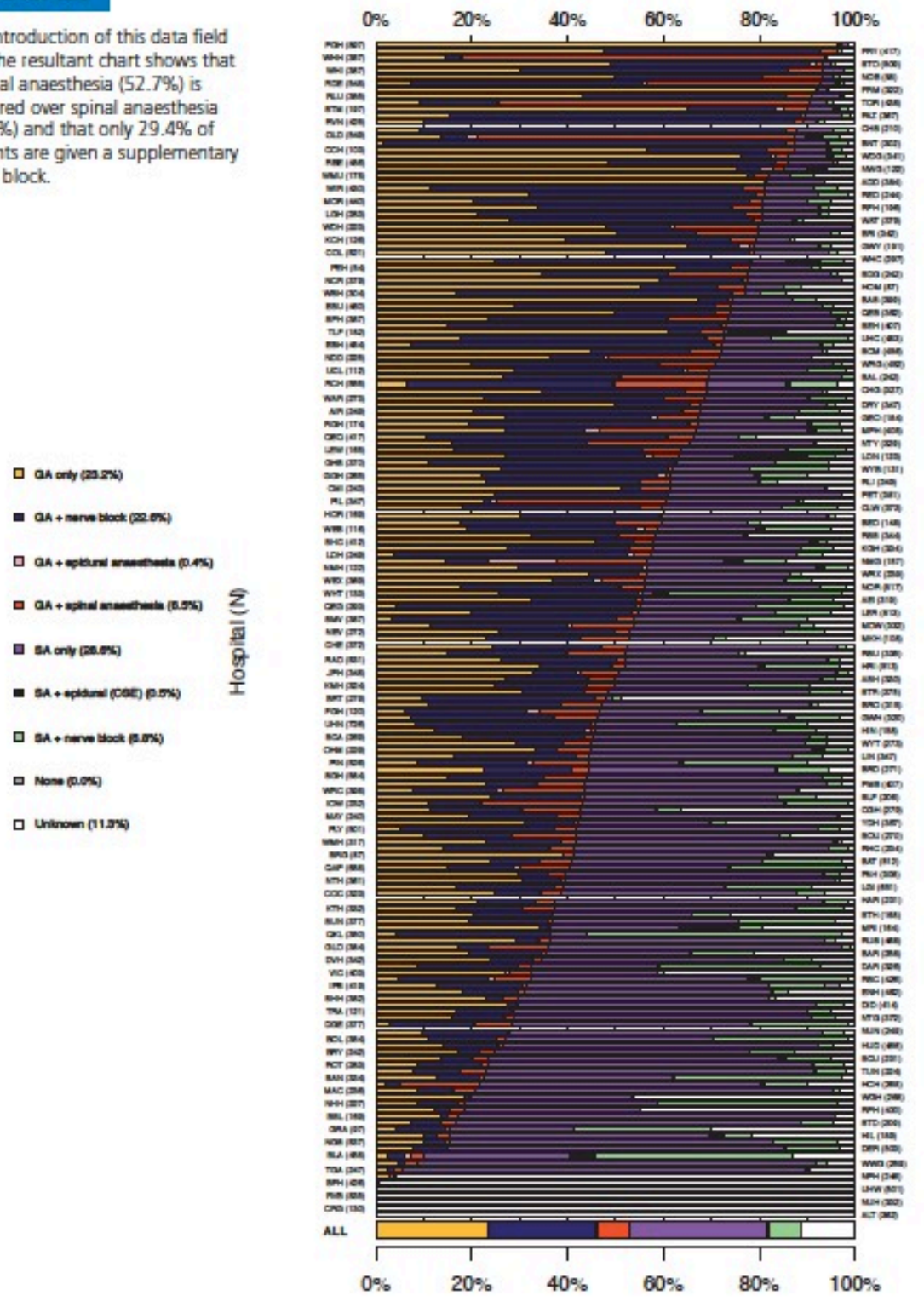
Predictions for Anaesthesia

- Regional ?
- 70%
- Nerve blocks?
- 60%
- reduced use of benzodiazepines
- reduce acute delirium

Chart 10 - Type of anaesthesia

NICE CG 124

The introduction of this data field and the resultant chart shows that general anaesthesia (52.7%) is favoured over spinal anaesthesia (42.4%) and that only 29.4% of patients are given a supplementary nerve block.



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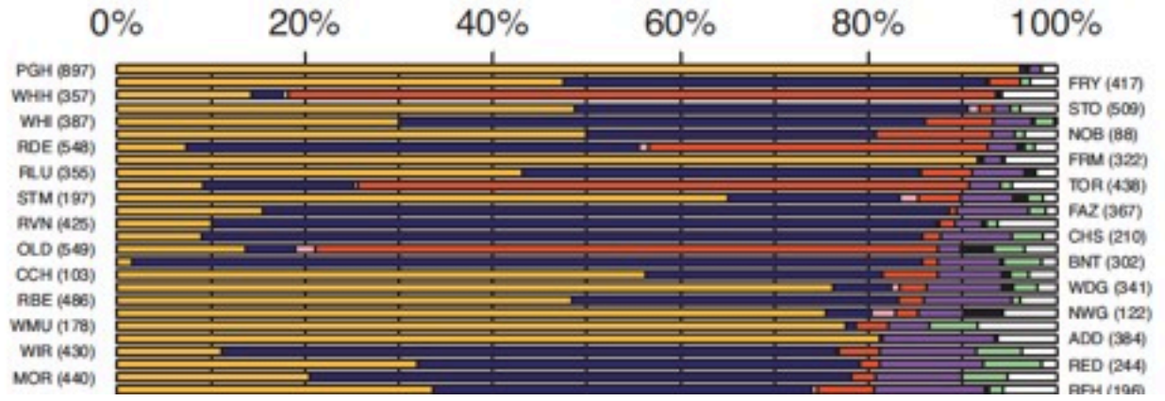

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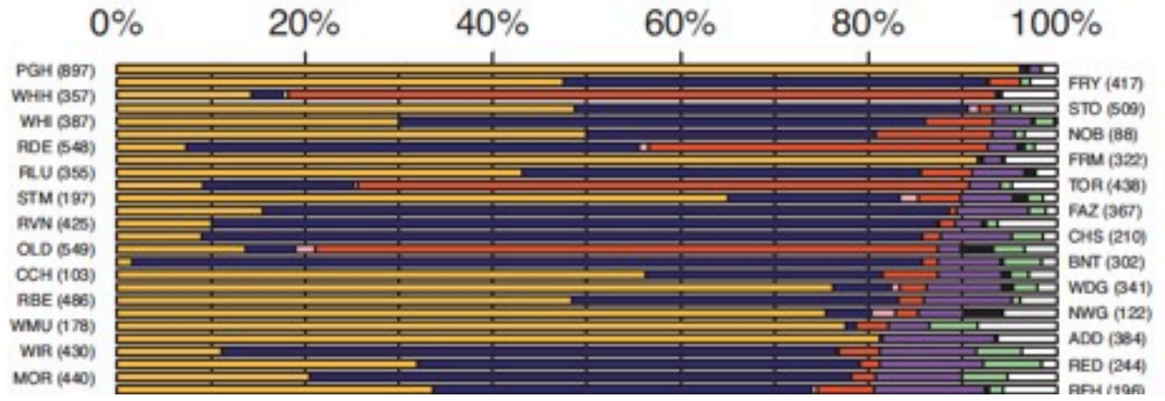

GA 53%

Chart 10 - Type of anaesthesia

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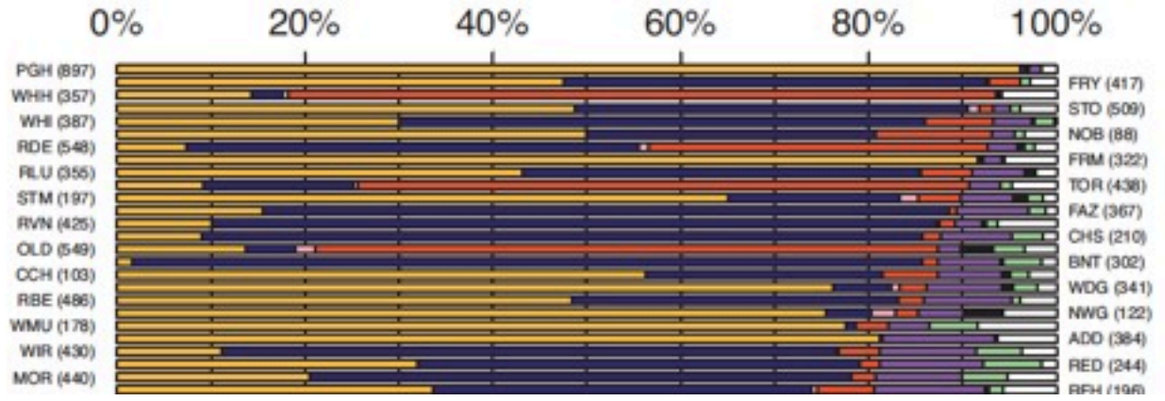

GA 53%

Spinal 42%

Chart 10 - Type of anaesthesia

NICE CG 124

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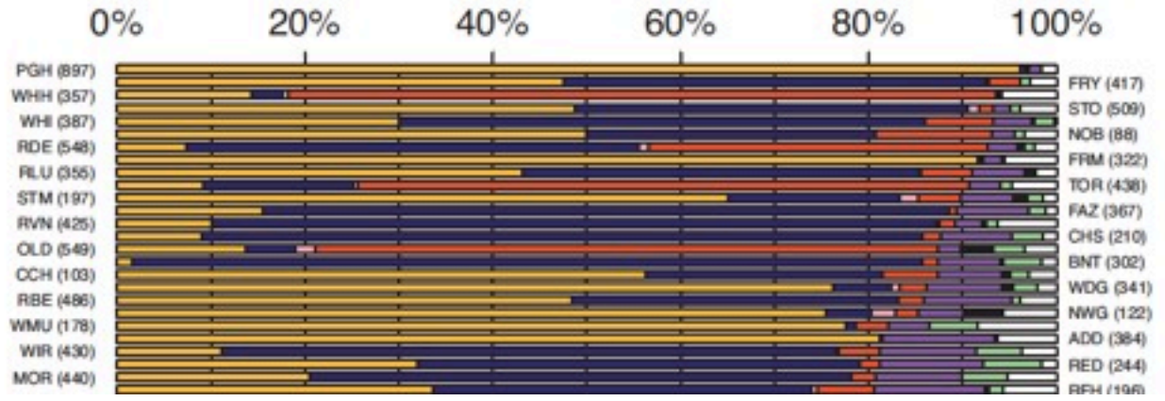


GA 53%

Spinal 42%

Nerve Block 29%

Hip fractures are prevalent, and on the rise. These are common and serious injuries of the elderly, associated with high morbidity and mortality, occupying a significant proportion of hospital resources, leading to a serious financial burden to the NHS and society.[1]

Hip Fracture Anaesthesia Sprint Audit Project (ASAP)

ASAP

- Anaesthesia Technique
- Hypotension
- Bone cement implantation syndrome
- Nottingham Hip Fracture Score

British Journal of Anaesthesia **101** (4): 511–17 (2008)
doi:10.1093/bja/aen236 Advance Access publication August 21, 2008

BJA

CRITICAL CARE

Development and validation of a preoperative scoring system to predict 30 day mortality in patients undergoing hip fracture surgery

M. J. Maxwell[1], C. G. Moran[2] and I. K. Moppett[1]*

[1]Department of Anaesthesia and [2]Department of Trauma and Orthopaedics, University of Nottingham, Queen's Medical Centre Campus, Nottingham University Hospitals NHS Trust, Nottingham NG7 2UH, UK

**Corresponding author. E-mail: iain.moppett@nottingham.ac.uk*

Background. Hip fractures are common in the elderly and have a high 30 day postoperative mortality. The ability to recognize patients at high risk of poor outcomes before operation would be an important clinical advance. This study has determined key prognostic factors predicting 30 day mortality in a hip fracture population, and incorporated them into a scoring system to be used on admission.

Methods. A cohort study was conducted at the Queen's Medical Centre, Nottingham, over a period of 7 yr. Complete data were collected from 4967 patients and analysed. Forward univariate logistic regression was used to select the independent predictor variables of 30 day mortality, and then multivariate logistic regression was applied to the data to construct and validate the scoring system.

Results. The variables found to be independent predictors of mortality at 30 days were: age (66–85 yr, ≥86 yr), sex (male), number of co-morbidities (≥2), mini-mental test score (≤6 out of 10), admission haemoglobin concentration (≤10 g dl^{-1}), living in an institution, and presence of malignant disease. These variables were subsequently incorporated into a risk score, the Nottingham Hip Fracture Score. The number of deaths observed at 30 days, and the number of deaths predicted by the scoring system, indicated good concordance (χ^2 test, P=0.79). The area (SE) under the receiver operating characteristic curve was 0.719 (0.018), which demonstrated a reasonable predictive value for the score.

Conclusions. We have developed and validated a scoring system that reliably predicts the probability of mortality at 30 days for patients after hip fracture.

Br J Anaesth 2008; **101**: 511–17

Keywords: complications, death; complications, trauma; risk; surgery, orthopaedic

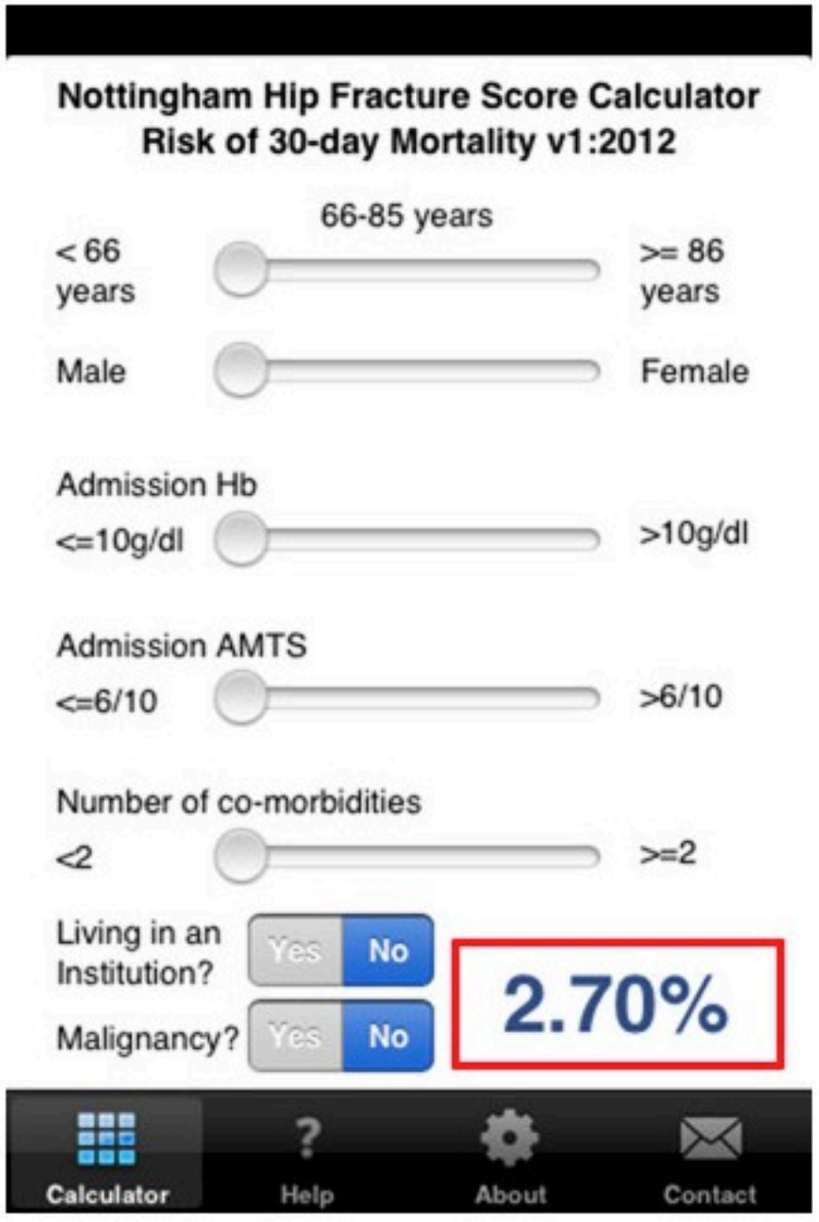
Accepted for publication: June 15, 2008

image 1 of 5

NOTTINGHAM HIP FRACTURE SCORE CALCULATOR

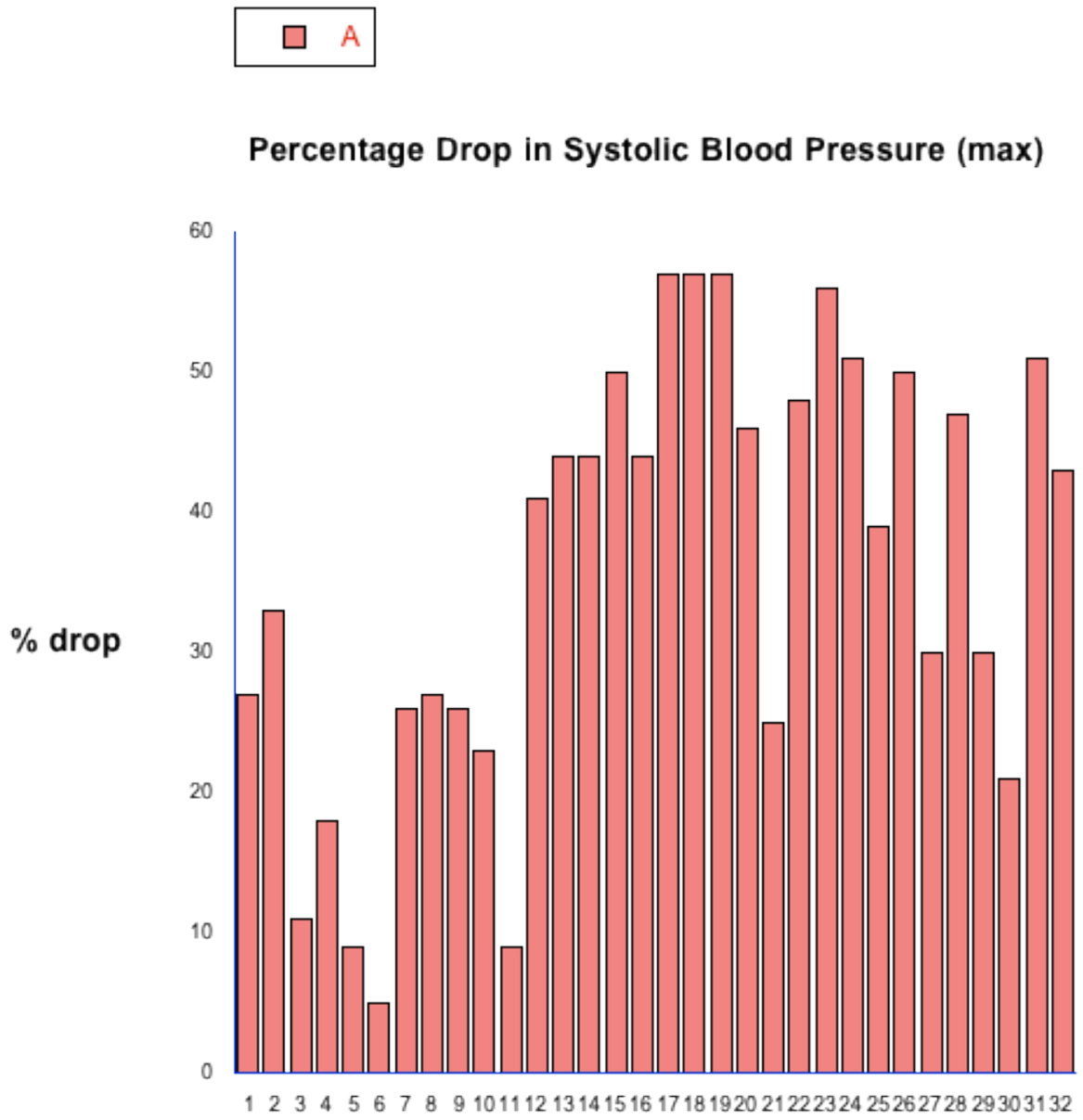
v1.3 (2012)

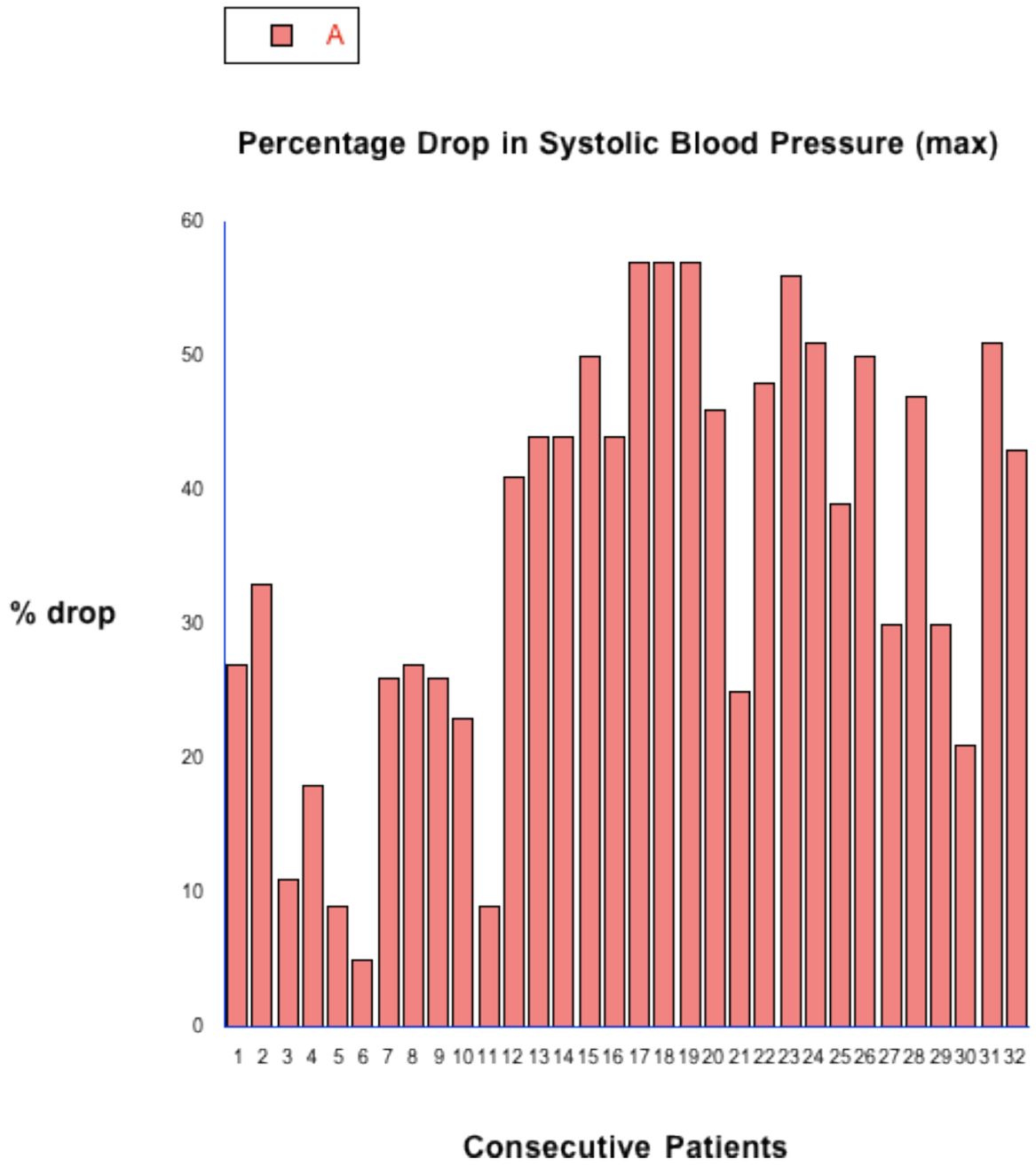
image 2 of 5



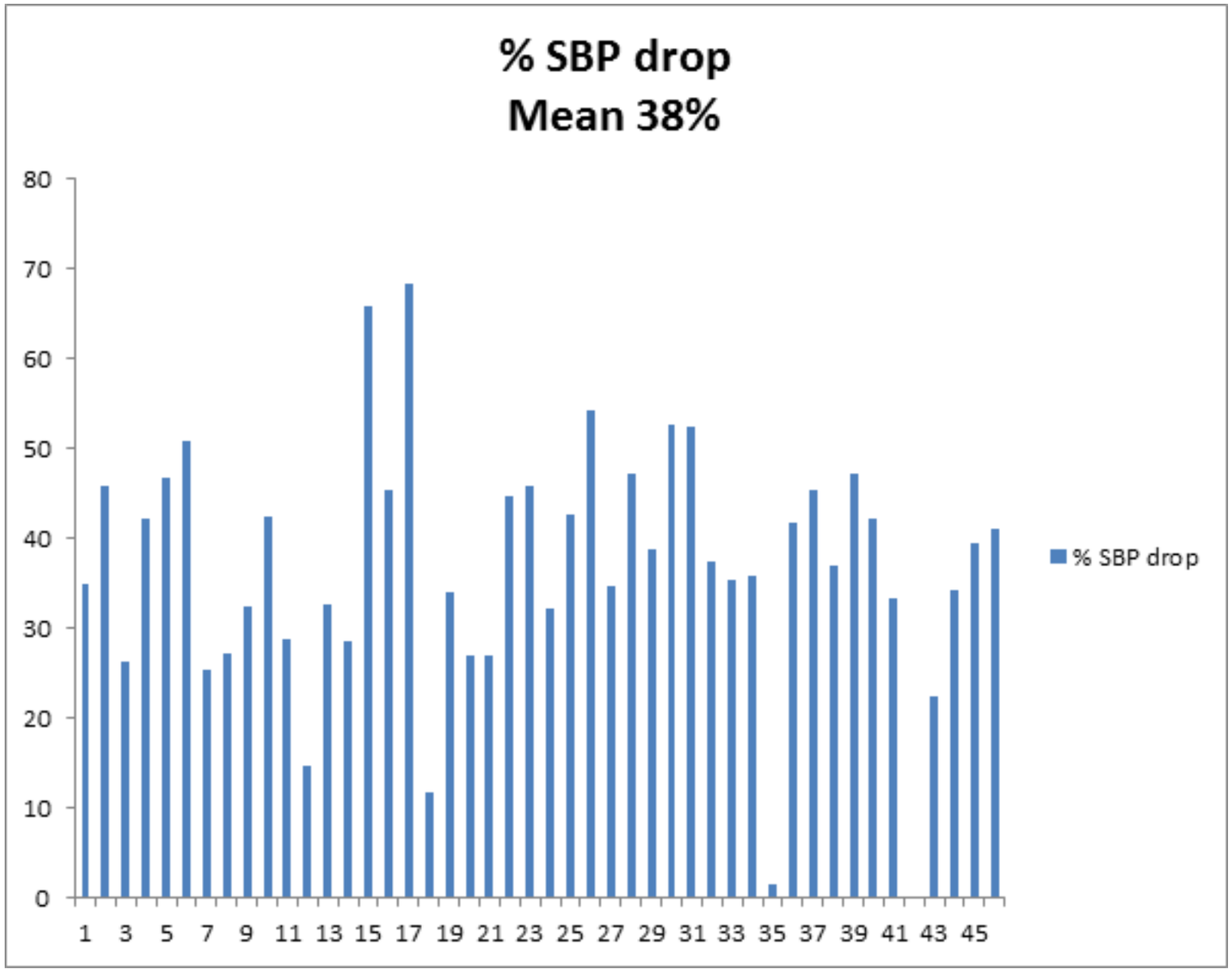
ASAP

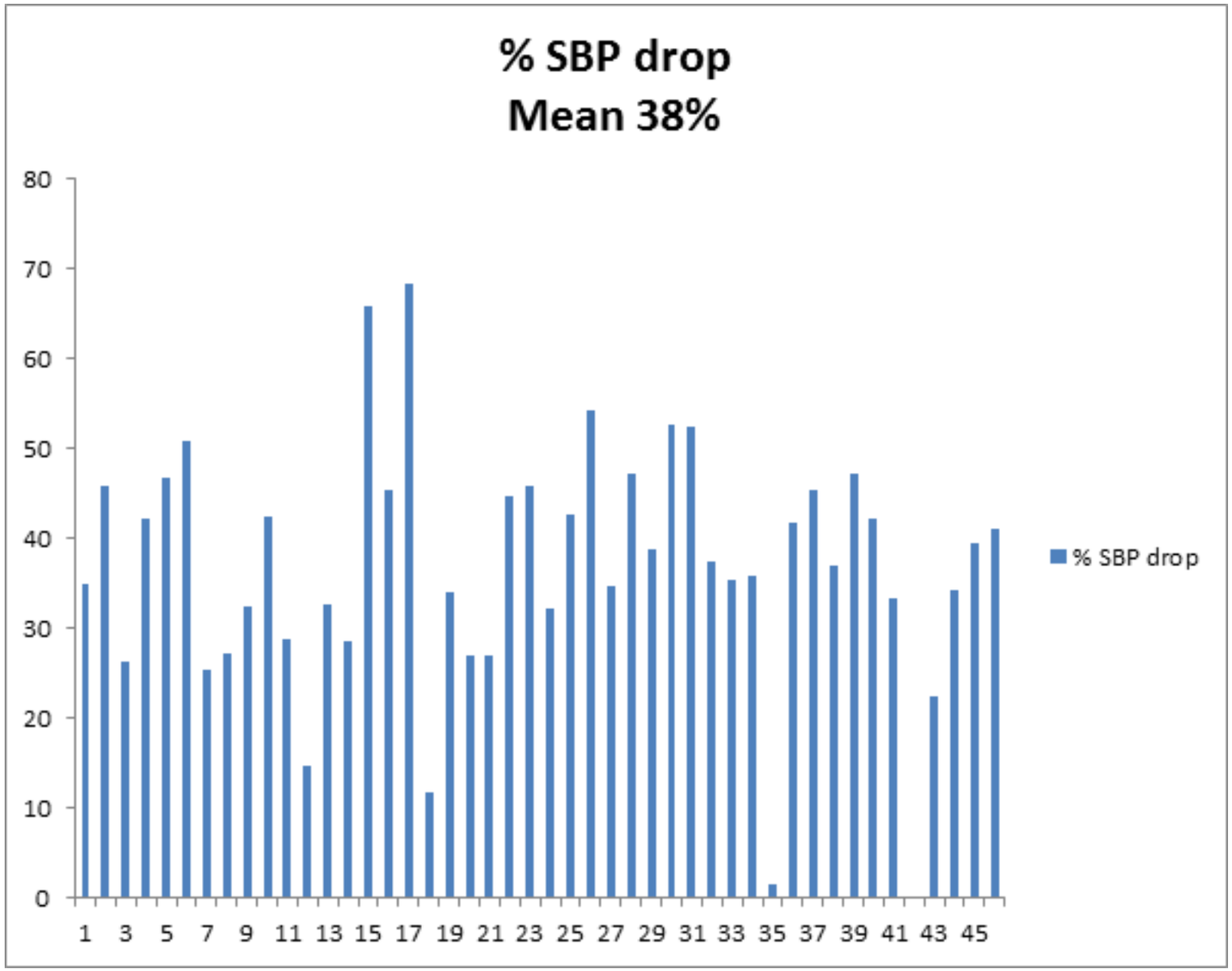
- Data collection underway at present
- 140 hospitals
- Hope to get data on over 10,000 patients in three months
- There have been some teething troubles


A
Percentage Drop in Systolic Blood Pressure (max)
% drop
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Consecutive Patients



36 % mean drop in blood pressure


% SBP drop
Mean 38%
80
70
60
50
40
30
20
10
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45
% SBP drop



QMC Nottingham

Clean hit rate from anaesthesia, 1 in 250,000
but
morbidity and later mortality likely to be much higher

Intraoperative Hypotension and Perioperative Ischemic Stroke after General Surgery

A Nested Case-control Study

Jilles B. Bijker, M.D.,* Suzanne Persoon, M.D.,† Linda M. Peelen, Ph.D.,‡
Karel G. M. Moons, Ph.D.,§ Cor J. Kalkman, M.D., Ph.D.,‖ L. Jaap Kappelle, M.D., Ph.D.,#
Wilton A. van Klei, M.D., Ph.D.*

This article has been selected for the ANESTHESIOLOGY CME Program. Learning objectives and disclosure and ordering information can be found in the CME section at the front of this issue.

ABSTRACT

Background: Postoperative stroke is a rare but major complication after surgery. The most often proposed mechanism is an embolus originating from the heart or great vessels. The role of intraoperative hypotension in the occurrence and evolution of postoperative stroke is largely unknown.

Methods: A case-control study was conducted among 48,241 patients who underwent noncardiac and nonneurosurgical procedures in the period from January 2002 to June 2009. A total of 42 stroke cases (0.09%) were matched on age and type of surgery to 252 control patients. Conditional logistic regression analysis was used to estimate the effect of the duration of intraoperative hypotension (defined according to a range of blood pressure thresholds) on the occurrence of an ischemic stroke within 10 days after surgery, adjusted for potential confounding factors.

Results: After correction for potential confounders and multiple testing, the duration that the mean blood pressure was decreased more than 30% from baseline remained statistically significantly associated with the occurrence of a postoperative stroke.

Conclusions: Intraoperative hypotension might play a role in the development of postoperative ischemic stroke. Especially for mean blood pressure values decreasing more than 30% from baseline blood pressure, an association with postoperative ischemic stroke risks was observed.

What We Know about This Topic

- The etiology of perioperative stroke is multifactorial, however, the recent POISE trial findings suggested that hypotension might contribute to the risk of stroke

What This Article Tells Us That Is New

- The results of this case-control study indicated that the duration of hypotension, defined as 30% reductions in mean blood pressure from baseline, was significantly associated with postoperative stroke in patients undergoing non-cardiac, non-neurosurgical surgery
- Further investigation is required to determine if specific perioperative blood pressure management strategies might mitigate such risk

STROKE is a rare but serious postoperative complication. Depending on the type and complexity of surgery, an ischemic stroke occurs in 0.1–3% of patients undergoing general surgery and as many as 10% of patients after complex cardiac surgery.[1–3]

Embolism often is considered the primary cause of a postoperative ischemic stroke. It may be related to postoperative atrial fibrillation or surgery-induced hypercoagulability in combination with vulnerable plaques in carotid or major cerebral arteries.[1] Hypoperfusion, defined as any combination of extracranial stenosis and/or systemic hypotension, is reported to be responsible for only 9% of all postoperative strokes in cardiac surgery patients.[4] In other types of surgery, no association between intraoperative hypotension (IOH) and postoperative stroke has been found.[5–7] However, the recent results of the Perioperative Ischemic Evaluation Study (POISE) trial (which investigated the effect of metoprolol *vs.*

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Address correspondence to Dr. Bijker: University Medical Center Utrecht, Department of Anesthesiology, F.06.149, P.O. Box 85500, 3508 GA Utrecht, The Netherlands. j.b.bijker@umcutrecht.nl. This article may be accessed for personal use at no charge through the Journal Web site, www.anesthesiology.org.

 Anesthesiology 2012; 116:658–64

Intraoperative Hypotension and Periope
Stroke after General Surgery

A Nested Case-control Study

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What We Know a
- The etiology of peri the recent POISE might contribute to

What This Article
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Hospital Stay and Mortality Are Increased in Patients Having a "Triple Low" of Low Blood Pressure, Low Bispectral Index, and Low Minimum Alveolar Concentration of Volatile Anesthesia

Daniel I. Sessler, M.D.,* Jeffrey C. Sigl, Ph.D.,† Scott D. Kelley, M.D.,‡ Nassib G. Chamoun, M.S.,§ Paul J. Manberg, Ph.D.,‖ Leif Saager, M.D.,# Andrea Kurz, M.D.,** Scott Greenwald, Ph.D.††

ABSTRACT

Background: Low mean arterial pressure (MAP) and deep hypnosis have been associated with complications and mortality. The normal response to high minimum alveolar concentration (MAC) fraction of anesthetics is hypotension and low Bispectral Index (BIS) scores. Low MAP and/or BIS at lower MAC fractions may represent anesthetic sensitivity. The authors sought to characterize the effect of the triple low state (low MAP and low BIS during a low MAC fraction) on duration of hospitalization and 30-day all-cause mortality.

Methods: Mean intraoperative MAP, BIS, and MAC were determined for 24,120 noncardiac surgery patients at the Cleveland Clinic, Cleveland, Ohio. The hazard ratios associated with combinations of MAP, BIS, and MAC values greater or less than a reference value were determined. The authors also evaluated the association between cumulative triple low minutes, and excess length-of-stay and 30-day mortality.

Results: Means (±SD) defining the reference, low, and high states were 87 ± 5 mmHg (MAP), 46 ± 4 (BIS), and 0.56 ± 0.11 (MAC). Triple lows were associated with prolonged length of stay (hazard ratio 1.5, 95% CI 1.3–1.7). Thirty-day mortality was doubled in double low combinations and quadrupled in the triple low group. Triple low duration ≥60 min quadrupled 30-day mortality compared with ≤15 min. Excess length of stay increased progressively from ≤15 min to ≥60 min of triple low.

Conclusions: The occurrence of low MAP during low MAC fraction was a strong and highly significant predictor

What We Already Know about This Topic
- Anesthesiologists continue to refine factors associated with morbidity and mortality after surgery.
- It is hoped identification of such factors will lead to treatments that may greatly reduce adverse outcomes during the perioperative period.

What This Article Tells Us That Is New
- In this retrospective review of a large database from a single institution, the occurrence of low mean arterial pressure during low minimum alveolar concentration fraction was a strong and highly significant predictor for mortality, and when combined with low bispectral index, the mortality risk was even greater. Additional studies are needed to validate the triple low as an indicator of perioperative mortality.

* Michael Gudahy Professor and Chair, # Assistant Professor, ** Professor and Vice-chair, Department of OUTCOMES RESEARCH, Cleveland Clinic, Cleveland, Ohio. † Director, Analytical Research, ‡ Chief Medical Officer, Respiratory and Monitoring Solutions, †† Senior Director, Advanced Research, Covidien, Inc., Dublin, Ireland. § Chair, Lown Cardiovascular Research Foundation, Boston, Massachusetts; Adjunct Staff, Department of OUTCOMES RESEARCH, Cleveland Clinic. ‖ Vice President, Clinical Research and Regulatory Strategy, Covidien. Currently: Corolla Clin-Reg Consulting, Corolla, North Carolina.

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Address correspondence to Dr. Sessler: Department of OUTCOMES RESEARCH, Anesthesiology Institute, The Cleveland Clinic—P77, Cleveland, Ohio 44195. ds@or.org. This article may be accessed for personal use at no charge through the Journal Web site, www.anesthesiology.org.

◇ This article is featured in "This Month in Anesthesiology." Please see this issue of ANESTHESIOLOGY, page 9A.

◆ This article is accompanied by an Editorial View. Please see: Kheterpal S, Avidan MS: "Triple low": Murderer, mediator, or mirror. ANESTHESIOLOGY 2012; 116:1176–8.

Spinal and GA Protocols

- We are deluding ourselves that we are conducting 'sympathetic anaesthesia" to these patients

- I now have data on over 400 cases

- I will soon have data on 10,000

Anaesthesia 2013, 68, 159–166 doi:10.1111/anae.12076

Original Article

A comparison of clinical practice guidelines for proximal femoral fracture

R. J. Kearns,[1] L. Moss[2] and J. Kinsella[3]

1 Consultant Anaesthetist, 2 Clinical Physicist and Honorary Lecturer, 3 Head of Section, Academic Unit of Anaesthesia, Pain & Critical Care Medicine, University of Glasgow, Glasgow Royal Infirmary, Glasgow, UK

Summary

Clinical practice guidelines are designed to assist clinical decision-making by summarising evidence and forming recommendations. The number of available guidelines is vast and they vary in relevance and quality. We reviewed guidelines relevant to the management of a patient with a fractured neck of femur and explored similarities and conflicts between recommendations. As guidelines are often produced in response to an area of clinical uncertainty, recommendations differ. This can result in a situation where the management of a particular clinical problem will depend upon which guideline is followed. We explore the reasons for such differences.

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Accepted: 2 October 2012

comply [35, 36]. In reply to recent similar criticisms [37], NICE responded by clearly stating that guidelines are "*not in any way mandatory*" and are designed to help "*healthcare professionals and patients make*

there was no advantage in adopting a higher transfusion threshold even in elderly patients at high risk of cardiovascular disease [41]. This new evidence is not incorporated in recent guidelines on hip fracture as it would have been unavailable during the period of research undertaken in this area. In addition, the timely implemented

duced. For example, a recently published, large, multicentre randomised controlled trial examining liberal versus restrictive blood transfusion in patients undergoing proximal femoral fracture repair concluded that

to target, types of system to use, and most importantly, effects on patient outcomes and cost-effectiveness, are needed. The recognition that poorly programmed systems may result in actual harm due to poor training, human error, or improper use of software is also important, and highlights the need for caution when

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Transfusion thresholds and other strategies for guiding allogeneic red blood cell transfusion (Review)

Carson JL, Carless PA, Hebert PC

THE COCHRANE COLLABORATION®

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2012, Issue 5

http://www.thecochranelibrary.com

WILEY
Publishers Since 1807

19 studies, all RCTs
6,264 patients

3 hip fracture studies
1 elective orthopaedic

1. 120 patients
2. 84 patients
3. 2,016 (FOCUS)
4. 603 (elective)

637 from a PICU study

838 TRICC study

In summary, a restrictive transfusion trigger reduces the risk of exposure to red blood cell transfusion and the total number of units transfused. The currently published evidence suggests that restrictive transfusion triggers do not adversely affect mortality, cardiac morbidity, function or length of hospital stay. For the present we recommend the use of a restrictive transfusion trigger, but suggest using caution in patients from high-risk groups such as acute coro-

? Define high risk groups?

AUTHORS' CONCLUSIONS

Implications for practice

In patients who do not have acute coronary artery disease, blood transfusion can probably be withheld in the presence of haemoglobin levels as low as 7.0 g/dL to 8.0 g/dL as long as there is no notable bleeding. The benefits of minimising allogeneic red cell transfusion are likely to be greatest where there is doubt about the safety of the blood supply.

Implications for research

Future trials of transfusion 'triggers' should include patients with acute coronary syndrome, elderly patients recovering from acute illness, patients with gastrointestinal bleeding, coagulopathy or haemorrhagic shock, and patients with traumatic brain injury. Trials are also needed that evaluate lower haemoglobin concentrations such as 6.0 g/dL. Trials should be large enough to measure the impact that lower thresholds have on clinical outcomes.

Table 2. Hemoglobin Levels and Transfusions.*

Variable	Liberal Strategy (N=1007)	Restrictive Strategy (N=1009)	P Value
Hemoglobin level — g/dl			
Before surgery	11.3±1.5	11.3±1.5	0.70
During eligibility screening	9.0±0.8	9.0±0.8	0.98
Before transfusion	9.2±0.5	7.9±0.6	<0.001
Estimated blood loss during surgery — ml†	209±179	232±257	0.03
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
Total no. of units	1866	652	
Storage of units transfused after randomization — days‡	22.0±9.5	22.1±9.9	0.83
Leukoreduced units transfused after randomization — %§	90.2	88.6	0.25
Major protocol violation — no./total no. (%)¶	91/1006 (9.0)	56/1007 (5.6)	0.003
Transfusion because of symptoms — no./total no. (%)‖			
Rapid bleeding	5/1006 (0.5)	14/1007 (1.4)	0.04
Chest pain	4/1006 (0.4)	9/1007 (0.9)	0.17
Congestive heart failure	1/1006 (0.1)	10/1007 (1.0)	0.007
Tachycardia or hypotension	43/1006 (4.3)	123/1007 (12.2)	<0.001

FOCUS

It is a study in the rehabilitation period and not within the preoperative or perioperative period

However, it is a large study which must have been very hard to conduct

There are some positive elements that come form it

Table 2. Hemoglobin Levels and Transfusions.*

Variable	Liberal Strategy (N=1007)	Restrictive Strategy (N=1009)	P Value
Hemoglobin level — g/dl			
Before surgery	11.3±1.5	11.3±1.5	0.70
During eligibility screening	9.0±0.8	9.0±0.8	0.98
Before transfusion	9.2±0.5	7.9±0.6	<0.001
Estimated blood loss during surgery — ml†	209±179	232±257	0.03
Transfusions before randomization			

Now, is that a 2.5gm.dl drop in haemoglobin in both groups?

FOCUS

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- Does that suggest that there may be hidden blood loss in hip fracture?

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- So, even if the blood loss at surgery is only 200ml, the Hb still goes down?
- What a surprise!!!!!!

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The hidden blood loss after hip fracture

G.H. Smith *, J. Tsang, S.G. Molyneux, T.O. White

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ARTICLE INFO

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Keywords:
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ABSTRACT

Introduction: Despite advances in surgical and anaesthetic techniques the mortality after hip fracture has not significantly changed in the last 40 years. Pre-operative anaemia is a risk factor for peri-operative death.

We speculate that a significant proportion of the blood loss related to hip fractures has occurred prior to surgery. Identifying patients at risk of pre-operative anaemia can facilitate appropriate medical optimisation. This study is unique in its attempt to quantify the blood loss associated with the initial hip injury.

Methods: In a retrospective study all patients with both a diagnosis of hip fracture and an operative delay of >48 h were assessed. The information collected included: fracture classification, serial haemoglobins and patient co-morbidities. The exclusion criteria included a pre-injury diagnosis of anaemia, anti-coagulation and gastro-intestinal bleeds.

Results: Between 2007/2008 sixty-eight intracapsular and fifty extracapsular hip fracture patients had serial haemoglobins and operative delays of >48 h (mean 75 h, range 48–270 h). The mean lowest recorded haemoglobin prior to surgery for both extracapsular and intracapsular fractures were 95.0 g/L (±SEM 2.2) and 108.5 g/L (±SEM 2.2) respectively. This difference was statistically significant (Student's *t*-test $p < 0.05$).

The mean haemoglobin drop in the extracapsular and intracapsular fracture groups was 20.2 g/L (range 0–69 g/L) and 14.9 g/L (range 0–59 g/L) respectively.

Conclusions: Hip fracture patients have a large drop in haemoglobin that is associated with the initial trauma rather than the operation. This highlights the need for anaesthetic and orthopaedic staff to be vigilant to the risk of pre-operative anaemia in this cohort of frail patients even when the initial haemoglobin is apparently normal.

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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*

ABSTRACT

AFTER

Constant Vigilance

Measure frequently

Blood loss is usually 2.5gm/
dl

Many are anaemic before
they fracture their hip

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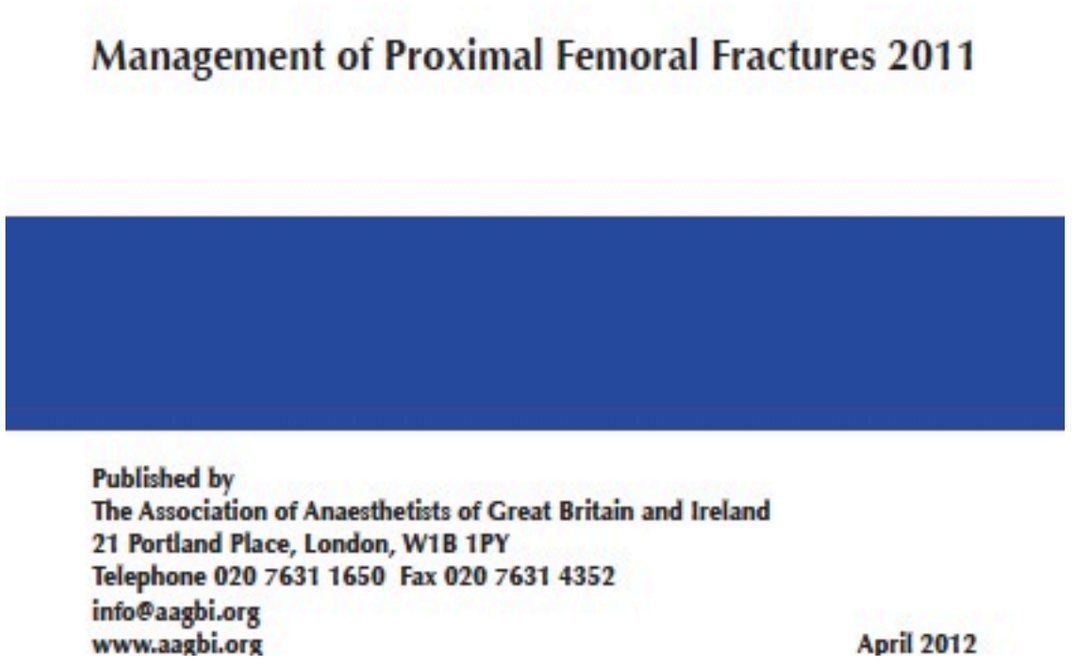
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Summary

- Important area for anaesthesia
- Specialist area
- Protocols may help
- Audit data is important
- UK database may yield information