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Postdischarge Costs in Arthroplasty Surgery

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Abstract: Postdischarge costs associated with primary arthroplasty surgeries have received limited attention in the literature. Our objective was to identify the costs incurred after discharge in primary arthroplasty and to estimate annual postdischarge expenditures in the United States. A cohort of 136 patients who underwent primary arthroplasty was studied. Comprehensive rehabilitation unit (CRU) and home care (HC) costs were obtained. The National Hospital Discharge Survey 2003 data were used to model the national discharge cost estimates. Local patient-oriented outcome was also compared in the patients discharged to CRU vs HC. Total costs were significantly lower in patients discharged directly to home vs those sent to the CRU and who subsequently received HC ($2405 vs $13435, $P < .001$); both patient groups experienced similar quality of life improvements. An estimated $3.2 billion is spent annually on postsurgical rehabilitation after arthroplasty. Postdischarge costs are significantly higher for patients going to a CRU vs those discharged home; yet, both groups had comparable short-term outcomes. **Key words:** postdischarge, costs, rehabilitation, primary arthroplasty.

More than 600000 primary total joint arthroplasties are performed annually in the United States [1]. Conservative projections from the American Academy of Orthopaedic Surgeons (Chicago, IL) estimate that about 750000 of these procedures will be performed annually by the year 2030 [2]. These trends, combined with life expectancy increases, as well as the desire to maintain active pain-free lifestyles, will lead to dramatic increases in annual joint arthroplasty surgery expenditures in the United States.

Given the continued increase in the number of arthroplasty surgeries, it will be essential to identify cost-effective strategies that do not diminish the quality of patient care. Furthermore, it is extremely important to justify post–acute care services pertaining to joint arthroplasty surgeries given that the current cost-containment pressures within the Medicare system will only intensify as the baby boom generation ages. Careful documentation of all perioperative and associated postoperative rehabilitative costs is a necessary first step in this process. National acute care hospital-based estimates of arthroplasty expenditures are available [3-5], but similar data on postrehabilitative discharge costs are not.

Most arthroplasty patients will require some form of rehabilitation ranging from inpatient stays to home care (HC) services and outpatient rehabilitation, or a combination of both. There have been a limited number of studies examining the efficacy of rehabilitation before and after joint arthroplasty surgery [6-8]. These studies did not address cost issues within the context of comparative outcomes. Postsurgical rehabilitation costs can be considerable

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and yet are frequently ignored when discussing the cost of joint arthroplasty surgery [9].

National estimates for postdischarge costs associated with arthroplasty are not available; yet, Medicare has recently instituted changes to its reimbursement policies, which will lead to changes in the funding available for postdischarge care (ie, the 75% rule) [10]. These reimbursement policy changes could have implications in terms of access because a number of patients live alone and have nowhere to go after surgery. Without a "baseline" for postdischarge expenditures, it will be difficult to even assess the financial implications of reimbursement policies because they are phased-in. Our objective is to document the costs incurred after discharge within a single surgical practice and to apply these cost estimates to the number of arthroplasties completed in the United States. We also compare surgical and quality of life outcomes in patients according to discharge status.

Methods

A cohort of 136 patients (143 procedures) from a single surgical practice, under the direction of the primary author, who underwent primary hip and knee arthroplasty between January to December of 2004, was enrolled in a prospective registry study after institutional review board approval, and informed consent was obtained. Patient characteristics were compared with national estimates using weighted data from the 2003 National Hospital Discharge Survey (NHDS) [11]. Local financial data were obtained from 3 sources, including the hospital cost accounting system for the comprehensive rehabilitation unit (CRU), and HC costs obtained directly from the provider, and estimated professional fees calculated using visit levels and the 2005 Medicare fee schedule. Local data on skilled nursing facility (SNF) costs after arthroplasty were not available. The use of the Medicare reimbursement rate is reasonable given that more than 60% of arthroplasties charges in the United States are reimbursed by this agency.

Outcome Measures

Preoperative and postoperative functional status and quality of life scales included a Pain Visual Analog Scale, the Western Ontario and McMaster University Osteoarthritis Index (WOMAC) [12], and the Short-Form 36 (SF-36) that assesses 8 domains, including physical function, bodily pain, mental health, social function, role limitation caused by physical function and emotional problems, vitality as well as general health perceptions [13,14]. The Quality of Well-Being (QWB) Index was also administered to assess general quality of life [15]. Postoperative measures were obtained at an average 8.6 $\pm$ 3.73 SD months (range, 1-24 months).

Expenditure Definitions

Comprehensive rehabilitation unit expenditures included both direct and indirect costs. Direct costs included items such as devices used (ie, continuous passive motion instrument), associated therapies (ie, physical therapy), supplies, and medications. Indirect costs included all support staff (ie, administration) and all ancillary services such as physical and occupational therapies, nursing, supplies (ie, assistive devices), and home health aides.

Estimation of National Expenditures

Total postdischarge costs included the sum of CRU, HC, and professional fees for each patient. We first estimated expenditures for 3 patient categories: (1) discharged to the CRU, (2) discharged to home, and (3) discharged to an SNF. Costs for CRU patients included CRU charges, professional fees, and any home health care costs incurred after discharge from the CRU. Costs for those discharged to home were limited to HC charges only (which include imbedded professional fees).

In our patient series, there were no SNF discharges during the surveyed period. Because SNF discharges can occur after arthroplasty, we estimated these costs based on the local average length of stay for an arthroplasty patient at our local SNF (20 days) multiplied by the local per diem Medicare reimbursement rate (Fig. 1) [16].

National postdischarge costs were estimated by applying the averages obtained for patients discharged to the CRU, home, and SNF to the 2003 NHDS estimates of the number of arthroplasty discharges in each of these 3 categories. Discharge status was unknown for nearly 20% of the NHDS patients. We assumed that the distribution of unknown discharges was equal to the distribution of known discharge subtypes to calculate a weighted cost average for this subgroup.

Statistical Analyses

The SPSS software (SPSS, Chicago, Ill) was used for the statistical analyses. Student *t* tests were used to compare costs in patients discharged to the CRU vs directed directly to HC. We calculated preoperative and average 8.6-month postsurgical change scores for all quality of life measures and