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Clinical difference and quality of life between Hilano GF-20 vs intra-articular corticosteroid in patients with knee osteoarthritis

Diferencia clínica y Calidad de vida, entre Hilano GF- 20 vs corticoesteroide intra-articular en pacientes con osteoartrosis de rodilla

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Abstract:

Background: Osteoarthrosis (OA) is the combination of mechanical and biological factors, altering articular cartilage, subchondral bone, joint capsule and structures near the joint. Knee OA accounts for up to 80% of OA cases. At the ISSSTE Pachuca Hospital, Dra. Columba Rivera Osorio, knee OA is the second cause of care in the traumatology and orthopedics service. **Objective**: To observe the difference in clinical response and improvement of quality of life between the intra-articular use of Hilano GF-20 and intra-articular corticosteroid, both part of the basic picture of the ISSSTE Pachuca Hospital, Dra. Columba Rivera Osorio. **Material and Methods**: A study was carried out with 220 patients, the 1st group of 140 patients received Hilano GF-20 in 3 doses, the 2nd group of 80 patients received a single dose of corticosteroid, to assess clinical difference and quality of life, the WOMAC questionnaire was carried out before and after treatment three months apart. **Results**: Improvement in quality of life was observed based on the decrease in stiffness and increased functionality with the use of Hilano GF-20, with respect to pain, corticosteroid use showed greater effectiveness, however, it barely achieved sustained analgesic effect above 3 months. **Conclusion**: The use of Hilano GF-20 and corticosteroid are functional alternatives to improve the quality of life of patients, being tools that are available in our institution. Both treatments are suitable for knee OA, however, it is shown that the best option is the Hilano GF-20, with a longer latency time of the pharmacological effect.

Keywords:

Osteoarthritis, corticosteroid, Hylan GF-20, pain, stiffness.

Resumen:

Antecedentes: La osteoartrosis (**OA**) es la combinación de factores mecánicos y biológicos, altera el cartílago articular, hueso subcondral, cápsula articular y estructuras cercanas a la articulación. La OA de rodilla representa hasta el 80% de los casos de OA. En el Hospital ISSSTE Pachuca, Dra. Columba Rivera Osorio, la OA de rodilla es la Segunda causa de atención del servicio de traumatología y ortopedia. **Objetivo**: Observar la diferencia en la respuesta clínica y mejoría de la Calidad de vida, entre el uso intra-articular de Hilano GF-20 y corticoesteroide intra-articular, ambos, parte del cuadro básico del Hospital ISSSTE Pachuca, Dra. Columba Rivera Osorio. **Material y Métodos**: Se realizó un estudio con 220 pacientes, el 1° grupo de 140 pacientes recibieron Hilano GF-20 en 3 dosis, el 2° grupo de 80 pacientes reciben dosis única de corticoesteroide, para valorar la diferencia clínica y calidad de vida se realizó el cuestionario WOMAC antes y después del tratamiento con tres meses de diferencia. **Resultados**: Se observó mejoría de la calidad de vida en base a la disminución de rigidez y aumento funcionalidad con uso de Hilano GF-20, con respecto al dolor, el uso corticoesteroide mostro mayor efectividad, sin embargo, apenas logro efecto analgésico sostenido arriba de los 3 meses. **Conclusión**: El uso de Hilano GF-20 y corticoesteroide son alternativas funcionales para mejorar la calidad de vida de los pacientes, siendo herramientas con las que se cuenta en nuestra institución. Ambos tratamientos son adecuados para OA de rodilla, sin embargo, se demuestra que la mejor opción es el Hilano GF-20, con mayor tiempo de latencia del efecto farmacológico.

Palabras Clave:

Osteoartrosis, corticoesteroide, hilano GF-20, dolor, rigidez.

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INTRODUCTION

Osteoarthrosis (**OA**) is a disease characterized by wear and tear of the joints and is the most common joint pathology over 50 years of age, this is the result of mechanical and biological changes that are represented by direct alterations on the articular cartilage, subchondral bone, joint capsule as well as structures close to the joint. The initial molecular and biochemical changes evolve into morphological and structural changes, mainly affecting the articular cartilage, with loss of it, causing subchondral sclerosis, formation of osteophytes and even deforming the joints.[1-7]

The knee osteoarthritis can represent up to 80% of all OA cases worldwide.[3]Osteoarthritis in Mexico is one of the most important causes of disability after 40 years of age, approximately 80% of people over 65 years of age have radiographic changes with evidence of arthritic changes, being between 10 to 25% of the reason for consultation of primary care.[8]

Knee OA is a disease closely related to age, family inheritance, predominantly associated with females and may be related to other factors such as occupation (high-impact or load-bearing activities), previous surgeries (traumatic history, fractures, meniscus tear), ligament injuries (especially anterior cruciate ligament rupture) of the knees.[8-10] The symptoms that occur in these conditions are joint pain, which can radiate to the proximal and distal areas of the knee, increases with load or pressure, crepitus, variable type deformity, limitation of mobility, synovitis with variable increase in volume, etc.[9]

The use of intra-articular corticosteroids (CS) is indicated in patients with osteoarthrosis of the knee and exacerbation of joint pain, especially if accompanied by synovial effusion. Viscosupplementation is recommended in patients with osteoarthrosis of the knee, in whom pharmacological treatment has not been successful or is contraindicated.[10]

The mechanism of action of CS is complex, has definite local effects and possible systemic effects. Intra-articular CSs act directly on nuclear steroid receptors, disrupting the inflammatory cascade, reduce vascular permeability, inhibit the secretion of inflammatory mediators such as cytokines, prostaglandins, and leukotrienes, inhibit the production of neutrophil superoxide and metalloproteinases, and negatively regulate immune function. [11,12]

Since hyaluronic acid was approved in 1997 by the FDA and has been widely used in medicine, Hilano GF-20 is a cross-linked form of purified hyaluronic acid, endowed with a high molecular weight and whose elastoviscous and rheological characteristics are similar to those of the synovial fluid of healthy young humans, with a longer-lasting effect than the use of simple hyaluronates. In summary, the mechanisms of action of Hilano GF 20 are chondroprotection (lubricates, absorbs shocks and reduces friction) and viscusupplementation (increasing the production of proteoglycans, Decreasing the production of prostaglandins and interleukins, as well as tumor necrosis factor). Hilano GF-20 has an analgesic function and preservative capacity of cartilage measured both by volume and by defects of the cartilage, as well as by the architecture and functioning of the joint, in addition to delaying the need for surgical intervention in patients with OA symptomatic.[13-18]

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The introduction of the concept "quality of life" in the field of health-care began to gain splendor in the 1990s, as a measure of the transcendental outcome in the evaluation of health innovations. This boom led to the need to develop instruments to make the index valid and reliable, including generic questionnaires, such as the COOP/WONCA questionnaire (The Dartmouth Primary Care Cooperative Information Project, Hanover, New Hampshire, USA) or the EUROQoL questionnaire and specific questionnaires for specific health problems. Such as the WOMAC (Western Ontario and McMaster Universities Arthritis Index) questionnaire for people with osteoarthritis of the hip and knee.[19,20]

In the General Hospital ISSSTE Pachuca, Dra. Columba Rivera Osorio osteoarthrosis is the second most common cause of medical care in the outpatient clinic of the traumatology and orthopedics department, after the spine pathology (information collected by the statistics service of this medical unit), this article hopes to observe the comparison between clinical improvement and quality of life through intra-articular application medications, such as corticosteroid (methylprednisolone acetate) and Hilano GF-20, two medical alternatives that are available in the basic drug framework of this institution, valuing pain reduction, improvement of joint mobility and functional autonomy, which leads to a better quality of life.

MATERIAL AND METHODS

This is a retrospective, non-randomized, longitudinal and observational study of patients taken at the traumatology and orthopedics consultation of the General Hospital ISSSTE Pachuca, Dra. Columba Rivera Osorio, with a diagnosis of knee OA, from July 2021 to October 2022. The inclusion criteria were: being a beneficiary and assigned to this unit, diagnosis of knee OA (given by the clinical practice guideline IMSS-329-10), indistinct age, indistinct sex, follow-up for more than 3 months in the traumatology and orthopedics service. The exclusion criteria were patients who stopped attending their follow-up visits, patients who lost the right to health-care, patients who did not complete treatment, patients who attended some other type of treatment through knee infiltration outside of this study, lost control of appointments.

The evaluation of the degree of OA in the knee was carried out using the Kellgren and Laurence scale, which is the most widely used classification for this and approved by the WHO (osteoarthritis: G0 = Normality ; GI = Doubtful ; GII= Minimum ; GIII = Moderate; GIV= Severe).[21] Two study groups were taken, in the first group patients were included those who followed a schedule of three doses of Hilano GF-20, applying one dose every week for three weeks, this after the infiltration with xylocaine 1 cm3 at 2% (only as an anesthetic for pain control during the procedure), in group two, patients who received doses with corticosteroid (methylprednisolone acetate) a single dose in combination with Xylocaine 2 cm3 at 2%. The form of intra-articular infiltration on all occasions was with the knee in flexion at 90 degrees with the use of the anterolateral portal, under sterile technique.[22]

The evaluation of these results was carried out using the WOMAC questionnaire (Table 1) in month zero and third month, to assess symptoms before and after both treatments, the questionnaire consists of 24 questions, divided into three symptoms, of these the first 5 questions are to assess pain, the next 2 stiffness and the last 17 physical function. First scores of 0-20 for pain, 0-8 for stiffness, 0-68 for physical function, higher scores on the WOMAC indicate worse pain, stiffness, and functional limitation.[19,20]

Statistical analysis was performed with the following programs: SPSS and Vassartstats to determine the results of the analyzed sample. This study complies with the ethical and bioethical standards of research such as those contained in the Declaration of Helsinki, in addition to the fact that it does not violate concepts of authorship, plagiarism, conflict of interest and has informed consent by patients, as well as approval by the ethics and research committee of the Hospital General ISSSTE Pachuca, Dra. Columba Rivera Osorio, with research number CEEI-065-23.

RESULTS

A total of 220 patients were included in the statistical basis of this study, of which 202 (91.8%) were female and 18 (8.2%) were male (Figure 1). In terms of age distribution, 46 patients were 50-59 years old, 96 patients were 60-70 years old, and 78 were over 70 years old (Figure 2). The degree of gonarthrosis obtained was: 74 were included in grade II (33.6%), grade III, 114 patients (51.8%) and grade IV, 32 (14.5%) (Figure 3).

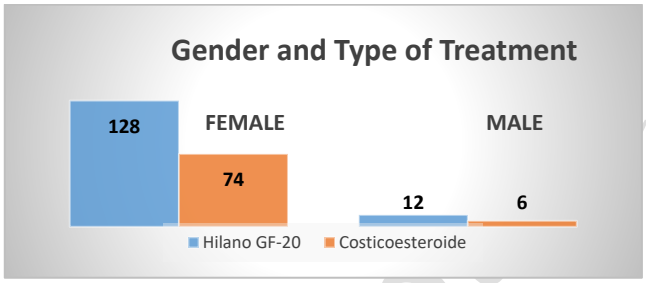

Figure 1. Distribution by gender and type of treatment Osteoarthrosis is predominant in females

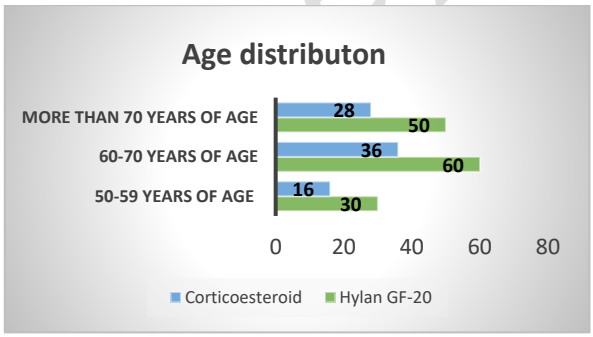

Figure 2. Age distribution. The incidence of the disease increases after the age of 50.

The study was divided into two groups: the first group of 140 patients who received Hilano GF-20 and who received three weekly doses of Hilano GF-20 and another group of 80 patients who were given a single corticosteroid dose.

Table 1. Western Ontario and McMaster Osteoarthritis Index Score Questionnaire.[19,20]

	how mucho pain is there...	None	Little	Pretty much	A lot	Much
w1	When walking on flat ground?	0	1	2	3	4
w2	When climbing stairs?	0	1	2	3	4
w3	¿At night in bed?	0	1	2	3	4
w4	When sitting or lying down?	0	1	2	3	4
w5	when standing?	0	1	2	3	4
	how much stiffness you notice...	None	Little	Pretty much	A lot	Much
w6	How much stiffness do you notice when you wake up?	0	1	2	3	4
w7	during the day and at rest?	0	1	2	3	4
	How difficult is it?	None	Little	Pretty much	A lot	Much
w8	Going down stairs?	0	1	2	3	4
w9	Climbing stairs?	0	1	2	3	4
w10	¿Do you get up after sitting?	0	1	2	3	4
w11	Do you stand?	0	1	2	3	4
w12	crouch to the floor?	0	1	2	3	4
w13	Walking on flat ground?	0	1	2	3	4
w14	Getting in and out of a car?	0	1	2	3	4
w15	Go shopping?	0	1	2	3	4
w16	Put on socks or stockings?	0	1	2	3	4
w17	get out of bed?	0	1	2	3	4
w18	Take off your stockings or socks?	0	1	2	3	4
w19	lying in bed?	0	1	2	3	4
w20	Came in and out of bathing?	0	1	2	3	4
w21	sit?	0	1	2	3	4
w22	Sit down and get up from the toilet?	0	1	2	3	4
w23	Do heavy housework?	0	1	2	3	4
w24	Do light housework?	0	1	2	3	4

Source: own elaboration, based on Western Ontario and McMaster Universities Arthritis Index

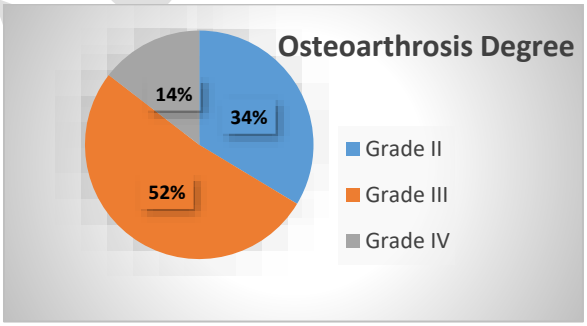

Figure 3. Degree of osteoarthrosis and percentages of the group studied. The Osteoarthrosis III Scale of Kellgren and Laurence is the most common.

Both groups received a WOMAC questionnaire before application and another three months after drug infiltration. Regarding the assessment of pain (questions 1-5 of the questionnaire), a migration of patients from severe pain to a moderate pain was obtained for the group with Hilano GF-20 (Figure 4) *p=0.5*. Regarding the corticosteroid, a migration of severe pain to slight was obtained (Figure 5) *p=0.03*. The response to stiffness was observed with Hilano GF-20 from severe to slight (Figure 6) *p=0.03* and with corticosteroid it was also observed from severe to slight (Figure 7) *p=0.5*. Regarding the function, the data obtained showed that with Hilano GF-20 it was modified from severe to slight (Figure 8) *p=0.03*, while with corticosteroid it was maintained to a severe pain level (Figure 9) *p=0.3*.

In this study, it is observed that the projection of the results for these three parameters (pain, stiffness and function) through the use of the WOMAC questionnaire and its statistical representation, in both medications showed a significant improvement in the quality of life of the patients. Let us not forget that the time of the study is relevant to the results, since the effectiveness will decrease over the months that have

passed, especially in patients who received a single dose of corticosteroid.

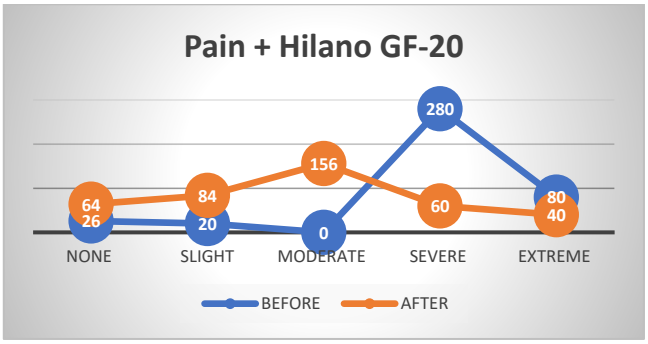

Figure 4. Pain Assessment with Hilano GF-20 Pain Score before and after 3 months of use of Hilano GF-20.

Figure 5. Corticosteroid Pain Assessment. Pain score before and after 3 months of corticosteroid use.

Figure 6. Stiffness Evaluation with Hilano GF-20. Stiffness score before and after 3 months of use of Hilano GF-20.

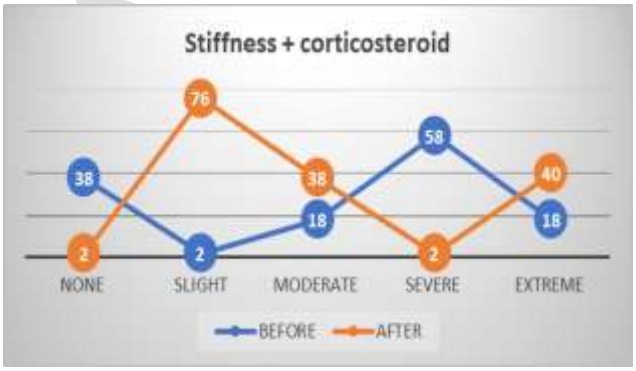

Figure 7. Corticosteroid Stiffness Assessment. Stiffness score before and after 3 months of corticosteroid use.

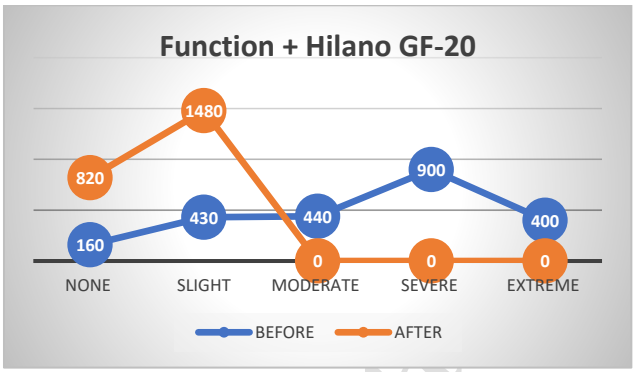

Figure 8. Function Assessment with Hilano GF-20. Function score before and after 3 months of use of Hilano GF-20.

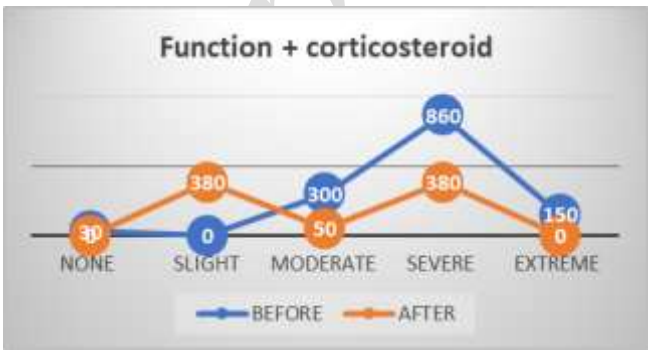

Figure 9. Corticosteroid Function Assessment. Function score before and after 3 months of corticosteroid use.

DISCUSSION

In this study it is observed that statistically there is an improvement in the stiffness and function of the patients to whom the three-dose Hilano GF-20 scheme was applied, the use of corticosteroid produces statistically significant improvement with respect to the pain section, these results are supported by previous studies and analyses in which it is shown that the effect of the Hilano GF-20 generates an advantage over the use of corticosteroids, in addition to limiting the use of corticosteroids to one or two doses only, in addition to the fact that currently Hilano GF-20 has greater support because it is a cutting-edge drug. As Leopold SS mentions, "Both the corticosteroid-treated group and the Hilano G-F 20 treated group demonstrated improvements over basal WOMAC scores".[9] Or as described by the mentioned by Bellamy N, in his article "Viscosupplementation for the treatment of knee osteoarthritis" where the best result is given by Hilano over the use of CS because it has a greater sustained effect.[23] This study shows a very similar result observed that the application of the Hilano GF-20 three-dose scheme improves the quality of life of patients, decreasing pain and significantly improving function and stiffness, all this increased the patient's autonomy and basic functions of daily life for a longer time.

We consider continuing to study the evolution of these patients over a longer period of time and even with other types of therapies and, taking them together, the combined treatment of

hyaluronate plus CS has been proposed, considering a synergistic action, which associates the short-term benefits of CS and the slower but longer lasting onset of the benefits of hyaluronate.[15] All this in order to make the best individualized option for each patient in the future and for them to obtain the best possible quality of life.

CONCLUSIONS

It has been observed that knee osteoarthritis today is a public health problem due to its high prevalence and high cost for the health sector. At the work level, it generates significant disability, on a day-to-day basis, it reduces the patient's quality of life, and this has been increasing as the life expectancy of the population increases, making this pathology more common every day in the practice of orthopaedic doctor, which is why the intra-articular infiltration procedure is an important tool for the treatment of osteoarthritis knee, if performed correctly in candidate patients.

This study demonstrates that both Hilano GF-20 and corticosteroids are treatments that, when applied through infiltration in variable cases of knee osteoarthritis (GII and GIII), represent clinical improvement in patients and a better quality of life, In this way we can take resources provided by the institutions in which we work to offer a suitable treatment for patients, the best option supported by a series of various articles and the benefit of its chronic use is Hilano GF-20, the counterpart of this is the high cost of the medication.

We conclude that treatment with Hilano GF-20 is more effective, over the use of corticosteroid, for improving quality of life by reducing pain, increasing functionality and reducing stiffness, which allows the patient to perform basic daily functions and allow the autonomy.

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