Journal Club: 14 June 2013
Chairmen: Mr BA Rogers & Mr DM Ricketts
Brighton & Sussex University Hospitals

Theme Hip Arthroplasty

Presented Papers

Contemporary Paper

Sandiford N, Doctor C, Rajaratnam SS. Primary total hip replacement with a Furlong fully hydroxyapatite-coated titanium alloy femoral component: results at a minimum follow-up of 20 years. *Bone Joint J* 2013;95-B:467-71.

'Classic' Paper

Britton AR, Murray DW, Bulstrode CJ, McPherson K, Denham R. Pain levels after total hip replacement their use as endpoints for survival analysis. *J Bone Joint Surg [Br]* 1997;79-B:93-98.

Sandiford N, Doctor C, Rajaratnam SS. Primary total hip replacement with a Furlong fully hydroxyapatite-coated titanium alloy femoral component: results at a minimum follow-up of 20 years. *Bone Joint J* 2013;95-B:467-71.

Reviewer   Mr Ed Lindisfarne

Summary

Purpose
In general

- Public awareness and scrutiny of implants

    – PIP breast implant scare

    – Metal on Metal hip implant concerns

- Need for long-term reliable evidence

This study

- To present the results at a minimum of 20 years follow-up

- for a previously reported cohort fully HA coated Furlong femoral stem

Methods

- Prospective study
- 1986-1991
- Includes 72 primary THRs in 60 patients
- All had same stem
- All procedures:
    - performed/supervised by senior author
- No patients lost to follow-up
- Outcome measures:
    - Patient:
        - MDP (Merle d'Aubigné & Postel) & VAS
    - Complications:
        - Medical/Surgical
    - Radiological:
        - Loosening in well defined zones
    - Revision:
        Femoral/Acetabulum/Both, Aseptic Loosening

Results

- Mean follow-up 22.5 years (20-25)
- 91.7% very satisfied
- Pain, Mobility & Function scores
    - 5.5, 3.8 and 3.3 respectively
- 17 deaths
- 7 revisions
    - 6 acetabulum only, 1 both (infection)
- No aseptic loosening of the stem
- Radiolucent Lines - 19 femoral components
    - But no association with pain
- Focal calcar resorption:
    - 10 hips (but good metaphyseal fixation)
- Heterotopic Ossification (HO) in 35 hips
    - Brooker grade 2 or 3 in 57%
- 4 calcar fractures

Conclusion

- This prosthesis provides pain relief in the long term

•22.5 yrs

•Survivorship 100%

–Endpoint: stem revision for aseptic loosening

•Survivorship 91%

–Endpoint: all cause revision

•Results comparable to any type of THR

Critique
Overview

•Is this a "Case Series" OR a "prospective cohort" study?

–Case Series: should not pretend to prove a hypothesis

–Cohort: should attempt to control for bias in results

Strengths

•Minimum 20 years

•No loss to follow-up

•Good follow-up of the patients who died

•Single approach: a Watson Jones approach in the supine position

•Single surgeon

Methodological Concerns

1. An earlier paper in 2008 studied the same patient cohort: at that time this included 291 patients (331 hips) [2]. The current paper would benefit from a clear description of the outcome for the 231 patients (259 hips) no longer included.

2. Inclusion/Exclusion criteria
This prosthesis used *"for all patients in whom an uncemented THR was required"* p467

–No details of Base-line characteristics
   •BMI, co-morbidities, ASA grade etc
   •No detail regarding attempts to control for bias
Therefore, can the results be generalised?

3. Outcome measures:

–Patient:

　　　•reliability of PROMs: have they been validated?

–Complications:

　　　•Medical/Surgical – not clearly defined.

–Radiological:

　　　•Not blinded, thus how objective?

　　　•No Inter/intra observer reliability provided

4. Revision:

•Were age-dependent criteria?

　　　4 patient s with mild-moderate start-up pain "did not wish to have further surgery because

　　　of their age" p469

•Note difficulty to revise Furlong stems.

•Revision is not necessarily a good outcome measure

cf Pain levels after THR: their use as endpoints for survival analysis *J Bone Joint Surg [Br]* 1997;79-B:93-8 (other paper reviewed in this journal club)

5. Statistical analysis:

–Student's t-test

–Compared mean scores for pain, mobility and function

　　　Normal distribution of data (no Kolmogorov-Smirnov test given)

　　　We are given a mean and a range (not Standard Deviation)

–No comparison of MDP scores between 10- and 20-years

–No null hypothesis stated in the "aims"

　　　E.g. "This stem is no better than cemented THR"

6. Graphs/Tables

•Kaplan-Meier survival curves

　　　–"number at risk" ? (p469)

　　　–No Life Table to explain

•Delee/Charnley/Gruen Zones table

　　　–Counting error:

"RLL noted around 29 acetabular components".... or 32?

Conclusion of Critique

"In *this* group of patients, this prosthesis has done very well."

However,

•Uncertain how generalisable the results are

•Lack of information about the group

Britton AR, Murray DW, Bulstrode CJ, McPherson K, Denham R. Pain levels after total hip replacement their use as endpoints for survival analysis. *J Bone Joint Surg [Br]* 1997;79-B:93-98.

Reviewer   Mr Aroonkumar Chouhan

Summary
Purpose

•Select the statistically most suitable single outcome measure after total hip replacement surgery

•Using survival analysis, choose most suitable single implant

Methods

•Inclusion criteria:

–Follow-up records

–THR between 1967 and 1989

–Age group: 17 to

–3 hospitals

•Outcome measures: pain, stiffness, radiographic

•Patient opinion

•Revision

•Natural history of pain

Results

•Outcome measures and patient opinion

–pain score, 0.52

•Outcome measures and revision

–severe or moderate pain

•The natural history of pain after THR

–large improvement at 6/12

–small improvement next 2 years

–gradual deterioration after 4 years

•Survival analysis using pain levels

Conclusion

•Assess presence of pain at:

–routine follow-up

–when monitoring new designs of joint replacement

Critique

Overview

•Difficult to read and follow

•Difficult to understand the statistics

•Poor Spearman's ranked correlation

•Conclusion drawn from a subjective view

•Wide range of implants used

•Comparing degenerative disease with ? Trauma

•Heterogeneous group

•Adds nothing new

Strengths

•Valid points in discussion

•Ongoing research by authors

Methodological Concerns

1. The authors state that 88% of patients originally had degenerative joint disease. We can only presume that the remainder of patients had joint replacement due to trauma. This would mean that like for like patients were not used.

2. 'The ages of the patients ranged from 17 to 93 years'. All in all a very heterogenous group was used in the study.

3. The authors state that 'six types of implant' were used. This is regarded a wide range, and hence would undoubtedly cause discrepancy within the results.

4. In order to compare two variables within outcome measures and patient opinion, the author's used Spearman's ranked correlation. The highest correlation with patient opinion was shown by pain scores (r = 0.52). This in itself is a very poor correlation, with r > 0.75 being regarded a meaningful and significant correlation.

5. No statistical measure was used to compare outcome measures and revision. Instead the authors provided a very random statement that, 'over 50% of the patients who required revision had reported *some degree* of pain'.

6. It appears that as part of the survival analysis (Figures 4 to 7), Kaplan-Meier survival analysis was used, but there is no mention of this in the paper.

7. The opening sentence in the discussion, 'pain appears to be a good outcome measure because it correlates with patient opinion, predicts revision and does not fluctuate unduly', is a subjective view of the authors and is not backed-up by any hard statistical evidence.

8. The recommendation in the closing paragraph, 'we therefore recommend that routine follow-up and the monitoring of new designs of joint replacement should use the presence of pain as one of the main outcome measures', is a practice that has been carried out by surgeons for many years.

Conclusion of Critique

- Interesting research question – paper has not helped reach towards an answer

- Conclusions are already widely practiced

- Is pain appropriate to use single outcome measure

- Need for single implant for validity