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Challenging New Treatment Safety Profile of Neuromyelitis Optica Spectrum Disorder

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Description

Neuromyelitis Optica Spectrum Disorder (NMOSD) is a rare and chronic neuro inflammatory immune-mediated disease of the central nervous system, associated frequently with aquaporin-4 antibodies (AQP4-Ab); initially in the progression of the disorder, demyelinating regions will exhibit symptoms comparable to Multiple sclerosis (such as macrophage/microglia proliferation and axonal injury [1]. Another distinctive aspect of NMO is that axonal damage occurs prior to demyelination.

In general, the condition is sporadic, albeit significant overlap in immune-modulating traits between particular viral strains and the aquaporin-4 water channel has been witnessed. NMO is distinguished by bilateral optic neuritis and myelitis, which cause blindness and paraplegia. Although the two normally appear at the same time, it is very rare for one to appear up to several weeks before the other. Furthermore, it has become apparent that some patients present with unilateral sensory nerve trauma.

NMOSD patients have been treated with no specific and off-label immunosuppressive drugs (e.g., anti-CD20 monoclonal antibody rituximab) until recently, when a new arsenal of monoclonal antibodies proven effective (such as satralizumab, a interleukin-6 receptor (IL-6R) blocker) were approved by Food and Drug Administration to treat NMOSD patients seropositive for aquaporin-4 antibody (AQP4-Ab), harboring hope on the clinical management of this devastating disorder. Despite their effectiveness and safety profile, it is important to remember that real life experience is always far more challenging than clinical trials because of unexpected responses or adverse effects from new medications.

"Severe febrile neutropenia associated with satralizumab in an Argentinian neuromyelitis optica spectrum disorder patient", a profound febrile neutropenia (described as less than 100 neutophils/mm3 according to US National Cancer Institute Common Criteria of Toxicity) was described in an NMOSD AQP4-Ab positive patient who started treatment with subcutaneous satralizumab as an add-on therapy to azathioprine and oral steroids (based on SakuraSky protocol), this therapeutic option was determined because of persistent disease activity despite the use of adequate azathioprine and oral steroids dosage [2].

Profound febril neutropenia was not described in satralizumab´s pivotal trials, and developed two weeks before the date in which first security laboratory tests are recommended; given this event, we suggest the first analytical test to be performed at week two in patients under this therapeutic approach.

On the other hand, the unexpected creates an opportunity to learn, to study and collaborate with each other for the good sake of our patients. In this specific case, we proposed several explications for neutropenia, such as: increased margination of circulating neutrophils into the bone marrow and increase transit time through it; neutrophil phagocytosis by FcγR-expressing phagocytic cells (IL-6 would act as an opsonin) and finally, the same mechanism could trigger intracellular signaling pathways, leading to apoptosis. Nevertheless, circulating neutrophils preserve their function, which could explain why patients treated with IL-6 blockers have not been reported to suffer severe infections despite neutropenia [3,4].

Given the proposed physipatological involved mechanisms, we believe it is important to stand out the fast neutrophil recovery of our patient after stimulating colony factor was administered (24 hours) and despite this is yet to be seen in other patients, this fast response may support neutrophil´s margination in bone marrow hypothesis as a collaborating neutropenia mechanism.

Since NMOSD is a rare disorder, we consider it fundamental to share these cases, mostly related to new drugs, to develop specific strategies to mitigate risks in protocols in a worldwide collaboration manner, in order to prevent or early detect adverse effects, and treat them timely; hence, safety should not be sacrificed over effectiveness.

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