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Multiple Sclerosis, Neuromyelitis Optica Spectrum Disorder and Myelin Oligodendrocyte Glycoprotein Antibody-Associated Disease: Challenges and Opportunities in Bangladesh

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Central nervous system (CNS) demyelinating disorders, including multiple sclerosis (MS), neuromyelitis optica spectrum disorder (NMOSD), and myelin oligodendrocyte glycoprotein antibody-associated disease (MOGAD), constitute a major cause of neurological disability among young adults worldwide. These disorders frequently affect individuals during their most productive years, leading to substantial personal, social, and economic consequences. Although remarkable advances in the understanding of disease mechanisms, diagnostic techniques, and disease-modifying therapies have transformed the management of CNS demyelinating disorders globally, translating these advances into clinical practice remains a significant challenge in many low- and middle-income countries, including Bangladesh. Limited awareness, inadequate diagnostic infrastructure, and restricted access to effective therapies continue to impede timely diagnosis and optimal management.

One of the most important barriers to effective care is delayed recognition of these disorders. The initial manifestations of MS, NMOSD, and MOGAD are often nonspecific, including optic neuritis, acute transverse myelitis, brainstem syndromes, or multifocal neurological deficits that may mimic stroke, infectious diseases, or metabolic disorders. In Bangladesh, patients commonly present first to general practitioners, ophthalmologists, internists, or physicians in emergency departments rather than neurologists. While this pattern reflects the realities of the healthcare system, limited familiarity with demyelinating disorders among non-neurologists frequently results in delayed referral, unnecessary investigations, inappropriate treatment, and ultimately postponement of definitive diagnosis. Such delays are particularly detrimental in disorders like NMOSD, where even a single untreated relapse may cause irreversible blindness or permanent spinal cord disability.

Accurate diagnosis has become increasingly dependent on advanced immunological testing. The discovery of aquaporin-4 immunoglobulin G (AQP4-IgG) and myelin oligodendrocyte glycoprotein immunoglobulin G (MOG-IgG) has fundamentally changed the classification of inflammatory demyelinating diseases. Current international recommendations advocate cell-based assays as the diagnostic gold standard because of their superior sensitivity and specificity compared with earlier enzyme-linked immunosorbent or immunoblot techniques. Correct antibody identification not only confirms the diagnosis but also guides therapeutic decisions and provides important prognostic information. Unfortunately, access to validated cell-based assays remains extremely limited in Bangladesh. Samples often require overseas shipment, increasing costs, delaying diagnosis, and rendering testing inaccessible for many patients. Consequently, clinicians frequently rely on clinical judgment and neuroimaging alone, increasing the risk of misclassification between MS, NMOSD, MOGAD, and other inflammatory or infectious disorders.

Magnetic resonance imaging (MRI) represents another cornerstone of diagnosis. Characteristic lesion distribution, morphology, and enhancement patterns are essential for differentiating MS from NMOSD and MOGAD. However, access to high-quality MRI with standardized demyelinating protocols is uneven across Bangladesh. Outside major urban centers, MRI facilities with adequate field strength and optimized imaging sequences remain scarce. Equally important is the shortage of neuroradiologists experienced in recognizing the distinctive imaging features of these disorders. Misinterpretation of MRI findings may contribute to

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diagnostic uncertainty, unnecessary invasive investigations, or inappropriate initiation of immunotherapy. Strengthening neuroradiology expertise through dedicated training and multidisciplinary collaboration is therefore an essential component of improving diagnostic accuracy.

The management of acute inflammatory relapses also presents significant challenges. Early administration of high-dose intravenous methylprednisolone remains the universally accepted first-line treatment for acute attacks of MS, NMOSD, and MOGAD. Prompt treatment can substantially reduce inflammation, accelerate recovery, and improve long-term neurological outcomes. Nevertheless, a proportion of patients, particularly those with NMOSD, demonstrate incomplete or absent response to corticosteroids. For these individuals, plasma exchange (PLEX) is strongly recommended as rescue therapy, ideally initiated early after recognition of steroid-refractory disease. Despite its proven efficacy, PLEX services in Bangladesh are currently confined to a limited number of tertiary hospitals. Delays associated with referral, transportation, financial constraints, and limited procedural capacity often postpone treatment beyond the period during which maximal neurological recovery can be achieved. As a result, many patients are left with preventable permanent visual impairment, paralysis, or other disabling neurological deficits.

Long-term relapse prevention remains another major area of unmet need. Modern immunotherapies have dramatically altered the prognosis of CNS demyelinating disorders. In MS, disease-modifying therapies reduce relapse frequency and delay disability progression, while in NMOSD, continuous immunosuppression is essential because each relapse carries a high risk of irreversible neurological injury. In contrast, MOGAD exhibits a more heterogeneous disease course; preventive immunotherapy is generally reserved for patients with recurrent attacks or those at particularly high risk of relapse. The recent availability of ocrelizumab in Bangladesh represents a significant milestone in expanding therapeutic options for MS. However, the high cost of treatment places this highly effective monoclonal antibody beyond the reach of most patients, particularly in the absence of comprehensive health insurance or national reimbursement programs. Similar financial barriers limit access to other biological therapies used internationally for NMOSD, highlighting the urgent need for equitable strategies to improve affordability and availability of evidence-based treatments.

Despite these considerable obstacles, encouraging developments have begun to reshape the landscape of demyelinating disease care in Bangladesh. The establishment of a national Multiple Sclerosis Society provides an important platform for patient advocacy, professional education, public awareness, and collaborative research. Dedicated weekly demyelinating disorder clinics are facilitating multidisciplinary evaluation, standardized follow-up, and accumulation of valuable clinical experience. Furthermore, ongoing efforts to develop national diagnostic and treatment protocols are expected to promote more uniform evidence-based practice across healthcare institutions. Such initiatives represent important first steps toward improving quality of care while generating locally relevant epidemiological and clinical data that have historically been scarce.

Looking ahead, improving outcomes for patients with CNS demyelinating disorders in Bangladesh will require coordinated action at multiple levels. Increasing awareness among primary care physicians and other frontline healthcare providers is essential for promoting early recognition and timely referral. Expanding access to validated antibody testing, improving MRI infrastructure and neuroradiology expertise, strengthening PLEX capacity beyond tertiary centers, and enhancing affordability of disease-modifying therapies should be regarded as national healthcare priorities. Equally important is the establishment of multicenter clinical registries and collaborative research networks to better define disease epidemiology, treatment outcomes, and healthcare needs within the Bangladeshi population.

Although substantial challenges remain, Bangladesh is entering a promising phase in the evolution of care for CNS demyelinating disorders. Continued investment in diagnostic capacity, specialized clinical services, professional training, and equitable access to modern therapies has the potential to transform patient outcomes. With sustained collaboration among clinicians, researchers, policymakers, and patient advocacy organizations, the country can progressively bridge the gap between international standards of care and local clinical practice, ensuring that patients with MS, NMOSD, and MOGAD receive timely, accurate, and effective management.

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