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Risk Factors of Pneumocystis jirovecii Pneumonia in Patients with Rheumatic Diseases

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Objectives: Effective prophylaxis has led to decrease in the incidence of Pneumocystis jirovecii pneumonia (PcP) in patients with AIDS; however, it remains a significant cause of pneumonia in non-HIV immunosuppressed patients. There are no established guidelines on PcP prophylaxis in patients with rheumatic diseases. This study aimed to determine the risk factors for PcP in these patients in order to define an at-risk group to which prophylaxis may be targeted.

Methods: Patients with rheumatic diseases diagnosed with PcP between March 2009-January 2016 in a single tertiary care center were included as cases in this retrospective study. Control patients were selected from patients followed up by the Division of Rheumatology and matched the cases in terms of age and disease distribution. The definition of PcP was based on detecting P. jirovecii in respiratory samples using microscopy and molecular assays, with consistent clinical and radiological findings. Demographic characteristics, clinical and laboratory findings of patients, systemic involvement of rheumatic disease and treatment history were recorded.

Results: Eighteen patients (9 male, mean age 55±11.9y) were diagnosed with PcP during the study period. A total of 47 patients (23 male, mean age 53.3±12.7y) with complete clinical data were included in the control group. Rheumatoid arthritis (36.9%) was the most common disease, followed by systemic lupus erythematosus. The recent treatment of all patients consisted of corticosteroids, disease modifying anti-rheumatic drugs, other immunosuppressive drugs and biological agents, which were used in 53.8%, 32.3%, 15.3%, 12.3% of the patients, respectively. Univariate analysis showed that there was no difference presence of pulmonary involvement related to rheumatic disease between the two groups and that PcP patients had a higher rate of muscular involvement, lower rate of joint involvement, decreased hemoglobin level, elevated neutrophil and aspartate aminotransferase levels. There was no difference between the two groups regarding their treatment except that steroids were more frequently used in the PcP group. All patients receiving pulse treatment during the preceding sixth month developed PcP (44.4% vs 0, $p<0.001$). Multivariate analyses showed that ongoing treatment with methylprednisolone at a dose ≥16 mg/day [OR=7.6 (95% CI 1.6-35.7), p=0.009], presence of muscle involvement related to rheumatic disease [OR=9.9 (95% CI 2.1-46.1), p=0.003] were independent risk factors for developing PcP.

Conclusion: Patients with rheumatic disease having muscle involvement and/or receiving high dose steroid and/or who have received pulse immunosuppressive therapy are at risk for developing PcP. These patients should be strongly considered for PcP prophylaxis.

Keywords: Pneumocystis jirovecii pneumonia (PcP), rheumatic disease, immunosuppressive therapy