

Impact of Covid-19 pandemic on injection-based practice: report from an Italian multicenter and multidisciplinary survey

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Parole chiave: COVID-19, SARS-CoV-2, malattie muscoloscheletriche, terapia intra-articolare, acido ialuronico, corticosteroidi

Abstract

Background. *There are no papers exploring the impact of COVID-19 pandemic on the injection-based practice in patients affected by different rheumatic diseases, including osteoarthritis. The aim was to investigate the impact of COVID-19 pandemic on injection-based practice through the Italian country.*

Study design. *A survey-based retrospective cross-sectional study*

Methods. *An Italian-language questionnaire was developed by a group of senior researchers and distributed by e-mail to some Rheumatology, Orthopedic and Rehabilitation Units from different geographic areas of Italy. The survey included information about the number of injections performed during COVID-19 pandemic (stratified by injected agents and injected joint), in comparison to the pre-pandemic period, and the possible reasons behind an eventual reduction. Responses were collected and descriptive analysis calculated.*

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Results. *Eleven centers of the National Health Service completed the survey. The activities of the injections services significantly decreased across the country with a percentage of reduction of 60% compared to the pre-pandemic period. A significant reduction of both intra-articular and peri-articular injections was registered. Among intra-articular treatments, the most affected ones were the hyaluronic acid injections, when compared to corticosteroids. A significant decrease of the total amount of peri-articular injections was observed. The strict government restrictions and the fear of patients to become infected represented the most limiting factors.*

Conclusions. *The reported decrease of the injection-based practice in our country during the COVID-19 pandemic highlights the detrimental effects of the COVID-19 pandemic on the management of chronic musculoskeletal diseases with possible negative consequences in terms of disability and quality of life.*

Introduction

Italy has been one of the first countries, after China, facing the unprecedented health emergency represented by the severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) pandemic (1). The first confirmed case dated back to February 21st, 2020 and since then 3.046.762 individuals became affected with 99.578 deaths as of March 8th, 2021 (2). To assist COVID-19 patients, territorial health services were totally reorganized, and some hospitals were converted into “COVID hubs”; from March 9th to May 4th, 2020, the Italian government established a strict lock-down recommending the suspension of all elective and “non-urgent” medical procedures, including those concerning musculoskeletal disorders (3). Some restrictions were thereafter confirmed until now with detrimental consequences on patients’ wellbeing and quality of life, as well as on the mental health of healthcare providers (4). Also, some patients felt themselves dubious and hesitant to reschedule their medical appointments for “minor” pathologies and various factors were demonstrated to influence patients’ behavior during COVID-19 pandemic, as age and education level (5). Clinical practice has profoundly changed over the last year with several face-to-face outpatient visits cancelled or postponed and a progressive development of telemedicine, due to containment measures (6-10).

Different reports demonstrated that this practice, especially during the first wave of COVID-19 pandemic, strongly influenced early diagnosis and start of new treatments in patients with inflammatory musculoskeletal diseases (11-13).

Conversely, there are no papers exploring the impact of COVID-19 pandemic on the injection-based practice in patients affected by different rheumatic diseases, including the most common one, osteoarthritis (OA). Injection-based therapy is considered a mainstay of conservative treatment of several musculoskeletal disorders and its use is widespread among physicians of different specialties, as rheumatology, orthopedics and physiatry. The great advantage of such kind of strategy is to maximize therapeutic effects locally with a reduction of systemic exposure, and consequent limited incidence of adverse reactions (14). Currently several intra-articular (i.a.) drugs exist, including corticosteroids (CSs), hyaluronic acid (HA), autologous platelet-rich plasma (PRP), autologous mesenchymal stem cell (MSCs) and stromal vascular fraction.

The aim of the present survey-based retrospective cross-sectional study was to evaluate the impact of COVID-19 pandemic on injection-based practice among different medical specialists, all over the Italian territory, comparing the i.a. and peri-articular (p.a.) treatments performed in 2019 to those administered in 2020.

Methods

This was a survey-based retrospective cross-sectional study based on a multicentric survey. An Italian-language questionnaire was developed by a group of senior researchers (F.An., M.A., M.S., S.V., G.S.), including orthopedic surgeons, physiatrists and rheumatologists. The survey draft was then reviewed by all researchers participating into the study, including two orthopedic surgeons, four rheumatologists, one radiologist and six physiatrists who provided their suggestions and comments. The final version was approved by all the included physicians. The English-language version of the survey is presented in the Supplementary Material 1. The questionnaire addressed the changes in injection-based practice from January 1st to December 31st, 2020, compared to the previous year (from January 1st to December 31st, 2019). The survey included a general section with the center identification information and two main sections dedicated to the period investigated (one for 2020 and one for 2019). Each section collected the following data: number of injections performed, indications for injection therapy, number of i.a. injections with CSs (stratified by injected joint) (CSs injections were performed by all the investigated centers with triamcinolone hexacetonide or methylprednisolone acetate, 40 mg for large joints and 20 mg for small joints), number of i.a. injections with HA (stratified by injected joint), number of i.a. injections with autologous PRP (stratified by injected joint), number of i.a. autologous MSCs (stratified by injected joint), and number of p.a. injections (stratified by indication). Furthermore, the questionnaire investigated the possible reasons behind the eventual reduction in the number of injections in 2020 and the subjective prevision of each center for the next year.

The survey was sent by e-mail to different Rheumatology, Orthopedic and Physical

Medicine and Rehabilitation Units from different geographic areas of Italy from January 8th, 2021 to February 8th, 2021 and data were then aggregated into a Microsoft Excel® spreadsheet database (Microsoft Corp., Seattle, WA, USA).

As no individual patients were enrolled, the study did not need to be approved by local Ethical Committees.

Statistical analysis

Descriptive analysis was performed on the results of the questionnaires. Paired *t* test was used to evaluate differences between the two years for center. A *p*-value less than 0.05 was considered the cut-off for statistical significance. Prism Software version 8.3.1 (GraphPad Software LLC, San Diego, CA, USA) was used to perform statistical analysis.

Results

Out of the 20 Italian centers of the National Health Service contacted by email, 11 agreed to participate and completed the survey: 2 from Northern Italy, 6 from Central Italy and 3 from Southern Italy.

The list of Italian participating centers and the distribution by center of the injection performed in 2019 and 2020 is shown in Table 1. The survey results showed a reduction in injection-based practice across our Country during the pandemic (Table 1).

The number and the kind of injections performed in the included centers between January 1st and December 31st, 2019 and between January 1st and December 31st, 2020 are shown in Fig. 1. The number of i.a. and p.a. injections significantly ($p < 0.001$) decreased during 2020 with a reduction of 60% compared to 2019. A significant decrease of both i.a. CSs and HA injections ($p < 0.001$ and $p < 0.01$, respectively), as well as of p.a. injections ($p < 0.05$) was observed (Fig. 1).

Table 1 - List of Italian participating centers and distribution by center of the injection performed in 2019 and 2020.

Centers	Region	N. of COVID 19 cases/100.000 inhabitants*	Total injection made in 2019	Total injection made in 2020	Percentage reduction (%)
Aldo Moro University, Orthopedics and Traumatology Unit, Bari	Puglia	3494	1035	900	13
Aldo Moro University, Physical Medicine and Rehabilitation Unit, Bari	Puglia	3494	630	370	41
Azienda Ospedaliera "Pugliese-Ciaccio", Rehabilitation Unit, Cantanzaro	Calabria	1885	637	403	37
Azienda Ospedaliera Universitaria Senese, Orthopedics and Traumatology Unit, Siena	Tuscany	4872	687	393	43
Azienda Ospedaliera Universitaria Senese, Rheumatology Unit, Siena	Tuscany	4872	1146	445	61
IRCCS Istituto Ortopedico Galeazzi, Diagnostic and Interventional Radiology, Milano	Lombardy	5804	927	347	62.5
San Pietro Fatebenefratelli Hospital, Rheumatology Unit, Rome	Lazio	3855	1900	1362	28
University La Sapienza, Legal Medicine and Orthopaedics Unit, Rome	Lazio	3855	420	230	45
University of Florence, Rheumatology Unit, Florence	Tuscany	4872	1045	710	32
University of Padua, Physical Medicine and Rehabilitation Unit, Padua	Veneto	6666	322	201	37.5
University of Parma, Department of Medicine and Surgery, Outpatient and Orthogeriatric Rehabilitation Unit, Parma	Emilia-Romagna	5558	243	164	32.5

*Number of COVID-19 total cases/100.000 inhabitants on February 22th, 2021.

Data from Italian Ministry of Health (<https://opendatadpc.maps.arcgis.com/apps/opsdashboard/index.html#/b0c68bce2cce478eaac82fe38d4138b1>)

As reported in Fig. 2, the distribution of the conditions treated with injections remained stable during the pandemic year 2020 compared to 2019, with the majority of injective treatments administered to patients affected by OA (88% in 2019 and 90% in 2020).

Table 2 shows the number and the percentage of reduction of i.a. CSs injections performed before and during pandemic and

the distribution by injected joint. The number of injection treatments with CSs passed from a pool of 163 ± 139.50 injections administered in 2019 to 88.91 ± 74.18 injections in 2020 ($p=0.04$). Stratifying CSs injections by the treated joint, the most significant reduction ($p=0.04$) concerned the ankle joint with a percentage of reduction of 66% compared to the pre-pandemic period.

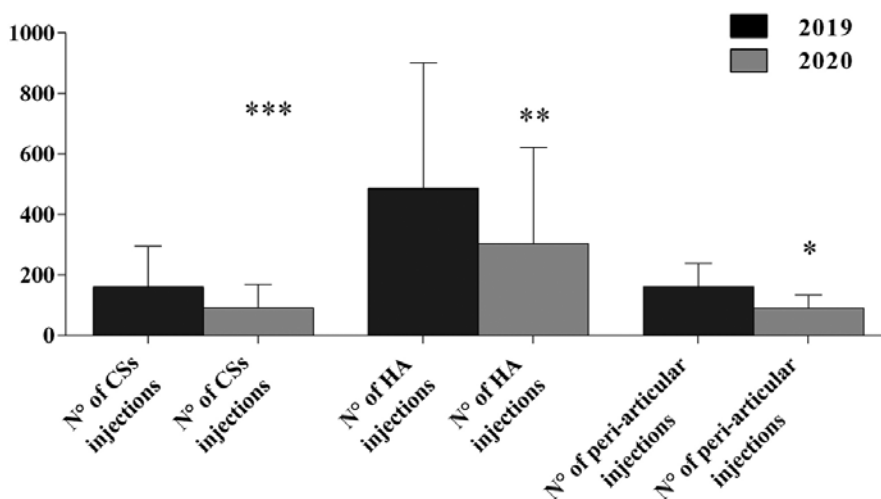


Figure 1 - Mean and standard deviation and type of injections performed in 2019, before COVID-19 pandemic and in 2020, during COVID 19 pandemic.

*p<0.05; **p<0.01; ***p<0.001 2020 vs 2019

Paired t test was used to evaluate differences between the two years for center.

CSs: corticosteroids; HA: hyaluronic acid.

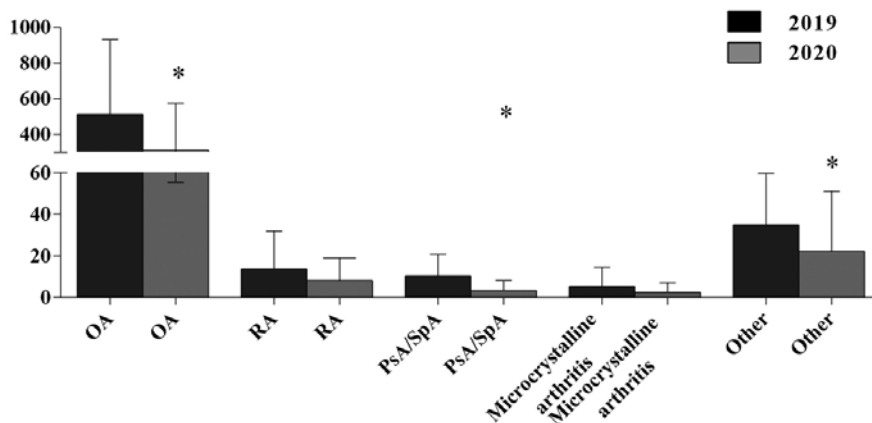


Figure 2 - Distribution of i.a. and p.a. injections in 2019 and in 2020 by indication.

*p<0.05 2020 vs 2019

Paired t test was used to evaluate differences between the two years for center.

p.a.: peri-articular; i.a.: intra-articular; OA: osteoarthritis; RA: rheumatoid arthritis; PsA/SpA: psoriatic arthritis/ spondyloarthritis.

Table 2 - Mean and standard deviation of intra-articular steroid injections and distribution by injected joint in 2019 and 2020 for center

Joint	2019	2020	p
All joints (mean \pm standard deviation)	163 \pm 139.50	88.91 \pm 74.18	0.04
Knee (mean \pm standard deviation)	48.36 \pm 34.85	39.09 \pm 46.27	0.38
Trapezio-metacarpal joint (mean \pm standard deviation)	11.91 \pm 14.36	7.18 \pm 8.56	0.07
Shoulder (mean \pm standard deviation)	74.45 \pm 136.06	34 \pm 56.08	0.13
Hip (mean \pm standard deviation)	5.45 \pm 6.89	1.91 \pm 3.14	0.08
Interphalangeal/ Metacarpophalangeal joints (mean \pm standard deviation)	7.27 \pm 12.91	2.36 \pm 4.15	0.06
Radio-carpal joint (mean \pm standard deviation)	0.91 \pm 2.02	0.27 \pm 0.90	0.21
Ankle (mean \pm standard deviation)	4.27 \pm 6.20	1.45 \pm 3.01	0.04
Sacro-iliac joint (mean \pm standard deviation)	4.54 \pm 8.14	2.64 \pm 5.14	0.083

Paired t test was used to evaluate differences between the two years for center.

Also, the injection practice with HA significantly decreased ($p=0.004$) across all the respondent centers, passing from a pool of 487.91 ± 414.16 injections during 2019 to 303.45 ± 318.88 during 2020 (Table 3). The greatest impact of COVID-19 pandemic was registered for the i.a. HA injections of the knee, which represented the most treated joint with such kind of i.a. therapy in all included centers. In detail, a significant decrease ($p=0.01$) of knee injections with a percentage of reduction of 44% was observed (Table 3).

We did not report the results about the impact of COVID-19 pandemic on the number of PRP and MSCs injections, because only a minority of the included centers performed such kind of treatments (3/11 centers and 2/11 centers, respectively).

Furthermore, our survey investigated the impact of COVID-19 pandemic on the p.a. injections which included local steroid injection treatment of the most common tendinopathies and neuropathies. Table 4 summarizes the number of p.a. injections performed during pandemic,

Table 3 - Mean and standard deviation of intra-articular hyaluronic acid injections and distribution by injected joint in 2019 and 2020 for center

Joint	2019	2020	p
All joints (mean \pm standard deviation)	487.91 \pm 414.16	303.45 \pm 318.88	0.004
Knee (mean \pm standard deviation)	244.73 \pm 43	136.91 \pm 116.51	0.01
Trapezio-metacarpal joint (mean \pm standard deviation)	24.64 \pm 43	13.10 \pm 19.09	0.2
Shoulder (mean \pm standard deviation)	60.73 \pm 51.53	41.10 \pm 30.35	0.10
Hip (mean \pm standard deviation)	151.27 \pm 348.46	108.54 \pm 275.68	0.09
Interphalangeal/Metacarpophalangeal joints (mean \pm standard deviation)	1 \pm 3	0.91 \pm 3.01	0.33
Ankle (mean \pm standard deviation)	4.54 \pm 6.65	2 \pm 2.72	0.09

Paired t test was used to evaluate differences between the two years for center.

Table 4 - Mean and standard deviation of peri-articular injections and distribution by injected condition in 2019 and 2020 for center

Joint	2019	2020	p
All conditions (mean ± standard deviation)	85.27 ± 53.93	56.82 ± 46.44	<0.001
Elbow enthesopathy (mean ± standard deviation)	28.10 ± 22.96	21.18 ± 17.68	0.08
Carpal tunnel syndrome (mean ± standard deviation)	8.81 ± 9.34	5.91 ± 6.74	0.07
Trigger finger (mean ± standard deviation)	7.27 ± 7.01	5 ± 6.48	0.04
De Quervain's tenosynovitis (mean ± standard deviation)	7.54 ± 6.80	4.54 ± 5.71	0.04
Trochanteric bursitis (mean ± standard deviation)	8.73 ± 21.68	4.18 ± 4.83	0.15
Plantar fasciitis (mean ± standard deviation)	16.54 ± 21.07	8.54 ± 11.97	0.98
Achilles' tendinopathy (mean ± standard deviation)	8.27 ± 8.38	4.18 ± 4.83	0.03
Facet joints (mean ± standard deviation)	2.54 ± 6.27	2 ± 4.79	0.26

Paired t test was used to evaluate differences between the two years for center.

in comparison to 2019, concerning the most frequent conditions treated by questionnaire's respondents. A significant reduction ($p < 0.001$) of the number of the p.a. injections was observed, passing from 85.27 ± 53.93 p.a. injections administered during 2019 to 56.82 ± 46.44 during 2020. Trigger finger, De Quervain's tenosynovitis and Achille's tendinopathy were the three conditions that resulted more affected by the reduction with a statistically significant decrease compared to 2019 ($p = 0.04$, $p = 0.04$ and $p = 0.03$, respectively).

The final part of the survey investigated the reasons behind the reduction of the injection-based practice in Italy during 2020. The majority of respondents (91%) thought that the strict lock-down phase, which lasted from March 9th to May 4th, 2020, and the fear of patients to become infected attending hospitals, mostly affected the limitations of the activities of the injections' services all around our country. Eighteen percent of respondents considered that also the difficulty to fully apply hygiene recommendations could have a role for this reduction, in association to the public authorities' limitations.

All the respondents thought to restore the normal injection practice in 2021.

Discussion

Injection-based therapy is considered a mainstay of conservative treatment of several musculoskeletal disorders, particularly widespread in OA, due to the anti-inflammatory and analgesic activities commonly administered. Such kind of approach has the advantage over systemic delivery to increase the bioavailability of the injected pharmacological agent, reduce systemic exposure with consequent fewer adverse events, and decrease the total drug cost (15). CSs and HA are the most widely used intra-articular therapies. Both the Osteoarthritis Research Society International (OARSI) and European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) guidelines support the use i.a. injections of CSs and HA in OA patients with persistent symptoms after first-line treatments and non-steroidal anti-inflammatory drugs (NSAIDs), with the first one recommended especially for short-term pain relief (16, 17).

The current paper provided an overview of the injection-based practice in Italy during the COVID-19 pandemic in 2020.

The activities of the injection's services in different Italian regions significantly decreased with a percentage of reduction of 60% compared to the pre-pandemic period (year 2019). A significant reduction of all kinds of investigated injections, both intra-articular and peri-articular ones was registered. Among i.a. treatments, the most affected ones were the HA injections, when compared to CSs, probably due to the indications of steroids also for urgent conditions, as arthritis flares. Further, the schedule of HA treatment, frequently characterized by the need of more consecutive injections, performed one week apart, could represented another limitation for the access to the injections outpatient's services.

The most frequent indication for the prescription of injection-based therapy remained OA both in 2019 and in 2020. A possible explanation can be represented by the difficulty to follow the actually available guidelines for the management of OA during COVID-19 pandemic. Indeed, patient education, therapeutic exercise and weight control are key points of OA therapy, but the prolonged closure of gyms and sport centers, together with the recommendation to stay home strongly limited this therapeutic strategy (16, 18). Further, the use of systemic nonsteroidal anti-inflammatory drugs (NSAIDs), the most common prescribed drugs in Europe for OA (19), was strongly discouraged in the early weeks of the epidemic for a possible correlation with higher risk of protracted and complicated course of COVID-19 pneumonia, although this hypothesis has never been confirmed subsequently (20, 21). For these reasons, i.a. injections with CSs and HA were considered a useful alternative for pain relief (22, 23).

However, since the onset of the COVID-19 pandemic, the use of i.a. CSs has been highly debated, considering the potential immunosuppressive effects of these pharmacological agents (24). Indeed, a short acting effect of CSs injections on

endogenous cortisol was demonstrated after 48 hours from the injection and lasting for 1-4 weeks (25). The retrospective study by Sytsma et al. (26) investigated the potential for CSs injections to increase susceptibility to influenza infection and found an absolute increase in annual infection risk of only around one in 1000. However, it should be underlined that the mean dose-equivalent of methylprednisolone considered in the above-mentioned study was 65.9 mg for each injection (over x1.5 the standard dose usually administered with single site injection) (26, 27). For these reasons, United Kingdom national guidelines, published in the first months of pandemic, recommended to reserve i.a. CSs only to patients with high levels of pain and disability, who have failed first-line measures and if symptom persistence will have negative effects on the health and well-being (28). Thus, it is noteworthy that the World Health Organization (WHO) did not provide specific guidelines on the use of steroid injections during the pandemic. More recently, two independent papers analyzing the incidence of adverse clinical outcomes related to COVID-19 infection following CSs injections were published. The retrospective study by McKean et al. (29) investigated the outcome of 443 patients treated with CSs injections between February 1st and June 30th, 2020, in Mandeville Hospital, UK. The Authors found a very low incidence of positive COVID-19 infection following steroids injections and no serious complications related to COVID-19 infection were registered. Similarly, Newton et al. (30) reported that none of the 30 patients treated with hand or wrist CSs injection between March 24th and June 19th, 2020 at Peterborough and Hinchingsbrooke hospitals, in UK, developed symptoms related to COVID-19 infection in the 30 days post-injection.

When stratified for injected joint or indication, a significant reduction was

found for ankle CSs injections, knee HA injections, and p.a. steroid injections for trigger finger, De Quervain's tenosynovitis and Achille's tendinopathy. However, it is probable that this sub-analysis was affected by the great heterogeneity of the injection clinical practice among the included centers, excepted for the knee, which represented the most frequent joint treated with injection-based therapy in all considered hospitals, in particular with i.a. HA.

The great majority of the interviewers though that the significant reduction of their injections' service was due to the strict government restrictions in the first wave of pandemic in association to the fear of patients to become infected in accessing hospitals. Indeed, until May 2020 the majority of the injections' services were totally closed or limited to the only urgent cases. Subsequently, all the included centers, although at a reduced level, restarted their activity, following careful hygiene rules, as reported by Oliva et al. (31).

We could hypothesize that the observed reduction in the injection-based practice across our country could have got worse the clinical conditions of patients affected by musculoskeletal disorders and negatively impacted on our healthcare system. Indeed, musculoskeletal diseases, including OA, which resulted to be the main indication for i.a. therapy in our survey, are associated with a high economical burden (32). For instance, a recent study by Colombo et al. (33) estimated that the mean of the direct medical costs of OA in Italy in 2019 was €22/patient for year; this would mean that the NHS spends approximately €2.5 billion per year for these patients. We can suppose that the closure of the injection services could have induced an increase of analgesics and NSAIDs consumption to alleviate pain, with possible cardiovascular and gastrointestinal complications, which in turn could have burden the NHS expense. Further, considering that the injection

practice cannot be dispensed by telemedicine and oral symptomatic drugs are not always effective for arthritis flares or can be contraindicated, the impossibility for patients with musculoskeletal disorders to access to i.a. therapy could have contributed to an increase of physical inactivity. Moreover, it is well known that physical inactivity represents a risk factor for all-cause mortality, cardiovascular diseases, diabetes, colon cancer, high blood pressure, osteoporosis, lipid disorders, as well as depression and anxiety. Thus, for these reasons, we think that the reduction of the injection service could have contributed to the burden of COVID-19 pandemic on healthcare system.

There are several limitations which need to be discussed. Firstly, all methodological bias associated with a survey-based study have to be mentioned: the adhesion bias, as centers volunteering for the questionnaire could not represent a uniform sample and the referral bias, as clinical units that experienced more difficulties could be more prone to answer promptly. Other possible drawbacks related to survey itself are that responses cannot be verified and that the collected data are heterogenous for age, experience and location of the practice. Further, demographic characteristics of the treated patients, as age and sex or detailed data about the kind of HA employed were not collected. Also, the possible incidence of COVID-19 infection following the injections was not evaluated. Then, we tried to include centers from Northern, Centre and Southern Italy, despite we could not include all the Italian regions in our paper. In addition, all the respondents belong to academic centers or hospital clinics. The heterogeneity of the collected data could also be increased by the different impact of the phases of pandemic with a major involvement of Northern Italy during the first wave and a more homogenous distribution across our country during the second wave.

In conclusion, through surveying a

sample of healthcare professionals, experts in different musculoskeletal disorders, a significant decrease of the injection-based practice in our country during the COVID-19 pandemic has been reported. These findings highlight the detrimental effects of the COVID-19 pandemic on the management of chronic musculoskeletal diseases with possible negative consequences in terms of disability and quality of life in the next years. As a consequence, this could lead to an increase of the economic burden of healthcare system for the direct and indirect costs related to musculoskeletal disorders.

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Riassunto

Impatto della pandemia Covid-19 sulla pratica infiltrativa: rapporto da un'indagine multicentrica e multidisciplinare italiana

Premessa. Non ci sono documenti che indagano l'impatto della pandemia di COVID-19 sulla pratica infiltrativa in pazienti affetti da diverse malattie reumatiche, inclusa l'osteoartrite. Lo scopo è stato quello di indagare l'impatto della pandemia di COVID-19 sulla pratica infiltrativa attraverso il paese italiano.

Disegno dello studio. Studio trasversale retrospettivo basato su una survey.

Risultati. Undici centri del Servizio Sanitario Nazionale hanno completato l'indagine. Le attività dei servizi infiltrativi sono notevolmente diminuite su tutto il territorio nazionale con una percentuale di riduzione del 60% rispetto al periodo pre-pandemico. È stata registrata una significativa riduzione delle iniezioni sia intra-articolari che peri-articolari. Tra trattamenti intra-articolari, quelli più colpiti sono stati le iniezioni di acido ialuronico, rispetto ai corticosteroidi. È stata osservata una significativa diminuzione della quantità totale di iniezioni peri-articolari. Le rigide restrizioni governative e la paura dei pazienti di contrarre l'infezione rappresentavano i fattori più limitanti.

Conclusioni. La diminuzione segnalata della pratica infiltrativa nel nostro paese durante la pandemia COVID-

19 evidenzia gli effetti dannosi della pandemia COVID-19 sulla gestione delle malattie muscolo-scheletriche croniche con possibili conseguenze negative in termini di disabilità e qualità della vita.

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Supplementary Material 1

The impact of the Covid-19 pandemic on injection-based therapy in patients with musculoskeletal diseases

Clinical Center: _____
Address: _____
Region: _____
Date of compilation: _____

Year 2019 section

In the year 2019 (January 1st, 2019 to December 31st, 2019) how many patients have You treated with intra-articular injections? ____

How many for osteoarthritis? ____

How many for rheumatoid arthritis? ____

How many for psoriatic arthritis / spondyloarthritis? ____

How many for microcrystalline arthritis? ____

How many for other pathologies? (please specify) _____

In the year 2019 (January 1st, 2019 to December 31st, 2019) how many intra-articular injections with corticosteroids have You done? ____

How many into the knee joint? ____

How many into the trapeziometacarpal joint? ____

How many into the shoulder joint? ____

How many into the inter-phalangeal/metacarpophalangeal joints? ____

How many into the hip joint? ____

How many into the radio-carpal joint? _____

How many into the ankle joint? ____

How many into the sacroiliac joint? _____

In the year 2019 (January 1st, 2019 to December 31st, 2019) how many intra-articular injections with hyaluronic acid have You done? ____

How many into the knee joint? ____

How many into the trapeziometacarpal joint? ____

How many into the shoulder joint? ____

How many into the inter-phalangeal/metacarpophalangeal joints? ____

How many into the hip joint? ____

How many into the ankle joint? ____

In the year 2019 (January 1st, 2019 to December 31st, 2019) how many intra-articular injections with autologous or allogeneic platelet-rich plasma (PRP) have You done? ____

How many into the knee joint? ____

How many into the trapeziometacarpal joint? ____

How many into the shoulder joint? ____

How many into the inter-phalangeal joints? ____

How many into the hip joint? ____

How many into the ankle joint? ____

In the year 2019 (January 1st, 2019 to December 31st, 2019) how many intra-articular injections with autologous mesenchymal stem cells (MSCs) have You done? ____

How many into the knee joint? ____

How many into the trapeziometacarpal joint? ____

How many into the shoulder joint? ____

How many into the inter-phalangeal joints? ____

How many into the hip joint? ____

How many into the ankle joint? ____

In the year 2019 (January 1st, 2019 to December 31st, 2019) how many patients have You treated with peri-articular injections? ____

For which pathology? Please specify with which drug/device/agent the injections were performed (corticosteroids, hyaluronic acid, NSAIDs, PRP, MSCs, ..)

For elbow enthesopathy (tennis elbow or golfer's elbow)? _____

For Achilles tendinitis / retrocalcaneal bursitis? _____

For hand pathologies (De Quervain's tenosynovitis, carpal tunnel syndrome, trigger finger, others..)? _____

For spine pathologies? _____

In the year 2020 (January 1st, 2020 to December 31st, 2020) how many patients have You treated with intra-articular injections? ____

How many for osteoarthritis? ____

How many for rheumatoid arthritis? ____

How many for psoriatic arthritis / spondyloarthritis? ____

How many for microcrystalline arthritis? ____

How many for other pathologies? (please specify) _____

In the year 2020 (January 1st, 2020 to December 31st, 2020) how many intra-articular injections with corticosteroids have You done? ____

How many into the knee joint? ____

How many into the trapeziometacarpal joint? ____

How many into the shoulder joint? ____

How many into the inter-phalangeal/metacarpophalangeal joints? ____

How many into the hip joint? ____

How many into the radio-carpal joint? _____

How many into the ankle joint? ____
 How many into the sacroiliac joint? _____

In the year 2020 (January 1st,2020 to December 31st, 2020) how many intra-articular injections with hyaluronic acid have You done? ____

How many into the knee joint? ____
 How many into the trapeziometacarpal joint? ____
 How many into the shoulder joint? ____
 How many into the inter-phalangeal/metacarpophalangeal joints? ____
 How many into the hip joint? ____
 How many into the ankle joint? ____

In the year 2020 (January 1st,2020 to December 31st, 2020) how many intra-articular injections with autologous or allogeneic PRP have You done? ____

How many into the knee joint? ____
 How many into the trapeziometacarpal joint? ____
 How many into the shoulder joint? ____
 How many into the inter-phalangeal joints? ____
 How many into the hip joint? ____
 How many into the ankle joint? ____

In the year 2020 (January 1st,2020 to December 31st, 2020) how many intra-articular injections with autologous MSCs have You done? ____

How many into the knee joint? ____
 How many into the trapeziometacarpal joint? ____
 How many into the shoulder joint? ____
 How many into the inter-phalangeal joints? ____
 How many into the hip joint? ____
 How many into the ankle joint? ____

In the year 2020 (January 1st,2020 to December 31st, 2020) how many patients have You treated with peri-articular injections? ____

For which pathology? Please specify with which drug/device/agent the injections were performed (corticosteroids, hyaluronic acid, NSAIDs, PRP, BMC, ..)

For elbow entesopathy (tennis elbow or golfer's elbow)? _____

For Achilles tendinitis / retrocalcaneal bursitis? _____

For hand pathologies (De Quervain's tenosynovitis, carpal tunnel syndrome, trigger finger, others..)? _____

For spine pathologies? _____

In Your opinion, which are the reasons why there was a reduction in the number of performed injection-based therapies (if there was actually a reduction)?

- a) Public authorities' recommendations to limit healthcare activities to solely emergencies and urgent cases
- b) Patient's fear to go to hospitals
- c) Impossibility to fully and safely apply hygiene rules recommended to prevent and restrain the COVID-19 pandemic (large spaces, air exchange, waiting room with interpersonal distancing of at least 1 m, personal protective equipments availability, ..)?
- d) other reason (please specify): _____

In Your opinion, how many injections will You perform in 2021? ____