Osteoarthritis and Cartilage 21 (2013) 1257–1263

Osteoarthritis and Cartilage

Acute postoperative pain following hospital discharge after total knee arthroplasty

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ARTICLE INFO

Article history:
Received 13 January 2013
Accepted 13 June 2013

Keywords:
Acute pain
Pain management
Analgesics
Non-pharmacological methods
Knee arthroplasty
Surveys

SUMMARY

Objective: The increasingly shorter hospitalization following total knee arthroplasty (TKA) requires patients to assume earlier responsibility to self-manage their pain. Poorly managed acute pain increases the risk of persistent pain, reduces quality of life and increases unnecessary healthcare utilization. This study aims to examine post-discharge pain intensity, pain management behaviors and potential barriers to optimal self-management of pain.

Design: We administered a questionnaire at 2 weeks after discharge to 174 patients undergoing TKA in 10 Australian hospitals. Participants rated pain expectation and severity, use of analgesics and non-pharmacological methods, side-effects, walking and exercise times, perceptions of analgesics, adequacy of pain management information provided and satisfaction with pain relief.

Results: Of 171 (98%) participants who completed the questionnaire, 88 (52%) reported that the worst pain period occurred during the first 2 weeks at home. During the first 2 weeks at home, the average pain was 'severe/extreme' for 40 (23%) participants and 92 (54%) experienced severe pain at least some of the time. Many participants sought further medical help for their pain. Adequate information on analgesics and non-pharmacological methods for pain relief were reported by only 73% and 47%, respectively. Approximately 20% had negative perceptions about analgesic use. Higher pain severity was associated with lower satisfaction and less time spent walking daily.

Conclusions: Effective pain relief after hospital discharge following TKA is a challenge. Many participants reported significant pain, sought further medical help for pain relief and had inadequate information at discharge to effectively self-manage their postoperative knee pain.

Introduction

Worldwide, there is a rapid increase in the number of total knee arthroplasty (TKA) procedures performed yearly[1–6]. In Australia, the number of TKA procedures undertaken annually has increased by 150% in the past decade[1]. In the United States, the rate is projected to increase in excess of 600% to 3.48 million procedures by the year 2020[4]. Escalating demand for TKA is largely due to extended longevity, higher prevalence of obesity and osteoarthritis, and improvements in surgical techniques[2,3]. This trend is expected to continue during the next decade, underscoring the increasing burden of TKA on the healthcare system[3,4].

The primary indication of TKA is advanced symptomatic knee osteoarthritis characterized by chronic pain, activity limitation, and reduced quality of life[7,8]. TKA is a major surgery and pain during the early days of recovery can be severe. Inadequate pain relief can cause delayed mobilization, greater risk of developing venous thrombosis, coronary ischemia, poor wound healing, longer length of hospital stay, unnecessary psychological distress and decreased patient satisfaction[9–14]. Severe postoperative pain also increases the risk of developing long term persisting pain[11,15].

The length of hospital stay following primary TKA has decreased considerably in the past decade from around 10–12 days to about 4–6 days currently[2,16,17] with indications of anticipated further reductions[2]. This shorter length of hospital stay shifts the responsibility of adequate pain management increasingly earlier to the patients themselves and their community-based healthcare providers. It is unclear how much further length of stay can be reduced without compromising quality of care or shifting cost to the outpatient setting[18].

Three published population-based surveys have concluded that pain relief after surgery was suboptimal with a large proportion of participants experiencing moderate to extreme pain[19–21]. Interestingly, more participants reported moderate to severe pain following hospital discharge in comparison with their time in hospital[19,20].

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1063-4584/$ – see front matter
http://dx.doi.org/10.1016/j.joca.2013.06.011

Unfortunately these surveys have not been procedure-specific, combined the analysis of inpatient and outpatient surgical procedures, required lengthy recall periods and recruited mostly younger participants (less than 50 years of age)[19–21]. These limitations make generalizations to the older TKA population tenuous.

This study aims to examine post-discharge pain intensity, pain management behaviors and potential barriers to optimal self-management of pain among participants who have recently undergone primary TKA.

Method

From June 2011 to November 2012, we invited 181 consecutive participants undergoing unilateral TKA and recruited to a multicenter randomized controlled trial (RCT) comparing rehabilitation strategies in 10 large public or privately funded hospitals in Australia, to complete a survey questionnaire 2 weeks after hospital discharge[22]. The RCT intervention (intensive exercise program) commenced 6 weeks after surgery. The RCT inclusion criteria required participants to be aged between 45 and 74 years, undergoing unilateral primary TKA, and able to be discharged home from the orthopedic ward[22]. Exclusion criteria were: (1) previous unicompartmental replacement or tibial osteotomy on the same knee, (2) lower limb joint replacement surgery within the last 6 months, (3) further lower limb joint replacement surgery anticipated within the next 12 months, (4) major co-morbidity precluding aerobic exercise at 50–60% maximum heart rate, (5) rheumatoid arthritis, (6) major neurological conditions[22]. Ethics approval for this survey was obtained from the University of Sydney Human Research Ethics Committee and from the Ethics Review Committee of the Sydney South West Area Health Service.

The survey questionnaire was previously administered to a cohort of TKA participants from Singapore; detailed description of the development and testing are described elsewhere[23]. The participants were provided a self-addressed postage paid envelope for returning the completed questionnaire. A reminder call was made if we did not receive a completed questionnaire by week 3 following discharge.

Survey questionnaire (see Appendix 1)

Pain severity and expectation

Pain severity was measured using the five-item Western Ontario and McMaster University (WOMAC LK3.1) Osteoarthritis Index Pain scale[24,25] with scores from 0 (no pain) to 20 (severe pain)[24,26]. The WOMAC has been validated in individuals undergoing TKA[25,27]. Our survey also included questions identifying: the most painful postope rative period, the expected severity of pain, and the actual pain experi enced for the first 2 weeks at home, with responses on a 5-point Likert scale (none, mild, moderate, severe, extreme) for the last two items.

Use, effectiveness and side-effects of analgesics, and non-pharmacological methods

Participants were asked to list how often and which analgesics they consumed during the first 2 weeks at home, the perceived effectiveness of the analgesics and any experienced possible side-effects. The participants were also asked to report the use of non-pharmacological methods (active and passive behavioral methods)[28] for pain relief and the perceived effectiveness of these methods. Active behavioral strategies require the patient to undertake an active role physically or mentally to relief pain. Conversely, passive behavioral strategies are where the patient adopts a passive role, e.g. ice pack, massage[28].

Further medical help

Participants were asked if they sought medical help for their pain since returning home, and to list the sources from which help was sought.

Daily time spent walking and time spent exercising the operated knee

Responses elicited ranged from: 'did not walk or exercise', 'less than 15 min', '15–30 min', '31–60 min', to 'more than 1 h'.

Adequacy of information on analgesics and non-pharmacological methods

The two items recorded the adequacy of information as: 'adequate', 'somewhat adequate', 'inadequate' to 'no instructions were given'.

Satisfaction with pain relief since returning home

One item: 'How satisfied are you with your pain relief since returning home?'. The 5-point Likert scale responses ranged from 'strongly dissatisfied' to 'very satisfied'.

Perceptions of analgesics use

There were five items on potential barriers to effective analgesic use: perceived efficacy of analgesics, perceptions on analgesic-associated side-effects, cost burden, tolerance and addiction[29]. The 5-point Likert scale responses ranged from 'strongly disagree' to 'strongly agree'.

Postoperative inpatient care

Postoperative care during the hospital admission period comprised of multimodal analgesic regimens, which typically included intravenous morphine-based analgesics for 2 days (which were converted to oral opioids thereafter), simple oral analgesics and oral non-steroidal anti-inflammatory drugs. Participants followed similar clinical pathways at each of the participating hospitals which involved progressive physiotherapy to increase active knee joint range of motion and independence of gait mobility. Participants were discharged home when medically stable and able to manage their functional mobility. Information on pain management upon discharge varied between hospitals.

Data analysis

Descriptive statistics were used for the questionnaire responses. We used the Spearman's rho to determine the relationship between the WOMAC pain scores and: (1) daily time spent walking, (2) daily time spent exercising the knee, (3) satisfaction with pain relief after discharge, and (4) perceptions of analgesic use. The first two variables were chosen as daily walking and exercising at home are important aspects of patient self-management early after discharge. We also wish to evaluate if pain was strongly associated with satisfaction with pain relief, or if inappropriate perceptions of analgesic use were associated with increased (potentially avoidable) pain. Analyses were conducted using SPSS 20.0 (SPSS Inc., Chicago, IL) with statistical significance set at $P < 0.05$.

Results

A total of 171 participants (98%) completed the questionnaire (Fig. 1). The baseline pre-operative demographic characteristics of the cohort are shown in Table I. The sample has a mean age of 65 years, was mainly retirees, home makers or not employed, and few (14%) were taking opioids prior to surgery. Most participants had stayed approximately 6 days in the hospital following TKA (Table I). There was only 1% missing survey data.

Pain severity and expectation (Table II)

For more than half of the participants, the most painful period was during the first 2 weeks at home. About 95% of the participants had expected moderate to severe postoperative pain. Even so, the