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# Case report progressive multifocal leukoencephalopathy in hiv patient

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**ARTICLE INFO**

***Article history:***

Received Jan 30, 2023
Revised Feb 17, 2023
Accepted Feb 28, 2023

***Keywords:***

Case Report
Progressive Multifoval Leukoencephalopathy
HIV

**ABSTRACT**

Progressive multifocal leukoencephalopathy (PML) is a neurological condition caused by the JC virus. PML is a demyelinating disease preferentially affecting the central nervous system. JC virus is a DNA virus of the polyomaviridae family. The virus remains latent in most immunocompetent hosts and rarely presents pathologically. In immunosuppressed hosts, however, a combination of poor cellular response of the host along with reactivation of the virus secondary to recombination of genes results in active disease. This case report described a 42 years old male patient with a HIV, PML, Anemia. The patient complaints that the body feels weak, loss of consciousness and difficult to communicate with. Physical examination, laboratory examination and MRI study findings was support the diagnosis of PML in HIV patients. This case report described a 42 years old male patient with a HIV, PML, Anemia. The patient complaints that the body feels weak, loss of consciousness and difficult to communicate with. Physical examination, laboratory examination and MRI study findings was support the diagnosis of PML in HIV patients.



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# INTRODUCTION

Progressive multifocal leukoencephalopathy (PML) is a neurological condition caused by the JC virus. PML is a demyelinating disease preferentially affecting the central nervous system (Breville et al., 2021; Lambrianides & Kinnis, 2019). In most individuals, it remains a latent infection however, it is particularly virulent in patients with immunosuppressive conditions (Abrão et al., 2021; Grebenciucova & Berger, 2018).

Most cases of progressive multifocal leukoencephalopathy occur as a reactivation of latent JC virus infection (Gold et al., 2017, 2022). PML is symptomatic in patients who are severely immunocompromised, such as HIV-AIDS patients, particularly those with a CD4 count of less than 200, organ transplant recipients, those with hematologic malignancies, and of late those who undergo treatment with monoclonal antibodies such as natalizumab. It has also been known to cause

disease in patients who receive antiretroviral therapy as therapy can incite immune reconstitution. These cases of PML are termed PML-IRIS (Bartsch et al., 2019; Sokol et al., 2017).

JC virus is a DNA virus of the polyomaviridae family. The virus remains latent in most immunocompetent hosts and rarely presents pathologically. In immunosuppressed hosts, however, a combination of poor cellular response of the host along with reactivation of the virus secondary to recombination of genes results in active disease (Bohra et al., 2017; Zucker & Stacpoole, 2018).

Progressive multifocal leukoencephalopathy can occur in the context of immune reconstitution syndrome. In AIDS patients on antiretroviral therapy who present with focal neurological deficits or altered mental status along with non-contrast enhancing lesions, a diagnosis of PML IRIS ought to be considered. This condition can present from 1 week to 26 months after the initiation of HAART (Barthwal et al., 2015; Vinhaes et al., 2021).

The evaluation of new-onset neurological symptoms in a patient with suspected or confirmed immunosuppression should include PML as part of the differential diagnosis (Abrão et al., 2021; Lai et al., 2016). These patients may present with altered mental status or an abnormal neurological examination and need to be evaluated (Abrão et al., 2021; Lambrianides & Kinnis, 2019).

The neurologic deficits that manifest correlate with the area of white matter demyelination. The presentation of PML includes progressive, multifocal, subacute focal neurological deficits that vary depending on the site of the lesion and include a spectrum of presentations including cognitive impairment, limb ataxia, gait ataxia, hemiparesis, hemianopia, and aphasia. Areas commonly involved include the subcortical white matter, periventricular areas, and cerebellar peduncles. In most cases, the optic nerve and the spinal cord are unaffected (Walker et al., 2015).

Currently, effective treatment for the complete cure for progressive multifocal leukoencephalopathy has not been found. At present, treatment is guided by efforts made to boost the adaptive immune response, and the methods to achieve this goal varies depending on the clinical setting. In HIV patients, prompt initiation of HAART is advised. In transplant patients, the use of multiple immunosuppressive therapies may be limited while weighing the risks of graft rejection. In PML induced by natalizumab use, cessation of therapy and resorting to plasma exchange therapy as a means of treatment have been advised (Boeva & Belyakov, 2018).

With regard to the treatment of PML IRIS, improvement in neurological status has been observed with the cessation of ART therapy. Certain studies have shown favorable outcomes with steroid treatment.5 However, cessation of antiretroviral therapy may increase the viral load and lead to antiretroviral resistance. PML IRIS carries a significant risk for mass effect and herniation, and hence glucocorticoids can be utilized in the event of such complications to counter the damage caused by immune reconstitution (Barthwal et al., 2015; Shuker et al., 2019).

PML is a progressive and fatal disease. At present, the primary goal of treatment is to improve the chances of survival. Factors that improve survival rates include a low viral load of JC virus in PCR CSF samples, high CD4 count, and contrast enhancement on radiological imaging. Furthermore, in patients with AIDS, initiation of antiretroviral therapy has been known to improve survival rates. In patients who develop PML-IRIS following antiretroviral therapy, administration of steroids and contrast-enhancing MRI imaging were good prognostic indicators for survival (Sandhu et al., 2019).

# RESEARCH METHOD

This type of research is a case study (Fajarwati & Irianto, 2021; Sugiyono, 2017, 2019). The subject of this case is Mr. X, 42 years old male.

# RESULTS AND DISCUSSIONS

A 42 years old male patient was brought to Royal Taruma Hospital ER with limp of whole body since 4 days ago before being taken to the Royal Taruma Emergency Room on 13th August 2022. The

patient comes with complaints that the body feels weak and decreased consciousness. The patient's family said the patient suddenly fell off the bench while sitting at home and became unconscious on 10th August 2022, so he was immediately taken to the hospital by the patient's family. The patient was taken to Ciputra Hospital when he was unconscious and was treated for 3 days before finally being taken to be treated at the Royal Taruma Hospital. Currently, the complaints of weakness are getting better after being treated, but the body parts are still difficult to move, especially the left leg and the patient is still difficult to communicate with. The current complaint is accompanied by coughing and sometimes choking when fed by mouth. The patient's family also said that the patient's weight was getting thinner. The complaints of nausea, vomiting, fever, headache, and convulsions were previously denied. The patient's family said the patient's condition was normal 1-2 days before the complaints appeared. The patient does not smoke, consume alcohol and rarely does exercise.

On physical examination patient compos mentis with GCS (E4 V-aphasia M6), Blood Pressure 110/70 mmHg, Pulse rate 78x/min, Respiratory rate 20x/min, Temperature 36.2$^{O}$C, Oxygen Saturation 100% Room air. Head-to-toe examination of organ systems, grade 1 decubitus ulcer, other organ was found within normal limits, Pupil round shape, isochoric, with diameter 3mm/3mm, revealed positive direct and indirect light reflexes on both pupils, negative meningeal signs, Cranial nerve examination was within normal limits. Neurological motoric examination revealed atrophy and hypotonic of all limbs, muscle strength $\frac{4444/4444}{4444/3333}$, positive physiologic reflexes, and no pathological reflexes. Sensorics and coordination examination cannot be checked.

Thorax X-Ray in supine position within normal limits. MRI of the head with and without contrast was done and revealed White matter hyperintensity includes extensive U fibers, bilaterally symmetric, in both cerebral hemispheres, bilateral basal ganglia, pons, bilateral mesencephalon and cerebellum, suggestive of PML picture (Fig. 1). positive AIDS screening lab results in 3 methods. CSF fluid analysis showed colorless, clear, 10 U/L cell count, 55 mg/dL protein and LDH (33 U/L). Full blood count examination revealed that the patient was slightly anemia (Hb 11.5 mg/dL) with low hematocrit (35.1 vol%), erythrocytes (3.88 106 /µL), with elevated ESR (104 mm/h) and Hs- CRP (82.96 mg/L). On specific examination, there was a decrease in CD 4% count (6%) and CD 4 ABS count (157 cell /µL), as well as an increase in the number of CD 8% count (68.00%) and CD8 ABS count (1673 cell /µL).

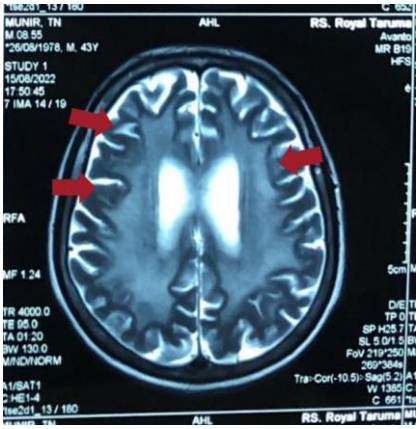


**Figure 1.** White matter hyperintensity includes extensive U fibers.

Based on clinical manifestations and laboratory examination results, the patient was diagnosed with HIV with Progressive Multifocal Leukoencephalopathy and Anemia. The patient was treated with Ketoconazole 1 x 200 mg, Acytrac 2 x 1 C, Fordesia 1 x 5 mg, Sanprima Forte 2 x 1 tab, Mycostatin 3 x 25 drops, Ialuset Cream 2x/ days, FDC-TLE 1x1, Codipront Expectorant 3 x 1

tab, Harnal ocas 0.4 mg 1 x 1 tab, Levofloxacin 1 x 750 mg, Peinlos 3 x 400 mg, Ceftriaxone 2 x 2 g, Indexon 3 x 5 mg, Omeprazole 1 x 40 mg, Triomix 500cc/ 24 hours.

We hereby presented a case reporting a 42 years old male with Progressive Multifocal Leukoencephalopathy. Patient come with complaints that the body feels weak and decreased consciousness. In immunocompetent individuals, the JCV is rarely pathogenic, but in immunocompromised patients, it may cause PML, an aggressive, progressive neurologic syndrome that is potentially devastating. In this patient, positive AIDS screening results were obtained in 3 methods so that the patient met the requirements that someone could suffer from PML (Trunfio et al., 2019).

Routine blood counts and HIV PCR testing are indicated to identify the cause of the immunosuppressed state that led to the reactivation of the JC virus. The evaluation of abnormal neurological findings in immunosuppressed patients, such as those with AIDS, begins with radiological imaging. Contrast- enhanced imaging with either CT or MRI aids the clinician in determining the presence of inflammatory change and mass effect. These findings are absent in PML, and their presence would point towards an alternative diagnosis such as toxoplasma encephalitis or primary CNS lymphoma (Seidel et al., 2021; Siegal & Bairey, 2019; Tsang et al., 2020).

The neurologic deficits that manifest correlate with the area of white matter demyelination. The presentation of PML includes progressive, multifocal, subacute focal neurological deficits that vary depending on the site of the lesion and include a spectrum of presentations including cognitive impairment, limb ataxia, gait ataxia, hemiparesis, hemianopia, and aphasia. Areas commonly involved include the subcortical white matter, periventricular areas, and cerebellar peduncles. In this patient, sub-acute focal neurological deficits were found, such as cognitive impairment, left leg ataxia and aphasia (Frattaroli et al., 2021).

In AIDS patients, the degree of immunosuppression, as evidenced by the CD4 count, is an indicator of the possible etiology underlying the abnormal neurological presentation. PML enters the differential when the CD4 count is less than 200. However, it may present even at levels above 200.[1] On the results of the examination of CD 4% levels in this patient, it was found a decrease in the number of CD 4% (6%) and CD 4 ABS (157 cell /µL).

PML manifests itself as white matter (WM) lesions affecting the U- shaped subcortical fibers with a decreased signal on T1-weighted sequences and an increased signal on T2-weighted sequences. On diffusion- weighted images (DWI), the signal is generally increased with restricted diffusion on borders corresponding to active demyelination.[7] In this case, an MRI examination of the head with and without contrast was performed, the results found White matter hyperintensity includes extensive U fibers, bilaterally symmetric, in both cerebral hemispheres, bilateral basal ganglia, pons, bilateral mesencephalon and cerebellum, suggestive of PML picture (Zucker & Stacpoole, 2018).

Currently, effective treatment for the complete cure for progressive multifocal leukoencephalopathy has not been found. At present, treatment is guided by efforts made to boost the adaptive immune response, and the methods to achieve this goal varies depending on the clinical setting. In HIV patients, prompt initiation of HAART is advised. PML IRIS carries a significant risk for mass effect and herniation, and hence glucocorticoids can be utilized in the event of such complications to counter the damage caused by immune reconstitution.7 The patient was treated FDC-TLE 0-0-1, indexon 3 x 5 mg. Mycostatin drops 3 x 25 drops for candidiasis of the oral cavity. Ketokonazol 1 x 1 in case of fungal etiology, Levofloxacin 1 x 750 mg, Sanprima Forte 2 x 1 tab, and Ceftriaxone 2 x 2 g in case of bacterial etiology. Patient also get Peinlos 3 x 400 mg, Omperazale 1 x 40 mg, Codipront expectorant 3 x 1 for supportive treatment.

PML is a progressive and fatal disease. At present, the primary goal of treatment is to improve the chances of survival. Factors that improve survival rates include a low viral load of JC virus in PCR CSF samples, high CD4 count, and contrast enhancement on radiological imaging.

Furthermore, in patients with AIDS, initiation of antiretroviral therapy has been known to improve survival rates (Sandhu et al., 2019; Sokol et al., 2017).

# CONCLUSION

This case report described a 42 years old male patient with a HIV, PML, Anemia. The patient complaints that the body feels weak, loss of consciousness and difficult to communicate with. Physical examination, laboratory examination and MRI study findings was support the diagnosis of PML in HIV patients.

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