

Causes of Revision THA in the United States During the Initial 90 Days Post Surgery: Data from the American Joint Replacement Registry (AJRR)

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Introduction

- Revision hip arthroplasty <90 days after primary procedure is less often due to implant design problems and more often due to potentially modifiable factors, such as surgical technique, facility factors and patient risk factors.
- It is critical to understand causes and factors associated with early revisions to enable practice improvement.
- The American Joint Replacement Registry (AJRR) is a not-for-profit 501(c)(3) tax-exempt organization for data collection and quality-improvement initiatives for total hip and knee replacements.
 - AJRR's goal is to capture 90% of all total joint replacement procedures in the U.S.
- As the U.S. National Arthroplasty Registry, AJRR provides a robust dataset to analyze revision metrics in the United States.

Goal

To examine causes and factors associated with <90-day hip revision in the United States of "linked revision arthroplasties" within a national Registry dataset, where data on the earlier primary total hip arthroplasty (THA) were also available in the Registry.

Material and Methods

Data Collection:

- AJRR participating hospitals submitted THA data electronically via a file upload to AJRR's secure FTP site.

Data Elements:

- ICD-9 diagnosis codes
- ICD-9 procedural codes
- Patient age
- Patient gender

Analysis:

- Study sample: 2012-2014 THA procedures (primary and revisions) based on ICD-9 hip procedural codes from Registry.
- Hip revision defined by ICD-9 codes:
 - 00.70 – Revision of hip replacement, both acetabular and femoral components
 - 00.71 – Revision of hip replacement, acetabular component
 - 00.72 – Revision of hip replacement, femoral component
 - 00.73 – Revision of hip replacement, acetabular liner and/or femoral head only
 - 00.74 – Hip-bearing surface, metal-on-polyethylene
 - 81.53 – Revision of hip replacement, not otherwise specified
- Linked revision defined as:
 - A revision procedure that has been matched in AJRR's database with a primary procedure based on patient data, laterality, procedure codes and diagnosis codes.
 - For this analysis, only <90-day revisions were reported.
- Causes of <90-day revisions were based on submitted ICD-9 diagnosis codes for each linked revision.
- Chi-square test for comparison of proportions (i.e., % men).
- ANOVA for comparison of means (i.e., mean age) across groups.

Results

2012-2014 Hip Revision Metrics:

- Reporting hospitals for sample = 217
- Total of hip revisions = 8,257 procedures
 - Of those, 920 (11%) were linked revisions
 - 672 (8.1% of all revisions) were linked <90-day revisions
- Of <90-day revisions:
 - 416 (61.9%) were female
 - Mean age = 67.6 years (12.6 SD)

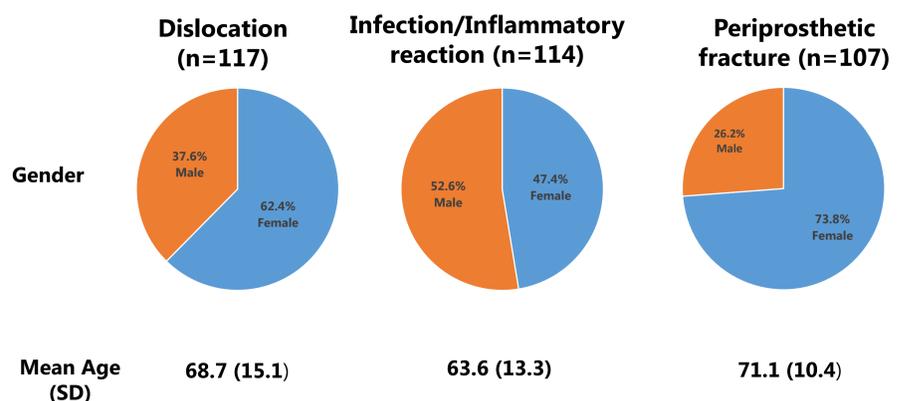
Leading Diagnoses for <90-day hip revisions (n=672)

Diagnosis	Number of Cases (%)
Dislocation	117 (17.4%)
Infection/Inflammatory reaction	114 (17.0%)
Periprosthetic fracture	107 (15.9%)
Osteoarthritis localized not specified whether primary or secondary involving pelvic region and thigh	95 (14.1%)

* The remaining 48 diagnosis codes reported had low frequency (i.e., less than 30 cases submitted for each code. Nineteen codes had only 1 case submitted).

Patient and Facility Risk Factors:

Top 3 Leading Causes of <90-Day Revision Demographics (n=338)



There were significant ($p < 0.05$) differences in mean age and sex distribution across the 3 leading diagnosis groups, with those sustaining periprosthetic fracture a mean of 7 years older.

Hospital and surgeon factors

- 137 (58.1%) hospitals performed <90-day hip revisions
 - Of those, 16 hospitals performed 10 or more <90-day hip revisions
 - In two hospitals, early revisions reflected 7.5% and 5.5% of total submitted cases
- Within the dataset, 316 surgeons performed <90-day hip revisions

Discussion

AJRR data suggest that efforts to reduce early revisions should focus on hip instability, infection prevention, and reduction of periprosthetic fracture, especially in older patients. Other studies have shown these problems to be at least partially related to surgical technique and implant choices under the control of surgeons.