Arthroplasty Today xxx (2017) 1–6

Contents lists available at ScienceDirect

Arthroplasty Today

journal homepage: http://www.arthroplastytoday.org/

Original research

Comparison of postarthroplasty functional outcomes in skilled nursing facilities among Medicare and Managed Care beneficiaries

Brandon A. Haghverdian, BSc [a], David J. Wright, MD, MSc [a], Ran Schwarzkopf, MD, MSc [b, *]

[a] Department of Orthopaedic Surgery, University of California, Irvine Medical Center, Orange, CA, USA
[b] Division of Adult Reconstruction, Department of Orthopedic Surgery, NYU Langone Medical Center, Hospital for Joint Diseases, New York, NY, USA

ARTICLE INFO

Article history:
Received 24 February 2017
Received in revised form
4 April 2017
Accepted 5 April 2017
Available online xxx

Keywords:
Total joint arthroplasty
Skilled nursing facility
Medicare
Managed Care
Physical therapy

ABSTRACT

Background: After home health care, the skilled nursing facility (SNF) is the most commonly used postacute care modality, among Medicare beneficiaries, after total joint arthroplasty. Prior studies demonstrated that a loss in postsurgical ambulatory gains is incurred in the interval between hospital discharge and arrival at the SNF. The aim of this present study is to determine the consequences of that loss in function, as well as compare SNF-related outcomes in patients with Medicare vs Managed Care (MC) insurance.

Methods: We conducted a retrospective analysis of 80 patients (54 Medicare and 26 MC) who attended an SNF after hospitalization for total joint arthroplasty. Outcomes from physical therapy records were abstracted from each patient's SNF file.

Results: There was an approximately 40% drop-off in gait achievements between hospital discharge and SNF admission. This decline in ambulation was significantly greater in Medicare patients (*Medicare*: 94.6 ± 123.2 ft, *MC*: 40.0 ± 48.9 ft, $P = .034$). Larger reductions in gait achievements between hospital discharge and SNF admission were significantly correlated with longer SNF lengths of stay and poorer gait achievements by SNF discharge. Patients with MC insurance made significant improvements in gait training at the SNF beyond that which was acquired at the hospital, whereas Medicare patients did not ($P_{Medicare} = .28$, $P_{MC} = .003$).

Conclusions: Large losses in motor function between hospital discharge and SNF admission were associated with poor functional outcomes and longer stays at the SNF. These effects were more pronounced in Medicare patients than those with MC insurance.

Introduction

Driven by growing demand and improvements in surgical technique and implant technology, the use of total joint arthroplasty (TJA) in the management of osteoarthritis and other degenerative and traumatic conditions has increased over recent decades [1]. Its excellent outcomes, however, are balanced by the need for postoperative rehabilitation, which may be protracted and demanding for some [2,3]. In the elderly or comorbid patient, use of rehabilitation care facilities, such as skilled nursing facilities (SNFs), long-term care facilities, and inpatient rehabilitation facilities (IRFs), may be warranted after surgery. Of these, the SNF is the most frequently used, second only to home health care as the most common postacute care (PAC) modality in patients with Medicare [4]. Forty-nine percent of Medicare beneficiaries attend a rehabilitation facility after TJA; of these patients, 75% attend an SNF [5]. Policymakers and clinical practitioners have consequently dedicated more attention to the clinical care and therapeutic services offered at SNFs, as well as postdischarge care for TJA patients.

Medicare's "75% rule" stipulated that, to qualify as an IRF, 75% of a facility's patient census must be admitted with 1 of 13 diagnoses, including hip fracture, polyarticular rheumatoid arthritis, and severe osteoarthritis [6]. In 2005, this was amended to a revised 60%

One or more of the authors of this paper have disclosed potential or pertinent conflicts of interest, which may include receipt of payment, either direct or indirect, institutional support, or association with an entity in the biomedical field which may be perceived to have potential conflict of interest with this work. For full disclosure statements refer to http://dx.doi.org/10.1016/j.artd.2017.04.002.

* Corresponding author. Division of Adult Reconstruction, Department of Orthopaedic Surgery, NYU Hospital for Joint Diseases, NYU Langone Medical Center, 333 E 38th St, New York, NY 10016, USA. Tel.: +1 212 598 6000.
E-mail address: schwarzk@gmail.com

http://dx.doi.org/10.1016/j.artd.2017.04.002

Table 1
Demographic and clinical characteristics of patients discharged to an SNF after TJA.

Characteristic	Medicare	MC	Total	*P* value[a]
Age, y (±SD, range)	71.4 (±12.0, 24-89)	63.5 (±8.0, 45-80)	68.7 (±11.4, 23-89)	.004
Gender	Male: 16, Female: 38	Male: 8, Female: 18	Male: 24, Female: 56	.92
BMI, kg/m^2 (±SD, range)	30.1 (±7.1, 16.2-50.0)	34.2 (±6.0, 21.7-45.1)	31.4 (±7.0, 16.2-50.0)	.01
Race	White: 35, Asian: 4	White: 21, Asian: 1	White: 56, Asian:5	.90
	Black: 3, Other: 12	Black: 0, Other: 4	Black: 3, Other: 16	
Married	Yes: 24, No: 30	Yes: 13, No: 13	Yes: 37, No: 43	.64
Living status	Alone: 15, With others: 39	Alone: 5, With others: 21	Alone: 20, With others: 60	.41
Surgery	TKA: 34, THA: 20	TKA: 16, THA: 10	TKA: 50, THA: 30	.90
	Primary: 44, Revision: 10	Primary: 19, Revision: 7	Primary: 63, Revision: 17	.39
Preoperative diagnosis	Osteoarthritis: 43, Other: 11	Osteoarthritis: 17, Other: 9	Osteoarthritis: 60, Other: 20	.17
ASA score (±SD, range)	2.91 (±0.46, 2-4)	2.92 (±0.50, 2-4)	2.92 (±0.47, 2-4)	.99
EBL, mL (±SD, range)	257.9 (±318.1, 50-2000)	288.5 (±331.5, 50-1500)	267.8 (±320.7, 50-1500)	.69

ASA, American Society of Anesthesiologists; EBL, estimated blood loss; THA, total hip arthroplasty; TKA, total knee arthroplasty; SD, standard deviation.
[a] A *t* test or chi-squared analysis was used to compare patient demographics between Medicare and MC groups.

rule, and consequently, more of these patients were diverged from the IRF to the SNF for post-TJA care [7]. An analysis by the Medicare Payment Advisory Commission (MedPAC) revealed that, between 2006 and 2013, Medicare fee-for-service spending on SNF care increased from $19.5 billion to $26.6 billion, although the number of Medicare-covered stays and SNF facilities decreased [8]. Therapeutic services rendered by the SNF make up a large proportion of this spending, despite the fact that over one-quarter of the physical therapy (PT) modalities used at the SNF have no or minimal documented benefit [8,9].

Recent efforts have aimed to elucidate both the cost of care and functional outcomes achieved at the SNF after TJA. Toward the latter end, comparisons have been made between the functional progress accomplished with home health care vs SNF care. Home health care is associated with significantly fewer hospital readmissions, adverse events, and infectious complications compared with care at the SNF [9-11]. With respect to cost, however, care at the SNF clearly confers a much higher price tag. For instance, the total 90-day cost of care for patients discharged to an SNF after total hip arthroplasty is roughly double compared with patients discharged with home health care [12]. Although patients with home health care attain greater mobility and independence than SNF patients, these differences are confounded by the fact that home health care patients have better baseline function and less comorbidity [13]. Efforts to compare functional outcomes at SNFs and IRFs have been equally challenging, although patients at IRFs tend to have shorter lengths of stay, participate in more intensive PT, and have more favorable mobility achievements than patients at SNFs [13-22].

In a prior study, it was demonstrated that patients who attend an SNF after TJA ambulate for shorter distances on the day of and the day following admission to the SNF compared with the day of hospital discharge [23]. For instance, on the first day after hospital discharge, patients at the SNF exhibited an ability to ambulate for only half the distance compared with their last hospital PT session. A related study evaluated the association between patient insurance status and multiple outcomes at the SNF, including length of stay, discharge functional status, and goal achievements [24]. The authors found that patients with Medicare endured longer lengths of stay, slower PT progress, and poorer functional outcomes compared with patients with private, Managed Care (MC; including health maintenance organization and preferred provider organization) health insurance.

These studies inspired several unanswered inquiries. First, what consequences, if any, arise from the reduction in ambulation observed in patients who attend SNFs? Secondly, what improvements in physical function are made at the SNF beyond that which is acquired from PT on hospital discharge? The present study aims to address each of these questions. Moreover, patients in this study are subdivided into Medicare and MC groups to further characterize differences in SNF outcomes based on insurance payer. We hypothesize that large reductions in ambulation after hospital discharge will correlate with longer stays and poorer functional outcomes at the SNF, and that patients will enjoy only nominal functional improvements during their SNF stay compared with what has been achieved in the hospital. We expect these effects to be more pronounced in patients with Medicare than patients with MC.

Material and methods

Study design

This study was approved by our institutional review board (IRB). We performed a multisite retrospective review of medical and PT records obtained from 29 SNF sites representing five different counties in California. Patients were included in this study if they attended an SNF after TJA at our institution between November 2012 and July 2014. All TJAs were performed by a single surgeon. After inclusion and exclusion criteria were met, a total of 80 patients were enrolled.

Data collection

Hospital records were reviewed for each consecutive patient, from which the following elements were abstracted: age, gender,

Table 2
Comparison of distance ambulated (feet ± SD) between Medicare and MC patients at hospital discharge, SNF admission, and SNF discharge.

Insurance	Hospital discharge	*P* value[a]	SNF admission	*P* value[a]	SNF discharge	*P* value[a]
All	118.05 ± 121.1		41.2 ± 41.5		173.1 ± 119.3	
Medicare	133.3 ± 140.4	.65	38.6 ± 37.2	.29	157.2 ± 94.2	.46
MC	86.5 ± 55.0	.91[b]	46.5 ± 49.7	.20[b]	204.2 ± 154.9	.10[b]

SD, standard deviation.
[a] Medicare vs MC.
[b] One-way analysis of covariance was used to adjust for between-groups differences in age and body mass index.

Please cite this article in press as: B.A. Haghverdian, et al., Comparison of postarthroplasty functional outcomes in skilled nursing facilities among Medicare and Managed Care beneficiaries, Arthroplasty Today (2017), http://dx.doi.org/10.1016/j.artd.2017.04.002