Postdischarge Unscheduled Care Burden After Lower Limb Arthroplasty

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ARTICLE INFO

ABSTRACT

Background: In contrast to postdischarge arthroplasty readmission rates, the unscheduled reattendance burden to primary care is under-reported. Understanding reasons for reattendance would allow for implementation of strategies to reduce this burden. The present study aims to quantify the out-of-hours (OOH) general practitioner and emergency department (ED) service reattendance burden and readmission rate after primary total hip arthroplasty and total knee arthroplasty, with estimation of the associated costs.
Methods: This is a prospective consecutive cohort study. A prospective audit of all total hip arthroplasty and total knee arthroplasty patients in 2016 in a single high-volume UK arthroplasty unit was performed. Incidence and reasons for reattendance to OOH and ED service, as well as readmission rates, at both 30 and 90 days following discharge are reported. A multivariate analysis was performed to determine patient characteristics, which results in increased reattendance and readmission rates.
Results: A total of 2351 procedures resulted in 374 attendances of OOH service and 665 to ED with a total estimated cost of £190,000 within 90 days. The readmission rate was 6.8%. Risk factors for reattendance and readmission were increasing age and a prolonged length of stay. The use of a 5-day postdischarge phone call and a dedicated Arthroplasty Care Practitioner favors reduced reattendances but not the readmission rate, with the additional benefit of being cost-effective.
Conclusion: The postdischarge arthroplasty reattendance burden is associated with significant costs, and strategies to reduce this should be developed. Further research is required to assess the effectiveness and cost-effectiveness of multicomponent strategies to reduce reattendance operating at scale.

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As numbers of hip and knee arthroplasties increase in the UK [1] and worldwide, so does economic pressure on health-care systems. Hospital readmission rates at 30 or 90 days after surgery are increasingly recognized as key care indicators. Although a reduced length of stay has definite financial benefits [2], this should not be at the cost of increased readmission rates. Readmission rates have been reported between 2.2% and 9.0% after lower limb arthroplasty, with higher rates observed after knee arthroplasty [2–8]. It has been estimated that up to 80% of hospital readmissions are potentially avoidable [9], with substantial cost savings [10]. Multidisciplinary enhanced recovery and facilitated discharge programs have been developed to avoid unplanned readmissions [11,12].

Direct comparisons of readmission rates between different hospitals or health-care systems are complicated by differences in criteria used for example, 30- or 90-day or other readmission rates

[13–15], with similar limitations reported in recent meta-analyses [16]. Also some count the interval from the date of surgery and others from the date of discharge [13–15]. Although readmission rates are widely reported [4,5,12–17], rate of attendance at OOH and emergency department (ED) is not. Understanding the reasons for these unscheduled health-care contacts could allow targeted changes to patient pathways, which could reduce these attendances and costs, and improve patient care and outcomes.

The following are the aims of this audit:

(1) To report the incidence of, and reasons for, unscheduled contact with OOH and ED attendances and hospital readmissions within 30 and 90 days from the date of surgery in a large consecutive cohort of lower limb arthroplasties.
(2) To assess the impact of proactive Arthroplasty Care Practitioner (ACP) telephone support on unscheduled attendance and readmission rates compared with helpline access and usual care.
(3) To compare estimated costs between these care models.

We also discuss how unscheduled contacts could be further reduced.

Methods

A single regional orthopedic service in a high-volume arthroplasty unit was evaluated. We collected demographic and surgical information as well as incidence of, and reasons for, OOH and ED attendances and hospital readmissions within 30 and 90 days from the date of discharge in 2351 consecutive primary total hip and knee arthroplasties, performed under the care of 25 different consultants from January 1 2016 to December 31, 2016. This service uses the Belfast Orthopaedic Information System, which collects patient demographics, intraoperative data, and episode-specific outpatient data after lower limb arthroplasty. The electronic care record (ECR) records patient contact across health-care facilities in Northern Ireland, except for scheduled attendances to the patients' own general practitioner. Initial points of contact for patients experiencing postoperative difficulties are their base hospital, their general practitioner (GP), OOH, or ED. Within our hospital, primary arthroplasty is performed under the care of 25 different consultants with variation in management on advice to patients following discharge if they experience problems. This falls broadly into 3 follow-up groups: group A in which patients routinely receive a 5-day phone call with advice to contact a "helpline" phone number; group B in which they can access a helpline only; and group C in which they have neither resource and are advised to contact their GP. The unit helpline and 5-day phone calls are performed by a specialist ACP nurse. These nurses function as part of the wider orthopedic multidisciplinary team, collecting follow-up and outcomes data, facilitating nurse-led review, and providing a helpline service for patients with postoperative problems (Supplementary Appendix A). As part of a unit audit process, Belfast Orthopaedic Information System and ECR were interrogated. Local audit approval was gained (BHSCT Orthopaedic Outcomes Ref 5626).

Local imaging systems (picture archiving communication systems) were interrogated for episodes of hip dislocation and suspected and/or confirmed venous thromboembolic events (VTEs) (ultrasound Doppler for deep vein thrombosis [DVT] and computed tomography pulmonary angiogram [CTPA] for pulmonary embolism [PE] investigations). This facilitated comprehensive collection of complications including mortality, which were cross-referenced with the ECR, within 90 days of surgery. Health economic analysis was performed using unit costs per attendance at both OOH GP and ED services. Patients use of hospital services were combined with

corresponding unit costs to estimate local costs per attendance for patient follow-up groups A, B, and C. Unit costs were obtained from publicly available sources set at 2015/2016 prices [18].

Statistical Analysis

Continuous data were tested for normality using the Kolmogorov-Smirnov test. Differences between groups were assessed using Student's t test or analysis of variance test for continuous variables and chi-square, Kruskal-Wallis, or Mann Whitney U tests for nonparametric data.

Multivariate logistic regression was used to investigate which variables were significantly associated with attendance at unscheduled cares services or readmission. For multivariate analysis, variables with moderate associations (P value < .20) on univariate analysis or of a priori importance (eg, body mass index) were included. For all tests, a P value < .05 was considered statistically significant. All analyses were performed using SPSS v22 for Mac (IBM Inc., Armonk, NY).

Results

Patient Characteristics

There were 1341 total hip arthroplasties (THAs) and 1010 total knee arthroplasties (TKAs) (1 simultaneous bilateral). Patient characteristics are shown in Table 1. Procedures were performed under the care of 25 consultant orthopedic surgeons and prospectively followed-up to 90 days from the date of surgery. Chemical VTE prophylaxis was predominately aspirin or enoxaparin with 489 patients receiving aspirin; 1858, enoxaparin; 1, warfarin; and 3 patients receiving no chemical prophylaxis. All patients received mechanical prophylaxis with calf pumps.

Average hospital length of stay was 4.4 ± 2.9 days. Mean time to first unscheduled contact was 25.4 ± 24.6 days. There were 2 deaths within 90 days (0.09%), both occurring in female TKA patients with American Society of Anaesthesiologists (ASA) grade 2 who were discharged on day 3 with no initial complications. One died 10 days postoperatively from a perforated abdominal viscus following emergency laparotomy. The second died of PE 55 days postoperatively, having been on aspirin VTE prophylaxis for 6 weeks postoperatively.

Unscheduled Care Attendance

Out-of-Hours General Practitioners

There were 284 (12.1%) patients who were attended by OOH GPs within 90 days of discharge, creating 374 OOH attendances.

Table 1
Demographic Data.

Variable	THA	TKA	P Value
N	1341	1010	
Male	592 (44.1%)	411 (40.7%)	.102
Female	749 (55.9%)	599 (59.3%)	
Age (mean ± SD)	66.7 ± 11.7	69.0 ± 9.3	<.001[*]
BMI (kg/m^2) (mean ± SD)	29.8 ± 7.3	32.2 ± 5.9	<.001[*]
ASA			
1	127 (9.5%)	53 (5.2%)	<.001[*]
2	1032 (76.9%)	797 (78.9%)	
3	177 (13.2%)	153 (15.1%)	
4	5 (0.4%)	7 (0.7%)	

ASA, American Society of Anaesthesiologists; BMI, body mass index; SD, standard deviation; THA, total hip arthroplasty; TKA, total knee arthroplasty.
[*] Denotes significant differences at P < .05 level.