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# Cryptococcal Meningitis and Autoimmune Encephalitis in a Young Adult Filipino Patient: A Case Report

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**Abstract: This case report describes the nursing care of a 23-year-old male patient admitted to the intensive care unit with a rare diagnosis of concurrent cryptococcal meningitis and autoimmune encephalitis. The patient presented with rapid onset neurological symptoms, including slurred speech, diaphoresis, weakness, syncope, and seizures. Diagnostic workup included Computed Tomography (CT) scan, Magnetic Resonance Imaging (MRI), electroencephalogram (EEG), and Cerebrospinal Fluid (CSF) analysis, which revealed findings suggestive of cryptococcal infection. The patient was managed with steroids, antifungal therapy and supportive care. This case highlights the importance of considering both infectious and autoimmune etiologies in patients presenting with complex neurological manifestations.**

***Keywords:*** *Cryptococcal Meningitis, Autoimmune Encephalitis, Case Report, Nursing Care, Intensive Care Unit.*

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## I. INTRODUCTION

Cryptococcal meningitis (CM) is a serious fungal infection of the central nervous system, while autoimmune encephalitis (AIE) is a group of inflammatory conditions characterized by autoantibodies targeting neuronal antigens. Both conditions can lead to significant morbidity and mortality if not promptly diagnosed and treated. CM is caused by the encapsulated yeast *Cryptococcus neoformans* or *Cryptococcus gattii*.[1] AIE is characterized by inflammation of the brain parenchyma, leading to a wide range of neurological and psychiatric symptoms.[2] This case study describes the nursing care of a young adult patient with concurrent CM and AIE, emphasizing the complex clinical presentation and the importance of a comprehensive nursing approach.

- *Patient Presentation*

A 23-year-old male from the Philippines, was admitted to the intensive care unit with a differential diagnosis of CM and AIE. The patient had a history of rapid onset of neurologic signs and symptoms which occurred one month before admission, such as slurring of speech, mood and behavioral changes, weakness, syncope, disorientation, and seizures. He had no known comorbidities and was not on any medications prior to admission.

- *Assessment*

Upon admission, the patient presented with a complex constellation of neurological, and other clinical findings. On neurological assessment, the patient was alert but disoriented, initially exhibiting slurred speech and decreased verbal output. He experienced focal seizures, a critical neurological sign that can indicate increased intracranial pressure or direct brain involvement. A CT scan revealed cerebral edema, further supporting the presence of significant neurological compromise. Cardiovascular assessment revealed that the patient's cardiovascular system was generally stable, with a normal sinus cardiac rhythm, although occasional premature ventricular contractions were noted. On the other hand, a respiratory assessment noted a tracheostomy tube was in place, and the patient was connected to a mechanical ventilator on synchronized intermittent mandatory ventilation (SIMV) mode for nine days. Decreased breath sounds in bilateral lower lung fields suggested a potential pulmonary issue, such as pneumonia or atelectasis, which can be a complication in patients with decreased consciousness and prolonged intubation.

Gastrointestinal assessment reported a siliconized nasogastric tube was in place, for medication administration and nutritional support, while integumentary assessment noted the presence of multiple whitish lesions on the lower labial mucosa. The patient’s musculoskeletal assessment revealed non-pitting edema was observed on bilateral upper and lower extremities. There were no joint contractures but

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the muscle strength is 2 out of 5 (movement of the limb with full range of motion but not against the force of gravity) in all extremities.

Multiple laboratory and diagnostic tests were done, and cerebrospinal fluid (CSF) analysis revealed clear fluid with normal levels of glucose and protein, which is somewhat atypical for CM, as CSF in CM often shows increased protein and decreased glucose. However, the positive Cryptococcal Antigen Latex Agglutination System (CALAS) test confirmed the diagnosis of CM.

Magnetic resonance imaging (MRI) showed hypointense lesions with edema, but no hydrocephalus; while the patient's electroencephalogram (EEG) showed diffuse slow brain activities which is indicative of a possible anti-NMDA receptor autoimmune encephalitis.[3]

Laboratory findings included hypernatremia, hypokalemia, and elevated blood urea nitrogen (BUN) and creatinine levels, indicating electrolyte imbalances and potential renal involvement. Early ICU-acquired hypernatremia has been described in severe sepsis patients receiving 0.9% saline fluid resuscitation.[4]

➢ *Nursing Diagnoses* [5,6]

Based on the assessment findings, the following nursing diagnoses were identified:

- **Risk for increased intracranial pressure (ICP) and Impaired cerebral tissue perfusion:** The presence of cerebral edema on the CT scan, along with neurological signs such as decreased level of consciousness, slurred speech, and seizures, indicated a high risk for elevated ICP, which can lead to further neurological deterioration and herniation.
- **Impaired gas exchange and Risk for dysfunctional ventilatory weaning response:** The decreased breath sounds in the bilateral lower lung fields, combined with the patient's dependence on mechanical ventilation via a tracheostomy tube, indicated a risk for impaired gas exchange. This could be due to various factors, including pneumonia, atelectasis, or other pulmonary complications, like dysfunctional ventilatory weaning response.
- **Risk for shock (septic):** The positive CALAS test confirmed the presence of CM, a fungal infection that can cause significant morbidity and mortality. The patient was at risk for further dissemination of the infection within the central nervous system and other organs, with the presence of systemic inflammatory response syndrome parameters. High-dose steroids given for the AIE may also have effects on the immunodeficiency of the patient, further compromising the immune system's response.
- **Self-care deficit:** The patient's altered mental status and decreased level of consciousness impaired his ability to perform basic self-care activities, such as feeding, dressing, and toileting, requiring assistance and support.
- **Impaired verbal communication:** The patient's initial assessment of having slurred speech and decreased verbal output significantly impaired his ability to communicate effectively, creating a barrier to expressing his needs and understanding his condition and treatment. This diagnosis was even highlighted when the patient was intubated and was placed on mechanical ventilation.
- **Impaired physical mobility and Ineffective tissue perfusion:** The patient's critical condition, decreased level of consciousness, and reduced mobility increased the risk of ineffective tissue perfusion.
- **Excess fluid volume and Risk for electrolyte imbalances:** The laboratory findings of electrolyte imbalances, including hypernatremia, hypokalemia, and elevated BUN and creatinine levels, suggested a potential compromise in the patient's fluid regulatory mechanisms.
- **Impaired skin integrity:** Prolonged immobility and decreased level of consciousness increased the patient's risk of developing pressure ulcers.
- **Impaired oral mucous membrane:** The presence of multiple white lesions on the labial mucosa due to the presence of a fungal infection also is another priority problem for the patient.
- **Plan of Care and Interventions:** The nursing care for this patient was multifaceted, addressing both the acute neurological manifestations and the underlying infectious and autoimmune processes, while also aiming to prevent complications associated with critical illness. The interventions were guided by critical care nursing standards and best practices.
- **Neurological and Autoimmune Management:** The primary focus was on managing and mitigating the risk of increased intracranial pressure (ICP) due to cerebral edema, a common and potentially devastating complication of both CM and AIE. Continuous neurological monitoring was essential, involving frequent assessments of the patient's Glasgow Coma Scale (GCS), pupillary size and reactivity, and other signs of increasing ICP, such as headache, vomiting, and changes in vital signs.[7] Pharmacological interventions included the administration of steroids (prednisolone) and anticonvulsants (lamotrigine, levetiracetam, and valproic acid) to control and prevent brain inflammation and seizures, which can further elevate ICP. The patient's head was maintained in a neutral position with the head of the bed elevated to 30-45 degrees to promote venous drainage from the brain and reduce ICP.[7]
- **Cardiorespiratory Support:** Given the patient's decreased level of consciousness and the presence of a tracheostomy tube connected to mechanical ventilation, meticulous respiratory care was crucial. This involved careful management of ventilator settings, including tidal volume, respiratory rate, and FiO2, to ensure adequate oxygenation and ventilation while minimizing the risk of ventilator-induced lung injury (VILI). Regular suctioning was performed to clear secretions and maintain airway patency. The implementation of a ventilator-associated pneumonia (VAP) bundle of care, including measures such as oral care with chlorhexidine, elevation of the head of the bed, and early mobilization, was essential to prevent this common and serious complication of mechanical ventilation.[8] Tracheostomy care, including regular cleaning, dressing changes, and cuff management, was also vital to prevent infection and maintain airway

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integrity.

- **Fluid and Electrolyte Management:** Close monitoring of fluid balance, serum electrolytes (particularly sodium and potassium), BUN, and creatinine levels was necessary to detect and correct any imbalances. The patient exhibited hypernatremia and hypokalemia, which can have significant neurological consequences. Intravenous fluids and electrolytes were administered as ordered, with careful consideration of the patient's overall fluid status and the risk of exacerbating cerebral edema. The early identification of ICU-acquired hypernatremia is important especially in patients receiving fluid resuscitation.[4]
- **Infection Control:** The cornerstone of treatment for CM is the administration of antifungal medications. In this case, amphotericin B was used. Given the potential nephrotoxicity of amphotericin B, close monitoring of renal function was essential. Strict adherence to aseptic techniques during all procedures, including intravenous line insertion, suctioning, and dressing changes, was crucial to prevent secondary infections.
- **Mobility and Skin Care:** Prolonged immobility in the ICU can lead to several complications, including pressure ulcers, deep vein thrombosis (DVT), and muscle atrophy. To mitigate these risks, the nursing care plan included passive range of motion exercises, regular turning and repositioning, and the implementation of pressure ulcer prevention measures, such as the use of specialized support surfaces.
- **Communication and Psychosocial Support:** The patient's decreased level of consciousness posed a significant challenge to communication. Nurses played a vital role in providing frequent orientation to person, place, and time, even if the patient's responses were limited. Therapeutic communication techniques, including touch, massage, and the provision of a quiet and calming environment, were used to promote comfort and reduce anxiety. The importance of addressing the patient's spiritual needs and providing support to the family was also recognized, as well as the impact of critical illness and sleep disruption.[9]

## II. EVALUATION

The patient's condition remained critical with notable developments throughout the ICU stay until discharge. Interventions from the interprofessional healthcare team helped in managing the patient's symptoms and preventing further complications.

Neurological status showed some improvement, with GCS increasing from 8 to 10 over the ICU stay, however, persistent neurologic deficits were still noted. The administration of steroids and anticonvulsants effectively controlled seizures, contributing to the stabilization of ICP.

Infectious processes were controlled as evidenced by negative repeat CSF cultures, and the patient continued to require completion of the antifungal therapy. Respiratory function improved with weaning from SIMV to spontaneous mode, but the patient remained tracheostomy-dependent at discharge. Challenges in weaning the patient off mechanical ventilation necessitated prolonged tracheostomy dependence. VAP bundle implementation was associated with the absence of new pulmonary infiltrates on chest X-ray, suggesting prevention of VAP. Aggressive electrolyte management corrected hypernatremia and hypokalemia, which was crucial for preventing further neurological complications.

Despite interventions, the patient experienced persistent muscle weakness, requiring ongoing rehabilitation planning. Upon discharge, the patient was referred to a rehabilitation facility for continued management of neurological deficits and physical therapy.

## III. DISCUSSION

This case highlights the diagnostic challenges and complexity of managing a patient with concurrent CM and AIE. The patient's initial presentation with neurological symptoms prompted a thorough investigation, including neuroimaging, EEG, and CSF analysis. The positive CALAS test confirmed the diagnosis of CM, while the possibility of AIE was considered due to the patient's clinical presentation and the absence of typical risk factors for CM.

The coexistence of CM and AIE is rare, and this case underscores the importance of a broad differential diagnosis in patients with neurological symptoms. While isolated cases of CM and AIE are relatively well-documented, the simultaneous occurrence, as seen in this patient, is rare. A study reported the first case of concomitant cryptococcal meningitis and anti-NMDAR encephalitis in 2020,[10] while a more recent study noted that only four cases have been reported in literature so far.[11] The patient's rare condition presents a complex interplay of infectious and autoimmune processes. Cryptococcal infection can trigger or exacerbate autoimmune responses in the CNS, potentially through mechanisms such as molecular mimicry or inflammation-induced disruption of the blood-brain barrier. Differentiating between neurological deficits caused directly by CM and those attributable to AIE required careful clinical assessment and consideration of the patient's overall presentation.

This case further highlights the need for vigilant neurological monitoring in patients with complex neurological conditions, as subtle changes can indicate significant deterioration. Nurses play a crucial role in the care of critically ill patients with complex neurological conditions. In this case, the nursing care focused on continuous monitoring, symptom management, prevention of complications, and provision of holistic care. The interventions were aimed at managing increased intracranial pressure, supporting respiratory and cardiovascular function, maintaining skin integrity, promoting communication and psychosocial well-being, and meticulous discharge planning for and with the patient.

## IV. CONCLUSION

This case study describes the nursing care of a young adult Filipino patient with concurrent CM and AIE. The patient's complex clinical presentation and the diagnostic

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challenges highlight the importance of considering both infectious and autoimmune etiologies in patients presenting with neurological manifestations. Nurses play a vital role in the management of these patients, providing continuous monitoring, symptom management, and holistic care to optimize outcomes.

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