



Seroprevalence of markers of autoimmune diseases in the immunology laboratory of the University Hospital Joseph Ravoahangy Andrianavalona

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Abstract

Introduction: Autoimmune diseases (AIDs) occur as a result of a dysfunction of the immune system which, instead of defending the body against external aggressions, attacks the components of the "self". Some antibodies are specific to an autoimmune pathology. The presence of antinuclear antibodies (ANA) and rheumatoid factor (RF) are biological signs of autoimmune diseases such as systemic lupus erythematosus and rheumatoid arthritis, and Antistreptolysin O (ASO) is commonly evaluated in the suspicion of rheumatic fever. Our objective is to estimate the prevalence of three autoimmune markers (ANA, FR and ASO) performed in the Immunology Laboratory of the Joseph Ravoahangy Andrianavalona Hospital (JRAH).

Material and Methods: The study was a retrospective, analytical study investigating on markers of autoimmune diseases at the Formation and Research Paraclinic Unit in Immunology (FRUI) of the Joseph Ravoahangy Andrianavalona Hospital (JRAH). The study was conducted over five years from January 2015 to 2020 based on the consultation the requests for analysis of antinuclear antibodies, rheumatoid factor and ASO.

Results: During the study period, 87 requests for antinuclear antibody analysis were processed, of which 18 cases were positive (20.7%), for rheumatoid factor, among 321 requested tests 22 (6.9%) and 1,346 ASO requests, 47.8% were above 200 IU/L.

Conclusion: Taken together, our study agrees with the findings of many authors who suggest that the three markers of autoimmune diseases predominate mostly in women with particular age range dominated over 40 years for ANA and RF and young under 20 years for ASO.

Keywords: Autoimmune Diseases; Rheumatoid Factors; Antinuclear Antibody; Antistreptolysin O; Madagascar

1. Introduction

Autoimmune diseases are common diseases worldwide and pose a public health problem such as cardiovascular diseases and cancer. Autoimmune diseases (AIDs) occur as a result of a dysfunction of the immune system which, instead of defending the body against external aggressions, attacks the components of the "self".

The clinical manifestations are varied and depend on the organ targeted by the immune system. The diagnosis of autoimmune diseases is based on certain clinical and biological criteria [1]. Some antibodies are specific to an

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autoimmune pathology whose dosage is necessary to (i) make the diagnosis, (ii) follow the evolution of the disease and (iii) ensure healing or recurrence. For instance, the presence of antinuclear antibodies (ANA) and rheumatoid factor (RF) are biological signs of autoimmune diseases such as systemic lupus erythematosus and rheumatoid arthritis, respectively. Likewise, Antistreptolysin O (ASO), an antibody specifically produced following infection by *Streptococcus*, is commonly evaluated in the suspicion of rheumatic fever and several other pathologies due to hemolytic *Streptococcus* [1].

Studies of markers of autoimmune diseases are very rare in Madagascar. Our objective is to estimate the prevalence of three autoimmune markers (ANA, FR and ASO) performed in the Formation and Research Paraclinic Unit in Immunology of the Joseph Ravoahangy Andrianavalona Hospital (JRAH).

2. Methods

This is a retrospective, analytical study on markers of autoimmune diseases at the Formation and Research Paraclinic Unit in Immunology (FRUI) of the Joseph Ravoahangy Andrianavalona Hospital (JRAH). The study was conducted over five years from January 2015 to 2020 based on the consultation of the registers or laboratory bench books containing the requests for analysis of antinuclear antibodies, rheumatoid factor and ASO in the FRUI of JRAH. This was an exhaustive sampling of all blood samples that arrived in the department with a request for the determination of the three markers. We included in the study all patients of any age and gender who had a medical prescription for the three parameters during the study period. We excluded incomplete records.

For each file, we analyzed the patients' epidemioclinical parameters (age, sex, clinical information) and the results of the screening tests.

The data were collected on Microsoft office Excel 2013 and the statistical analysis of the data was performed with R software, the threshold value of p is 5%. Chi-square test was used to compare the observed percentages. Student's t -test was used to compare means. Measures were taken to ensure strict confidentiality in the preparation of the records.

3. Results

During the study period, 87 requests for antinuclear antibody analysis were processed, of which 18 cases were positive (20.7%), with a female predominance of 72 % (table 1). The predominant age range was between 40 and 59 years. We found that the majority of clinical information from the prescriber were dermatological manifestations (44.44%). In the age group of 20 to 39 years, 42.86% of the positive population had joint and dermatological manifestations whereas in the age group of 40 to 59 years, 55.56% of positive population presented other manifestations such as renal, neurological, cardiac and abdominal signs. Our study revealed that the female gender dominated in the dermatological manifestations (7 women for 1 man).

Concerning the rheumatoid factor, among 321 requested tests 22 (6.9%) were positive. As for ANA, the predominance of the female gender at 72.73% was noted (table 1). We found a peak in frequency for the population aged between 40 and 59 years (63.64%). Among the clinical information, joint manifestations dominated over other signs, 77.27%.

Most of positive people in the 40-59 age group (12 cases) were women, while the majority of those over 60 years old were men (4 cases).

Of the 1346 ASO requests, 664 patients (47.8%) were above 200 IU/L. The predominance of females at 61.96% was noted (table 1). The peak age for ASO positivity (22.52%) was 10 to 19 years. Joint manifestations represented 43.79% of the clinical information.

Table 1 Prevalence of three autoimmune markers (ANA, FR and ASO)

	ASO	FR	ANA
Female	399 (61.94%)	16 (66.66%)	13 (72.22%)
Male	245 (38.04%)	6 (33.33%)	5 (27.77%)
	644 (47.8%)	24 (6.9%)	18 (20.7%)

4. Discussion

Antinuclear antibodies are a group of autoantibodies that react with various constituents of the nucleus. According to the study of Dinse et al. which is done in 3 periods, between 1988 to 1991 the prevalence rate of ANA was at 11% then a slight increase to 15.9% from 2011 to 2012 [2]. In Brazil, the study done by Fernandez SAV et al. in 2003 showed that 22.6% of the normal blood donor population tested positive for ANA in a total number of 113 donors [3]. A Chinese study done by Y.-P. Guo et al, published in 2014 showed that 5.92% evokes the overall prevalence of ANA positivity in the Chinese population [4]. The detection rate was low compared to other studies which may be due to the difference in the tests used. In this study, line immunoassay or LIA was used for ANA screening while in our study, we used ELISA. In our study, 20.7% of the ANA screening results were positive, i.e. 18 out of 87 requests. Our study revealed that the majority of the results studied were from female individuals at the rate of 72.22%. This is also justified in the study done by Dinse et al. that women are 2 to 3 times more likely to have high ANA levels than men [2]. Patients between 40 and 59 years of age had a rate of 50%. This result corroborated with the unpublished retrospective study conducted at the Pasteur Institute of Casablanca that the age group with the highest rate is 40 years. As in our study, the study carried out by S. Feki et al. showed that dermatological manifestations predominate over other manifestations. [5]. The appearance of autoimmune diseases are related to genetic predisposition but also caused by infections (viral, bacterial and parasitic), hormonal factors which is especially frequent in women because of the increase in the levels of female sex hormones, environmental factors such as smoking, exposure to sunlight and toxicants and finally drugs.

Our study showed that out of 321 requests for rheumatoid factor analysis made in the Immunology Department of the IJAH, 22 were positive (i.e. 6.9%).

The presence of rheumatoid factor does not necessarily mean the diagnosis of rheumatoid arthritis, it is a marker of immune activation and therefore can be present in the circulation of people suffering from a variety of inflammatory conditions and plausibly among 5% of healthy population [6]. Study done at the CNTS Antananarivo and the CRTS Fianarantsoa by Randriamahazo et al. revealed that the prevalence of positive RF was 1.4% [7]. The value obtained is significantly lower than our study 6.4% probably as the studied population was among healthy blood donors. Between 2002 and 2012, a study done in South Korea showed that 4.4% of the study population tested positive for RF. [8]. The population tested positive at a mean age of 48.5 with an age range of 34 to 72 years. The prevalence of rheumatoid factor positivity increases with age, a Swiss study in 2016 showed that 15% of the study population were aged between 40 and 70 years [9]. Rheumatoid factor is a primary marker but not specific, when looking for rheumatoid arthritis. Indeed, this marker is also found in other autoimmune diseases such as Sjögren's syndrome, cryoglobulinemia and systemic lupus erythematosus and several other chronic infectious, viral and parasitic diseases, which explain the diversity of clinical manifestations among positive RF patients [10].

In our study, we found 47.85% of positivity among 1346 requests for antistreptolysin O screening. The prevalence of ASO screening in the study of Sunil Hatkar et al. In 2017 was significantly lower with only 6.03% of positivity. This was a prospective study done in the microbiology department at the tertiary care hospital of two years period (from January 2015 to December 2016). Similarly to the RF and ANA markers, the predominance of women was found. The study that was conducted in Bank region of Nepal, in 2012, also revealed 59% female predominance within the age group of 11-20 years of patients who performed the serum ASO screening test [11]. The predominant clinical manifestations in both genders are articular manifestations.

Taken together, our study agrees with the findings of many authors who suggest that the three markers of autoimmune diseases predominate mostly in women with particular age range dominated over 40 years for ANA and RF and young under 20 years.

5. Conclusion

In summary, this study led to the following three conclusions. First, autoimmune disease markers are found predominantly in females. Second, about the ANA and RF, the predominant age range was between 40 and 59 years and for ASO the predominant age range was between 10 and 19 years. Third, joint manifestations were predominant joint manifestations were predominant in people with ASO and RF and dermatological manifestations in ANA. Therefore, long-term study of these markers seroprevalence is necessary.

Compliance with ethical standards

Disclosure of conflict of interest

All authors declare no competing interests.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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