Cytarabine Associated Posterior Reversible Encephalopathy Syndrome in Acute Myeloid Leukemia: A Case Series

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INTRODUCTION

Posterior reversible encephalopathy syndrome (PRES) is a rare but potentially life-threatening neurological complication in patients undergoing chemotherapy with Cytarabine. We present two cases of cytarabine-associated PRES syndrome in AML patients, along with which we explore underlying risk factors and management challenges.

CASES

CASE 1

Presentation : 19 year old Acute Myeloid Leukemia (AML), 2024 July (85% Marrow Blast)
Initial Therapy:

- Induction with standard **7+3 regimen** (cytarabine + daunorubicin)
- Planned for **five cycles of intermediate-dose cytarabine** for consolidation

Consolidation Courses:

- **Completed 4 cycles**
- The patient developed **neutropenic sepsis with CRE infection** after each chemotherapy cycle, experienced one episode of **septic myocarditis (EF 25%**), and, following the third consolidation cycle, developed disseminated ***Fusarium solani* complex** infection**.**

Post-Fourth Consolidation cycle : **she again developed:**

- Neutropenic Septic Shock (WBC 0.01 × 10^9/L)
- Pancytopenia
- Dyselectrolytemia
- Liver Dysfunction with rising bilirubin (from 2 to 6.7 mg/dL)

Started on broad-spectrum Antimicrobials.

On day 28 Post Consolidation:

- **Developed acute transient episode of hypertension (BP 160/80 mmHg)**
- **Experienced blurring of vision, prosopagnosia, and a generalized tonic-clonic seizure**

Imaging:
MRI Brain: Vasogenic edema in bilateral posterior parieto-occipital regions → **consistent with PRES**

Management: Mannitol, strict antihypertensive control, Levetiracetam withdrawal of all Antibiotics and No further Consolidation was given.

CASE 2

Presentation

- 13-year-old girl diagnosed with AML in Dec 2023 (23% marrow blasts)
- Treated with 7+3 induction (cytarabine + daunorubicin)

Course

- Post-induction (Day 30): developed profound neutropenic septic colitis with Klebsiella Pneumonia (0.03x10^9/L) .
- CT abdomen: Typhlitis
- Progressed to **septic shock** and **hypoglycemia** → PICU transfer
- Repeat cultures: **CRE *Klebsiella*** → Initiated on ceftazidime-avibactam + aztreonam

Liver Dysfunction & PRES Episode

- Developed **hepatomegaly**, **bilirubin peak 24 mg/dL**,
- On Day 30 post-induction: sudden **hypertension (BP 170/80)**, **generalized tonic-clonic seizure**, **drowsiness**, **incoherent speech**, and **blurred vision**

MRI brain: Vasogenic edema in bilateral posterior parieto-occipital regions → consistent with **Posterior Reversible Encephalopathy Syndrome (PRES)**

Management :

- Treated with **labetalol infusion**, **mannitol, levetiracetam**, and **electrolyte correction.**

DISCUSSION

Posterior Reversible Encephalopathy Syndrome (PRES) is a clinical-radiological condition characterized by **encephalopathy, seizures, headache**, and **vasogenic edema**, typically in the **posterior cerebral circulation**[1-3,5]. Seizures occur in up to **74–87%** of patients—often within **24–48 hours**—with a smaller subset (3–17%) progressing to **status epilepticus**[1,3]. Headaches are present in ~50% of cases, while **visual symptoms** (e.g., field deficits, hallucinations, cortical blindness) occur in only **39%,** despite occipital involvement. **Focal deficits** such as aphasia and hemiparesis are less common (~19%)[3].

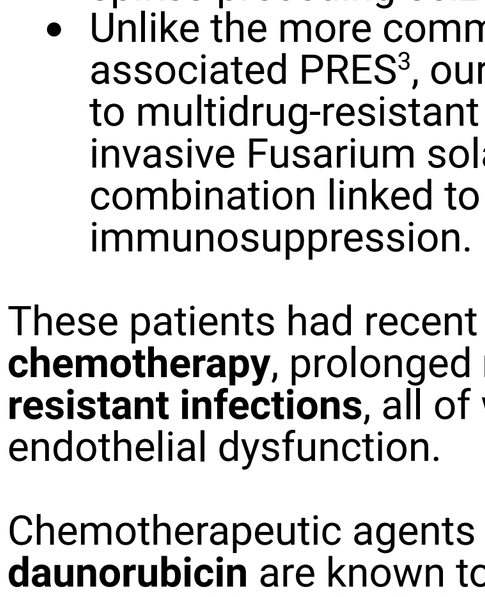
PRES is linked to **endothelial injury**, which may result from **hypertension, sepsis, electrolyte disturbances**, or exposure to **cytotoxic/immunosuppressive drugs**[1,2,5]. Though hypertension is a classic feature, **normotensive presentations** are increasingly recognized—as seen in our two patients.

Our cases are **unique**:

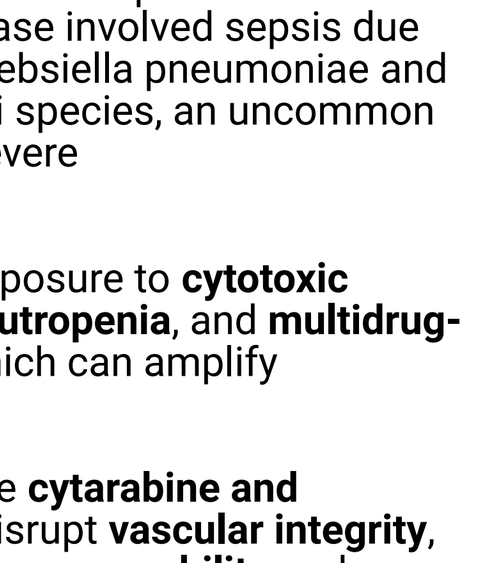
- Both had **Acute Myeloid Leukemia (AML)** rather than ALL (more commonly associated with PRES) [4]
- Both were **female**, aligning with reported sex-based susceptibility[3].
- **No sustained hypertension**, only transient BP spikes preceding seizures
- Unlike the more common Gram-positive cocci–associated PRES[3], our case involved sepsis due to multidrug-resistant Klebsiella pneumoniae and invasive Fusarium solani species, an uncommon combination linked to severe immunosuppression.

These patients had recent exposure to **cytotoxic chemotherapy**, prolonged **neutropenia**, and **multidrug-resistant infections**, all of which can amplify endothelial dysfunction.

Chemotherapeutic agents like **cytarabine and daunorubicin** are known to disrupt **vascular integrity**, increasing **blood–brain barrier permeability** and promoting **vasogenic edema**—the hallmark of PRES.[4] The emergence of PRES across treatment phases in both patients emphasizes the **persistent vulnerability of cerebral vasculature to chemotherapy-related injury**, even in the **absence of sustained hypertension**.



Case 1: Il-defined confluent areas of vasogenic edema in the bilateral posterior parieto-occipital regions



CASE 2 : T2 high signal lesions within the cortex and subcortical region of both parietal and occipital lobes

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