NR607 Standardized Procedure Worksheet

Name: [redacted] March 16, 2025

1. Definition

a. Disease or condition

Neuroleptic Malignant Syndrome (NMS)

b. Pathophysiology

While NMS is a rare condition, it is deemed a life-threatening neurological emergency that results from using dopamine-blocking agents, mainly antipsychotics (including risperidone, chlorpromazine, and haloperidol). It is characterized by a triad of neuromuscular abnormalities, autonomic dysfunction, and hyperthermia (Perry et al., 2022). The disease has a significantly complicated pathophysiology that has not yet been understood entirely. Nonetheless, it is still mainly linked to the dopamine D2 receptor blockade found in the central nervous system (CNS), specifically in the hypothalamus and basal ganglia. The hypothalamus, which is responsible for autonomic control and regulates temperature, is dysregulated, resulting in diaphoresis, fever, altered mental status, labile blood pressure, and tachycardia. On the other hand, the role of the basal ganglia entails movement regulation. Consequently, when dopamine is inhibited in this region, there is bradykinesia (like Parkinsonian symptoms) and severe muscular rigidity (lead-pipe rigidity) (Perry et al., 2022). Metabolic demand is increased from hyperthermia and sustained muscle contraction from severe rigidity, resulting in myoglobinuria, rhabdomyolysis, and acute kidney injury (AKI) due to renal overload and excessive muscle breakdown. The condition can further be worsened by autonomic instability, which may manifest as respiratory distress, hypertension or hypotension, arrhythmia, and tachycardia. The most common

occurrence of NMS is within weeks or days after increasing the dose or initiating use of an antipsychotic; however, evidence suggests that sudden withdrawal of dopamine agonists like levodopa in patients with Parkinson's disease can result in NMS (Perry et al., 2022). Immediate intervention is necessary due to the progression and severity of the symptoms. The interventions include aggressive supportive care, discontinuing offending agents, and pharmacologic management using muscle relaxants and dopamine agonists. NMS mortality rate ranges between 10% and 20%, necessitating early recognition, intervention, and prompt treatment.

c. Incidence and prevalence

Although rare, NMS is an adverse and serious reaction to dopamine-blocking agents. According to Gurrera et al. (2022), NMS incidence is estimated to be 0.02% to 3.23% among people receiving antipsychotic medication. However, the actual prevalence figures could be understated because of underreporting or misdiagnosis, more so in atypical presentation cases. While the common association of NMS is with first-generation antipsychotics (typical), including chlorpromazine and haloperidol, cases have been reported with atypical (second-generation) antipsychotics like clozapine, risperidone, and olanzapine. While this condition can affect individuals of all ages, it is predominant in young adult males and has an approximate female-to-male ratio of 1:2 (Gurrera et al., 2022). Susceptibility to NMS is enhanced by certain risk factors such as catatonia, dehydration, rapid escalation or higher doses of antipsychotic medications, agitation, intramuscular administration, and pre-existing neurological disorders like Parkinson's disease. The risk of this condition among psychiatric populations is significantly higher among bipolar disorder and schizophrenia patients, primarily when admitted inpatient, where there are frequent medication adjustments. Gurrera et al. (2022) state that "*Despite*

advancements in early detection and supportive care, NMS remains a significant concern due to its high mortality rate, which ranges from 10% to 20% in untreated cases but has declined to <5% with prompt medical intervention." The condition may not be encountered frequently by clinicians due to its rarity; however, it is critical to create awareness, considering that delaying diagnosis can result in severe complications like cardiovascular instability, respiratory failure, rhabdomyolysis, and acute kidney injury (AKI).

2. Assessment

a. Symptoms

- Following dose escalation or initiation of dopamine-blocking agents, NMS essentially develops for 24 to 72 hours.
- A triad of neuromuscular abnormalities, autonomic instability, and change in mental status are present in patients.
- An altered mental status, which ranges from restlessness, agitation, and confusion to more severe manifestations like catatonia or delirium, is one of the earliest subjective symptoms.
- Another hallmark symptom is hyperthermia, where patients experience fevers that exceed 101.3°F (38.5°C).
- Extensive muscle rigidity is reported by many patients, contributing to declining mobility, stiffness, and pain.
- Gastrointestinal complaints may also exist, including difficulty urinating, vomiting, and nausea.