Primary Lateral Sclerosis

Return to search results (/search/advanced?books=spendiso&include=puente&headingsOnly=false&sort=relevance&order=desc)

Search other sites

Listen (http://app.na.readspeaker.com/cgi-bin/rsent?customerid=6538&lang=en_us&readid=main_content_text&url=http%3A%2F%2Fsearch.credoreference.com%2Fcontent%2

Email | Print | Remove | Cite Entry | Translate Entry | Permalink

DESCRIPTION

Primary lateral sclerosis (PLS) has been described as a syndrome of progressive upper motor neuron dysfunction when no other cause can be attributed to the condition (Singer, Statland, Wolfe, & Barohn, 2007). Although motor symptoms predominate, cognitive deficits are also seen, with the functional constellation presenting similarly to frontotemporal dementias. Consequently, emotional and behavioral alterations can also be seen, but are not considered a specific characteristic of the presentation until later in the disease progression and early on may be more reactionary to functional changes as opposed to neurological disruption. Eventually, patients become dependent on a caregiver or family and the social economy is affected.

NEUROPATHOLOGY/PATHOPHYSIOLOGY

The most common functional changes associated with PLS involve leg weakness and spasticity, as well as spastic bulbar weakness. However, sensory symptoms should be carefully considered in case of alternative diagnosis such as amyotrophic lateral sclerosis (ALS). Thus, it still remains unclear if exclusively limb or bulbar cases are present or if the disease would progress become spinobulbar spasticity with time (Singer et al., 2007). Furthermore, initial symptoms associated with PLS have included dysarthria, dysphagia, inappropriate laughing or crying, and hyperactive muscle-stretch reflexes (Beal & Richardson, 1981). In addition, Beal and Richardson reported some pathological changes in a case report that include atrophy of the precentral gyri, a depletion of Betz cells, and loss of myelinated fibers through the pyramidal system, although there were no signs of loss of cranial nerve neurons or spinal cord anterior horn cells. Laminar gliosis in the external and internal pyramidal cell cortical layers have also been noted (Pringle et al., 1992). In contrast, the substantia nigra is not affected, and lower motor neuron abnormalities are not typically found in hypoglossal or spinal gray nuclei (Pringle et al., 1992).

Similarly, Gastaut, Michel, Figarella-Branger, and Somma-Mauvais (1988) reported five PLS cases using clinical and laboratory data. As a result, the following pathological changes were consistently indicated: (a) dysarthria, (b) difficulty chewing, (c) salivary stasis, (d) speech difficulty, (e) moderate disability in all four limbs, (f) rigid movement, (g) fixed facial expressions, (h) inability of closing mouth due to excess of saliva, (i) cheek and jaw movement were limited, (j) stiffness in walking, and (h) inability to talk due to dysphagia.

NEUROPSYCHOLOGICAL/CLINICAL PRESENTATION

The onset of PLS starts at middle age, ranging from 45 to 55 years. It is predominantly seen in males. The first symptoms that appear in the clinical picture are spastic bulbar weakness as manifested in dysarthria, followed by dysphagia that progresses to anarthria. Progressive spasticity and weakness of limbs have also been noted as early symptoms. The course of the disease has a slow and insidious progression with several studies reporting periods of stability or improvement lasting months or even years (Floeter & Mills, 2009). Survival after the onset ranges from 1 to 15 years but the causes of deaths have not been attributed directly to this disease (Le Forestier et al., 2001; Singer et al. 2007).

The work of Singer et al. (2007) described the clinical manifestations that are typically reported by patients. They indicate stiffness, clumsiness, and poor coordination as the initial limb movement loss. Generally, the most common clinical symptoms are spasticity, hyperreflexia, and mild weakness. Electromyography (EMG), muscle biopsy, and motor evoked potentials are recommended to confirm diagnosis as well as other laboratory studies such as the normal serum chemistries, vitamin B_{12} levels, cerebrospinal fluid examination, and magnetic resonance imaging (MRI) (Le Forestier et al., 2001).

In more advanced stages of the disease, affective symptoms such as emotional instability, inappropriate laughing and crying emerge. Neurocognitive functioning is also compromised during the course of the illness with memory and executive functioning deficits presenting similar to that seen in the frontotemporal dementias. As a result, sensitive neurocognitive tests are needed to detect these deficits, thus brief and standard psychological test such as WAIS do not identify the impairment (Piquard et al., 2006).

In a study regarding neuropsychological functioning, Caselli, Smith, and Osborn (1995) studied the nine patients with PLS. The individuals underwent a neuropsychological assessment between 3 and 20 years after the onset of the spasticity symptom. They found mild cognitive deficits in executive functioning and memory that were noticed only by using sensitive neuropsychological tools such as the Controlled Oral Word Association Test, Wisconsin Card Sorting Test, Booklet Category Test, Stroop, and Trail Making Test. Other studies confirm the presence of more severe neurocognitive symptoms that are associated to frontotemporal atrophy and it suggests a form of dementia syndrome (Murphy et al., 2008; Tan et al., 2003).

DIAGNOSIS

Previously, Pringle et al. (1992) proposed the following diagnostic criteria for PLS: (a) insidious onset of spastic paresis in upper and more commonly lower extremities; (b) an adult onset, commonly by the age of 50 or later; (c) lack of family history; (d) progressive course is gradual instead of sudden; (e) duration is at least 3 years or more; (f) clinical findings are mainly associated with corticospinal dysfunction; and (g) the individual develops severe spastic spinobulbar paresis with symmetrical distribution.

Despite the diagnostic criteria, the concept of PLS remains controversial and the condition is attributed to other central nervous diseases. According to Gastaut et al. (1988), PLS is still considered a rare condition although it was first described by Charcot over a century ago. As a result of the controversy, numerous studies have been conducted with the objective of distinguish PLS diagnosis. For instance, Caselli et al. (1995) reviewed the results of cognitive and neuropsychological testing in nine patients (seven males and two females) with no signs of dementia and who were clinically diagnosed with PLS to determine if functions of the frontal lobe were normal using the criteria set by Pringle et al. (1992), although not all the patients had every test that Pringle et al. listed in their diagnosis criteria. Findings from Caselli et al. supported the following: (a) PLS is accompanied by mild cognitive deficits, (b) neuropsychological testing is useful in the diagnosis and management of patients with PLS, (c) many other causes of progressive spasticity can be differentiated from PLS by using modern techniques such as MRI or EMG.

In recent years, the number of studies comparing PLS and ALS has increased with the objective of differentiating the diseases. In order to distinguish between PLS and ALS, Le Forestier et al. (2001) investigated evidence of involvement of lower motor neurons using electrophysiological examinations and muscle biopsy in 20 patients who were diagnosed with PLS according to the diagnostic criteria from Pringle et al. findings. Le Forestier et al. revealed that PLS is part of the continuum of motor neuron disease instead of a separate condition.

Overall, the diagnostic criteria of PLS are still controversial because the distinction among other conditions is unclear. For instance, although Beal and Richardson (1981) presented a case report of a 66-year-old female who met the criteria of PLS, the absence of modern technologies for pathologic confirmation might question the PLS diagnosis. Furthermore, the application of MRI, EMG, and modern neurodiagnostic techniques is recommended in order to establish a clear distinction among PLS and other conditions such as ALS, multiple sclerosis, structural cerebral lesions, as well as spinal cord lesions (Caselli et al., 1995).

TREATMENT

Although there is no cure for PLS, treatment can improve both the quality and length of life. Because PLS is a complex disease, caring of PLS patients is best provided at multi-compound treatment (Veldink, Van den Berg, & Wokke, 2004). It requires a multidisciplinary approach with specialists in each branch of pneumology, nutrition, palliative care, psychology, neuropsychology, neurology, neuropsychology, psychiatry, speech therapist, social workers, and nurses (Rodríguez, Grande, & García-Caballero, 2007); each one is responsible for treating physical, behavioral, cognitive, spiritual, and emotional symptomatology of the patient, their caregiver and family. Professionals also serve to inform, guide, treat, rehabilitate, and follow-up in each of the different stages of the disease.

The treatment of spasticity is the main aspect of medical care. The spastic paresis of origins has been treated with gamma-aminobutyric acid agonists, in particular, baclofen (Marquiardt & Seifert, 2000). Riluzole, an anti-glutamate drug, has proven to be effective in slowing the disease, which restrains the release of glutamate, decreasing its citotoxic effect (Veldink et al., 2004). Drugs such as tricyclics, inhibitors of the reuptake of serotonin, psychotropics, muscle relaxants or corticoids, and so forth are used to alleviate other symptoms such as muscle stiffness, the cramps, the problems of salivation, swallowing, weakness, respiratory problems, and psychiatric symptoms, such as depression (Gil, 2007).

Nevertheless, more studies are needed to expand the evidence-based approaches in supportive treatments, including radiotherapy and the effect on sialorrhoea, the effect of medications on symptoms, the effects of noninvasive ventilation, and the comparison of percutaneous endoscopic gastrostomy with radiologically inserted gastrostomy and a hybrid gastrostomy technique (per-oral imagine-guided gastrostomy) (Veldink et al., 2004).

In conclusion, the combination of different imaging modalities such as volumetric MRI with perfusion MRI or functional MRI, or volumetric MRI with SPECT/PET will not only add to the understanding of the disease processes but also help to improve interpretation of treatment effects. Finally, magnetic resonance measures might also be helpful to identify patients at risk of developing adverse effects during the treatments (Gil, 2007).

Bibliography

- Beal, M.; Richardson, E. (1981). Primary lateral sclerosis. A case report. Archives of Neurology, 38, 630-633. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.g of Neurology&rft.atitle=Primary lateral sclerosis&rft.date=1981&rft.aulast=Beal&rft.aufirst=M.&rft.volume=38&rft.spage=630)
- Caselli, R.; Smith, B.; Osborn, D. (1995). Primary lateral sclerosis: A neuropsychological study. Neurology, 45, 2005-2009. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.g lateral sclerosis: A neuropsychological study&rft.date=1995&rft.aulast=Caselli&rft.aufirst=R.&rft.volume=45&rft.spage=2005)
- Floeter, M.; Mills, R. (2009). Progression in primary lateral sclerosis: A prospective analysis. Amyotrophic Lateral Sclerosis, 10(5-6), 339-346. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.g Lateral Sclerosis&rft.atitle=Progression in primary lateral sclerosis: A prospective analysis&rft.date=2009&rft.aulast=Floeter&rft.aufirst=M.&rft.volume=10&rft.issue=5-6&rft.spage=339)
- Gastaut, J.; Michel, B.; Figarella-Branger, D.; Somma-Mauvais, H. (1988). Chronic progressive spinobulbar spasticity. A rare form of primary lateral sclerosis. Archives of Neurology, 45, 509-513. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.g of Neurology&rft.atitle=Chronic progressive spinobulbar spasticity&rft.date=1988&rft.aulast=Gastaut&rft.aufirst=J.&rft.volume=45&rft.spage=509)
- Gil, R. (2007). Neuropsicología. Ed. Elsevier Masson. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.ge
- Le Forestier, N.; Maisonobe, T.; Piquard, A.; Rivaud, S.; Crevier-Bushman, L.; Salachas, F., et al. (2001). Does primary lateral sclerosis exist? A study of 20 patients and a review of the literature. Brain, 124, 1989-1999. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.g primary lateral sclerosis exist? A study of 20 patients and a review of the literature&rft.date=2001&rft.aulast=Le Forestier&rft.aufirst=N.&rft.volume=124&rft.spage=1989)
- Marquiardt, G. Seifert, V. (2000). Use of intrathecal baclofen for treatment of spasticity in amyotrophic lateral sclerosis. Journal of Neurology, Neurosurgery and Psychiatry, 72, 275-276. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.g of Neurology, Neurosurgery and Psychiatry&rft.atitle=Use of intrathecal baclofen for treatment of spasticity in amyotrophic lateral sclerosis&rft.date=2000&rft.aulast=Marquiardt&rft.aufirst=G.&rft.volume=72&rft.spage=275)
- Murphy, M.; Grace, G.; Tartaglia, M.; Orange, J.; Chen, X.; Rowe, A., et al. (2008). Cerebral haemodynamic changes accompanying cognitive impairment in primary lateral sclerosis. Amyotrophic Lateral Sclerosis, 9(6), 359-368. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.g Lateral Sclerosis&rft.atitle=Cerebral haemodynamic changes accompanying cognitive impairment in primary lateral sclerosis&rft.date=2008&rft.aulast=Murphy&rft.aufirst=M.&rft.volume=9&rft.issue=6&rft.spage=359)
- Piquard, A.; Le Forestier, N.; Baudoin-Madec, V.; Delgadillo, D.; Salachas, F.; Pradat, P., et al. (2006). Neuropsychological changes in patients with primary lateral sclerosis. Amyotrophic Lateral Sclerosis, 7(3), 150-160. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-

2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.
Lateral Sclerosis&rft.atitle=Neuropsychological changes in patients with primary lateral sclerosis&rft.date=2006&rft.aulast=Piquard&rft.aufirst=A.&rft.volume=7&rft.issue=3&rft.spage=150)

- Pringle, C.; Hudson, A.; Munoz, D.; Kierman, J.; Brown, W.; Ebers, G. (1992). Primary lateral sclerosis. Clinical features, neuropathology and diagnostic criteria. Brain, 115, 495-520. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.
lateral sclerosis&rft.date=1992&rft.aulast=Pringle&rft.aufirst=C.&rft.volume=115&rft.spage=495)
- Rodríguez, F. J.; Grande, M.; García-Caballero, J. (2007). Desarrollo de una vía clínica para la atención a pacientes con esclerosis lateral amiotrófica en un ámbito regional. Red de Atención de ELA-Comunidad de Madrid. Neurología, 22(6), 354-361. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.
de una vía clínica para la atención a pacientes con esclerosis lateral amiotrófica en un ámbito regional&rft.date=2007&rft.aulast=Rodríguez&rft.aufirst=F. J.&rft.volume=22&rft.issue=6&rft.spage=354)
- Singer, M.; Statland, J.; Wolfe, G.; Barohn, R. (2007). Primary lateral sclerosis. Muscle & Nerve, 35, 291-302. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.
%26 Nerve&rft.atitle=Primary lateral sclerosis&rft.date=2007&rft.aulast=Singer&rft.aufirst=M.&rft.volume=35&rft.spage=291)
- Tan, C.; Kakita, A.; Piao, Y.; Kikugawa, K.; Endo, K.; Tanaka, M., et al. (2003). Primary lateral sclerosis: A rare upper-motor-predominant form of amytrophic lateral sclerosis often accompanied by frontotemporal lobar degeneration with ubiquitinated neuronal inclusions? Acta Neuropathologica, 105, 615-620. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.
Neuropathologica&rft.atitle=Primary lateral sclerosis: A rare upper-motor-predominant form of amytrophic lateral sclerosis often accompanied by frontotemporal lobar degeneration with ubiquitinated neuronal inclusions&rft.date=2003&rft.aulast=Tan&rft.aufirst=C.&rft.volume=105&rft.spage=615)
- Veldink, J.; Van den Berg, L.; Wokke, J. (2004). The future of motor neuron disease. The challenge is in the genes ALS. Journal of Neurology, 251, 491-500. Check for Full Text (http://rf2tt2th6w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rfr_id=info%3Asid%2Fcredoreference:credoreference&rft.
of Neurology&rft.atitle=The future of motor neuron disease&rft.date=2004&rft.aulast=Veldink&rft.aufirst=J.&rft.volume=251&rft.spage=491)

Carlos Ojeda
Mónica Muzquiz
Javier Gontier
Antonio E. Puente