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Research Article

Predictive Factors of Mortality and Causes of Mortality in Systemic Lupus Erythematosus

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ABSTRACT

Introduction: Our study was to assessment morbidity and causes of death in Systemic Lupus Erythematosus (SLE) and assessment prognostic factors predictors of mortality.

Patients and methods: Follow up study patients were diagnosed as systemic lupus erythematosus registered at the Rheumatology clinic in between 2009-2020 was performed.

Results: 79 patients with diagnosed systemic lupus erythematous the mean age group affected is 36 ± 8 years, female are affected more than male. Most patients have a relapsing and remitting course and continuously active disease, most common morbidity is hypertension, recurrent infection, diabetes, pulmonary hypertension and renal failure and hemodialysis. The most common mortality is Lupus nephritis followed infections and prognostic factors influencing survival in our study, age, male gender, black race and sever disease activity, hypertension, positive anti cardiolipin antibody, renal disease and neurologic disease.

Conclusion: Mortality in patient have SLE during study was (27.8%). The mean age at death in the 33 ± 6 years and most common mortality is disease activity followed infections.

Keywords: Systemic lupus erythematosus; Morbidity; Mortality; Disease activity; Prognostic factors

INTRODUCTION

Recently new the challenge in systemic lupus erythematosus, the five-year survival rate in Systemic Lupus Erythematosus (SLE) has dramatically increased since the mid-20th century from approximately 40% in the 1950s to more than 90% in studies beginning after 1980 [1,2], a trend that has continued into the early 21st century [3]. The improvement in patient survival is probably due to multiple factors. These include increased disease recognition with more sensitive diagnostic tests, the advanced medical therapy in and prompt treatment of complications. Bimodal pattern of Deaths in patients with SLE were considered as early in patients who died <5 years from the time of diagnosis of SLE and late in patients who died >5 years after diagnosis [4,5]. The major early Causes of death in SLE is active disease (renal, or cardiovascular disease or cerebrovascular disease) or infection due to immunosuppression, while late deaths are caused by the illness (end-stage renal disease), by treatment complications (including infection and coronary disease) [6-8]. Race, gender, old age at onset, thrombocytopenia, nephritis, central nervous system involvement, and disease activity are risk factors associated with mortality in patients with SLE [9]. Despite a reduction in the risk of premature death, patients with SLE are at risk for significant morbidity due both to active disease and to the side effects of drugs such as glucocorticoids and cytotoxic agents [10,11]. Glucocorticoid-induced avascular necrosis of the hips and knees, osteoporosis, fatigue, and cognitive dysfunction and accumulated organ damage may also be predictive of increased mortality.

METHODOLOGY

Follow up study patients were diagnosed as systemic lupus erythematosus registered at the 7th October Rheumatology clinic in between 2009-2020 was performed. Those patients were studied clinically demographics characteristics like age and duration of disease, comorbidities, complete blood count, immunological profile, SLE SLEDAI, SLICC Damage Index score, drug therapy, and cause of mortality. The data analyzed after been collected, to find out the mean, standard deviation and the T-test and one way

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ANOVA using SPSS version 22.

Systemic Lupus Erythematosus Disease Activity Index (SLEDAI) has been defined on the basis of SLEDAI scores: no activity (SLEDAI=0), mild activity (SLEDAI=1-5), moderate activity (SLEDAI=6-10), high activity (SLEDAI=11-19), very high activity (SLEDAI>20).

The Systemic Lupus International Collaborating Clinics Damage Index (SLICCDI) for Systemic Lupus Erythematosus (SLE) damage (non-reversible change) occurring since the onset of lupus, ascertained by clinical assessment and present for at least 6 months. The maximum score is 47 but patients rarely score above 12 points.

Ethical

My study done on human body by interviewed with a structured questionnaire in rheumatology clinic, no invasion investigation done and all patients had agreed precipitated in my work.

RESULTS

79 patients with diagnosed systemic lupus erythematous were included in the study. Patient's demographic and clinical characteristics are shown below Table 1. The age of the study patients ranged from (18-55 years), M=(36 ± 8 years), 76(96.2%) were female, the most of the patients were white 69(87.4%) and 10(12.6%) were black. The duration of systemic lupus erythematosus disease range from (3 months-20 years) M=10 ± 7 years. According to clinical manifestation of systemic lupus erythematous we found skin and mucous membrane are 59(74.7%), arthritis are 68(86.1%), serositis are 16(20.3%), hematologic disease 66(83.5%), renal disease are 37(46.8%), neurologic disease are 20(25.3%), cardiac disease are 8(10.1%) and pulmonary manifestation are 16(20.2%).

Table 1: Demographic and clinical characteristics of patients in systemic lupus erythematosus.

Characteristics of patients	Outcomes
Age	18-55 years M=(36 ± 8 years)
Sex	76 female (96.2%); 3 male (3.8%)
Race	
White	69(87.4%)
Black	10(12.6%)
Marital state	18(22.7%)
Duration disease	3 months-20 years; M=(10 ± 7 years)
Skin manifestation	59(74.7%)
Arthritis	68(86.1%)
Serositis	16(20.3%)
Hematologic manifestation	66(83.5%)
Renal manifestation	37(46.8%)
Neurologic manifestation	20(25.3%)
Cardiac manifestation	8(10.1%)
Pulmonary manifestation	16(20.2%)
Patterns of SLE activity	
Relapsing-Remitting (RR)	52(65.8%)
Chronic Active (CA)	19(24.1%)
Long Quiescent (LQ)	8(10.1%)

According to disease activity patterns was measures disease activity index (SLEDAI) identified 3 main patterns of disease activity Relapsing-Remitting (RR), Chronic Active (CA) and Long Quiescent (LQ). The most common type Relapsing-Remitting (RR) was 52(65.8%), Chronic Active (CA) was 19(24.1%) and Long Quiescent (LQ) was 8(10.1%). The main Systemic Lupus Erythematous (SLE) therapies prescribed during the study period are shown below (Table 2).

Table 2: Drug therapy in patients with systemic lupus erythematosus.

Drugs	Outcomes
Steroid	73(92.4%)
Antimalarial (hydroxychloroquine)	50(63.3%)
Azathioprine	45(57%)
Pulse cyclophosphamide	11(14%)
Mycophenolate mofetil	22(27.8%)
Rituximab	18(22.7%)

73 patients (92.4%) received doses of more than 10 mg Prednisolone/day, hydroxychloroquine were prescribed in 50 patients (63.3%), Azathioprine in 45 patients (57%), Pulse cyclophosphamide in 11 patients (14%), mycophenolate mofetil in 22 patients (27.8%) and Rituximab in 18 patients (22.7%). According to long term morbidity of patients in systemic lupus erythematosus was assessment by Systemic Lupus International Collaborating Clinics Damage Index (SLICCDI) during the study period are shown below (Table 3).

Table 3: Long term morbidity of patients in systemic lupus erythematosus.

Morbidity of patients	Outcomes	
Alopecia	12(15.2%)	0
Skin scarring/pigmentation	14(17.7%)	0
Ischemic Heart Disease (IHD)	2(2.5%)	0.159
Myocarditis	5(6.3%)	0.045
Pulmonary Hypertension (PAH)	13(16.5%)	0
End stage renal failure/hemodialysis	8(10.1%)	0
Hypertension	41(51.9%)	0
Neuropsychiatric manifestation	8(10.1%)	0.001
Seizures	5(6.3%)	0.004
Stroke	3(3.7%)	0.024
Diabetes	10 (12.6%)	0
Recurrent Infection	24(30.3%)	0
Avascular necrosis	6(7.6%)	0.001
Osteoporosis	4(5%)	0.004
Oilgamenorrhea/amenorrhea	19(24%)	0

Note: Systemic Lupus International Collaborating Clinics (SLICC) damage index score: T-test, $p \leq 0.05$

We found alopecia in 12 patient (15.2%), p=0.000, skin scarring/pigmentation in 14 patients (17.7%), p=0.000, Ischemic Heart Disease (IHD) in 2 patients (2.5%), p=0.159, myocarditis in 5 patients (6.3%), p=0.045, Pulmonary Hypertension (PAH) in 13 patients (16.5%), p=0.000, end stage renal failure/hemodialysis in 8 patients (10.1%), p=0.000, hypertension in 41 patients (51.9%), p=0.000, neuropsychiatric manifestation in 8 patients (10.1%), p=0.001, seizures in 5 patients (6.3%), p=0.004, stroke in 3 patients (3.7%), p=0.024, diabetes in 10 patients (12.6%), p=0.000, recurrent infection in 24 patients (30.3%), p=0.000, avascular necrosis in 8 patient (7.6%), p=0.001, osteoporosis in 4 patients (5%), p=0.004, and oilgamenorrhea/amenorrhea in 19 patients (24%), p=0.000. According to number of death and cause of death of patients in systemic lupus erythematosus are shown below (Table 4).

Table 4: Mortality rate and cause of mortality related to systemic lupus erythematosus disease duration.

Cause of death			Early death <5 years after diagnosis of SLE	Late death >5 years after diagnosis of SLE
Caused by active disease manifestations	Multiple organ failure	2 (9.1%)	0.014	0.249
	Lupus nephritis/ARF	9 (41%)	0	0.032
	Alveolar hemorrhage/ pneumonitis	1(4.6%)	0.001	0.588
	Cerebrovascular diseases	1 (4.6%)	0.001	0.588
Infections	-	7(32%)	0.004	0
Unknown	-	2(9.1%)	0.014	0.249
Number of death=22(27.8%)				
Number of survival=57(72.2%)				

We found number of death during study period 2009-2020 was 22 patients (27.8%). The mean age at death in the patients in our study was (18 years-44 years) M=33 ± 6 and number of survival of patients was 57(72.2%). The comments' cause of death are caused by active disease manifestations lupus nephritis/ARF in 9 patients (41%), followed multiple organ failure in 2 patients (9.1%), alveolar hemorrhage/pneumonitis and cerebrovascular diseases were one patient (4.6%) and second infections in 7 patients (32%), followed unknown cause in 2 patients (9.1%), in compared between common cause of death in systemic lupus erythematosus in early five years diagnosis and more five years diagnosis we found renal and infection are common in both with statistical significance. Other cause of death is common in early five years diagnosis. According to predicative factors of mortality in systemic lupus erythematous during the study period are shown below (Table 5).

Table 5: Predicative factors of mortality in systemic lupus erythematous.

Factors	Outcomes
Age	0.036
Sex (male)	0
Race (black)	0.018
Duration disease	0.306
Sever disease activity (SLEDAI)	0.007
Hypertension	0.002
Positive anticardiolipin antibody	0.035
Renal involved	0.001
CNS involved	0.052

We found age <30 years is p=0.036, sex is p=0.000, race is p=0.018, sever disease activity (SLEDAI) is p=0.007, hypertension is p=0.002, positive anticardiolipin antibody is P=0.035, renal involved is P=0.001, Central Nerve System (CNS) involved is P=0.052 all factors with statistical significance.

DISCUSSION

Our studies noted that a large proportion of patients with lupus are white and female the mean age group affected is 36 ± 8 years, like other studies [2,12]. Our analysis noted that a large proportion of patients with lupus are unmarried, reflect wrong ideal about disease in general people of our community. Most patients have a relapsing and remitting course and continuously active disease [13], most patients 92.4% are received doses of more than 10 mg Prednisolone/day, hydroxychloroquine were 63.3%, azathioprine were 57%, pulse cyclophosphamide were 14%, mycophenolate mofetil were 27.8% and rituximab were 22.7%, morbidity patterns in our patients had alopecia (15.2%), skin scarring/pigmentation (17.7%), Ischemic Heart Disease (IHD) (2.5%), myocarditis (6.3), Pulmonary Hypertension (PAH) (16.5%), end stage renal failure/ hemodialysis (10.1%), hypertension (51.9%), neuropsychiatric manifestation (10.1%), seizures (6.3%), stroke (3.7%), diabetes (12.6%), recurrent infection (30.3%), avascular necrosis (7.6%), osteoporosis (5%) and oilgamenorrhea/amenorrhea (24%) all statistical significance, reflecting higher disease activity and medication toxicities, in our findings atherosclerosis and cardiovascular disease not concord with published data due to the small number and one base hospital center studies [14-16].

The most important causes of death in patients with SLE are disease activity (complicated by organ system involvement), treatment related complications such as infections, and long-term disease complications particularly cardiovascular disease [17,18]. Despite improvements in immunosuppressive treatment strategies for active disease, infections are still an important cause of death in SLE patients, both early and late in the disease course [17-20].

Our studies number of death during study period 2009-2020 was (27.8%). The mean age at death in the 33 ± 6 year and number of survival of patients was (72.2%). The comments' cause of death are caused by active disease manifestations which commonly lupus nephritis/ARF (41%) and second infections (32%), followed unknown cause (9.1%), in compared between common cause of death in early five years diagnosis and more five years diagnosis we found renal and infection are common in both with statistical significance .other cause of death are common in early five years diagnosis was near to mortality reported in the most recent studies in which it varied from 6.8% to 20.2% in SLE [3,4,16-18]. Among the prognostic factors influencing survival in our study, age, male gender, black race and sever disease activity, hypertension positive anti cardiolipin antibody renal disease and neurologic disease to be affect patient survival [3,4,18-20].

CONCLUSION

The most common morbidity is hypertension, recurrent infection, diabetes pulmonary hypertension, end stage renal failure and hemodialysis, neuropsychiatric manifestation and oilgamenorrhea and amenorrhea mortality in patient have SLE during study period was (27.8%). The most common mortality is lupus nephritis followed infections followed unknown cause. Renal and infection are common causes of death are in early five years diagnosis and more five years diagnosis of systemic lupus erythematosus. The prognostic factors influencing survival of disease are age, male gender, black, sever disease activity, hypertension, and positive anti cardiolipin antibody, renal disease and neurologic disease.

DECLARATIONS

Recommendations

Education, insertion new trend management and early diagnostic with good follow up are improve mortality in patient with systemic lupus erythematosus.

Limitation of study

Small number and due to the large amount of missing data and one base clinical hospital lack date for evaluation risk cardiovascular disease which important cause mortality in systemic lupus erythematosus.

Conflicts of interest

Authors had no conflicts of interest.

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