

## Priapismus as Leukostasis Manifestation in Chronic Myeloid Leukemia

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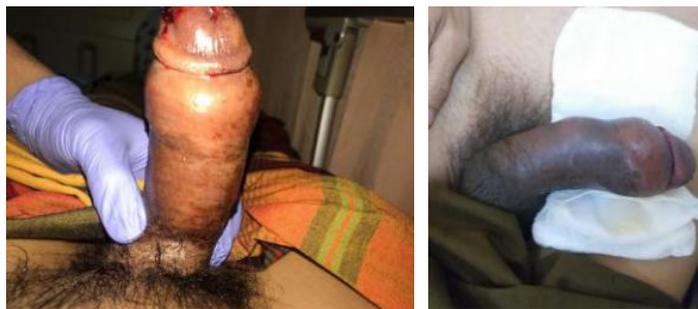


Figure 1. Clinical photograph of an erect penis before and after therapy.

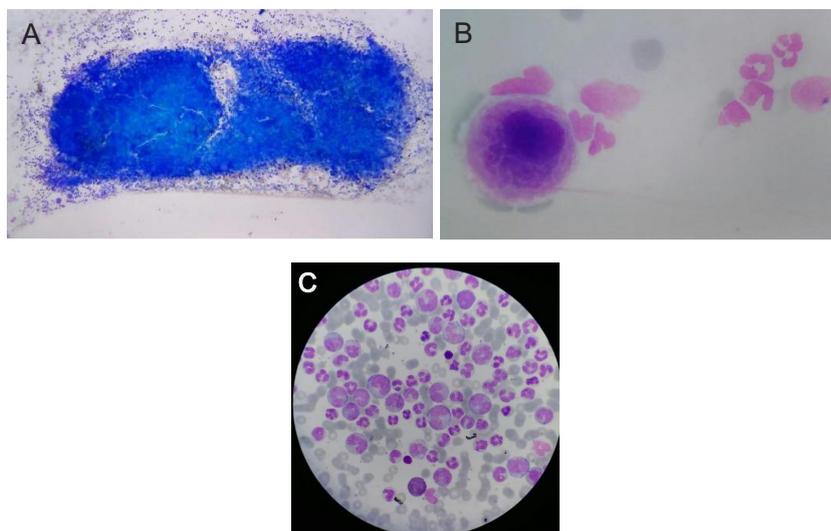


Figure 2. Bone marrow picture of chronic myeloid leukemia. A) Hypercellular bone marrow. B) Increased myeloid: eritroid ratio 23:1. C) Dwarf megakaryocyte.

Chronic Myeloid Leukemia (CML) is a myeloproliferative disease characterized by the presence of Philadelphia chromosome or BCR-ABL oncogene fusion. Patients with CML commonly present in the chronic phase with chief complaint of abdominal pain or early satiety. Priapismus as the first manifestation of CML is a rare phenomenon. Priapismus as a consequence of leukostasis is a urological emergency that requires immediate intracavernosus therapy followed by systemic therapy. We report a 44-year-old male patient presenting with priapismus as the first manifestation of CML.<sup>1</sup>

A 44-year-old male patient came to the emergency room (ER) at Cipto Mangunkusumo Hospital with a chief complaint of persistent, painful penile erection lasting for 4 days. Erection occurred suddenly without sexual stimulation. The penis became increasingly painful, swollen, and bluish day by day. The patient never had the same complaint before. There was no history of trauma or use of certain drugs. The patient also complained of being fatigued since one month before admission. The patient had experienced 2 kg weight loss within one month. There were no complaints of abdominal bloating, nausea, vomiting, and enlarged abdomen. Three days before admission, he was prescribed with sleeping pills and pain relievers by a general practitioner but the patient had no improvement. The patient had no comorbidity or history of malignancy.

Physical examination showed normal level of consciousness, normal vital signs, and visual analog scale (VAS) of 8. The patient had pale skin, conjunctival pallor, and leukemic retinopathy in both eyes. Abdominal examination showed Schuffner 2 splenomegaly, whereas genitalia examination showed erect penis with edema, bluish discoloration, and tenderness (**Figure 1**). Other physical examinations were within normal limits. There were no neurological complications caused by leukostasis.

Laboratory examination showed low hemoglobin level (7.9 g/dL), normal MCV/MCH (86.1 fL/32.4 pg), normal platelet count (355,000/ $\mu$ L), and hyperleukocytosis (399.560/ $\mu$ L). Peripheral blood smear revealed microcytic hypochromic, anisopoikilocytosis,

fragmentocytes, and polychromic erythrocytes; increased leukocytes with a left-shift, comprising 2% basophils, 5% eosinophils, 66% neutrophils, 3% lymphocytes, 1% monocytes, 4% blast, 3% promyelocytes, 4% metamyelocytes, 12% myelocytes; The number of platelets was sufficient and the morphology was normal. In summary, the patient had hyperleukocytosis with left-shift and 4% blast, suggesting chronic phase CML. Blood chemistry examination showed slightly increased uric acid (7.6 mg/dL), slightly increased ureum (45.1 mg/dL), and slightly increased creatinine (1.3 mg/dL). Other blood chemistry tests were within normal limits. Electrocardiography and chest X-ray were within normal limits.

The patient was initially admitted to the Urology Department at the ER and was treated with aspiration of the penile corpus followed by injection of sympathomimetic epinephrine. Afterwards, he was referred to the Internal Medicine ward. After reviewing his clinical findings and laboratory examinations, we concluded that CML was the most probable cause of his priapismus. He then began receiving intravenous fluids of 500 mL NaCl 0.9% every 6 hour, allopurinol 300 mg once daily, sodium bicarbonate 500 mg three times daily for potential tumor lysis syndrome, and cytoreductive therapy with hydroxyurea 1 gram three times daily. After the treatment, the erection and pain gradually resolved.

The BCR-ABL1 examination result was positive BCR-ABL1 transcript in the form of b3a2 fusion, coding for the p210 protein (major breakpoint). Bone marrow puncture (BMP) examination showed hypercellularity. The ratio of myeloid to erythroid increased to 23:1. Suppressed erythropoiesis, increased granulopoiesis, and increased thrombopoiesis were observed. There were also immature myeloid cells and 1% blast. Partial megakaryocytes with dwarf megakaryocyte morphology were also observed (**Figure 1**). These histologic findings led to diagnosis of CML. The patient was given 400 mg of imatinib once daily and the hydroxyurea was tapered off.

After 15 days of hospitalization, his white blood cells decreased to 117,650, VAS decreased

to 3, and priapism resolved. Three months later he achieved complete hematological response with leukocytes of 8,040/ $\mu$ L. However, the patient suffered erectile dysfunction as a complication of ischaemic priapism.

In CML patients, leukostasis as a result of hyperleukocytosis is considered as the cause of priapism. The main pathophysiology of priapism in CML is aggregation of leukemic cells in corpus cavernosa and dorsal veins of the penis.<sup>1</sup> Another contributing factor is congestion of the corpus cavernosum veins caused compression of abdominal veins by enlarged spleen. Another proposed hypothesis is infiltration of leukemic cells in sacral nerve, but there was no evidence to support this hypothesis.<sup>2</sup> Priapism as a manifestation of leukostasis is a strong indication to look for the possibilities of hidden leukostasis in other tissues, such as in nervous system and eyes. We consulted the patient to a neurologist and ophthalmologist, and they did not find any abnormality.

Based on American Urological Association (AUA) recommendation, the initial treatment of suspected ischemic priapism caused by leukemia is intracavernosal therapy in conjunction with systemic therapy of the underlying disease.<sup>3</sup> In our patient, the urologist did the cavernous aspiration and epinephrine sympathomimetic injection. Aspiration procedure only, with or without irrigation, has the success rate of around 30%. Successful rate of aspiration combined with sympathomimetic injection varies from 43% to 81%. The low successful rate was more likely due to delayed patient admission, which was more than 72 hours after the onset.<sup>2,4</sup>

Hydroxyurea (40 mg/kg body weight/day) is used as an initial therapy when BCR-ABL1 examination result is not available yet in order to prevent the complications due to leukostasis. To prevent tumor lysis syndrome, it is recommended to administer 2.5–3 L fluid per day. Sodium bicarbonate is recommended to maintain urine pH of 6.4–6.8 to optimize uric acid clearance. Allopurinol can be given but it increases the risk of xanthine accumulation in patient with renal failure, and should be limited to patients with symptomatic hyperuricemia. If the BCR-ABL1 is positive, then the tyrosine kinase inhibitor (TKI) must be given immediately and hydroxyurea should be tapered off.<sup>5</sup> We gave our patient hydroxyurea 1 g t.i.d., sodium bicarbonate 500 mg mg i.v. t.i.d., and allopurinol 300 mg p.o. o.d.

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