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Cerebral Venous Thrombosis Indicative of Polycythemia Vera: Case Report

Taoufik Boubga[1*], Ennmer Mohammed[2], Abdellah Taous[1], Maha Ait Berri[1], Tarik Boulahri[1]

[1]Neurology Department, Moulay Ismail Military Hospital, Meknes, Morocco
[2]Department of Radiology, Military Hospital Mohammed V, Rabat, Morocco

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***Corresponding author:** Taoufik Boubga
Neurology Department, Moulay Ismail Military Hospital, Meknes, Morocco

Abstract **Case Report**

Polycythemia vera, a myeloproliferative disorder, seldom leads to cerebral venous thrombosis, making this association a rare occurrence. Here, we present the case of a 62-year-old patient without significant medical history, who was admitted due to a one-month history of intracranial hypertension syndrome. Upon admission, papillary edema (stage II) was observed, along with a lack of focal neurological signs. MRI angiography revealed thrombosis in the right lateral sinus. Further diagnostic investigation confirmed the presence of polycythemia vera. The patient was initiated on anti-edematous and anticoagulant therapy, followed by bloodlettings and cyto-reduction treatment, resulting in a favorable clinical outcome.

Keywords: Cerebral Venous Thrombosis – Polycythemia Vera - Myeloproliferative Syndrome - Case Report.

INTRODUCTION

Polycythemia vera is a chronic disorder of the myeloproliferative system, primarily affecting the development of erythroblasts. This uncommon hematologic malignancy is linked to an elevated risk of thromboembolic events, which can impact arteries of various sizes as well as the venous system. It's estimated that about thirty percent of individuals with this myeloproliferative disorder will experience either arterial or venous thromboembolism as a complication over the course of their condition.

PATIENT AND OBSERVATION

Patient Information

A 62-year-old male patient with no significant pathological history was admitted due to a progressive neurological condition. He had been experiencing helmet headaches, vomiting, and a bilateral decline in visual acuity over the course of a month. These symptoms were further complicated by the recent onset of bilateral papillary edema just before his hospitalization.

Clinical Findings

Upon clinical examination, there were no observed sensory-motor deficits or coordination issues. The patient displayed symmetrical osteotendinous reflexes. Notably, an ophthalmic examination revealed bilateral papillary edema classified as stage II. No hepatomegaly or splenomegaly was detected.

Timeline of Current Episode: The patient's neurological symptoms had been evolving over the span of a month.

Diagnostic Assessment

Cerebral MR angio-MRI results indicated thrombosis specifically within the right lateral sinus (Figure 1). Cerebrospinal fluid (CSF) analysis showed clear fluid with elevated pressure (38cm H2O), while cyto-bacteriological and chemical tests yielded normal results. Hematological assessments included a blood count (CBC) revealing hyperleukocytosis, hyperplaquettosis, and elevated hemoglobin and hematocrit levels. The JAK2 V617F mutation assay returned positive. Osteo-medullary biopsy findings displayed hyperplasia with notable erythroblastic and megakaryocyte proliferation. Abdominal ultrasound findings were unremarkable.

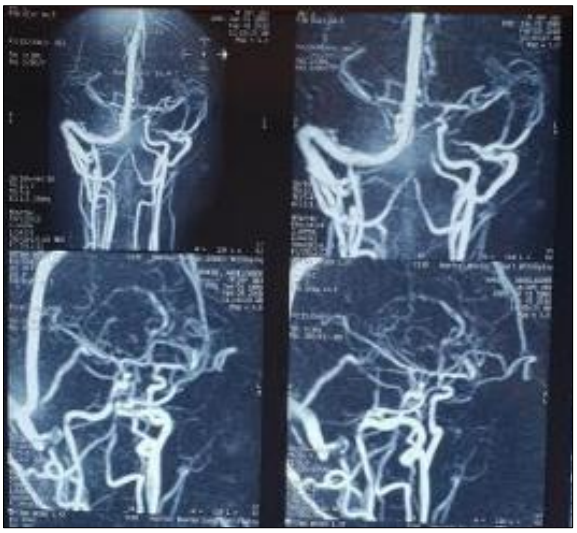

Figure 1: Cerebral MR angio-MRI: thrombosis of the right lateral sinus

Diagnosis

The conclusive diagnosis pointed towards cerebral venous thrombosis, which was attributed to an underlying condition of polycythemia vera. This diagnosis was reached after a thorough etiological assessment.

Therapeutic Interventions

The patient's treatment plan encompassed a combination of therapeutic approaches. This included administration of an anticoagulant, specifically low molecular weight heparin, at a hypo-coagulant dose. An anti-edematous agent (Acetazolamide) and an analgesic were also included in the regimen. Furthermore, a cyto-reducing treatment with Hydroxycarbamide (500 mg, 2 tablets per day) was initiated. Simultaneously, interventions for cerebral venous thrombosis were implemented alongside the bloodletting procedure.

Follow-Up and Outcome of Interventions

The patient exhibited a favorable response to the treatment regimen, with noticeable improvement in the myeloproliferative syndrome. Additionally, the signs of cerebral intracranial hypertension gradually diminished over the course of the treatment.

Patient Perspective: The patient expressed satisfaction with the interventions and care provided.

Informed Consent: The patient has given informed consent.

DISCUSSION

Polycythemia vera is a rare clonal bone marrow disorder often linked to a JAK2 gene mutation (JAK2 V617F) in hematopoietic stem cells [1]. It leads to an overproduction of red blood cells, driven by erythroid lineage proliferation, possibly extending to increased polynuclear cell and platelet production.

The incidence of this disease is approximately 1 case per 100,000 individuals annually, with a slight male predominance [2]. Initial clinical signs might include hot water pruritus, headaches, and erythromelalgia, indicating a possible hyperviscosity syndrome, sometimes coupled with splenomegaly. The World Health Organization's 2016 criteria guide its diagnosis (Table 1).

Table 1: 2016 World Health Organization diagnostic criteria for polycythemia vera

Major criteria	Hemoglobin > 16.5 g/dL(men) Hemoglobin > 16.0 g/dL (women) or Hematocrit > 49% (men) Hematocrit > 48% (women) or increased red cell mass (RCM)c
	bone marrow biopsy showing hypercellularity for age with trilineage growth (panmyelosis) including prominent erythroid, granulocytic and megakaryocytic proliferation with pleomorphic, mature megakaryocytes (differences in size)
	Presence of JAK2 or JAK2 exon 12 mutation
Minor criteria	Subnormal serum erythropoietin level
Diagnosis requires meeting either all three major criteria or the first two major criteria and one minor criterion	

The disease can lead to hematological complications (myelofibrosis after a decade, and more rarely, acute leukemia) and thrombotic issues [3, 4]. Thrombotic events frequently occur during the disease and are a prominent indicator as well as a primary cause of death [4]. Arterial thromboses, primarily affecting cerebral and coronary vessels, are common, with strokes being prevalent prior to diagnosis [4].

Venous thrombosis is less frequent (pre-diagnosis rate < 15%), often involving deep veins in lower limbs and sometimes the portal system [5]. Major thrombosis risk factors include age (>60 years) and a history of thrombotic events [6]. Complex pathophysiology involves changes in blood lines, endothelial damage, and general risk factors [7].

Treating polycythemia vera aims to reduce thrombo-hemorrhagic risk, manage symptoms, and prevent long-term hematologic complications. Keeping hematocrit (HCT) <45% is crucial. Low-risk patients (<60 years without thrombosis history) undergo phlebotomy and low-dose aspirin, while high-risk patients receive cyto-reducing agents [8]. Hydroxyurea and interferon are primary options, with interferon favored for younger patients , Ruxolitinib serves as second-line treatment for resistant cases [9] .

Managing cerebral venous thrombosis in polycythemia vera involves preventing recurrence and organ dysfunction. While treatment guidelines aren't well-defined, analogously to splanchnic venous thrombosis, anticoagulation is recommended. Balanced use is essential due to bleeding risks. Cytoreductive therapy is also vital to maintain recommended blood counts [10].

CONCLUSION

This case report highlights that ischemic strokes and transient ischemic attacks are the main thrombotic issues in polycythemia vera, with cerebral venous thrombosis being a rarer and inadequately addressed complication. Improved management strategies and further research are imperative to address these challenges effectively.

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