



CODEN [USA]: IAJPBB

ISSN: 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

<http://doi.org/10.5281/zenodo.3816641>

Available online at: <http://www.iajps.com>

Research Article

RATE OF OCCURRENCE AND PROGNOSTICATORS OF PULMONARY HYPERTENSION AMONG PATIENTS SUFFERING FROM SYSTEMIC LUPUS ERYTHEMATOSUS

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Article Received: March 2020

Accepted: April 2020

Published: May 2020

Abstract:

Objective: The aim of this study is to determine the rate of occurrence and prognosticators of pulmonary Hypertension among patients suffering from Systemic Lupus Erythematosus in our regions.

Methodology: This research work was carried out at Rheumatology Department of Allied Hospital, Faisalabad from July 2019 to December 2019. A sum of ninety-seven patients who fulfilled the criteria of ACR (American College of Rheumatology) for systemic lupus erythematosus got recruitment for this research work. The measurement of Pulmonary Arterial Hypertension was carried out with the calculation of the pulmonary arterial SBP (Systolic Blood Pressure) through ECG (Echocardiography) by cardiologist. We collected the characteristics of demography and disease in an organized Performa. We defined the pulmonary arterial hypertension as average pulmonary arterial pressure of 25.0 mmHg or more measured with the help of a formula. We used SPSS V.23 for the statistical analysis of the collected information.

Results: Out of ninety-seven patients, 89.70% (n: 87) patients were females and 10.30% (n: 10) patients were from male gender, with an average age of 31.290 ±8.824 years. The average duration of the disease was 24.210 ±30.460 months. We found the pulmonary arterial hypertension in 23.30% (n: 23) patients, including four males and nineteen females. On further examination of the data, we assessed the Raynaud phenomenon, nephritis and rheumatoidfactor as prognosticators of the pulmonary arterial hypertension and all of these factors displayed significance statistically for the availability of the pulmonary arterial hypertension according to Chi square test (P<0.050).

Conclusion: In this study, 23.30% patients of systemic lupus erythematosus showed the presence of pulmonary arterial hypertension and we also found a strong statistical significance between prognosticators as Raynaud phenomenon, nephritis, rheumatoid factor, and availability of pulmonary arterial hypertension. So, it is much important to diagnose the presence of pulmonary arterial hypertension fast and start timely treatment to obtain the best Quality of Life.

Keywords: Systemic Lupus Erythematosus, Hypertension, Systolic Blood Pressure, Prognosticators, Nephritis, Diagnose, Rheumatoid Factor.

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Please cite this article in press Amna Noor et al, *Rate Of Occurrence And Prognosticators Of Pulmonary Hypertension Among Patients Suffering From Systemic Lupus Erythematosus.*, Indo Am. J. P. Sci, 2020; 07(05).

INTRODUCTION:

Systemic lupus erythematosus is an auto-immune complication and a disease of multi-system. This can cause fatigue, rash and arthritis on one end and it can lead to the anemia, nephritis, serositis, thrombocytopenia and neurological issues on the other end [1]. Diagnosis of systemic lupus erythematosus is confirmed in the patients who fulfil the at least four out of eleven diagnostic American College of Rheumatology 1992 criteria [2]. One of the most important systemic lupus erythematosus manifestation is pulmonary arterial hypertension even though this complication is not criteria for diagnostic, but it comes under one of the manifestations leading to fatality [3]. There is poor prognosis of the pulmonary arterial hypertension which is associated with the diseases of connective tissue, although patients with pulmonary arterial hypertension, suffering from systemic lupus erythematosus have good prognosis as compared to the patients suffering from scleroderma present with pulmonary arterial hypertension [3]. Even though, there are disastrous outcomes of the pulmonary arterial hypertension in different rheumatic diseases, its rate of occurrence is not well-examined in Lupus [4]. In one research work, the range of the rate of occurrence of pulmonary arterial hypertension in the patients of systemic lupus erythematosus was from 0.50 to 17.50%. There are many prognosticators for the development of the pulmonary arterial hypertension in the patients of systemic lupus erythematosus like serositis, Raynaud's phenomenon, rheumatoid factor, and nephritis [4]. Although there is observation that patients suffering from systemic lupus erythematosus present with serositis, rheumatoid factor, nephritis and anticardiolipin antibodies were discovered to have pulmonary arterial hypertension rather than those patients present without these complications. Finally, there can be suggestion that initiation of the early treatment in the patients of systemic lupus erythematosus with already mentioned prognosticators can cause favorable consequences about the prognosis of the disease [5]. There are multi factors for pulmonary arterial hypertension in the patients of systemic lupus erythematosus. Immune system, genetics and environmental factors play very vital role [6]. All such factors create a disparity between the vasoconstrictors & vasodilator substances causing to enhance the PVR (Pulmonary Vascular Resistance). There are always increased levels of thromboxane & endothelins in the patients suffering from systemic lupus erythematosus with pulmonary arterial hypertension as compared to the patient's systemic lupus erythematosus who are present without pulmonary arterial hypertension [4].

Approximately forty two percent patients of systemic lupus erythematosus present with pulmonary arterial hypertension were available to have antibodies against Type-A of endothelin receptor. Also, there is occurrence of the formation of the small micro thrombi into vessels, resultantly precipitating further rise in the complication. There is presence of many confusing factors which can lead to pulmonary arterial hypertension like the interstitial lung complications, IHD (Ischemic Heart Disease), VHD (Valvular Heart Disease), cardiomyopathy and COPD (Chronic Obstructive Pulmonary Disease), or diseases of other connective tissues causing the pulmonary arterial hypertension. So, these types of patients were not included in this research work [7]. In this research work, because of the delayed appearance of the complication, we saw the complicate patients in the clinics.

The main purpose of this research work was to find out the rate of occurrence of pulmonary arterial hypertension in the patients of systemic lupus erythematosus in our regions with the utilization of the echocardiography which is not an invasive procedure and it does not need any professional training and it can be used in normal routine practices of clinical fields [8]. We make a comparison of the rate of occurrence of pulmonary arterial hypertension in the patients of systemic lupus erythematosus in that particular region of our country Pakistan with the rest regions of the world as there is variation in the severity of the complication in various populations. There is no previous research work on this topic in our country Pakistan, so we desired to perform this research work to draw the attentions of the professionals to determine such unobserved complications associated with the disorder of systemic lupus erythematosus.

MATERIAL AND METHODS:

This transverse research work was carried out in the Rheumatology Department of the Allied Hospital, Faisalabad from July 2019 to December 2019. The ethical committee of the institute gave the permission to conduct this research work. A sum of ninety-seven patients got recruitment after the calculation of the sample size with 95.0% Confidence Interval, 5.0% error margin and taking the rate of occurrence of pulmonary arterial hypertension in the patients of systemic lupus erythematosus as 23.0%. All the patients who fulfilled four out of total eleven diagnostic American College of Rheumatology 1992 standards for systemic lupus erythematosus were the participants of this research work. All the patients who were suffering from Ischemic Heart

Disease, Valvular Heart Disease or other complication of metabolism were not included in this research work. We also excluded the patients present with disease of mixed connective tissue or having the past history of addiction of cigarette smoking or chronic obstructive pulmonary disease. We took the written consent from every patient after describing them the purpose of this research work. We promised the patients to maintain their confidentiality. We recorded the characteristics about demography and variables of disease in well-organized Performa. The calculation of the pulmonary arterial hypertension was carried out with the help of echocardiography by single cardiologist of our institute. Rest of the examinations as X-ray of chest, complete examination of urine, 24 hours urinary proteins and tests for the functions of kidneys and rheumatoid factor relevant to determine the prognosticators for pulmonary arterial hypertension or systemic lupus erythematosus were also advised.

We performed the Doppler studies of the tricuspid & pulmonary valves for the confirmation of the diagnosis of the pulmonary arterial hypertension. The calculation of the MPAP (Mean Pulmonary Artery Pressure) was carried out by following formula $MPAP = 0.610 \times PASP + 2.0 \text{ mm Hg}$ and

we labelled the patients having pulmonary arterial hypertension if $MPAP \geq 25.0 \text{ mmHg}$. We used SPSS V.23 for the statistical analysis of the collected information. The pulmonary arterial hypertension presence and prognosticators linked with pulmonary arterial hypertension were calculated in percentages and frequencies. The division of the patients was carried out in two groups; one with pulmonary arterial hypertension and other was without pulmonary arterial hypertension. For the patients of both groups, we measured the rate of occurrence of pulmonary arterial hypertension and prognosticators of pulmonary arterial hypertension.

RESULTS:

In this current research work, we selected total ninety-seven patients suffering from systemic lupus erythematosus. Out of these recruited patients, eighty-seven patients were females and ten patients were males. The average age of the patients was 31.290 ± 8.824 years. The rate of occurrence of pulmonary arterial hypertension among these patients was 23.30%. In accordance with the standard of the systemic lupus erythematosus, we studied the different features like arthritis, proteinuria, serositis and oral ulcers. The percentages and the relative distribution of the gender have been displayed in Figure-1.

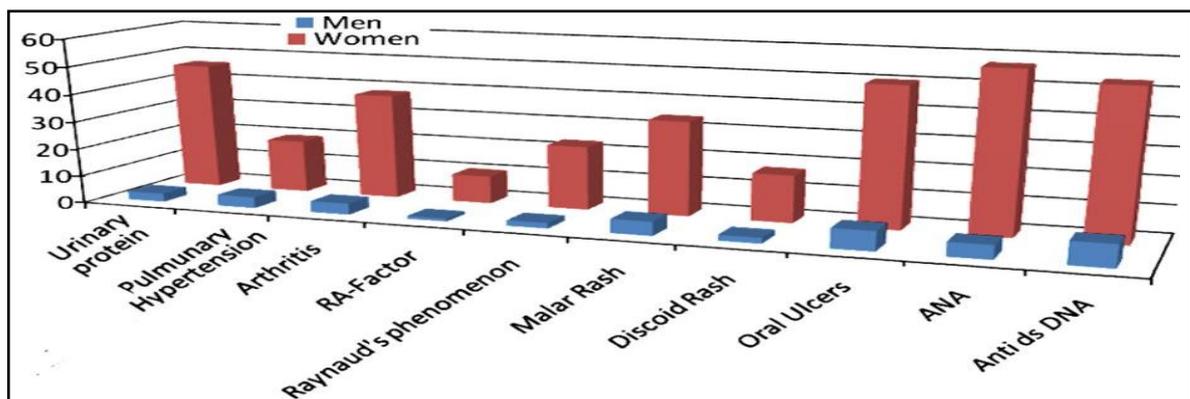


Fig.: Frequency of various clinical and biochemical features in patients with systemic lupus erythematosus.

Positive association of the pulmonary arterial hypertension in the patients of systemic lupus erythematosus with different prognosticators are present in Table-1, describing the elaborate plan to work in future. There was strong association of the prognosticators with the pulmonary arterial hypertension in the patients of systemic lupus erythematosus as Raynaud's phenomenon, rheumatoid factor and urinary proteins with a significant P value of less than 0.050 as elaborated in Table-2.

Table-I: Association of Various Factors with Pulmonary Hypertension in Systemic Lupus Erythematosus

Variables		Pulmonary Hypertension		P-Value
		Yes	No	
Reynaud's Phenomenon	Present	11	61	0.005
	Not Present	12	14	
Urinary Proteins	Detected	19	30	<0.001
	Not Detected	4	45	
RA-Factor	Positive	7	4	0.001
	Negative	16	71	

Table-II: Frequency Distribution of all Variables

Variables	Detected/Present/Positive			Not Detected/Absent/Negative		
	Total	Male	Female	Total	Male	Female
Urinary Protein	49(50%)	3	46	49(50%)	7	42
Pulmonary Hypertension	23(23.3%)	4	19	75(76.7%)	6	69
Arthritis	42(42.9%)	4	38	56(57.1%)	6	50
RA- Factor	11(11.2%)	1	10	87(88.2%)	9	78
Reynaud's Phenomenon	25(25.5%)	2	23	73(74.5%)	8	65
Malar Rash	39(39.8%)	5	34	59(60.2%)	4	54
Discoïd Rash	19(19.4%)	2	17	79(80.6%)	8	71
Oral Ulcers	57(58.1%)	7	50	41(41.9%)	3	38
ANA	62(63.2%)	5	57	36(36.8%)	5	31
Anti ds DNA	61(62.2%)	8	53	37(37.8%)	2	35

DISCUSSION:

systemic lupus erythematosus is a chronic auto-immune inflammatory abnormality that has variable manifestations involving different body organs. Pulmonary as well as cardiac manifestations are much frequent in the patients of systemic lupus erythematosus which are much common cause of morbidity as well as mortality. The least examined parameter in the patients of systemic lupus erythematosus is Pulmonary Arterial Hypertension but it is not much infrequent [7]. The diagnosis of the pulmonary arterial hypertension at early stage can protect the patients from dire consequences [8]. In accordance with the findings of this research work, a sum of total ninety-seven patients were recruited and rate of occurrence of pulmonary arterial hypertension was discovered to be 23.30% in those patients [9]. According to our research, there is no data of this nature is available in our region. The findings of another research study showed that the range of the rate of occurrence of hypertension was from 1.0% to 14.0% [10]. One other research work found that the rate of occurrence of the pulmonary arterial hypertension in the patients of systemic lupus erythematosus was discovered to be 10.80% and there was much high rheumatoid factor & anti cardiolipins in those patients.

One other research work found the range of prevalence of pulmonary arterial hypertension in the patients of systemic lupus erythematosus from 0.50% to 17.50% [5]. In another research work conducted in China on six hundred and forty-two patients stated the rate of incidence of pulmonary arterial hypertension in the patients of systemic lupus erythematosus from 5.0% to 14.0%. These findings of that research work are much comparable with the results of this current research work. Among all the diseases of connective tissue, the second most common disease is systemic lupus erythematosus after the system sclerosis with pulmonary arterial hypertension as the most common prognosis of the disease [11]. The rate of incidence of the pulmonary arterial hypertension in the patients of systemic lupus erythematosus was from 2.80% to 23.30% according to the findings of one other research work [9]. One other comparative research work was carried out in which they examined different pulmonary manifestations in the patients of systemic lupus erythematosus and found that the most common complication in those patients was pulmonary arterial hypertension [12]. In one other meta-analysis of different research works, it was discovered that the rate of incidence of pulmonary arterial hypertension was 8.0% in the

patients of systemic lupus erythematosus [13]. Different prognosticators of the pulmonary arterial hypertension were compared which were present with direct association to pulmonary arterial hypertension like nephritis, Raynaud's phenomenon, serositis and rheumatoid factor. The most important risk factor for the determination of the pulmonary arterial hypertension in the patients of systemic lupus erythematosus was Raynaud's phenomenon [14]. There is much low risk of pulmonary arterial hypertension in the patients present without pleuritis & pericarditis [15]. Different research studies showed that serositis, Raynaud's phenomenon, nephritis and rheumatoid factor are present with association with the development of the pulmonary arterial hypertension in the patients of systemic lupus erythematosus [16,17].

This current research work confirmed that the association of Raynaud's phenomenon, nephritis & rheumatoid factor with incidence of pulmonary arterial hypertension in the patient of systemic lupus erythematosus. Depending upon the publications stating the association with data of invasive measurement, there are recommendation about the Doppler echocardiography as the main tool for timely screening and evaluation of the patients suffering from pulmonary arterial hypertension [18,19]. In accordance with the current guidelines, an elaborated echocardiographic evaluation is equally valuable diagnostic modality for the identification of pulmonary arterial hypertension in the patients of systemic lupus erythematosus [20]. This method is completely non-invasive, and it is much easy to perform in the patients of systemic lupus erythematosus.

CONCLUSION:

The results of this research work concluded that rate of occurrence of pulmonary arterial hypertension in the patients of systemic lupus erythematosus is very high and with the availability of the observed prognosticators, we should recommend the timely pulmonary arterial hypertension screening. This will support us in timely diagnosis, fast treatment and decrease in the proportions of associated complications.

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