Polycythaemia Vera Causing Cerebral Venous Thrombosis

H Gupta*, SV Joshi**, N Manchal***, M Deshmukh+

Abstract
Cerebral venous thrombosis has been associated with many congenital and acquired hypercoagulable states. Included in this long list are thrombocytosis, polycythaemia vera, and remote infections. This case is being presented for the rarity of association of polycythaemia vera leading to sagittal venous thrombosis and central retinal venous occlusion (CRVO) with grade II papilloedema in a nonsmoker young adult with normal platelet count.

Introduction
Polycythaemia vera (also known as "Erythraemia") is a blood disorder in which the bone marrow makes too many red blood cells. It is a chronic, progressive and ultimately, fatal disease. Polycythaemia due to secondary causes like high altitude, chronic pulmonary disease and tumours is common.1-3 However, true polycythaemia vera is a rare entity. Symptoms are caused mainly by increased blood volume and by thrombotic haemorrhagic complications.

Cerebral venous thrombosis has been associated with many congenital and acquired hypercoagulable states. Included in this long list are thrombocytosis, polycythaemia vera, and remote infections.4-6 We present a case of polycythaemia vera causing cerebral venous thrombosis.

Case Report
A 40 year old man presented to us with acute onset of headache and projectile vomiting. This was associated with diminished vision in both eyes. There was no significant past history and no history of smoking.

On examination, he was afebrile and vitals were stable. The conjunctival vessels were congested and palms were plethoric. CNS examination revealed a bilateral sixth cranial nerve palsy with normal power in all 4 limbs. Visual acuity was 6/9 in both eyes. There was no meningeal signs and plantars were flexor. Systemic examination revealed no significant abnormality.

Complete blood count showed Hb of 21 gms/dl with a haematocrit of 64 per cent. ESR was 2 mm/hr. WBC count was 6.9 x 10^9/L and platelet count was 200 x 10^9/L. An urgent brain CT scan showed evidence of superior sagittal sinus thrombosis involving left horizontal and sigmoid sinuses (Fig. 1). Fundoscopy showed thrombosed blood vessels suggestive of central retinal venous occlusion (CRVO) with papilloedema (Fig. 2). USG abdomen was normal. Unfractioned heparin and fluids were given intravenously. Other investigations were carried out to rule out hypercoagulable states. Thrombophilia profile (F.V. Leiden Mutation, Antithrombin III, Protein C, Protein S, Anticardiolipin antibody) was normal. Prothrombin and MTHFR mutation was negative. Normal ABG with PO_2 of 115.7 mm Hg ruled out hypoxia as a cause of polycythaemia. Serum erythropoietin was 3.7 mu/ml (4.0-26 mu/ml). Bone marrow examination showed M:E ratio of 8:1 with increased megakaryocytes consistent with polycythaemia vera. The patient underwent phlebotomy on alternate days in which one unit whole blood was removed in each session to bring haematocrit to 45%. Lifelong aspirin (162.5 mg) was
prescribed and every month ophthalmic and CBC check up was advised. Patient was free of symptoms after three months of follow up.

Discussion

Polycythaemia vera, a clonal disease characterized by the over-production of blood cells by a mutant multipotential haematopoietic stem cell in the marrow. The hallmark of the disease is an increased number of red cells. The number of white blood cells and platelets are also usually increased.

Cerebral venous thrombosis is a rare clinical entity. Septic sagittal sinus thrombosis may develop in relation to infection of ear or para-nasal sinuses or to bacterial meningitis. Aetiological factors for aseptic sagittal sinus thrombosis are head injury, tumours, oral contraceptive pill, pregnancy and coagulopathies. It affects sagittal sinus (71%) more often than any other dural sinuses because of its high position, low pressure and slow flow.7,8

In cerebral venous thrombosis polycythaemia vera accounts to 1.6% and papilledema in 46.6%.9 We present a case of polycythaemia vera with papilloedema causing cerebral venous thrombosis with Hb level of 21 g%.

Decreased visual acuity in one or both eyes, enlarged blind spots, concentric decrease in visual fields can also be present in chronic papilloedema.10,11

Fig. 1: CT showed evidence of superior sagittal sinus thrombosis

Fig. 2: Fundoscopy showed thrombosed blood vessels suggestive of central retinal venous occlusion (CRVO)
Parija et al\textsuperscript{12} reported a 45-year-old male presented with sudden onset of headache, vomiting and blurring of vision of 28 days duration. Past medical history was insignificant. Detailed ophthalmological examination revealed normal anterior segment findings. However, Kyritsis et al\textsuperscript{13} documented superficial septic thrombophlebitis of the right leg in a 63-year-old woman with the diagnosis of polycythaemia vera had been diagnosed 4 years earlier, at which time she had 10,900 leucocytes/mm\textsuperscript{3}, 5.8 x 10\textsuperscript{6} erythrocytes/mm\textsuperscript{3}, 584,000 platelets/mm\textsuperscript{3}, a haemoglobin concentration of 17.1 g/100 ml, and a haematocrit of 51%.

Medical management of cerebral venous thrombosis generally include attention to the treatment of seizures, broad-spectrum antibiotics for septic thrombosis, detection and management of metabolic derangements and management of cerebral oedema and elevated intracranial pressure. Patients with aseptic thrombosis are treated with anticoagulant to combat risk of haemorrhage. Prolonged anticoagulation may be required for refractory cases or for patients with an identified pro-thrombotic state.\textsuperscript{7}

In our study, the patient underwent phlebotomy on alternate days in which one unit whole blood was removed in each session to bring haematocrit to 45%.\textsuperscript{14}

Low-dose aspirin can safely prevent thrombotic complications in patients with polycythaemia vera who have no contraindications to such treatment.\textsuperscript{15} Lifelong aspirin (162.5 mg) was prescribed and every month ophthalmic and CBC check up was advised. Patient was free of symptoms after three months of follow up.

Kyritsis et al\textsuperscript{13} initially treated an elderly female patient with P-32; thereafter, her haematocrit was maintained at approximately 40% with phlebotomies. On her platelet count was 687,000/mm\textsuperscript{3}. Her haemoglobin concentration was 13.6 g/100 ml, and her haematocrit was 41%. Her medications included nifedipine, hydrochlorothiazide/triamterene, atenolol, methotrexate, and piroxicam. Treatment with intravenous antibiotics and intravenous heparin was started on admission. Her partial thromboplastin time was maintained between 40 and 50 seconds.

Parija et al\textsuperscript{12} treated the patient initially with subcutaneous injection of Heparin (40 mg twice daily) and acetazolamide 250 mg orally twice daily. Therapeutic venesection was done followed by systemic hydroxyurea (500 mg four times daily to start with followed by 500 mg twice daily). Headache and vomiting subsided within 10 days of initiation of treatment.

Polycythaemia vera, sickle cell anaemia, sickle-C disease, and essential thrombocythaemia are the major disorders of formed blood elements causing stroke. Special, step-wise screening for occult prothrombotic entities in stroke patients is recommended for young persons with stroke of uncertain cause, for those with prior venous thrombosis, for those with a family history of unusual thrombosis, and for those with no other explanation for recurrent stroke. Acquired, perhaps transient, abnormalities of platelets, coagulation inhibition, and fibrinolysis may contribute importantly to brain ischaemia in synergy with other mechanisms, but at present these remain ill-defined. The contribution of prothrombotic diatheses to stroke is probably under recognized and warrants further investigation.\textsuperscript{14}

**Conclusion**

This case is being presented for the rarity of association of polycythaemia vera leading...
to sagittal venous thrombosis and central retinal venous occlusion (CRVO) with grade II papilloedema in a nonsmoker young adult with normal platelet count.

References