Rheumatol. Forum
2022, vol. 8, No. 2, 60–68

ISSN: 2720-3921, e-ISSN: 2720-3913
10.5603/RF.2022.0006

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Analysis of hospital admissions of rheumatoid arthritis patients in the context of everyday clinical practice

ABSTRACT

Rheumatoid arthritis is a chronic autoimmune connective tissue disease. Among all autoimmune diseases, rheumatoid arthritis is still recognised as having the most complicated pathogenesis. The importance of early diagnosis of RA and the prompt implementation of effective treatment that will lead to remission should be emphasised. The introduction of biological drugs for the treatment of arthritis at the end of the 20th century proved to be a „milestone" in rheumatology. These drugs have been targeted to stop or slow down the progression of the disease. However, not all treated patients will benefit from such treatment since a significant proportion of patients do not respond to the treatment.

The study aimed to analyse in real-world clinical practice patients admitted to a typical rheumatological department. Patients were analysed in terms of biological treatment, age, admission procedure, gender, comorbidities, reduction in disability, as well as articular and extra-articular complications.

Most of the hospitalised patients were women, married people and people living in the city. Most of the hospitalised patients are 61 to 80 years old. It is worth noting that biologically treated patients — 43 people, were hospitalised more than once a year. Usually, they received biological drugs on a scheduled basis, once a month.

Studies show that patients included in the drug programme have fewer mobility limitations and fewer articular and extra-articular complications. They are between the ages of 41 and 60 and have a university degree

Rheumatol. Forum 2022, vol. 8, No. 2: 60–68

KEY WORDS: rheumatoid arthritis; biological treatment; hospitalisation rates

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic systemic connective tissue disease, the most common form of chronic inflammatory arthropathy, affecting 1–2% of the general population [1]. It has a course that is difficult to predict, with an uncertain prognosis and periods of exacerbation and remission [2]. The characteristic feature of the disease is the presence of arthritis, affecting small joints of the hands and feet, usually occurring symmetrically [3]. Over time, the disease may also affect other joints, leading to deformity and structural changes [4]. Moreover, RA leads to extra-articular lesions and organ complications that lead to disability, invalidity and also premature death.

Quality of life in RA patients is mainly affected by invalidity, persistent pain, fatigue and depression, but is also influenced by their beliefs about their health and psychological problems [5, 6]. The treatment of patients with RA should therefore be comprehensive and include pharmacotherapy, physiotherapy and, in some cases, psychological support. Pharmacotherapy with disease-modifying drugs and, if these are ineffective, the use of biologics or targeted disease-modifying drugs (tsDMARDs) is a key element of disease management [7]. With the introduction of such a complex treat-

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ment, it has become possible to slow down or even prevent the progression of the disease, especially in the context of adopting new therapeutic strategies based on achieving maximum effectiveness of treatment.

Both pharmacological and non-pharmacological management of RA is included in the recommendations of the European League Against Rheumatism (EULAR). The main principle is goal-oriented treatment, and this involves using all available treatment methods to achieve remission or low activity of the disease [8].

If the above treatment methods are not sufficiently effective, i.e. do not lead to remission/low disease activity, then the guidelines indicate that the patient should be considered for so-called biological drugs.

The presented study attempts to analyse the health of RA patients treated in a clinical rheumatology department in a daily clinical practice setting.

AIM AND ASSUMPTIONS

This study aimed to analyse patients with RA who were treated with biologics in the Department of Internal Medicine and Rheumatology in 2019.

The following specific research questions were formulated to address the main research problem:

— What was the mode of admission for inpatients, elective or urgent?
— What was the length of stay of patients in the ward during hospitalisation?
— Was the patient hospitalised more often than once a year?
— What symptoms were predominant in the exacerbation of the patient's disease?
— Did the patient receive biological treatment?
— What are the most common comorbidities?
— Is there any reduction in disability in patients?
— What is the severity of articular and extra-articular complications?

MATERIALS AND METHODS

The study involved an analysis of the medical records of 88 patients who were admitted between 1 January and 31 December 2019 to the Department of Internal Medicine and Rheumatology of the Medical University of Silesia in Katowice. Research was carried out with the prior approval of the Head of the Department. Due to the retrospective nature of the study, the approval of the Bioethics Committee was not required.

The data was collected from the hospital's electronic information system. This system contains data collected on the basis of the ICD-10 international classification of disease entities (International Statistical Classification of Diseases and Related Health Problems). Statistical data are downloaded into the system according to the primary diagnoses in the patients' hospital discharge summaries.

The method of documentary analysis was used to achieve the formulated objectives. The study used the technique of survey and the research tool was an original survey questionnaire. The questionnaire contained 19 questions designed to facilitate the analysis of the medical records available to provide answers to the research problems outlined.

Microsoft Excel 2010 was used to collect and process the material. For the analysis, patients were divided into groups based on sex, age, biological treatment and mode of admission.

Records of a total of 88 RA patients including 20 men (17.6%) and 68 women (82.4%) aged 23–82 years were analysed. The duration of the disease ranged from 1 year to 45 years (mean 14 years). The patients included in the analysis met the inclusion criteria for the National Health Fund's therapeutic programme covering biological treatment.

CHARACTERISTICS OF THE SAMPLE GROUP

The majority of patients in the study were aged 61–80 years (44 patients — 50%) while the smallest number of patients were over 81 years of age (2 patients — 2.3%). An analysis of the study shows that patients aged 21–40 years are exclusively female, amounting to 7 patients and representing 8% of all patients. The mean age of the subjects was 60 years (Table 1).

The analysed group was predominantly residents of urban areas — 64 patients (72.7%), while 24 patients (27.3%) were patients who live in rural areas. The detailed characteristics are shown in Table 2.

RESULTS

MODE OF HOSPITAL ADMISSION

The analysis of the records shows that 68 patients (77.3%) were admitted on an elective basis, while only 20 patients (22.7%) were

Table 1. Comorbidities in hospitalised patients

n		21–40 years n = 7		41–60 years n = 35		61–80 years n = 44		80–100 years n = 2	
		Percentage of patients	n	Percentage of patients	n	Percentage of patients	n	Percentage of patients	
Diabetes mellitus		0	0	4	11.4	9	20.5	1	50
Gastrointestinal diseases		0	0	7	20	14	31.8	1	50
Neurological diseases		1	14.3	0	0	3	6.8	0	0
Skin diseases		0	0	1	2.9	0	0	0	0
Cardiovascular disease		3	42.9	19	54.3	33	75	2	100
Respiratory diseases		0	0	6	17.1	13	29.5	1	0
Diseases of the urinary tract		1	14.3	3	8.6	7	15.9	0	0
Osteoporosis		0	0	5	14.3	10	22.7	0	0
Cancer		0	0	1	2.9	1	2.3	0	0
Other diseases	Anaemia	1	14.3	3	8.6	9	20.5	0	0
	Thyroid diseases	2	28.6	3	8.6	8	18.2	1	50
	Hyperlipidaemia	0	0	4	11.4	6	13.6	1	50
	Cataract	0	0	3	8.6	5	11.4	1	50
	Other diseases	0	0	1	2.9	2	4.6	0	0

Table 2. Characteristics of the sample group

n		Biological treatment n = 43			Treatment other than biological n = 45		
		%	Percentage of patients treated with biologics	n	%	Percentage of patients treated with non-biological drugs	
Sex	Female	35	39.8	81.4	33	37.5	73.3
	Male	8	9.1	18.6	12	13.6	26.7
Place of residence	Urban areas	30	34.1	69.8	34	38.6	75.6
	Rural areas	13	14.8	30.2	11	12.5	24.4
Level of education	Primary education	4	4.5	9.3	6	6.8	13.3
	Vocational education	13	14.8	30.2	18	20.5	40
	Secondary education	7	8	16.3	7	8	15.6
	Higher education (university degree)	19	21.6	44.2	14	15.9	31.1
Professional activity	In employment	19	21.6	44.2	11	12.5	24.4
	Unemployed	24	27.3	55.8	34	38.6	75.6
Age	21–40 years	6	6.8	14	1	1.1	2.2
	41–60 years	20	22.7	46.5	15	17	33.3
	61–80 years	17	19.3	39.5	27	30.7	60
	81–100 years	0	0	0	2	2.3	4.4

admitted to the department under the emergency procedure.

Patients treated under the drug programme were also included in the study. Of note, an analysis of these results reveals that patients receiving biological treatment are more frequently admitted on an elective basis — 43 patients, which represents 63.2% of elective admissions to the Department of Internal Medicine and Rheumatology, while only non-biologically treated patients are admitted urgently — 20 patients, which represents 100% of urgent admissions to this department. Patients not treated in the drug programme are admitted both on an elective basis with 25 patients (55.6%) and on an urgent basis with 20 patients (44.4%).

Table 3. Types of articular and extra-articular complications in hospitalised patients

	Total		Biological treatment n = 43			No biological treatment n = 45		
	n	%	n	%	Percentage of patients treated with biologics	n	%	Percentage of patients not treated with biologics
Articular complications								
Joint deformities	28	31.8	17	19.3	39.5	11	12.5	24.4
Joint pain	19	21.6	6	6.8	14	13	14.8	28.9
Joint swelling	25	28.4	8	9.1	18.6	17	19.3	37.8
Limited joint mobility	14	15.9	3	3.4	7	11	12.5	24.4
Nodules	3	3.4	2	2.3	4.7	1	1.1	2.2
Contractures in joints	4	4.5	2	2.3	4.7	2	2.3	4.4
Redness on joints	3	3.4	0	0	0	3	3.4	6.7
Paresthesias	3	3.4	0	0	0	3	3.4	6.7
Extra-articular complications								
Urinary tract infections	7	8	1	1.1	2.3	6	6.8	13.3
Haematuria	1	1.1	0	0	0	1	1.1	2.2
Fever	8	9.1	1	1.1	2.3	7	8	15.6
Diarrhoea	1	1.1	0	0	0	1	1.1	2.2
Nausea	4	4.5	0	0	0	4	4.5	8.9
Constipation	1	1.1	0	0	0	1	1.1	2.2
Abdominal pain	4	4.5	0	0	0	4	4.5	8.9
Dyspnoea	2	2.3	1	1.1	2.3	1	1.1	2.2
Cough	4	4.5	0	0	0	4	4.5	8.9
Ulcerations	5	5.7	2	2.3	4.7	3	3.4	6.7
Mucosal dryness	3	3.4	1	1.1	2.3	2	2.3	4.4
Rash	1	1.1	1	1.1	2.3	0	0	0
Pruritus	3	3.4	2	2.3	4.7	1	1.1	2.2
Headache	1	1.1	0	0	0	1	1.1	2.2
Dizziness	3	3.4	1	1.1	2.3	2	2.3	4.4
Vision disorders	1	1.1	0	0	0	1	1.1	2.2
Sweating	2	2.3	1	1.1	2.3	1	1.1	2.2
Deep vein thrombosis	2	2.3	2	2.3	4.7	0	0	0

LENGTH OF HOSPITAL STAY

More than half of the patients admitted to the Department of Internal Medicine and Rheumatology in 2019 were admitted for one day only (Table 3).

The results shown below reveal that 100% of patients receiving biological treatment stay in the ward for one day. They account for 93.5% of one-day stays in the ward. The situation is different for those not receiving treatment under the drug programme. The results show that the largest number of those patients stay in the ward for 6 to 10 days (n = 20; 44.4% of non-biologically treated patients). The smallest number of patients are hospitalised for more than 20 days, and there were only 3 of them, which represents 6.7% of the non-biologically treated patients.

NUMBER OF HOSPITAL ADMISSIONS FOR ONE PATIENT OVER ONE YEAR

In the analysed group, 45 patients (51.1%) were hospitalised once a year compared to 43 (48.9%) who were hospitalised several times. It can be noted that the patients hospitalised once a year were mainly non-biologically treated ones — 41 (91.1%). On the other hand, among patients hospitalised many times during a year, patients receiving biological treatment predominated — 41 (95.3%).

Analysis of the results of the study showed that the largest number of patients receiving biological treatment are admitted to the ward 11–12 times per year — 11 patients, representing 12.5% of all patients and accounting for 25.6% of those receiving biological treatment.

PATIENT'S PREDOMINANT SYMPTOMS IN AN EXACERBATION OF THE DISEASE

Analysis of predominant symptoms showed that most patients had more than one predominant symptom. The most commonly reported symptom was pain in the joints, which was present in 83 (94.3%) of the subjects with a similar distribution in both sexes. In contrast, the least common predominant symptoms were muscle weakness — 15 people (17%) and fatigue — 20 people (22.7%). Other symptoms experienced by patients were fever — 4 people (4.5%), hotness in the joint — 1 person (1.1%), erythema — 1 person (1.1%), and paresthesias — 1 person (1.1%). In total, as many as 203 predominant symptoms were registered in 88 patients, of which 155 (76.4%) symptoms affected women and 48 (23.6%) affected men 11) (Table 4).

ANALYSIS OF BIOLOGICALLY TREATED AND HOSPITALISED PATIENTS

An analysis of patients according to the type of treatment applied (biologic *vs.* conventional) showed a similar pattern of admissions in both groups — 43 (48.9%) patients treated with biologics *vs.* 45 (51.1%) not treated in the drug programme.

In both groups, there was a quantitative predominance of women and a similar structure of the place of residence (urban *vs.* rural areas).

Greater disproportions were observed in the level of education. The group of patients receiving biological treatment were predominantly university graduates — 19 people, representing 44.2% of those treated in this way. In contrast, the other group was predominantly people with vocational education — 18 people, which represents 40% of those treated with synthetic drugs. The assessment of the employment structure of the patients showed a slight predominance of professionally inactive persons — 24 persons against 19 persons in employment.

The majority of patients receiving biological treatment were aged between 41 and 60 years — 20 patients, representing 46.5% of patients receiving biological treatment, and there were no patients aged over 81 years.

In the analysed group of patients treated with biologics, the largest number of patients were those with the shortest duration of treatment — 12 patients (27.9%). The second most numerous group are patients receiving biological treatment for 7 to 12 months — 10 patients (23.3%). The analysis shows a predominance of women in every subgroup, which may be attributed to the fact that the majority of RA patients are women. Most women — 10 (28.6%) were treated with this method for 1–6 months. As for men, they were most often treated for 7–12 months — 4 (50%) patients.

COMORBIDITIES IN HOSPITALISED PATIENTS

It is worth noting that the majority of patients had more than one comorbidity. The medical records of the patients indicate that the most frequent comorbidities include cardiovascular diseases, which occurred in 57 patients (64.8%), regardless of the age group of the patients, while the least frequent comorbidities were skin diseases — 1 patient (1.1%) and cancer — 2 patients (2.3%).

After cardiovascular diseases, gastrointestinal diseases were the most common comorbidity in both men and women — they were recorded in 16 women, which is 23.5%, and 6 men, which is 30% of the men in the study.

Gastrointestinal diseases were the second most common group of diseases both in patients between 41 and 60 years of age, and between 61 and 80 years of age (Table 1).

REDUCED PHYSICAL FUNCTION IN PATIENTS

An analysis of the severity of disability and the need for orthopaedic equipment showed that the majority of patients — 57 (64.8%) — did not require such equipment. Considering the method of treatment, it should be noted that as many as 36 (83.7%) of the patients treated with biologics do not use orthopaedic equipment. This is a large disproportion compared to patients not treated with biologics and using such equipment — 24 (53.3%) patients. The structure of the use of orthopaedic equipment is shown in Table 5.

Table 4. Types of symptoms predominating during disease exacerbation according to age and gender of hospitalised patients

	21–40 years n = 7			41–60 years n = 35			61–80 years n = 44			80–100 years n = 2			Total n = 88			Women n = 68			Men n = 20		
	n	%	Percentage of symptoms	n	%	Percentage of symptoms	n	%	Percentage of symptoms	n	%	Percentage of symptoms	n	Percentage of patients	Percentage of symptoms	n	Percentage of patients	Percentage of symptoms	n	Percentage of patients	Percentage of symptoms
Joint swelling	4	57.1	30.8	23	65.7	27.7	19	43.2	18.8	1	5	16.7	47	53.4	23.1	37	54.4	23.9	10	50	20.8
Joint pain	7	100	53.8	34	97.1	41	40	90.9	39.6	2	100	33.3	83	94.3	40.9	64	94.1	41.3	19	95	39.6
Stiffness in the morning	1	14.3	8	13	37.1	15.7	16	36.4	15.8	1	50	16.7	31	35.2	15.3	22	32.4	14.2	9	45	18.8
Muscle weakness	1	14.3	8	3	8.6	3.6	11	25	10.9	0	0	0	15	17	8.4	13	19.1	8.4	2	10	4.2
Fatigue	0	0	0	7	20	8.4	12	27.3	11.9	1	50	16.7	20	22.7	9.9	15	22.1	9.7	2	10	4.2
Other diseases	0	0	0	3	8.6	3.6	3	6.8	3	1	50	16.7	7	8	3.4	4	5.9	9	3	15	6.3
Symptoms in total	13		100	83		100	101		100	6		100	2	2.3	1	2	2.9	1.3	2	10	4.2

Table 5. Types of orthopaedic equipment used by in-patients

Orthopaedic equipment	Biological treatment n = 43			Not treated with biologics n = 45		
	n	%	Percentage of patients treated with biologics	n	%	Percentage of patients not treated with biologics
Cane	1	1.1	2.3	8	9.1	17.8
Crutches	4	4.6	9.3	2	2.3	4.4
Walker	1	1.1	2.3	11	12.5	24.4
Wheelchair	1	11	2.3	3	3.4	6.7

ARTICULAR AND EXTRA-ARTICULAR COMPLICATIONS IN HOSPITALISED PATIENTS

In a significant proportion of patients, comorbidity with another serious illness was recorded. On average, one person was found to have more than one complication of both articular and extra-articular nature. In this group of patients, however, articular complications predominate, which were found in 64 patients, i.e. 72.7% of those assessed. Articular complications were found in 28 (65.1%) of those treated with biologics, with as many as 31 patients (72.1%) reporting no associated symptoms. Considering patients not treated with biologics, 36 (80%) of them had articular complications and 33 (73.3%) had non-articular complications. Among articular complications, joint deformities were the most common ones. Interestingly, despite the existence of structural joint changes, a significant proportion of patients did not report complaints related to the involved joints. On the other hand, among extra-articular complications, the most common complication was fever, which was reported in 8 patients (9.1%).

Joint swelling, in turn, was significantly more common in the group not receiving biological treatment. Among systemic symptoms, similar to the group treated with biologics, the most common ones were fever, which was observed in 7 patients (15.6% not treated with biologics), and urinary tract infection — in total in 6 patients (13.3% not treated with biologics) (Table 3).

DISCUSSION

Rheumatoid arthritis is an incurable chronic systemic connective tissue disease that usually affects small joints and also contributes to the impairment of the function of internal organs. The chronic inflammation associated with the disease and the clinical symptoms experienced by patients have a significant impact on their quality of life [9]. The persistent progression of the disease and the accompanying pain often make it difficult or impossible to carry out daily activities independently, and thus to function in the family and society. All of this leads to the deterioration of the patient's mental well-being [10]. For this reason, it is very important to diagnose the disease as soon as possible and then initiate the appropriate treatment to achieve remission [7]. Fortunately, the number of therapeutic options for the treatment of RA has increased in recent years. This has resulted in improved patient outcomes and reduced the number of complications that in the past had a negative impact on quality of life and markedly shortened patient survival. Unfortunately, rheumatology patients have many chronic diseases resulting in more frequent use of medical care and a range of related responsibilities. An additional difficulty is the shortage of medical staff, the reduction in the number of wards and the long waiting times for specialist appointments. All this leads to a discrepancy between patients' health problems and the possibilities of addressing them.

An analysis of the pattern of admissions showed that the majority of those admitted were aged 61–80 years. These data are in agreement with findings reported by other Polish authors. An analysis of these studies shows that the average age was 46 years for men, compared to 53 years for women. An analysis of the many available studies shows that the average age of patients with connective tissue diseases ranges from 40 to 60 years.

This study analyses the demographics and clinical features of patients usually treated in a daily practice setting in one of the typical rheumatology departments in Poland. The analysis showed changes in the structure of admissions with a predominance of one-day admissions dictated by the requirements

of the treatment programme. Patients admitted outside the therapeutic programme are those admitted for emergency indications, with an exacerbation of the disease. This admission structure reflects trends in RA treatment, based mainly on outpatient care that guarantees a professional and comprehensive approach to the patient, with modification of the treatment if needed [11]. This approach to the management of RA brings our country closer to the standards developed in Western Europe and the United States [12]. Analysis of the structure of admissions shows that there is still an almost perfect balance between admissions of biologically treated patients and patients admitted for emergency indications. An important difference, however, is that patients admitted for emergency indications were admitted on average once a year while patients receiving biological treatment were admitted on average once a month. Naturally, these data reflect the requirements of the National Health Fund treatment programme. The demographic structure of patients receiving biological treatment is changing, with a predominance of university graduates living in urban areas [13]. This observation is in line with global trends linking care for one's health with the level of education, reflected in a higher economic status, a better level of health awareness and sometimes better accessibility to specialised medical care. This group of patients is also interested in returning to work as soon as possible, with a smaller loss of earnings [14].

The structure of patients assessed in terms of gender is not surprising. RA is a disease that more frequently affects women, hence the clear predominance of females in the analysed group [13]. However, the relatively low proportion of very young and middle-aged patients is somewhat surprising. This is an important observation because, considering the age at which the disease develops, it shows that middle-aged individuals with high professional potential and major responsibilities related to their social roles still do not fully benefit from effective treatment that in many cases ensures the achievement of a lasting remission. It can only be presumed that the time taken to decide that a patient should be transferred to biological treatment is too long. In this case, EULAR recommendations should be applied more extensively and such patients should be referred for treatment, especially if the treatment provided so far seems suboptimal or if there are factors of poor prognosis [15, 16].

The present study confirms the common occurrence of multimorbidity among RA patients, especially the occurrence of cardiovascular disease [17]. Despite better treatment of both RA and cardiovascular disease, this group of diseases constitutes a factor significantly limiting the full recovery and has a markedly negative impact on the quality of life of these patients [18–21]. In view of the age structure of RA patients and the duration of the disease, it could be speculated that a significant proportion of cardiovascular complications were developed as a consequence of the ineffective treatment of RA before formal inclusion in the treatment programme. This requires that patients should be considered more quickly for inclusion in treatment programmes that guarantee optimal suppression of the disease in order to avoid irreversible cardiovascular changes.

The final aspect of the presented study is the economic analysis. As shown in the paper, emergency admissions resulted in prolonged hospital stay (up to 20 days). In this case, the cost of the stay alone („hospitality cost") amounted to PLN 9,000. This simple analysis shows that, despite the high unit cost of purchasing a drug, avoiding costly hospitalisations can be an economically legitimate measure.

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