2

THUMB BASE INVOLVEMENT IN SYMPTOMATIC HAND OSTEOARTHRITIS IS ASSOCIATED WITH MORE PAIN AND FUNCTIONAL DISABILITY

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ABSTRACT

Objective. To assess the impact of different subsets of symptomatic hand osteoarthritis (OA) on pain and disability.

Methods. From 308 patients with hand OA a group with carpometacarpal joint (CMCJ) symptoms only (group I, n=20) was identified as well as groups with symptoms at the interphalangeal joints (IPJs) only (group II, n=138) and symptoms at both sites (group III, n=150). Hand pain and function, assessed with the AUSCAN, were compared between groups using linear mixed models. Radiographic OA was assessed using the Kellgren-Lawrence grading scale.

Results. Mean (SD) AUSCAN scores for group I, II and III were 23.1 (11.7), 18.3 (11.9) and 26.4 (12.5), respectively. After adjustment for age, gender, body mass index, family effects and number of symptomatic hand joints, significant differences in AUSCAN scores of 7.4 (95%CI 1.8 to 13.0) between group I and II, and 5.7 (95%CI 2.7 to 8.6) between group II and III were found. AUSCAN scores were 5.8 (95%CI 3.1 to 8.6) higher for patients with versus patients without CMCJ symptoms. Kellgren-Lawrence scores did not differ between groups.

Conclusion. In symptomatic hand OA, CMCJ OA contributes more to pain and disability than IPJ OA. Hence, treatment of CMCJ OA should be emphasised, even if it coincides with IPJ OA.

INTRODUCTION

Hand osteoarthritis (OA) is a common musculoskeletal disorder, leading to variable degrees of pain and disability.[1] It typically affects the distal interphalangeal joints (DIPJs), followed by the proximal interphangeal joints (PIPJs) and the first carpometacarpal joints (CMCJs).[1,2]

Different subsets of hand OA have been proposed based on different risk factors, associations and outcomes, although evidence is limited.[3,4] Recognised subsets are IPJ OA (with or without nodes) and CMCJ OA. Articular hypermobility was positively associated with CMCJ OA, while it was found to be protective for IPJ OA.[5,6] In addition, IPJ OA was found more often in the dominant hand, whereas CMCJ OA was found more often in the non-dominant hand.[7] Few data are available on health outcomes in these subsets.[8]

The impact of functional limitations in the IPJs can differ from that in CMCJs, because IPJ OA causes limitations in movement of the fingers, whereas CMCJ OA affects closure of the first web. Therefore, different treatment strategies may be required. Current EULAR recommendations state that treatment of hand OA should be individualised according to its localisation.[9]

In the present study we take advantage of the presence of different subsets of symptomatic hand OA in a relatively large cohort. A group of patients with CMCJ OA only was identified as well as patients with IPJ OA only and patients with OA at both joint sites. We compared pain and disability between these subsets, which may have implications for the importance of treatment for each joint group. This study can contribute to the further distinction between subsets of hand OA and recommended management strategies.

PATIENTS AND METHODS

Study design and patient population

The Genetics ARthrosis and Progression (GARP) study is a cohort study, aimed at identifying determinants of OA susceptibility and progression.[10] A total of 192 Caucasian sibling pairs with OA at multiple sites in the hands or in two or more sites being hand, knee, hip or spine, were included after giving informed consent. Details on the recruitment and selection have been published elsewhere.[10] The study was approved by the medical ethics committee.

Patients were eligible for the present study if they fulfilled the American College of Rheumatology (ACR) criteria for clinical hand OA[11] or if they had hand pain or stiffness on most of the days of the preceding month in addition to multiple bony swellings in the selected joints from the American College of Rheumatology (ACR) criteria, or a Kellgren-Lawrence score ≥ 2 in any hand joint.

A standard diagram of the hand joints was used to identify painful and stiff joints. Based on the location of these self-reported symptoms patients were assigned to three groups: group I with CMCJ symptoms only, group II with IPJ symptoms only and group III with symptoms at both sites. The number of symptomatic joints (maximum 30) identified by this method was used for analysis.

Disease characteristics

Self-reported hand pain and function were assessed with the pain (5 items) and physical functioning (9 items) subscales, as well as the total score (15 items) of the Australian/Canadian Osteoarthritis Hand Index LK 3.0 (AUSCAN) on a five-point Likert scale (0=none to 4=extreme).[12]

Hand radiographs (dorsal-volar) were obtained by a single radiographer, employing a standard protocol. Radiographic hand OA was evaluated by an experienced radiologist (HMK) using the Kellgren-Lawrence grading scale.[13] Intrareader reproducibility was high.[10]

Statistical analysis

Data were analysed using SPSS, version 14.0 (SPSS, Chicago, Illinois, USA). Demographic characteristics, AUSCAN and Kellgren-Lawrence scores were compared between the three groups using one-way ANOVA for normally distributed variables, the Kruskal-Wallis test for not normally distributed variables, and chi-square test for proportions. For post hoc analysis the Bonferroni test and Mann-Whitney U test were used. All tests were two-tailed and p-values <0.05 were considered statistically significant.

Hand pain and function measured by the AUSCAN were compared between groups using linear mixed models adjusting for age, gender, body mass index (BMI) and number of symptomatic hand joints. A random intercept was used to adjust for family effects, meaning resemblance between siblings of one family. First the initial three groups were compared, followed by comparison of patients with CMCJ symptoms (group I + III) and those without CMCJ symptoms (group II). Estimates of fixed effects are reported with 95% confidence intervals (95%CI).

RESULTS

Population description

Of the 308 eligible patients 20 (6.5%) were assigned to group I (CMCJ symptoms only), 138 (44.8%) to group II (IPJ symptoms only) and 150 (48.7%) to group III (symptoms at both sites). The mean age was 60 years, the majority were women and fulfilled the ACR criteria for clinical hand OA (table 1). Group III consisted of significantly more women compared to groups I and II. Other demographic characteristics did not differ between the groups. The mean (SD) AUSCAN total score for the whole population was 22.5 (12.8). AUSCAN was positively associated with the number of symptomatic joints.

Hand pain and function

Mean (SD) AUSCAN total scores were 23.1 (11.7) for group I, 18.3 (11.9) for group II, and 26.4 (12.5) for group III (table 1). Multivariable analysis showed differences in AUSCAN total scores of 7.4 (95%CI 1.8 to 13.0) between groups I and II, and 5.7 (95%CI 2.7 to 8.6) between groups II and III. Differences between group I and III were not significant. AUSCAN pain and function scores showed the same pattern.

Comparing patients with and without CMCJ symptoms (groups I + III vs group II) showed that AUSCAN total scores were 5.8 (95%CI 3.1 to 8.6) higher for patients with CMCJ symptoms compared to patients without CMCJ symptoms; AUSCAN pain

Table 1. Demographic characteristics, Australian/Canadian Osteoarthritis Hand Index (AUSCAN) and Kellgren-Lawrence scores of 308 patients with symptomatic hand osteoarthritis.

	Study population (n=308)	Group I (n=20)	Group II (n=138)	Group III (n=150)	P-value*
Age, mean (SD) years	60.1 (7.3)	59.0 (5.7)	60.7 (7.6)	59.7 (7.4)	NS
Women, %	86.4	75.0	81.2	92.6	<0.01 III vs I 0.01 III vs II
Post-menopausal, %	88.7	66.7	91.2	89.2	NS
BMI, mean (SD) kg/m^2	26.9 (4.6)	28.2 (5.9)	26.6 (4.3)	26.9 (4.6)	NS
ACR criteria hand OA, %	87.0	75.0	84.8	90.7	NS
Right handed only, %	78.7	75.0	77.4	79.3	NS
Symptomatic hand OA only, %	12.1	21.7	11.7	10.9	NS
No. painful hand joints‡	5 (2-10)	2 (1.3-2)	4 (2-8)	7 (4-12)	NS
No. stiff hand joints‡	5 (0-16)	0 (0-0)	6 (0-16)	7 (2-17)	NS
No. bony swellings‡	9 (6-14)	6 (4-12.3)	9 (5-14)	9 (6-14)	NS
AUSCAN, mean (SD)					
Total (0-60)	22.5 (12.8)	23.1 (11.7)	18.3 (11.9)	26.4 (12.5)	<0.01 II vs III
Pain (0-20)	7.5 (4.4)	7.8 (3.9)	6.1 (4.1)	8.9 (4.2)	<0.01 II vs III
Function (0-36)	13.2 (8.5)	13.9 (8.0)	10.6 (8.0)	15.6 (8.5)	<0.01 II vs III
Kellgren-Lawrence‡					
Total (0-120)	15 (8-25)	16.5 (11-24)	14 (7.8-23)	16 (8-27)	NS
IPJ (0-72)	12 (6-22)	12.5 (8-20)	13 (6.8-22)	11.5 (6-22.3)	NS
CMCJ (0-8)	2 (0-4)	4 (2.3-5)	1 (0-3)	3 (1-5)	<0.01 II vs I and II vs III

Group I=symptoms at first CMCJs only, group II=symptoms at IPJs only, group III=symptoms at first CMCJs and IPJs. AUSCAN was unavailable for 10 patients assigned to group II and 16 patients assigned to group III.
‡Median (IQR).
*P-value derived from one-way ANOVA, Mann-Whitney U test or Chi-square test.
Abbreviations: CMCJ: carpometacarpal joint; IPJ: interphalangeal joint; BMI: body mass index; ACR: American College of Rheumatology.

scores were 2.1 (95%CI 1.2 to 3.1) higher and AUSCAN function scores were 3.6 (95%CI 1.8 to 5.5) higher.

Radiological damage

Median Kellgren-Lawrence scores for the total hand did not differ between the groups (table 1). Considering the CMCJs showed that group II had lower scores than groups I and III (p<0.01).

DISCUSSION

In this study it was found that symptomatic CMCJ OA contributes substantially to the level of self-reported pain and disability in patients with symptomatic hand OA. Patients with IPJ symptoms only reported the lowest levels of pain and disability, followed by patients with CMCJ symptoms only. Patients with symptoms at both sites

experienced the highest levels of pain and disability. After adjustment for the number of symptomatic joints, which was associated with pain and disability, the levels of pain and disability reported by patients with CMCJ symptoms remained significantly higher compared to patients without CMCJ symptoms. This suggests that treatment aiming at CMCJ symptoms in patients with symptomatic hand OA is important, even if it coincides with IPJ symptoms.

This is one of the first studies comparing patients with symptomatic CMCJ OA to patients with symptomatic IPJ OA. Spacek et al. compared disability and perceived handicap in hand OA between patients with predominantly thumb base symptoms and patients with predominantly IPJ symptoms.[8] They found that disability and perceived handicap levels were comparable between the groups. However, they classified patients based on the location with most severe symptoms. Thus, patients in the thumb base group could experience IPJ symptoms and vice versa. This classification may be the reason why no differences between the groups were found. The classification criteria used in the present study were stricter, resulting in a more pronounced distinction between the groups. In general, no classification criteria for subsets of hand OA are available. We chose self-reported symptoms as classification criteria because symptomatic hand OA is considered the disease of clinical and public health interest.

Several limitations of this study have to be considered. The first is the small number of patients in the group with CMCJ symptoms only. However, this small number may reflect the clinical reality where isolated symptomatic CMCJ OA is not very prevalent. Second, patients in the present study had familial OA at multiple sites. Whether the results can be generalised to patients with hand OA only, in a less selected population, has to be investigated.

Based on these results it seems that CMCJ OA adds more to pain and disability in symptomatic hand OA than IPJ OA alone. This may be explained by the prominent role of the thumb in hand functioning. CMCJ symptoms therefore may be perceived as more severe and as having more impact on functioning than symptoms at the IPJs. Although no cut-off values are available for the AUSCAN, differences on the function subscale between those with and without CMCJ symptoms seem clinically relevant.[14]

The findings of this study suggest that treatment of CMCJ symptoms may substantially reduce levels of pain and disability, even if there is concurrent IPJ involvement. The results support expert opinion on the use of intra-articular corticoids and thumb orthosis for CMCJ OA.[9] Occupational factors involving repetitive thumb use or heavy load on the thumb are modifiable factors that can contribute to CMCJ OA. Therefore, they should be taken into account when education and lifestyle advice are considered.[15] Future research should aim at elucidating the efficacy of interventions targeted at the CMCJ in symptomatic hand OA.

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