The most common motorneuron disease, amyotrophic lateral sclerosis (ALS) is the result of a progressive loss of voluntary movement which occurs when neurons in the brain (upper motoneurons) and/or in the spinal cord (lower motoneurons) fail to conduct nerve impulses. It can impede swallowing and speaking (25%) cause weakness in the limbs (70%) or weakness in trunk muscle including those involved in breathing (5%)\[1\]. Since there is not yet a single definitive test that can distinguish between a number of neurological conditions with similar symptoms, patients presenting with the signs of ALS often need to go through a number of clinical investigations ranging from nerve conduction tests to MRI (magnetic resonance imaging) before their condition can be distinguished from other conditions that show signs that are similar to those of ALS\[1\] many of which are treatable\[2\].

Worldwide, approximately 2 per 100,000 are diagnosed annually with ALS\[3\] and it's incidence is increasing. The chance of onset of ALS becomes higher with age with the mean age of onset between 55-60 years and is somewhat higher in men (1 in 350 cases) than in women (1 in 400 cases)\[4\].

Not all ALS cases are the same in terms of likely cause or progression. To date approximately 10% of cases are associate with 13 familial-linked gene mutations\[1\], and more recently several other genes have been linked to a predisposition for developing ALS\[5\]. Identifying the specific cause of ALS is the first step in designing studies to treat or modify the effects of these gene deficits, and highlights the importance of patients joining a voluntary register for ALS sufferers. 20% of the gene mutations identified result from deficits in the anti-oxidant defence enzyme superoxide dismutase-1 (SOD1), and promising results are apparent from antioxidant based interventions currently being tested in clinical trials\[6\].

The remainder of ALS cases arise sporadically, these have been attributed to a diverse array of pathways ranging from the overactivity/overstimulation of upper motoneurons, which then secrete and excess of excitatory neurotransmitter glutamate\[7,8\], to the loss of muscle produced motoneuron growth factors\[9\], or the presence of misfolded proteins due to environmental agents\[10,11\]. There have been some direct translations of such lines of research into treatments, for example, Rizuole has been used to supress glutamate release, alleviating some symptoms that impair life quality and prolonged survival by 3-6 months. New leads have arisen from voluntary registers of sporadic ALS cases, which form a base for scientific investigations many of which are being tested in animal models of ALS\[12-16\].

The malfunction of pathways within motoneurons or their support cells (glia) are currently providing information about the process of neurodegeneration in ALS and point the way to new interventions that could be developed through continued research\[17,18\]. In addition,
human clinical trials of an intervention to increase muscle contraction (CK-2017357) in patients with ALS have begun with the first step in the trials yielding promising data\textsuperscript{[19]}. Unfortunately, there are a number of procedures advertised that have not been validated in any approved clinical trials. Professional bodies, such as the World Federation of Neurology Research Group, investigate and produce reviews of some of the treatments.

In summary, full screening of people presenting with ALS-like symptoms is needed to rule out other treatable conditions. There are many different types of ALS and for some there are clinical management pathways that reduce the severity of the condition and a number of time consuming clinical trials underway to examine the safety and validity of novel treatment options.

References:


