

Duration of Hypoxemia in *Pneumocystis Jirovecii* Pneumonia

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Abstract

Hypoxemia affects up to 50% of HIV-infected patients with *Pneumocystis Jirovecii* Pneumonia (PCP), frequently causing hospitalization. The expected duration of hypoxemia in this setting has not been reported. We prospectively enrolled patients living with HIV, diagnosed with PCP (confirmed in sputum or bronchoalveolar lavage samples, or suspected based on typical radiological findings and elevated lactate dehydrogenase serum levels) and hypoxemia (<70 mm Hg PaO₂ in arterial blood gas). Resolution of hypoxemia was defined as the date when hypoxemia normalized during the hospitalization. If the participant was discharged with oxygen therapy, the first normal reading of oxygen saturation was considered the date of resolution. Among 20 patients enrolled, CD4 T-lymphocyte count ranged 1-122/μl. Eight patients have confirmed PCP, and 4 had concomitantly treated infections. Hypoxemia lasted a median of 8 days (range 1-72), and the duration was not influenced by steroid use. Considering the declining incidence of PCP, larger studies are needed to provide more reliable data to guide management of hypoxemia in HIV-infected people with PCP.

Keywords: AIDS; Hypoxemia; HIV; *Pneumocystis Jirovecii*

Introduction

The introduction of combination antiretroviral therapy is associated with a significant decline in the incidence of opportunistic infections, including *Pneumocystis Jirovecii* Pneumonia (PCP), in patients living with HIV (PLWH) [1]. Hypoxemia affects up to 50% of HIV-infected patients with PCP, which is an indication for hospitalization and adjuvant steroid therapy [2,3]. An extensive search of the literature did not show information regarding the expected duration of hypoxemia among HIV-infected patients with PCP.

While hypoxemia confers more severity to conditions causing dyspnea, adds little to the differential etiological diagnosis [4]. Rush decisions can result from the finding of hypoxemia and abnormal chest X rays, particularly among patients formerly treated for PCP. Understanding the natural and post therapy history of PCP pneumonia is essential for decision-making

Objective

To report duration of hypoxemia among HIV-infected patients with diagnosis of PCP.

Materials and Methods

In this prospective non-interventional cohort, we enrolled 20 HIV-infected patients with suspected or proven PCP and hypoxemia, defined as a partial oxygen pressure <70 mm Hg breathing room air, or alveolar to arterial oxygen difference >35 mm Hg in patients on known inspired oxygen fraction over 21%, as previously published [5]. A proven case was defined when *Pneumocystis Jirovecii* was identified in sputum or bronchoalveolar lavage samples. A suspected case was defined when organism was not found, but characteristic manifestation on the chest radiograph without alternative diagnosis, and elevated serum levels of Lactic Dehydrogenase (LDH) were present. Participants' charts were reviewed for alternative causes of hypoxemia (such as pulmonary embolism, heart failure, or concomitant infections) and steroid

utilization. Daily oxygenation parameters were captured until hospital discharge. Resolution of hypoxemia was defined as the date when hypoxemia parameters normalized during the hospitalization. If the participant was discharged with oxygen therapy, the first normal reading of oxygen saturation was considered the date of resolution. Prolonged hypoxemia was defined as a duration longer than 14 days. Radiological findings were defined as severe when more than 1 pulmonary lobe was affected, as published [6].

Results and Discussion

Fourteen (70%) of the 20 evaluated patients were men. The median age was 42 years (range 33-57 years). Eight patients (40%) had confirmed PCP. Median CD4 T- lymphocyte count was 25/ μ l (range 1-122). Four patients with confirmed PCP had other organisms grown in the respiratory cultures (one each for *H. influenzae*, *M. kansasii*, *P. aeruginosa*, and Group a Streptococcus), and were treated accordingly. One patient had concomitant heart failure, and one had pulmonary embolism. Seventeen patients had severe radiologic findings. Prednisone was prescribed in 17 patients.

Hypoxemia lasted a median of 8 days (range 1-72), including 8 patients with prolonged hypoxemia (22, 29, 39, 62, and 72 days in 5 patients, and 28 days each in 3 patients). Hypoxemia lasted 22 and 39 days in two patients co-infected with *H. influenzae* and *M. kansasii* respectively, and 72 days in a patient with pulmonary embolism. None of the following elements predicted prolonged hypoxemia: prednisone use, severe radiologic findings, CD4 T-lymphocyte count <100/ μ l, alternative cause of hypoxemia, or serum LDH levels twice above upper normal limit.

To our knowledge this is the first study that addresses duration of hypoxemia in HIV-infected patients with PCP. These findings may provide guidance regarding the need and duration of post-hospital supplemental oxygen therapy and the differential diagnosis for conditions associated with hypoxemia among HIV-infected patients with PCP. Considering the declining incidence of PCP, larger studies are needed to provide more reliable data to guide management of hypoxemia in HIV-infected people with PCP.

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