CORRELATION BETWEEN CLINICAL VARIABLES IN HIP OSTEOARTHRITIS

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Abstract: *Osteoarthritis is the most common joint disorder and has an important impact on patients' quality of life. We aimed at establishing the correlations between several parameters: pain, functional impact and disability, but also the relationships between these parameters and age or disease duration in hip osteoarthritis patients. We evaluated 144 patients, all Caucasians, with hip osteoarthritis treated in the Emergency Hospital "Avram Iancu", from Oradea, Romania. All the patients followed a rehabilitation programme for 12 days, repeated after 6 months and 1 year. We performed four evaluations: at admission, before patients started the rehabilitation programme, at discharge, after 6 months and after 1 year, using VAS pain scale, Lequesne functional index and HAQ index. SPSS statistics was used. There were high correlations, statistically highly significant between age and disease onset, age and disability, assessments at admission, discharge, 6 months and 1 year. Age correlated moderately, but statistically highly significantly with functional impact established at admission in the hospital and at discharge. Both age and disease onset poorly correlated, but statistically significantly, with pain. Correlation of pain with disability was low at admission, but highly statistically significant. Disability assessed by HAQ and patients' age were strongly correlated, showing that with age the quality of life in hip osteoarthritis cases deteriorates. Correlations of clinical and functional variables with duration of disease were of different intensities, most closely relationship was obtained with functional impact, confirming that progression of anatomo-pathological phenomena interfere with occupational activities.*

Cuvinte cheie: *coxartroză, calitatea vieţii, impact funcţional, durere, corelaţii*

Rezumat: *Artroza este cea mai frecventă afecţiune articulară şi are un impact important asupra calităţii vieţii pacienţilor. Ne-am propus stabilirea corelaţiei parametrilor durere, impact funcţional, disabilitate între ei, dar şi cu vârsta pacienţilor şi durata bolii la pacienţii cu coxartroză. Am evaluat 144 pacienţi, toţi caucazieni, cu coxartroză, trataţi în Spitalul Clinic de Urgenţă „Avram Iancu", din Oradea, România. Toţi pacienţii au urmat un program de recuperare timp de 12 de zile, repetat după 6 luni şi 1 an. Am efectuat patru evaluări: la internare în spital, înainte de începerea programului de recuperare, la externare, după 6 luni şi după 1 an, folosind scala VAS, indicele funcţional Lequesne şi indicele HAQ. Pentru prelucrarea datelor statistice s-a folosit programul SPSS. Au fost corelaţii înalte, statistic foarte semnificative între vârstă şi debutul bolii, vârstă şi disabilitate, evaluare la internare, externare, 6 luni şi 1 an. Vârsta s-a corelat moderat, dar statistic foarte semnificativ cu impactul funcţional stabilit la internarea în spital şi la externare. Atât vârsta cât şi debutul bolii au fost slab corelate, dar semnificativ statistic, cu durerea. Corelaţia durerii cu disabilitatea este mică la internare, dar foarte semnificativă statistic. Disabilitatea evaluată prin HAQ şi vârsta pacienţilor sunt puternic corelate, relevând faptul că, odată cu vârsta calitatea vieţii se deteriorează în cazurile cu coxartroză. Corelaţiile variabilelor clinice şi funcţionale cu durata bolii au fost de intensităţi diferite, legătura cea mai strânsă fiind obţinută cu impactul funcţional, confirmând faptul că derularea fenomenelor anatomo-patologice interferează cu activităţile ocupaţionale.*

INTRODUCTION

Osteoarthritis is the most common joint disorder and has an important impact on patients' quality of life. Osteoarthritis typically affects hips, knees, hands, feet or spine joints. The disease is characterized by the damage of the cartilage, remodelling of the underlying bone and synovitis, being considered the disease of the entire joint, which leads to pain and disability. A gradual onset of hip pain is usually reported in hip osteoarthritis, increasing with joint use and being relieved with rest. In time, as the disease becomes more severe, pain at rest or at night are reported.(1)

Chronic evolution of osteoarthritis with its disabling potential involves a permanent evaluation in order to assess the consequences of illness and medical recovery.(2) The disease has a significant impact on quality of life, which is partly ameliorated by arthroplasty. An early diagnosis, a compliant patient and competent physician could influence the disease outcome and the patient's quality of life.(3)

A "core set" of recommendations , which could be used to measure clinical performance in the management of the disease was proposed.(4) A guideline that gives recommendations on initial assessment and evaluation of treatment and also gives recommendations regarding physical therapy before and after total hip or knee replacement in

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osteoarthritis is now also available.(5)

PURPOSE

We aimed at establishing the correlations between several parameters: pain, functional impact and disability, but also the relationships between these parameters and age or disease duration in hip osteoarthritis patients. It highlights the influence of some factors upon a certain characteristic, the relationship between two or more variables.

METHODS

Between January 2010 and January 2011, we evaluated 144 patients, all Caucasians, with hip osteoarthritis treated in the Emergency Hospital "Avram Iancu", from Oradea, Romania, who met the inclusion criteria. These were: diagnosis of hip osteoarthritis according to ACR criteria (6) and radiological criteria, age over 18 years, with no previous rehabilitation treatment for hip osteoarthritis, possibility of evaluating the patient at least twice a year - for one year, acceptance to perform a kinetic program at home and to comply with the rules of self-management and life style changes. Exclusion criteria: existence of a joint arthroplasty, acute flare of associated disease, presence of disorders that contraindicate our rehabilitation centre procedures (cancer, depression, severe dementia, autoimmune diseases, heart failure NYHA class II to IV, severe kidney diseases, asthma that require oxygen continuously), patients who underwent rehabilitation treatment for other diseases, but had associated hip osteoarthritis (e.g. neurological diseases).

Data was collected according to medical ethics principles. All patients gave the written informed consent for inclusion in the study.

Demographic and clinical data included age, gender, height, weight, BMI, other affected joints. Mitchel and Cruess disease staging was used.(7) Hip radiographies were assessed using Kellgren-Lawrence grading system.(8)

All the patients followed a rehabilitation program for 12 days, repeated after 6 months and took medication for osteoarthritis and for the associated disorders, as recommended by the specialist doctor. Intensive rehabilitation program consisted of: electrotherapy, massage, paraffin application, kinetic therapy. For each case rehabilitation program was established according to the objectives and their particularities: kinetotherapy with exercises that increase strength, endurance (weight bearing training) and coordination, reduce pain, active range of motion; paraffin heat treatment for induction of muscular relaxation and antialgic effect, antialgic electrotherapy (interferential current, TENS), ultrasound and massage aimed to reduce pain and induce muscle relaxation. Patients' education and self-management included lifestyle changes. We performed four evaluations: at admission in the hospital, before patients started the rehabilitation program, at discharge, after 6 months and after 1 year, using VAS pain scale, Lequesne functional index and HAQ index. Assessments at 6 months and 1 year were performed before patients started the rehabilitation programs. Pain assessment was performed with VAS scale (length 100 mm, from absence of pain to very severe pain). Lequesne index was used to assess severity of hip osteoarthritis. The questionnaire has 10 questions, maximum index score is 24 (9). For functional status assessment we used Health Assessment Questionnaire (HAQ), consisting of 20 items grouped in 8 categories regarding activities of daily living. For each of these, the score ranges from 0 (no difficulty) to 3 (unable to do that item).(10)

Statistical processing of data used the SPSS (version 20.0). Significance threshold for comparisons was set at 5% ($p<0.05$). For the analysis of correlations between linear parameters Pearson coefficient has been calculated.

RESULTS

Pain, measured with VAS scale, showed a wavy trend, decreasing significantly under the action of rehabilitation treatment, increasing in the free interval of 6 months almost to baseline values.

Lequesne functional index, which expresses the functional impact of the disease, increased in the interval between the two rehabilitation periods, but the mean determined values remained lower than in the first assessment. It decreases by approximately 23% after recovery treatment, the effect size is 0.69, showing a moderate change.

HAQ score, which measures disability, is also modified by the rehabilitation treatment, thus, quality of life immediately increased after treatment and decreased in the free interval of 6 months, continuing to decrease until the fourth determination, resulting that despite appropriate treatment, we can not stop the evolution of the disease.

Correlations of the determined variables in patients with hip osteoarthritis

For statistics we used the Pearson coefficients of product-moment correlation (r) for pairs of variables and significance tests of these coefficients. This allowed us to find the degree of relationship that exists between any two continuous variables in our study.

There were high correlations (0.70), statistically highly significant ($p<0.001$) between age and onset, age and disability (HAQ) assessments at admission, discharge, 6 months and 1 year (tables no.1 and 2).

Age correlated moderately, but statistically highly significantly ($p<0.001$) with functional impact (Lequesne) established at admission in the hospital (0.59) and at discharge (0.57) (table no. 3).

Onset of the disease correlated moderately, highly statistically significantly ($p<0.001$) with disability (HAQ) assessed at admission (0.60), discharge (0.61), 6 months (0.59) and 1 year (0. 59) and with functional impact (Lequesne) (0.50) assessed at first admission and discharge (tables no. 1, 2, 3).

Table no. 1. Correlations between disability (HAQ), age and disease onset in patients with hip osteoarthritis

HIP OSTEOARTHRITIS		
CORRELATION COEFFICIENTS		
ITEMS	Age (years)	Onset (years)
Age	1	0.71
Onset	0.71	1
HAQ at admission in the hospital	0.70	0.60
HAQ at discharge	0.70	0.61
HAQ after 6 months	0.71	0.59
HAQ after 1 year	0.70	0.59

Table no. 2. Correlations between pain (VAS), age and disease onset in patients with hip osteoarthritis

HIP OSTEOARTHRITIS		
CORRELATION COEFFICIENTS		
ITEMS	Age(years)	Onset(years)
VAS at admission in the hospital	0.23	0.24
VAS at discharge	0.26	0.35
VAS after 6 months	0.27	0.33

Both age and disease onset poorly correlated, but statistically significantly ($p<0.02$) with pain (VAS) recorded at admission (0.23 or 0.24, respectively), discharge (0.26 or 0.35, respectively) and at 6 months (0.27 or 0.33, respectively) (table no. 3).

Correlations between pain and functional indicators are weak, but statistically significant (table no. 4).

Table no. 3. Correlations between functional index (Lequesne), age and disease onset in patients with hip osteoarthritis.

HIP OSTEOARTHRITIS		
CORRELATION COEFFICIENTS		
ITEMS	Age (years)	Onset(years)
Lequesne at admission in the hospital	0.59	0.50
Lequesne at discharge	0.57	0.50

Table no. 4. Correlations between pain and functional indicators in patients with hip osteoarthritis

	VAS and Lequesne functional index		VAS and HAQ score:		Lequesne functional index and HAQ score:	
	r	p	r	p	r	p
at admission in the hospital	0.18*	≤0.05	0.377†	≤0.001	0.18*	≤0.05
at discharge	0.22*	≤0.05	0.6‡	≤0.0001	0.22*	≤0.05
after 6 months	0.23*	≤0.02	0.239*	≤0.02	0.23*	≤0.02
after 12 months	0.25*	≤0.0001	0.38†	≤0.0001	0.47†	≤0.0001

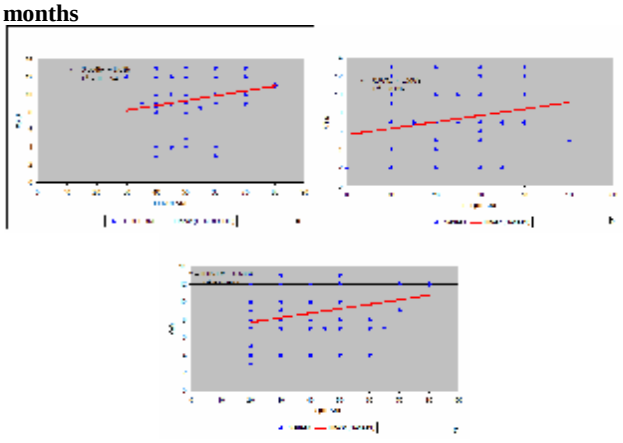
*weak correlation, statistically significant; †moderate correlation, statistically significant; ‡strong correlation, highly statistically significant

We found that pain poorly correlated with functional impact (Lequesne) at admission (0.18), not statistically significant (p = 0.04), at discharge (0.22), statistically significant (p<0.05) and at 6 months (0.23), statistically significant (p ≤ 0.02) (figure no. 1, table no. 5).

Table no. 5. Correlations between functional impact (Lequesne) and pain (VAS) in hip osteoarthritis patients

CORRELATION COEFFICIENTS		Pain(VAS)
ITEMS	r	p
Functional impact (Lequesne) at admission	0.18	0.04 NS
Functional impact (Lequesne) at discharge	0.22	0.05 S
Functional impact (Lequesne) at 6 months	0.23	0.02 S

Figure no. 1. Correlations between pain, assessed with VAS scale, and Lequesne index in patients with hip osteoarthritis: a) at admission in the hospital, b) at discharge, c) after 6 months



Correlation of pain (VAS) with disability (HAQ) is low at admission (0.37), but highly statistically significant (p<0.001) and 6 months decreases (0.24), but remained statistically significant (p<0.02) (figure no. 2, table no. 6).

Figure no. 2. Correlations between pain, assessed with VAS scale, and HAQ score in patients with hip osteoarthritis: a) at admission in the hospital, b) after 6 months

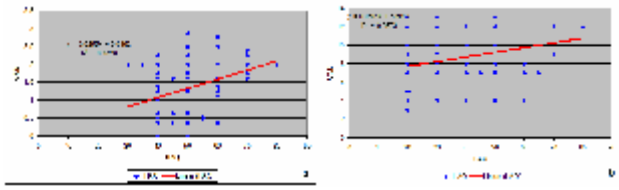


Table no. 6. Correlations between disability (HAQ) and pain (VAS) in hip osteoarthritis patients

CORRELATION COEFFICIENTS		Pain (VAS)
ITEMS	r	p
Disability (HAQ) at admission	0.37	<0.001 S
Disability (HAQ) at 6 months	0.24	<0.02 S

Correlation between functional impact (Lequesne) and disability (HAQ) was weak, statistically not significant (p> 0.05) at first admission (0.18), statistically significant (p<0.05) at discharge (0.22) and at 6 months (0.23) (p<0.02) (figure no. 3, table no. 7).

Figure no. 3. Correlations between Lequesne index and HAQ score, in patients with hip osteoarthritis: a) at admission in the hospital, b) at discharge, c) after 6 months

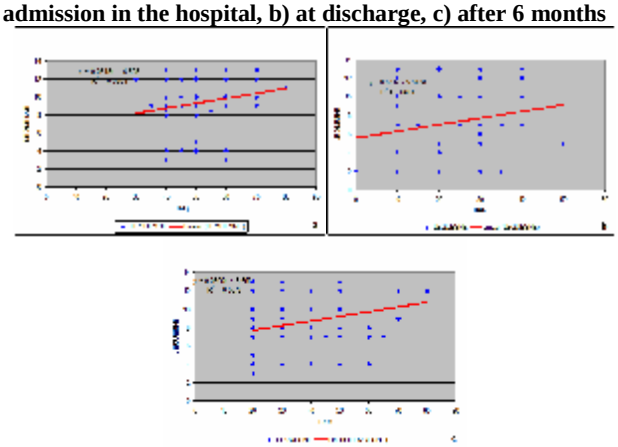


Table no. 7. Correlations between functional impact (Lequesne) and disability (HAQ) in hip osteoarthritis patients

CORRELATION COEFFICIENTS		Functional impact (Lequesne)
ITEMS	r	p
Disability (HAQ) at admission	0.18	>0.05 NS
Disability (HAQ) at 6 months	0.23	<0.02 S

DISCUSSION

Chronic diseases represent the majority of healthcare costs worldwide. Primary goals of healthcare for a chronic disease, such as osteoarthritis, are functional, to minimize loss, maintain independence and preserve quality of life.(11,12)

Identification of determinants of health status, outcomes and relationships between these could lead to comprehensive interventions that could reduce social and economic costs associated with rheumatic diseases.(13)

It was demonstrated that satisfaction at the same level of health status may vary.(14,15)

Strong positive correlations between age of patients with disease duration means that the disease evolves proportional with age and duration of disease.

Closest correlation was observed between patients age, functional capacity investigated by HAQ and the functional impact measured with Lequesne index.

Average HAQ score (disability) and patients age also strongly correlated (r = 0.70) highly statistically significant (p<0.001), demonstrating the influence of age on quality of life in cases with hip osteoarthritis. Increasing score is inversely proportional to the quality of life.

Also, Lequesne functional index values strongly correlate, directly proportional, to the age of patients, proving that the functional impact caused by osteoarthritis is severe in geriatric patients.

Since the onset of the disease moderately correlates with disability (HAQ) and functional impact (Lequesne) augmentation of disease age is not always predictive for functional evolution.

Both age and disease onset correlates poorly with pain (VAS). Also, pain correlates poorly with functional impact (Lequesne) with disability (HAQ), although highly statistically significant for the latter.

The correlation obtained between pain, observed dysfunction and overall functional capacity is poor, unlike the data found in the literature, but for other pathologies.(14)

The difference is explained not only by the issues due to lack of validity for self evaluation, but also because ADL areas investigated by HAQ include both activities dependent on lower body mobility, and on proximal joints of the upper limb.(16)

Besides obvious impact on quality of life and the frustration caused by the inability to conduct important activities, performance of a reduced daily activity is often associated with depressive symptoms. It was reported that a 10% loss in the ability to perform ADL is a significant predictor for the onset of depressive symptoms. Therefore, preserving the ability to perform ADL remains an important factor in maintaining the well-being of the individual.(3,14,17)

Therefore finding complementary methods to the pharmacological and surgical treatment (18,19) such as adapted support means or finding suitable alternatives to perform these activities, represents a challenge for professionals involved in assisting patients with physical dysfunction.(20) It is not the purpose of our study to assess the appropriateness of any therapeutic method, but to monitor the natural course of osteoarthritis under the influence of conservative treatment.

Medical rehabilitation must be considered in the context of surgical therapy, preceding it and continuing it, tailored in amplitude and intensity to the degree of evolutivity/severity of disease, that is the evolutionary stage and psychological, social, familial, educational, professional context or the pathology associated with each case.(5,21) Pre and postoperative rehabilitation is a net benefit to one recovery session, regarding control of pain and inflammation.(22,23) The basic idea that we rely on in specialized assistance for the rehabilitation of patients with hip osteoarthritis is that, for them, now and increasingly in the future, a “normal life” full and independent will be possible.(22,24) Physical therapy and orthopedic-surgical therapy continue to have a fundamental place to prevent or minimize disability that can be installed early in the evolution of these patients.(25)

The high degree of correlation between the clinical aspects investigated with Lequesne index, HAQ, and VAS shows that progression of anatomo-pathological phenomena affects patients daily life, which corresponds with the literature data.(17)

CONCLUSIONS

The obtained correlations between clinical areas investigated with VAS, disability and functional capacity indicators highlighted with the HAQ score, functional impact obtained with Lequesne index are statistically significant, the highest degree was seen for the correlation of pain with quality of life (r = 0.37), p<0.001, which shows that the disease undoubtedly affects quality of daily life.

Disability assessed by HAQ and patients’ age is strongly correlated, showing that with age the quality of life in hip osteoarthritis cases deteriorates.

Correlations of clinical and functional variables with duration of disease are of different intensities, most closely relationship (r = 0.60) was obtained with functional impact, confirming that progression of anatomo-pathological phenomena interfere with occupational activities (activities of daily living).

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