

ORIF vs acute arthroplasty for fractures of the proximal femur

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I (and/or my co-authors) have something to disclose.

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The Problem with IF...

- **High revision rates**
 - 30-40% displaced, 20% undisplaced
- **Femoral neck shortening**
 - 30% shortening rates
 - Affects patient function negatively (SF-36)
- **So to prevent this....**
 - The alternative may be an arthroplasty



Arthroplasty for femoral neck fracture: What is the rationale?

Eliminates the need for

Revision surgery

-avascular necrosis

-nonunion

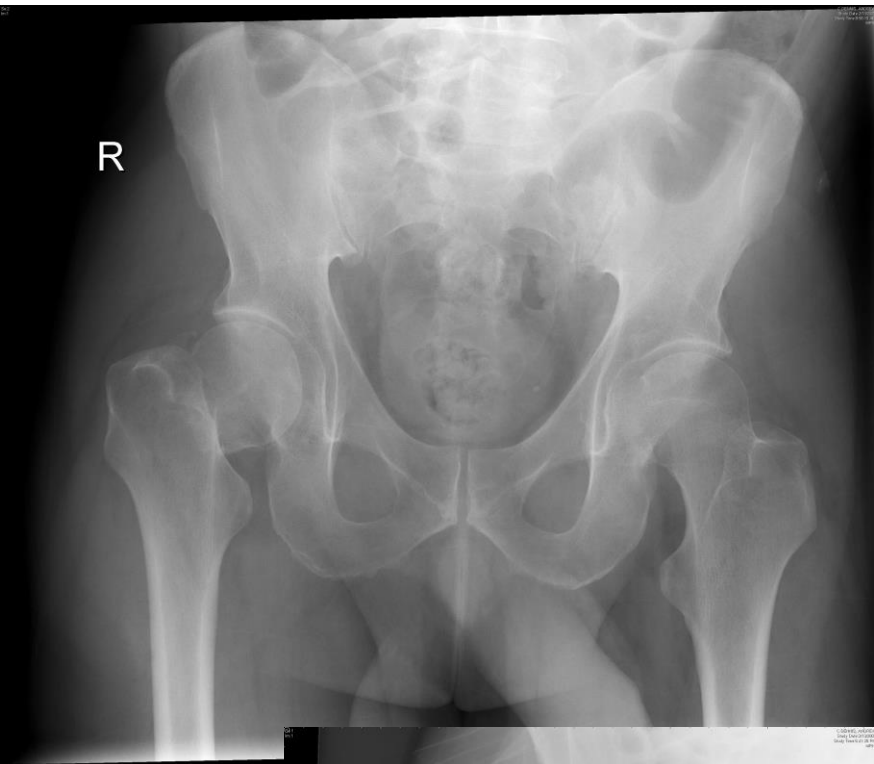


Arthroplasty for femoral neck fracture: What is the rationale?

Improves function
-less shortening

Slobogean et al. OTA 2017: Any femoral neck shortening post fracture fixation negatively impacts functional outcomes





Fixation vs Recon

INTERNAL FIXATION COMPARED WITH ARTHROPLASTY FOR DISPLACED FRACTURES OF THE FEMORAL NECK

A META-ANALYSIS

BY MOHIT BHANDARI, MD, MSC, P.J. DEVEREAUX, MD, MARC F. SWIONTKOWSKI, MD,
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Investigation performed at McMaster University, Hamilton, Ontario, Canada

Meta-analysis

- Fourteen trials - 1901 patients provided data on revision surgery
 - less risk of revision surgery after arthroplasty vs. internal fixation (RR=0.23; p=0.0003)
 - Pain relief and function were similar
- Higher re-operation rates and treatment failure in the internal fixation cohort

- Operate on patients with the aim to allow them to fully weight bear (without restriction) in the immediate postoperative period. **[2011]**
- Offer arthroplasty (THA or HA) to patients with a displaced intracapsular hip fracture **[2017]**

So why not arthroplasty?

Traditional thinking:

- Not usually necessary with undisplaced fractures
- Arthroplasty in young patients problematic
 - Dislocation
 - Loosening
 - Infection
 - Revision
- Difficulty defining “young”



Recent literature challenges dogma

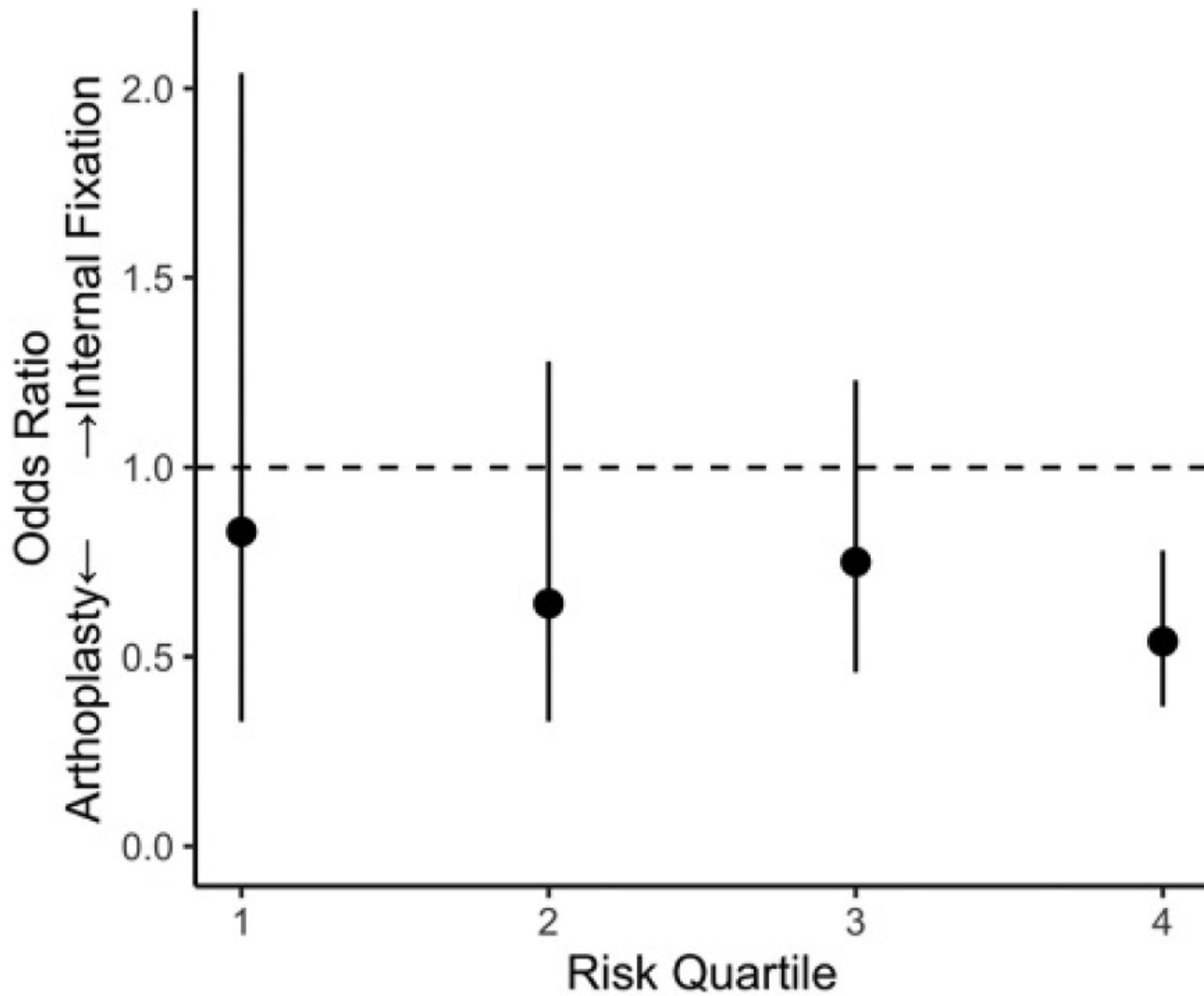
- Garden 1 (42%) and 2 (63%) fractures collapsed more than expected ($>1\text{cm}$) after IF (Cronin et al, JOT 2019)
- Hemiarthroplasty led to improved mobility and fewer major re-ops compared to IF for nondisplaced femoral neck fractures (Dolatowski JBJS 2019)

Arthroplasty Versus Internal Fixation for the Treatment of Undisplaced Femoral Neck Fractures: A Retrospective Cohort Study

Shaikh Afaq, MD,^a Nathan N. O'Hara, MHA,^a Emil H. Schemitsch, MD, FRCSC,^b Sofia Bzovsky, MSc,^c Sheila Sprague, PhD,^{c,d} Rudolf W. Poolman, MD, PhD,^e Frede Frihagen, MD, PhD, FRCSC,^f Diane Heels-Ansdell, MSc,^d Mohit Bhandari, MD, PhD, FRCSC,^{c,d} Marc Swiontkowski, MD,^g and Gerard P. Slobogean, MD, MPH^a on behalf of the FAITH and HEALTH Investigators

	Arthroplasty (n = 1441)	Internal Fixation (n = 734)	Crude OR (95% CI)	P	Adjusted OR (95% CI)	P
Mortality, n (%)	198 (13.7%)	129 (17.6%)	0.75 (0.59–0.95)	0.02	0.56 (0.44–0.73)	<0.01
Reoperation, n (%)	117 (8.1%)	131 (17.9%)	0.41 (0.31–0.53)	<0.01	0.41 (0.32–0.55)	<0.01

	Arthroplasty (n = 1006)	Internal Fixation (n = 490)	Crude Difference (95% CI)	P	Adjusted Difference (95% CI)	P
24-mo SF-12 PCS, mean (SD)	38.8 (9.9)	36.1 (9.9)	2.7 (1.7–3.8)	<0.01	2.7 (1.6–3.8)	<0.01
24-mo SF-12 MCS, mean (SD)	52.3 (10.6)	51.2 (14.5)	1.1 (–0.1–2.3)	0.07	0.9 (–0.3–2.0)	0.14



High failure rate after internal fixation and beneficial outcome after arthroplasty in treatment of displaced femoral neck fractures in patients between 55 and 70 years

An observational study of 2,713 patients reported to the Norwegian Hip Fracture Register

Stefan BARTELS ¹, Jan-Erik GJERTSEN ^{2,3}, Frede FRIHAGEN ⁴, Cecilia ROGMARK ⁵, and Stein Erik UTVÅG ^{1,6}

- Major reoperations occurred in 27% after IF, 3.8% after HA and 2.8% after THA.
- Is 55 the upper limit for Internal fixation?

Total Hip Arthroplasty Leads to Better Results After Low-Energy Displaced Femoral Neck Fracture in Patients Aged 55 to 70 Years

A Randomized Controlled Multicenter Trial Comparing Internal Fixation and Total Hip Arthroplasty

Stefan Bartels, MD, Torbjørn B. Kristensen, MD, PhD, Jan-Erik Gjertsen, MD, PhD, Frede Frihagen, MD, PhD, Cecilia Rogmark, MD, PhD, Filip C. Dolatowski, MD, PhD, Wender Figved, MD, PhD, Jūratė Šaltytė Benth, PhD, and Stein Erik Utvåg, MD, PhD

Investigation performed at Akershus University Hospital, Lørenskog, and Haukeland University Hospital, Bergen, Norway

- THA patients reported better health-related quality of life at 4 months postop and greater satisfaction and less pain at 4 and 12 months post-op
- 51% of the IF group vs 4% in the THA group underwent a major reoperation

Arthroplasty

- Must consider:
 - THA vs HA
 - Use of cement
 - Approach
 - Head size



Hip Fracture Evaluation with Alternatives of Total Hip Arthroplasty Versus Hemi-Arthroplasty (H.E.A.L.T.H)

HEALTH Investigators

NEJM 2019

Primary Endpoint

Secondary hip procedures within 24 months:

THA group:

57 of 718 patients (7.9%)

HA group:

60 of 723 patients (8.3%)

HR 0.95, 95% CI: 0.64-1.40; p=0.79


No difference

Functional Outcomes and Quality of Life

Patients in the THA group had superior function as measured by the WOMAC but differences were below MCID: 9 points

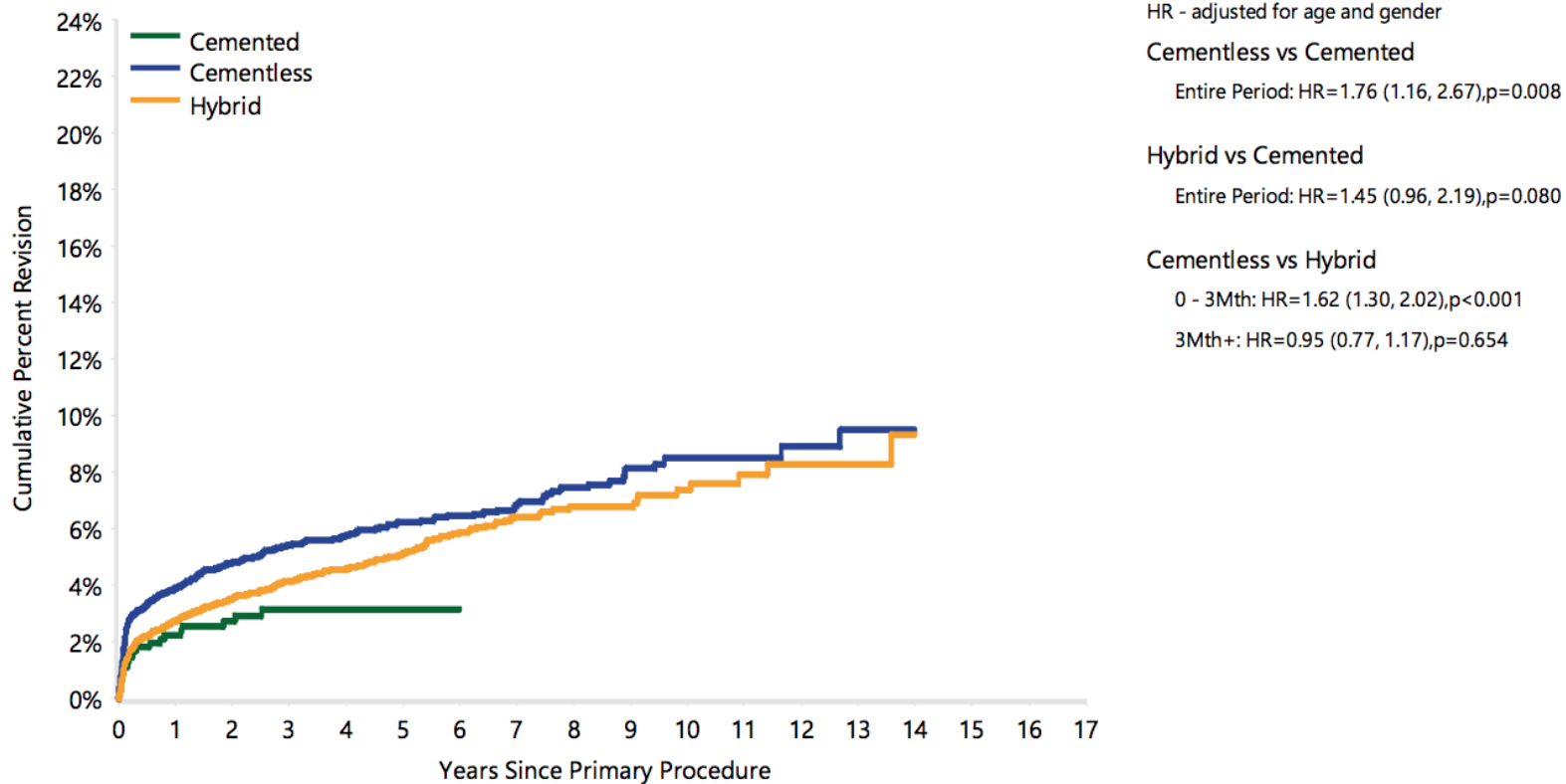
Endpoint, n (%)	Total N=1,441	Mean Difference at 24 Months (99% CI)
WOMAC Total	943 (65.4)	-6.37 (-9.18, -3.56)
WOMAC Pain	990 (68.7)	-0.93 (-1.42, -0.44)
WOMAC Stiffness	987 (68.5)	-0.44 (-0.65, -0.23)
WOMAC Function	947 (65.7)	-4.97 (-7.11, -2.83)
EQ-5D Utility	1,141 (79.2)	0.04 (-0.03, 0.11)
EQ-5D VAS	1,111 (77.1)	0.72 (-2.02, 3.46)
SF-12 PCS	1,006 (69.8)	1.41 (-0.33, 3.14)
SF-12 MCS	1,006 (69.8)	1.34 (-0.38, 3.05)
Endpoint, n (%)	Total N=1,441	Odds Ratio (99% CI)
TUG	1,268 (88.0)	0.72 (0.38, 1.36)

Role of Cement

- Fewer complications
 - Moerman et al, BMC MSK Disord 2017 (RCT 201 pts)
- Less re-ops
- Less fractures (THA and HA)
 - Lindberg-Larsen et al, Acta Orthop 2017
 - Chammout et al, Acta Orthop 2017
- Less pain and improved function
- Better long term survival
- ?less optimal with  co-morbidities
(? ASA III-IV)

Role of Cement

Figure HT57 Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Fixation (Primary Diagnosis Fractured NOF)



Cement plays an increasing role with age >70

ORIGINAL ARTICLE

Cemented or Uncemented Hemiarthroplasty for Intracapsular Hip Fracture

Miguel A. Fernandez, Ph.D., Juul Achten, Ph.D., Nicholas Parsons, Ph.D.,
Xavier L. Griffin, Ph.D., May-Ee Png, Ph.D., Jenny Gould, Alwin McGibbon, B.A.,
and Matthew L. Costa, Ph.D., for the WHiTE 5 Investigators*

ABSTRACT

- 1225 patients > age 60
- Cemented HA resulted in a modestly but significantly better quality of life
- Periprosthetic fractures in 0.5% vs 2.1%
(odds ratio [uncemented vs. cemented], 4.37; 95% CI, 1.19 to 24.00)

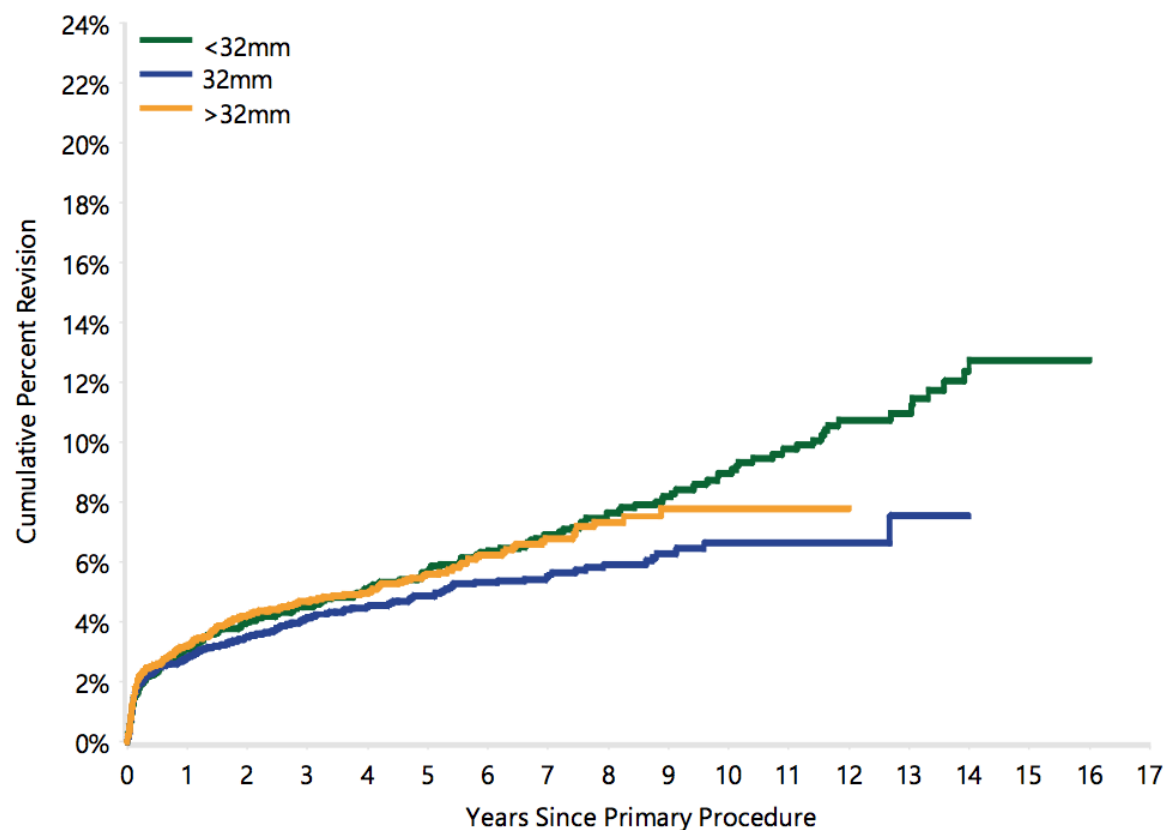
Role of surgical approach

Controversial

- Direct lateral may be less optimal
 - Worse function, more pain
 - Kristenson et al, Acta Orthop 2017
 - Hongisto et al, Scan J Surg 2018
- Posterior
 - Instability still a problem
 - Hongisto et al Scan J Surg 2018
- DAA
 - Increased role
 - Dimitriou et al, J Arthroplasty 2018
 - Ochi et al, SICOT J 2017
 - Kunkel et al, Euro J Orthop Surg Trauma 2018

Role of Head Size

Figure HT60 Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Head Size (Primary Diagnosis Fractured NOF)



HR - adjusted for age and gender

<32mm vs 32mm

0 - 1Mth: HR=0.92 (0.66, 1.30), p=0.650

1Mth - 6Mth: HR=1.08 (0.79, 1.46), p=0.628

6Mth+: HR=1.47 (1.19, 1.82), p<0.001

>32mm vs 32mm

Entire Period: HR=1.08 (0.92, 1.28), p=0.350

>32mm vs <32mm

Entire Period: HR=0.88 (0.74, 1.05), p=0.161

Head size at least
32 mm

Dual Mobility Cup for femoral neck fracture

- Significant reduction in rates of dislocation
 - *Bensen et al, Int Orthop* 2014
 - *Adam et al, Orthop Trauma Surg Res* 2012
 - *Tarasevicius et al, Hip Int* 2013
 - *Graverson et al, SICOT J*, 2017
- *Cemented vs uncemented options*



Rationale for Acute Arthroplasty

- Eliminates the need to deal with:
 - The presence of failed internal fixation devices
 - Potential infection
 - Bone deformity
 - Bone loss
 - Poor bone quality
 - Poor femoral canal anatomy

Salvage THA after Hip Fx

- Not a straight forward procedure
- Not equivalent to primary THA for OA
 - Qin et al, J Arthroplasty 2017
 - Schwarzkopf et al, J Arthroplasty 2017
 - Lee et al, J Arthroplasty 2017
- Increased risk of dislocation
 - McKinley et al, JBJS(A) 2002
 - Sah et al, JBJS(A) 2008
 - **Careful attention should be paid to the complete and thorough capsular repair**
 - **Large femoral heads**
 - **?Dual mobility**
- Increased risk of periprosthetic #



Evidence based conclusions: Femoral neck fractures

- **IF results in more reoperations and likely worse function than Arthroplasty**
- **Arthroplasty may be more advantageous even with undisplaced fractures especially in older patients**
- **Cemented outperforms uncemented arthroplasty**
- **Dislocation may be an issue following arthroplasty; Increasing role for Dual Mobility**
- **It is better to do a primary THA than secondary THA**

Thank you

