Causes and types of disease in elderly patients leading to one or multiple hospital admissions in rheumatology wards of southwestern Iran: A 6-year review

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The physiological changes associated with aging and the presence of comorbid diseases may complicate the treatment of elderly patients with rheumatic diseases. This study aimed to determine the prevalence and main causes of admissions of elderly patients to rheumatology wards and the number and duration of their hospitalizations.

Data was collected on patients aged ≥ 60 who were admitted to rheumatology wards from 2008 to 2013. To make a good comparison, the last diagnoses of younger patients admitted to these wards were also recorded.

In the elderly group, the records of 399 patients admitted to hospitals with a flare-up of a new or known case of rheumatoid arthritis (RA) were compared with those of 480 young patients. No significant difference was seen between these two groups in the duration of hospital stay.

In the elderly group, hypertension (62.4%) was the most common comorbidity. The presence of psychiatric problems showed a significant association with the number of admissions (*P* value=0.037) as well as patients receiving infliximab, rituximab, and IV IG (*P* value=<0.001). Recurrent admissions were seen mostly in patients with psoriatic arthritis (PsA), polymyositis, and Behçet's disease.

Flare-ups or new diagnoses of RA were the most prevalent causes for the admission of elderly patients to rheumatology wards. Recurrent admissions were seen mostly in patients with PsA and were associated with the presence of psychiatric problems and a need for IV medications. The results highlight the need for healthcare centers to support outpatient clinics for elderly patients.

Keywords: Rheumatic diseases; hospital admission; elderly; review

Introduction

Rheumatic diseases represent a broad and heterogeneous group of diseases that can lead to frequent disabilities, impaired quality of life, and sometimes increased mortality [1]. The most common rheumatologic disorders in elderly populations are polymyalgia rheumatica (PMR), fibromyalgia, giant cell arteritis (GCA), crystalline arthropathies, and degenerative joint disease (DJD). Physiological changes associated with aging and decreases in functional reserves lead to adverse reactions to pharmacologic therapies, such as hepatotoxicity and occult gastrointestinal blood loss, and the presence of comorbid diseases like cardiovascular disease and cognitive impairment may complicate the management of rheumatic diseases in elderly patients [2]. Given the advances in managing rheumatic diseases and the new guidelines made in the last decade, new trends for the outpatient management of rheumatology patients and the complete reduction of inpatient ad-

missions (except for patients in poor condition) have been suggested. One study showed that day care is substantially cheaper than inpatient care and apparently does not compromise clinical outcomes [3].

The current study determined the prevalence and main causes of admissions of elderly patients to rheumatology wards, the number and duration of their hospitalizations, and the factors related to their multiple admissions.

Materials and Methods

Study subjects

The archived records of patients aged ≥60 who were admitted to the rheumatology wards of Hafez and Faghihi Hospitals, affiliated with Shiraz University of Medical Sciences, from March 2008 to February 2013 were studied. Patients with unproven diagnoses or who were transferred to another ward or hospital without any known diagnosis were excluded from the study. To make a good compari-

son, the latest diagnosis leading to admission of younger patients in these wards was recorded. Thus, the type of known or newly diagnosed rheumatic diseases in elderly inpatients, duration of hospital stay, number of admissions, and the presence of comorbid diseases were analyzed. The elderly patients were divided into two groups. Group one comprised patients with a rheumatic disease diagnosed upon admission to the ward, and group two comprised patients with a rheumatic disease previously defined by a rheumatologist during follow-up who referred to the hospital with a complaint related to that rheumatic disease or a non-rheumatologic complaint. The rheumatologic complaints included disease flare-ups, infections, adverse drug events, or other complaints.

Statistical methods

All data was kept in the patients' records, entered into SPSS 16, and then analyzed carefully by this software. The t-test and chi-square test were used for analysis. Results were shown as mean ± standard deviation. A P value < 0.05 was considered statistically significant.

Results

Demographic data

There were 500 elderly admissions during the time under study. After data analysis and the exclusion of patients with incomplete data or unknown diagnoses, the 399 remaining valid admissions in the elderly group were stud-

ied. In addition, 3161 patients below the age of 60 years were admitted during this time. The records of 480 of these young patients were selected by simple random sampling and compared with those of the elderly group. In the elderly group, 69.9% (279 individuals) were female and 30.1% (120 individuals) were male. Ages ranged from 60 to 88 years with a mean age of 69.6 ±7.7 years. The maximum duration of disease in this group was 38 years, and the minimum was zero, which means there were patients in this study whose disease was newly diagnosed. In the young patient group, ages ranged from 14 to 59 years with a mean age of 39.05 years. In this group, 19.4% (93 individuals) were male and 80.6% (387 individuals) were female. There were more females in both the elderly and the young group than males; however, the number of female patients was significantly higher in the young patient group (P value=<001).

Duration of hospital stay

The mean duration of hospital stay in the elderly group was 7.4±5.2 (1-49 days) days. The mean time for hospital stay in the young group was 6.84±5.1 (1-39) days. A comparison of the two groups showed that there was no significant difference in duration of hospital stay between younger and older patients (P value=0.302). The longest durations of admission were seen in patients with osteomyelitis, vasculitis, or septic arthritis (Table 1).

Table 1. Mean duration of hospitalization and mean number of admissions based on diagnosis in patients aged > 60 years old

Diagnosis	Number of patients N (%)	Mean duration of hospitalization (day)	Mean Number of admission (mean ± SD)	Diagnosis	Number of patients N (%)	Mean duration of hospitalization (day)	Mean Number of admission (mean ± SD)
Rheumatoid arthritis	262 (55.6%)	6.51 ± 4.16	1.6 ± 0.9	Osteoarthritis	36 (7.6%)	9 ± 8.37	1.1 ± 0.3
Scleroderma	21 (4.5%)	6.52 ± 2.96	1.5 ± 0.7	Systemic lupus erythematosus	15 (3.2%)	11.6 ± 8.68	1.2 ± 0.4
Gout	14 (3%)	5.42 ± 2.13	1.1 ± 0.3	Bacterial arthritis	12 (2.5%)	13.5 ± 10.27	1 ± 0
Giant cell arteritis	12 (2.5%)	7.83 ± 2.79	1 ± 0	Polymyositis	11 (2.3%)	5.81 ± 6.2	2.2 ± 1.4
CPPD	10 (2.1%)	5.5 ± 2.71	1.2 ± 0.4	Undifferentiated collagen vascular disease	9 (1.9%)	7.11 ± 4.01	1 ± 0
Osteoporosis	9 (1.9%)	3.55 ± 2.18	1.6 ± 1	Psoriatic arthritis	6 (1.3%)	7.83 ± 3.18	3 ± 1.5
Low back pain	5 (1.1%)	7.4 ± 3.04	1 ± 0	Behçet's disease	5 (1.1%)	9.8 ± 6.68	2.2 ± 1
Undifferentiated vasculitis	4 (0.8%)	6.75 ± 4.19	1 ± 0	Overlap syndrome	4 (0.8%)	5.5 ± 2.08	1.5 ± 0.5
Ankylosing spondylitis	4 (0.8%)	4.5 ± 3.69	1.5 ± 0.5	Uveitis	4 (0.8%)	6 ± 3.16	1.5 ± 0.5

Diagnosis	Number of patients (%) N	Mean duration of hospitalization (day)	Mean Number of admission (mean ± SD)	Diagnosis	Number of patients N (%)	Mean duration of hospitalization (day)	Mean Number of admission (mean ± SD)
Dermatomyositis	3 (0.6%)	4.33 ± 4.93	1.6 ± 0.5	Vasculitis	2 (0.4%)	18 ± 24.04	1 ± 0
Osteomyelitis	2 (0.4%)	22 ± 11.31	1 ± 0	Churg strauss disease	2 (0.4%)	13 ± 4.24	1 ± 0
Chronic monoarthicular arthritis	2 (0.4%)	10 ± 7.07	1 ± 0	Canal stenosis	2 (0.4%)	8.5 ± 2.12	1 ± 0
Membranoproliferative glomerulonephritis	2 (0.4%)	15 ± 7.07	2 ± 0	Inflammatory bowel disease (IBD)	1 (0.2%)	4	1 ± 0
Brucella	1 (0.2%)	10	1 ± 0	Undifferentiated spondyloarthritis	1 (0.2%)	6	1 ± 0
R/O malignancy	1 (0.2%)	5	1 ± 0	Arthritis of IBD	1 (0.2%)	18	1 ± 0
Post herpetic neuralgia	1 (0.2%)	3	1 ± 0	Mixed connective tissue disease	1 (0.2%)	5	1 ± 0
Discopathy	1 (0.2%)	6	1 ± 0	Osteonecrosis	1(0.2%)	8	1 ± 0
Unknown disease	1 (0.2%)	5	1 ± 0	Polymyalgia rheumatica	1 (0.2%)	8	1 ± 0
				Frozen shoulder	1 (0.2%)	8	1 ± 0

N:Number

SD: Standard deviation

Presence of comorbid diseases

In the elderly group, 76.9% had comorbidities, with hypertension being the most common disorder. The most common comorbidities analyzed in this study were hypertension (HTN): 62.4%, diabetes mellitus (DM): 24.1%, ischemic heart disease (IHD): 15.5%, cerebrovascular accidents (CVA)/transient ischemic attack (TIA): 1:8%, and psychiatric disease: 1.5%, respectively.

Admission of patients with known rheumatologic diseases

About 69% of admissions among the elderly occurred in patients with known and previously diagnosed rheumatic diseases. The most common, kn=own rheumatic diseases were rheumatoid arthritis (RA), osteoarthritis (OA), crystal arthropathy, systemic lupus erythematosus (SLE), and scleroderma. Most patients (96%) were admitted with a disease flare-up or with rheumatic complaints; the remaining 4% of patients had non-rheumatic complaints upon admission. In the group of previously diagnosed patients who were admitted to the hospital for rheumatic complaints, the most common, chief complaints were arthralgia and dyspnea, respectively. In the group of previously diagnosed patients who had been admitted for non-rheumatologic complaints, the most frequent complaints were weight loss, dyspnea, gastrointestinal bleeding, thyroid mass, lower extremity edema, and abdominal pain, respectively.

Admissions of elderly patients with no previous known rheumatic diseases

Overall, there were 484 admissions, among whom 147 patients (30.4%) were admitted due to new presentations of a rheumatic disease, including RA, giant cell arteritis (GCA), bacterial arthritis, undifferentiated connective tissue diseases, or crystal arthropathy, respectively (Table 3).

Table 2. The total elderly rheumatologic diseases leading to hospitalization during study time

Name of disease	Frequency	Percent
RA	262	55.6
Osteoarthritis	36	7.6
Scleroderma	21	4.5
SLE	15	3.2
Gout	14	3
Bacterial arthritis	12	4.2
Giant cell athritis	12	2.5
Polymyositis	11	2.3
CPPD	10	2.1
Osteoporosis(complicated)	9	1.9
Undifferentiated collagen vascular	9	1.9
Psoriatic arthritis	6	1.3
Behçet's disease	5	1.1
Low back pain	5	1.1
Undifferentiated vasculitis	4	8.
Ankylosing spondylitis	4	8.
Uveitis	4	8.
Overlap syndrome	4	8.
Dermatomyositis	3	6.
others	25	5.3

Drugs administered to the admitted elderly patients

Another parameter checked in this study was drug administration. Seventeen main drugs were evaluated. The drugs most commonly used for all diagnoses were glucocorticoids (78.7% of all cases). One hundred and ninety-six patients used NSAIDs, and 168 used methotrexate. Other medications used during hospital stays were sulfasalazine, hydroxychloroquine, colchicine, cyclophosphamide, rituximab, cyclosporine, intraarticular injections, IV IG, infliximab, and other drugs, respectively.

Patients with recurrent admissions

About 400 patients (82.6%) had been admitted one to four times (Table 2). The most common rheumatic diseases in patients with recurrent admissions were psoriatic arthritis, polymyositis, and Behçet's disease.

Table 3. New diagnoses in hospitalized elderly patients

Name of disease	frequency	Percent
RA	22	18.96
Giant cell arthritis	12	10.34
Bacterial Arthritis	12	10.34
Undifferentiated collagen vascular disease	9	7.75
Gout	9	7.75
CPPD	8	6.89
Osteopenia	6	5.17
Low Back Pain	5	4.31
Undifferentiated vasculitis	4	3.44
SLE	3	2.58
Polymyositis	3	2.58
Others	23	19.82

Each patient's age at each admission was evaluated to determine whether age was a predisposing factor for the number of admissions. The mean age of patients in the elderly group was almost the same (68.3); thus, in this group, age had no correlation with the number of admissions.

Another parameter that seemed to affect recurrent admissions was the presence of comorbid diseases. In all admissions, patients with comorbidities had more than one admission. Overall, comorbid disease did not have a statistically significant correlation with the number of admissions (P value=0.7). Although the existence of a comorbidity had no association with recurrent admissions, the presence of a positive medical history of psychiatric problems separately showed a significant correlation (P value=0.037). HTN, CVA.TIA, DM, and IHD had no association.

Drug use was another factor that was assessed and found to be correlated with the number of admissions. Glucocorticoids (P value=0.3), cyclosporine (P value=0.9), mycophenolate mofetil (P value=0.08), cyclophosphamide (P value=0.9), sulphasalazine (P value=0.1), NSAIDs (P value=0.3), colchicine (P value=0.9), and intra-articular injection (P value=0.8) did not show any significant relationship with different numbers of admissions. However, MTX (P value=0.02), hydroxychloroquine (P value=0.003), rituximab (P value=< 00001), infliximab (P value=< 00001), and IVIG (P value=< 00001) showed significant correlations.

Discussion

This retrospective research focused on patients older than 60 years of age. The goal of this research was to determine the nature of rheumatic disease in patients admitted to hospital and to compare the variables that can affect the number and duration of admissions.

The results showed that the percentage of hospitalized elderly females was greater than that of males. The difference between sexes has been proven by previous studies on most rheumatic diseases. In most rheumatic diseases like PMR, GCA, scleroderma, SLE, etc., female gender was a predisposing factor; one exception is gout, which was more prevalent in men [4-7].

The young group also comprised a greater number of females than males. The mean duration of stay in this group was similar to that of the elderly without any significant difference that could show that age is not a predictive value for duration of hospital stay.

The most common causes of admission in the elderly patients of this study were related to previously known rheumatic diseases, mostly RA (55.6%), and the most common reason for their admissions was a flare-up of their disease. In the newly diagnosed admitted groups, RA patients again had the highest rank. Both GCA and bacterial septic ar-

thritis held the second rank for newly diagnosed diseases among admissions in this study. In a study done by Lubart et al. in a geriatric rheumatology and rehabilitation ward, the most frequent causes of admission among the elderly were OA, crystal arthropathies, RA, undefined arthritis and then back problems, PMR, and GCA, respectively [8].

In 1995, Michet et al. showed that patients with RA were hospitalized at a higher rate than those without RA; this increased rate of hospitalization was found in both sexes, all age groups, all calendar years studied, and throughout disease duration [2]. In another study on patients with RA, a decrease in the number of hospitalizations was seen in RA patients in Italy from 2001-2008, probably because of better management as a result of earlier diagnosis and biologic and non-biologic treatments in their day care clinics, especially in 2005, and the availability of more effective treatments [9]. Therefore, increasing the number of day clinics and making them more available for patients will probably decrease the rate of RA hospital admissions at the hospitals in the current study.

In the group with known rheumatologic diseases, the second most prevalent cause of admission was scleroderma (5.9%), and the third was SLE (3.7%). The causes of the high rate of scleroderma admissions have been studied by the authors in a previously published study; although all age groups of patients were evaluated, it was found that uncontrolled digital ulcers, interstitial lung disease (ILD), and infections were the most common causes of hospitalization for this group of patients in the studied center (4).

The next group of elderly admissions were patients with acute or chronic, previously unknown conditions who were admitted for diagnosis. The most common new diagnoses were RA (18.9%) followed by giant cell arteritis (10.3%), septic arthritis (10.3%), and crystal arthropathies (7.7%), respectively. These results differed from those of Lubart et al., who found that crystal arthropathies were more frequent causes of admissions and connective tissue diseases other than RA were the least frequent causes of admissions in elderly patients [8]. This difference may be explained by the fact that the center of evaluation in Lubart et al.'s study was mostly a geriatric center for the long-term hospital care of elderly patients and a rehabilitation center instead of pure rheumatologic admissions. It should be mentioned that due to the cultural perspective in Iran, the prevalence of crystal arthropathies are lower in its population compared to other populations with higher alcohol use, and this may be the reason for the lower admissions rate of elderly populations with crystal arthropathies [10].

Recurrent admission was seen mostly in patients with psoriatic arthritis (3 times), patients with Behçet's disease (2 times), and patients with polymyositis (2 times). It seems that the main causes of their recurrent admissions should be determined. Furthermore, it seems that starting

biologic treatments for patients with psoriatic arthritis or continuing them, when insurance companies only support these medications in hospital for patients with Behçet's disease with severe uveitis and for patients with RA and psoriatic arthritis, are the main causes for their multiple admissions. Moreover, receiving IV IG for patients with resistant polymyositis was the main cause of multiple admissions of our patients with myositis.

About 77% of all patients had a positive medical history for at least one comorbidity. The current study focused on the diseases more commonly seen among the elderly (DM, HTN, CVA, etc.). Therefore, it is logical to find such percentage. Moreover, it was observed that the presence of a psychiatric comorbidity had a significant correlation with recurrent admissions for each disease. This indicates that more psychiatric care is needed for patients in clinical follow ups. It has been previously shown that patients with major depressive episodes during the treatment of RA had worse outcomes than mentally healthy patients [11]. In addition, it was reported that the number of comorbid conditions was significantly associated with the length of hospital stay and hospital charges for patients with RA [12]. In a study by Joyce et al., patients with cardiovascular disease and/or depression had a greater rate of RA-related hospitalizations [13]. In another study by Sibley et al., poor global assessment, high disability index, and the presence of comorbid disease on admission as well as admission late in the week were predictive of prolonged hospital stays in patients with RA [14]. In addition, no correlation between age and duration of hospital stay was observed in elderly patients compared with younger patients in the current study.

In the current study, a correlation was seen between the number of admissions and use of MTX and hydroxychloroquine, and a significantly higher correlation was seen with rituximab, infliximab, and IVIG. The reason for this bias regarding biologics and IVIG, as previously stated, is the admission of such patients to receive IV medications in hospital either for better insurance support or to start a more potent treatment for patients in poor condition. In another study on patients with RA, the risk factors for the most frequent causes of hospitalization were age, serum albumin level, and corticosteroid use (>5 mg prednisolone), but not methotrexate or biological agent use [15]. The current results differed from those of the study on methotrexate and prednisolone; patients in the current study were not compared based on their steroid dose, and this was one limitation of the study.

All rheumatologic diseases were analyzed to determine the effect, if any, of type of disease on the duration of admission. The longest durations were observed for osteomyelitis followed first by septic arthritis and then by vasculitis. This result is related to the long-term need of these infectious diseases for intravenous antibiotic treatment.

The current results and the high burden of elderly RA inpatients (both new diagnoses or flare-ups) prompted the authors to establish a new program for referring patients for early diagnosis of RA and to establish day clinics for biologic treatments supported by the patients' insurances.

Conclusion

In the current study, the most prevalent causes for admissions among elderly patients in the rheumatology wards of the studied hospitals were flare-ups of RA in previously diagnosed patients, OA, crystal arthropathy, systemic lupus erythematosus (SLE), and scleroderma, respectively. The admission of elderly patients with no previously known rheumatologic disease resulted most often in diagnoses of RA, GCA, and bacterial arthritis, respectively. The mean duration of stay in both the young and the elderly groups was the same, indicating that age is not a predictive value for duration of hospital stay. Recurrent admissions were associated with a previous history of psychiatric disease and a need for IV medications. The results reinforce the need for healthcare services and insurance companies to support outpatients clinics prepared to use intravenous biologic therapies and other medications, especially in the elderly population.

Acknowledgments

Conflict of Interest

The authors declare no conflicts of interest.

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