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Observational study

Results of lumbar spine surgery: A postal survey

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HIGHLIGHTS

- We studied the results of lumbar spine surgery in Northern Finland.
- We used three questionnaires: a self-made questionnaire, ODI and SF36.
- The outcome after lumbar disc operation was good (pain, functional capacity and QOL).
- After stabilizing and decompression surgery outcome were less favourable.

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ABSTRACT

Background and aims: No studies have been published regarding the results of lumbar spine surgery in a population-based setting in Finland. Our objective was to investigate functional capacity and quality of life after lumbar spine surgery in a population-based cohort in Northern Finland, focusing on working-age patients.

Methods: This was a cross-sectional postal survey. Three questionnaires (a self-made questionnaire, the Oswestry Low Back Disability Questionnaire and the SF-36) were sent the patients aged 18–65 years, who had undergone lumbar spine surgery due to disc herniation, instability or spinal stenosis in the Oulu University Hospital between June 2005 and May 2008.

Results: The postal survey was sent to 814 patients, of whom 537 patients (66%) replied. Of these, 361 (67%) underwent disc surgery, 85 (16%) stabilizing surgery and 91 (17%) decompression. Pain was absent or present only occasional in 51% in the disc surgery group, whereas it was present daily in 59% in the stabilizing surgery group and in 58% in the decompression group ($P < 0.001$). Axial pain was slightly more intense than radicular pain. Pain was milder in the disc surgery group compared with the stabilizing surgery and decompression groups: mean (SD) axial pain with 0–10 NRS was 4.0 (2.3), 4.7 (2.4) and 4.8 (2.3) respectively ($P = 0.002$) and radicular pain 3.5 (2.6), 4.2 (2.8), 4.5 (2.6) respectively ($P < 0.001$). The total ODI score (mean, SD) was 20 (17) in the disc surgery group, 35 (17) in the stabilizing surgery group and 32 (17) in the decompression group ($P < 0.001$). The physical dimension sum score from the SF-36 was 42 (11) in the disc surgery group and 34 (10) in the stabilizing surgery and decompression groups ($P < 0.001$). Mental sum scores did not vary significantly between the groups.

Conclusions and Implications: Outcome was good after lumbar disc operations but less favourable after stabilizing surgery and decompression regarding pain, functional capacity and quality of life. Implications. This study offers important information about outcome after lumbar spine surgery in Oulu University Hospital. It also brings out that in Finland we need systematic national spine register, with accurate pre- and postoperative data.

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1. Introduction

Spinal disorders are a major health and economic burden for developed countries [1]. According to statistics on pensions in Finland from The Social Insurance Institution, musculoskeletal problems have the highest disability pension occurrence numbers (2010; 34%) [2]. Within the musculoskeletal group of disability pension, spinal disorders are the leading cause (2010; 42%) [3].

The direct yearly cost of lumbar spine surgery is slightly over 20 million euros in Finland, and a lumbar spine operation is performed in about 6000 patients/year in Finland (population 5.4 million) [4]. To improve diagnostics, treatment and rehabilitation of back disorders Current Care Guidelines for low back pain were published in Finland in 1998 and updated in 2008 [5]. The ministry of Social Affairs and Health of Finland published uniform criteria for access to non-emergency treatment in 2005, provided criteria for the most common surgeries, including lumbar spine surgery to ensure uniform treatment throughout the country [6].

Research on spinal surgery is abundant in Finland, but no studies have been published on the results of spinal surgery in a population-based setting, to the best of our knowledge. Follow-up studies of surgery are important to improve patient selection and treatment.

The aim of this study was to investigate the results of lumbar spine surgery in a Finnish population-based cohort concentrating on working-age patients.

2. Materials and methods

2.1. Patients and data collection

The Oulu University Hospital provides specialist care for a population of 730,000, being the main centre of spinal surgery in Northern Finland. Only a small minority of lumbar spine operations are performed in other hospitals. To investigate the results of lumbar spine surgery in Oulu University Hospital, patients were identified using ICD-10 procedure codes for lumbar spine operations during the period 1.6.2005 to 31.5.2008. Surgical procedures due to acute traumas were not included. Only patients of a working-age (18–65 years) were included. Each patient was listed only once, and the index operation was defined as the latest lumbar spine surgery during the above-mentioned period. Based on medical records, patient who had undergone lumbar spine reoperation after 1.6.2008 and patients with insufficient capacity in the Finnish language, major abuse problem or progressive, severe illness (e.g., cancer, dementia) were excluded. The ICD-10 diagnosis code for spinal disease and the previous lumbar spine operations before the index surgery were recorded.

The questionnaires and a consent form were sent to all traceable patients in September 2009. The patients were asked to fill in three questionnaires: (1) a self-made questionnaire, (2) the Oswestry Low Back Pain Disability Questionnaire [7,8] and (3) the SF-36 [9].

The self-made questionnaire included questions regarding the occurrence of pain (never, occasionally, daily or almost daily, and all the time), the average intensity of pain (NRS 0-10) and pain-associated disability (NRS 0–10). Axial low back pain and radicular pain were assessed separately. Weight and height were queried for body mass index (BMI) calculation.

The ODI contains ten items, each with six statements graded from zero (lowest disability) to five (greatest disability). The total score is calculated as a sum of each completed item and expressed as a percentage of the maximum number of possible points, i.e. related to the number of items the patient has answered [10]. Scores are defined by a scale according to the original publication: 0–20 minimal, 20–40 moderate and 40–60 severe disability. A score of 60–80 indicates a crippled patient and 80–100 indicates that the patient is either bed-bound or exaggerating their symptoms [7].

The short form 36 health survey (SF-36) is a self-administered 36-item questionnaire. It measures health status and outcomes of the following 8 health concepts: (1) physical functioning (PF), (2) role physical (RF), (3) bodily pain (BP), (4) social functioning (SF), (5) mental health (MH), (6) role emotional (RE), (7) vitality (VT) and (8) general health (GH). Item scores are coded, summed and transformed on to a scale from 0 (worst possible health state measured by questionnaire) to 100 (best possible health state) for each variable. These eight domains were aggregated into two distinct summary components – mental and physical [11,12].

2.2. Statistical methods

The data are presented as means with standard deviations (SD) or as counts with percentages. Statistical comparisons were made using the chi-square test, Fisher's exact test, analysis of variance (ANOVA) or bootstrap type analysis of covariance (ANCOVA) taking gender and age values as covariates. Ninety-five percent confidence intervals (95% CI) were obtained by bias-corrected bootstrapping (5000 replications). The bootstrap method is significantly helpful when the theoretical distribution of the test statistic is unknown or in the case of violation of the assumptions. No adjustment was made for multiple testing. The STATA 13.1, StataCorp LP (College Station, TX, USA) statistical package was used for the analyses.

2.3. Ethical aspects

The study protocol was approved by the local ethics committee, and the patients gave their informed consent in writing.

3. Results

During the study period 1.6.2005 to 31.5.2008, a lumbar spine operation due to non-traumatic lumbar diseases was performed to 1180 patients in our hospital. Of these, 11 had passed away by the beginning of this study. Of the surviving patients, 273 were excluded due to age, 43 due to other diseases, 28 due to a subsequent lumbar spine surgery after the index operation, 7 due to severe abuse problem and 4 due to insufficient capacity in the Finnish language. Hence the postal survey was mailed to 814 patients, of whom 537 (66%) replied.

The respondents and the non-respondents were compared regarding gender, age and type of surgery. The respondents were older compared to non-respondents (45 years vs. 42 years). Of the respondents, 361 (67%) had undergone surgery for lumbar disc herniation, 85 (16%) stabilizing surgery and 91 (17%) decompression. The follow-up time (median, IQR) for the disc surgery patients was 31 (23, 39) months, for the stabilizing surgery patients 31 (22, 42) months and for the decompression patients 33 (22, 41) months, with no significant difference between the groups ($P = 0.89$).

The demographic and clinical characteristics of the patients are presented in Table 1. The mean age of the patients was 42 years in the disc surgery group, 48 years in the stabilizing surgery group and 55 years in the decompression group. Males dominated slightly disc surgeries and decompressions (proportion of males 59 and 54%, respectively), while more females underwent stabilizing surgery (65%). The index operation was the first lumbar surgery procedure in most cases (88% in the disc surgery group, 82% in the stabilizing surgery group and 90% in the decompression group).

The results regarding patient-reported pain and pain-related disability are presented in Table 2. Only a small minority of the patients was completely pain-free (1% in the stabilizing surgery group, 6% in the decompression group and 9% in the disc surgery