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Botulinum toxin — how a poison turned to a fascinating ally against an old adversary

Toxina botulínica — de como um veneno transformou-se num fascinante aliado contra um velho adversário

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The clinical features of dystonia were first reported in 1911, when Oppehneim[1] and Flatau[2] described some Jewish children affected by a syndrome that was retrospectively considered to represent familial cases of DYT1 dystonia. In 1975 it was recognized that the dystonia phenotype also encompasses poorly-progressive focal and segmental cases with onset in adulthood, such as blepharospasm, cervical dystonia (CD) and writer's cramp[3]. A modern definition of dystonia was worded some years later, in 1984[4,5].

CD is the most common form of focal dystonia and its prevalence is estimated to be 11.5 cases per 100,000 individuals. CD is characterized by involuntary contractions of cervical region muscles, leading to awkward posture of the head and neck. Most of the cases have idiopathic origin[6].

In this volume of *Arquivos de Neuropsiquiatria*, Werle et al. published the article "The physical, social and emotional aspects are the most affected in the quality of life (QoL) of the patients with cervical dystonia", showing how painful and distressing this disease can be without the treatment effect. Among those seventy Brazilian patients, 84% had pain, disabling in half of them. The vast majority showed difficulty in keeping up with professional and personal demands, felt uneasy in public and suffered depression. The greater are the disability, pain and severity of dystonia, the worse is the QoL[7].

Botulinum toxin (BT) poisoning has afflicted mankind through since a long time ago. The physician and poet Justinus Kerner published the first accurate descriptions of food-borne botulism in 1822, and also postulated that the toxin might be used for treatment purposes. In 1895, in the Belgian village of Ellezelles, an outbreak of botulism led to the discovery by Emile Pierre van Ermengem of the pathogen *Clostridium Botulinum*, the anaerobic bacterium that produces the neurotoxin. Alan B. Scott and Edward J. Schantz, in the 1970s, were the modern pioneers of botulinum toxin (BT) treatment to correct strabismus[8].

The molecular biology cleared about the precise *Clostridium Botulinum toxin* mechanism, showing that BT acts in the cytosol of nerve endings to cleave the SNAP-25 protein that mediates the docking and fusion of neurotransmitter-containing vesicles to the presynaptic membrane. This cleavage prevents exocytosis of acetylcholine from the presynaptic terminal of neuromuscular junctions, resulting in a temporary, reversible block of the motor fibers and weakened muscle contraction. This is the rationale for its use in dystonia treatment. To date, BT has been used to treat a wide variety of diseases associated with muscular hyperactivity, glandular hypersecretions and pain[9,10].

In Brazil, this friendly poison has been employed in many neurologic conditions since 1991, improving patient's lives and turned out a precious tool for skilled doctors. Many Brazilian articles has been published and more and more doctors are familiarized its indications, injection technics and results[11,12].

BT injections continue, aside oral medication, and, more recently, deep brain stimulation, as the current mainstays of treatment for dystonia. In addition, physical and other supportive therapies may help prevent further complications, as contractures, and improve function. Evidence-based medical treatment of dystonia enhances BT impact on QoL and motor aspects on those patients[13].

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