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Original Research Article

Prevalence of anterior knee pain among patients following total knee arthroplasty with nonreplaced patella: A retrospective study of 1778 knees

Vahur Metsna [a,b,*], *Sigrid Vorobjov* [c], *Aare Märtson* [b,d]

[a] *East Tallinn Central Hospital, Department of Orthopaedic Surgery, Tallinn, Estonia*
[b] *University of Tartu, Tartu, Estonia*
[c] *National Institute for Health Development, Tallinn, Estonia*
[d] *Tartu University Hospital, Department of Orthopaedic Surgery, Tartu, Estonia*

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ABSTRACT

Background and objective: : Anterior knee pain (AKP) may compromise the results of total knee arthroplasty in more than quarter of cases. The aim of the current work was to determine the prevalence of AKP and the severity of patellofemoral symptoms among patients who received a total knee arthroplasty with non-replaced patella in East-Tallinn Central Hospital from January 1, 2000 to December 31, 2009.

Materials and methods: We carried out a retrospective study involving 1778 consecutive total knee arthroplasties with non-replaced patella. Mean follow-up time was 68 months. We collected data by two patient-reported measures: the knee pain questionnaire and the Kujala score.

Results: We diagnosed AKP among 20.2% of patients, 33.6% had pain in the knee from a source other than patellofemoral joint and 46.2% were pain free. In 87.3% of AKP cases the pain emerged within the first five years of knee replacement. AKP was more prevalent among patients with osteoarthritis compared to rheumatoid arthritis and among patients below 60 years. There was no difference in the prevalence of AKP in terms of gender or mobile and fixed bearing implants. The severity of patellofemoral symptoms in case of AKP was moderate.

Conclusions: AKP is a frequent complication of total knee arthroplasty with non-replaced patella and patients undergoing this procedure should be apprised of the high probability of experiencing pain in the anterior part of the replaced knee.

* *Corresponding author at*: Department of Orthopaedic Surgery, East Tallinn Central Hospital, Ravi 18, 10138 Tallinn, Estonia.
E-mail address: vahur.metsna@itk.ee (V. Metsna).

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1. Introduction

Despite constant research in the field, improved implant design and surgical excellence, the anterior knee pain (AKP) following total knee replacement continues to excite the orthopedic community affecting up to 26.2% of the recipients of a prosthetic knee joint [1,2]. Fortunately, a significant proportion of AKP is of nondisabling nature, thus maintaining a reasonable knee function. Patellofemoral symptoms are at the bottom of revision surgery in 1.9%–7.8% of cases of primary knee replacement [1,3,4]. The multiplicity of variables favoring the evolvement of AKP has hindered the development of uniform guidelines for the prevention of this widespread complication. Even meta-analyses of AKP leave the reader often uncertain about the best way to handle the patella during knee replacement [5].

Our aim was to determine the prevalence of AKP and the severity of patellofemoral symptoms among patients who received a total knee arthroplasty with nonreplaced patella.

2. Materials and methods

We carried out a retrospective analysis of 1778 consecutive primary total knee arthroplasties without patellar replacement performed from January 1, 2000, to December 31, 2009, on 1431 patients in East-Tallinn Central Hospital.

The primary outcome included the prevalence of AKP. Subgroup analysis specified data concerning the prevalence of AKP by age, by diagnosis and by implants. The secondary outcome included the severity of patellofemoral symptoms assessed by the Kujala Score.

The knee was the unit of analysis. Implants were inserted using a medial parapatellar approach, fixed to the bone with cement and the patella was not replaced. By the time of the beginning of the study, 213 patients (250 knees) were deceased, 16 knees were revised and contact information of 7 patients (7 knees) was missing. 274 (18.2%) primary unrevised total knee arthroplasties performed on men and 1231 (81.8%) on women were available for the study. 1505 sets of two self-report measures (the Anterior Knee Pain Questionnaire and the Kujala score) were sent to 1200 patients by ordinary mail. Patients with both knees replaced received two sets of measures: one for each knee. The Anterior Knee Pain Questionnaire (Table 1) developed for the current study is based on a reflective model measuring AKP as an indirect construct by observable items [6].

The Anterior Knee Pain Questionnaire looked into the activities exerting the greatest strain on the patellofemoral joint. On the basis of the responses to the Anterior knee pain questionnaire, the knees were grouped into three pain related categories: (1) pain free, (2) anterior knee pain and (3) knee pain of some other origin than patellofemoral joint. Knees marked with "0" to question 1 were considered as pain free. The remaining group with responses "1", "2," or "3" to question 1 consisted of painful knees and was further subdivided into two. Anterior knee pain was diagnosed if in addition to response "1", "2," or "3" to question 1 either "1" or "2" was chosen to all of the remaining questions (2–6) of the Anterior Knee Pain Questionnaire. The rest of the knees with the responses "1," "2," or "3" to question 1 denoted knee pain of some origin other than patellofemoral joint.

Table 1 – Anterior Knee Pain Questionnaire.

1. When did the knee pain arise following arthroplasty?
   a. The knee does not hurt (0)
   b. The knee remained painful right after arthroplasty (1)
   c. Within 1–5 years following arthroplasty (2)
   d. More than 5 years following arthroplasty (3)
2. Does the knee hurt when rising from the chair or coach?
   a. Never (0)
   b. Sometimes (1)
   c. Always (2)
3. Does the knee hurt when ascending or descending the stairs?
   a. Never (0)
   b. Sometimes (1)
   c. Always (2)
4. Is touching of the knee cap painful?
   a. Never (0)
   b. Sometimes (1)
   c. Always (2)
5. Does the knee hurt when squatting?
   a. Never (0)
   b. Sometimes (1)
   c. Always (2)
6. Do you feel pain mostly in the anterior part of the knee?
   a. Never (0)
   b. Sometimes (1)
   c. Always (2)

The Kujala score evaluates subjective symptoms and functional limitations in patellofemoral disorders [7]. With Urho M. Kujala's consent, the questionnaire was adapted to the local language. To ensure that the original and the translated questionnaire were identical, forward and back translation method was used [8]. The sum of the Kujala score ranges from 0 to 100, where the greater value indicates a better patellofemoral function. Mean of the Kujala score was calculated for each of the abovementioned three knee categories.

Patients returned 944 sets of completed measures (171 male and 773 female knees) to investigators, thus resulting in a 62.7% response rate. The response rate was fairly similar among men and women, 62.4% and 62.8% respectively. 50 sets of the returned and filled-in measures (6 male and 44 female knees) were defective and therefore excluded from the study. 894 sets (165 male and 729 female) of properly completed questionnaires were left for the final analysis, constituting 59.4% of all questionnaires sent out initially. Fig. 1 describes how the study sample was developed.

Descriptive statistics, including mean and standard deviation (SD) were used for continuous variables. For categorical variables, percentages (%) and absolute (n) frequencies were presented. 95% confidence intervals (95% CI) were calculated to provide an estimate of population parameters. The chi-squared test, t test and ANOVA were used to test the statistical significance. Two-tailed P values less than 0.05 were considered statistically significant.

Approval from Tallinn Medical Research Ethics Committee was obtained to study the prevalence of anterior knee pain.