The Journal of Arthroplasty Vol. 27 No. 8 Suppl. 1 2012

The Financial Impact of Joint Registries in Identifying Poorly Performing Implants

Randy Luo, BA,* Adam Brekke, BA,† and Philip C. Noble, PhD*†

Abstract: We analyzed the effect of the Australian National Joint Registry on the cost of joint arthroplasty through identification of implants with higher than expected failure rates. From 2003 to 2007, 242 454 primary joint arthroplasties were performed in Australia at a total cost of $4.1 billion. Of these cases, 19 224 were performed using components identified by the Registry as poorly performing. If all of these cases were performed using average-performing designs, the number of revisions would have dropped by 28.6%. We also predicted that over a 5-year period after Registry identification, 32 807 primary procedures would be performed using poorly performing implants. If implants of average longevity were selected instead, we predict that 25.8% fewer revision procedures would be needed, ranging from 7% in unicompartmental knee replacement to 47% in total hip arthroplasty. This change in practice is expected to save 10.2% of direct costs, corresponding to $14 million over a 5-year period. **Keywords:** joint registries, implants, arthroplasty.
© 2012 Elsevier Inc. All rights reserved.

Joint arthroplasty has proven to be a highly effective surgical intervention for improving the health-related quality of life by reducing pain, restoring range of motion, and allowing patients to return to a more active lifestyle [1]. Nonetheless, artificial joints fail at a rate of approximately 1% per year, leading to revision surgeries to replace the original devices [2]. This trend is exacerbated by a shift in the demographics of patients receiving joint arthroplasties. Although these procedures were once reserved for older patients who sought symptomatic relief, in recent years, younger and more active patients have decided to undergo joint arthroplasties [3]. Their postoperative lifestyle is usually more active, placing them at a greater risk for revision surgery. In addition, as people live longer and more patients receive joint arthroplasties, there will be a corresponding increase in the number of revision arthroplasties being performed nationwide.

Revision surgeries have also proven to be effective [4]. However, the increased expense and prevalence of complications associated with these procedures places a greater clinical and economic burden on the patients, caregivers, and the health care system [5,6]. Published studies have suggested various methods to reduce the financial burden of revision surgeries [7-9]. However, most studies have been based on limited numbers of patients, physicians, and hospitals and have been restricted to specific interventions. Although these studies offer important findings, their recommendations lack broad applicability and may not translate well across different hospitals or surgeons due to variations in facilities and surgeon training. Thus, it is desirable to have access to large databases of joint arthroplasty outcomes to monitor overall performance and to allow policymakers to formulate guidelines. This desire led the Swedes to develop the Swedish Hip Arthroplasty Registry in 1979, which has become the gold standard that many other countries have emulated in the years. The Swedish Registry has standardized reporting procedures which has helped them capture data from 94% of hip replacements performed in Sweden each year. Analysis of the data collected has led to the formulation of evidence-based recommendations concerning the effectiveness of different methods of implant fixation and identification of best surgical practices. These efforts have helped reduce the revision burden within Sweden to 10% over a 10-year period, corresponding to estimated cost savings of $140 million [10].

While the Swedish Registry routinely reports the cumulative survivorship of specific implant designs, the Australian Registry has taken this practice one step

*From the *Baylor College of Medicine, One Baylor Plaza, Houston, Texas; and †IORE, Houston, Texas.*
Submitted August 17, 2011; accepted March 26, 2012.
Supplementary material available at www.arthroplastyjournal.org.
The Conflict of Interest statement associated with this article can be found at doi:10.1016/j.arth2012.03.046.
Reprint requests: Philip C. Noble, PhD, Institute of Orthopedic Research and Education, 6550 Fannin, Suite 2512, Houston, TX 77030.
© 2012 Elsevier Inc. All rights reserved.
0883-5403/2708-0015$36.00/0
doi:10.1016/j.arth.2012.03.046

further by publicly identifying components associated with excessive revision rates. Over the period 2004 to 2008, the Australian Registry identified 47 components used in total hip arthroplasty (THA), hip resurfacing arthroplasty (HRA), total knee arthroplasty (TKA), and unicompartmental knee arthroplasty (UKA) that they determined to have higher than expected failure rates [11,12]. Empirical observation has shown that, in many cases, this process of public identification of specific designs by the Australian Registry, though technically without an official recommendation, has been followed by a dramatic reduction in use. Consequently, the process of "identification" has profound implications for implant selection and affects all stakeholders, including surgeons, patients, orthopedic implant companies, and payers [13].

Despite the process of public identification of implants by the Australian Registry, some surgeons elect to continue to use identified designs, presumably because they have observed satisfactory performance of the identified components in their own patients. This raises the questions:

1. Does public identification of poorly performing implant designs lead to a reduction in the revision burden through changes in implant selection and utilization?
2. What are the potential cost savings through changes in implant utilization resulting from public identification of poorly performing prostheses?

The following study was performed to address these issues using data published by the Australian National Joint Replacement Registry.

Methods

From 2004 to 2008, the Australian Joint Registry identified 47 prostheses that had higher than expected revision rates (3 HRA, 24 THA, 13 TKA, and 7 UKA). Four components were identified in the 2004 report, 6 in 2005, 12 in 2006, 12 in 2007, and 13 in 2008.

Usage of Identified Implants

To quantify the cost implications of the identification process, we analyzed the data in 2 steps:

As an initial step, we calculated the cost burden of poorly performing implants to the Australian health-care system over the period 2003 to 2007, independent of the decision of the surgeon to select a specific design of component. This represents the theoretical savings that would accrue from a system that eliminated all poorly performing implants from usage. We assumed that implants identified by the NJRR were the only poorly performing components available to Australian surgeons. The increase in the number of revisions attributable to the use of these identified implants was calculated as the product of the cumulative number of cases performed using each component and the 5-year cumulative revision rate of that component. In all, follow-up data on 35 of the 47 designs were available from the Annual Reports of the Australian Registry to enable inclusion in these calculations. The calculation was repeated assuming that a component displaying the average cumulative revision rate had been used instead of the identified component. The difference between the number of revisions performed with the identified component and the estimated number if the average component had been selected was defined as the excess revisions attributable to use of the identified component.

The second step involved estimating the extent to which changes in implant selection could reduce the number of revisions over a 5-year period *after* identification by the registry (potential savings). To do this, we predicted how usage of the 47 identified components would change over the same period if they had not been identified, based on the history of usage of usage of each component in the years leading up to identification.

We observed 3 different patterns of usage of identified designs. Components identified by the Registry retrospectively (ie, that were no longer used by the time they were identified) were grouped into Category A; those that showed a decrease in use prior to identification but were still in use during 2003 to 2007 were grouped into Category B; and components that exhibited increased use at the time of identification were classified as Category C (Figure).

For Category B and C components, the projected change (increase or decrease) in use over the ensuing 5-year period was calculated using linear trend analysis from the time of the components' peak usage. The number of revisions performed during the post-identification period was estimated by multiplying the projected usage of each identified component by its 2008 5-year revision rate. The calculation was repeated assuming that all of the post-identification procedures were performed using components in each group with average 5-year revision rates. The burden of excess revisions was defined as the difference between the number of revisions predicted if the identified implants were selected and the number predicted if a component with average survivorship was used instead.

Cost of Revision Procedures

Although it is well appreciated that the financial impact of revision joint replacement extends far beyond the direct cost of the hospital admission and the operative procedure, we calculated only the direct costs of revision procedure as the most conservative indicator of potential savings from reductions in the revision burden. The average cost of performing a revision procedure in Australia was estimated from cost data from the National Hospital Cost Data Collection Report (NHCDC) [6]. The NHCDC captures the total public and private costs for major categories of

Download English Version:

https://daneshyari.com/en/article/4060850

Download Persian Version:

https://daneshyari.com/article/4060850

Daneshyari.com