November 2007
Volume 12, Issue 2

STROKE OF GENIUS

The official newsletter of the APTA Neurology Section Stroke Special Interest Group

Message From Our Chair

How much is enough?

How much practice is enough? What kind of therapy is best for which patients? These are the questions that physical therapists who work with stroke survivors wrestle with every day in their clinical practice. Our presentations at the Combined Sections Meeting in Nashville in February 2008 are expressly designed to help with both of these critical issues. First, we will hear from Catherine Lang. PT, PhD as she gives her talk "Practice and activity in people with hemiparesis post stroke". Dr Lang has recently published two studies that captured the amount of practice and the quantity of activity of people post-stroke. From these data it is readily apparent that our patients with stroke may not be getting an adequate dose of practice in therapy, nor are they active enough when not directly engaged in care. Is more practice better? Future studies will have to determine the answer to this question, but it is safe to say that we are likely not engaging our patients as vigorously as we might. Come to our business meeting on Firday, February 8, 2008 from 4:00 to 6:30 pm to hear Dr. Lang.

Now for our second problem, what kind of therapy is best for whom? Patricia Scheets, PT, DPT, NCS and Ann Medley, PT, PhD will discuss this issue using diagnostic classifications as a guide during the roundtable discussion on Saturday, February 9, 2008 from 1:00 to 3:00 pm. Certainly there are no easy solutions to the problem of determining what kinds of practice are best after stroke but an interactive discussion with two clinical experts will yield an exciting outcome. So come and join us at CSM!

Lara Boyd, PT, PhD
President, Stroke Special Interest Group

INSIDE THIS ISSUE

Diagnostic Classifications for Patients with Neuromuscular Conditions (Part 2)

By Ann Medley, PT, PhD

During the preconference course prior to CSM 2007, Patty Scheets, PT, DPT, NCS presented diagnostic categories for patients with neuromuscular conditions (Movement System Impairment Diagnoses: Neuromuscular Conditions). This is the second in a series of articles highlighting the diagnoses. For this newsletter, we present "Sensory Detection Deficit" and "Force Production Deficit". A general description of each diagnosis is included as well as key signs. We also provide a general summary of treatment ideas.

Diagnoses should guide treatment.

Sensory Detection Deficit: The primary movement system problem is the inability to execute intersegmental movement due to lack of joint position sensor due to multisensory failure affecting joint position sense, vision, or the vestibular system. This problem may describe the upper extremity, lower extremity, or both[1].
Patients with this diagnosis may exhibit loss of joint position sense, protective sensation or touch sensation. Patients with a new visual field deficit greater than 50% would also fall under this diagnosis. During movement patients often exhibit poor timing and coordination of limb movements. They may exhibit some improvements with visual guidance. They are able to sit unsupported but have difficulty with unsupported standing. They demonstrate increased sway and loss of balance if they close their eyes during standing. They also demonstrate difficulty with dynamic functional tasks such as sit to stand transfers and gait. During gait, they may exhibit variable foot placement that improves if they can see their feet.

Treatment should focus on using vision to guide motor activities whenever possible. The patient should also be instructed in safety issues (increased difficulty in conditions with poor lighting and uneven surfaces) regarding the loss of sensation as well as other compensatory strategies for the sensory loss.

Force Production Deficit: "The primary movement system problem is weakness. The origin of the weakness may be muscle, neuromuscular junction, peripheral nerve, or central nervous system dysfunction. The presentation may be focal (one joint), segmental (generalized to an extremity or body region), or related to fatigue (of skeletal muscle rather than cardiopulmonary capacity)."[1]

Fractionated movement is often present and muscle tone may be normal, mild, or flaccid. Sensation is often normal or minimally lost. In the early stages of recovery, the patient may be unable to sit or stand without support. During gait they may require an assistive device and may exhibit significant deviations. Strength and functional ability often decline with repeated trials of a task.

Patients with this diagnosis may have good or poor potential for recovery. The prognosis for recovery is related to their medical diagnosis. For example, a patient with Guillian-Barré syndrome would have a good prognosis for recovery while a patient with Muscular Dystrophy would have a poor prognosis for recovery. Patients with good prognosis would benefit from interventions designed to promote motor recovery. They will most likely ambulate independently without a device in the community. Patients with poor potential for recovery will demonstrate variable amounts of improvement. These patients may require assistance for activities of daily living and may need to learn compensatory strategies.

Since diagnoses should guide treatment decisions, clinicians should consider using these diagnoses to develop appropriate plans of care for their patients. For more information about all of the diagnoses, contact Patty Scheets at Patricia.Scheets@Carle.com

See the June 2007 issue of PT for the following article:
[1]Scheets, Sahrmann, Norton. Use of movement system diagnoses in the management of patients with neuromuscular conditions: a multiple-patient case report. Phys Ther. 2007;87:654-669.

Stroke and Diabetes: How do these two common comorbidities affect one another?

By Patricia Kluding, PT, PhD

Stroke and diabetes are both leading causes of adult disability and growing public health problems. Each year about 700,000 people experience a new or recurrent stroke according to statistics from the American Heart Association.[1]The number of adults in the United States diagnosed with diabetes has increased by 61% since 1991, and diabetes is currently the 7th leading cause of death.[2]

Type 2 diabetes mellitus is a known risk factor for stroke, possibly as a result of altered biochemistry of large blood vessels that leads to a greatly increased risk of cardiovascular disease as well as stroke.[3, 4] Because of this, the combination of both diabetes and stroke is a common clinical problem. Approximately 21% of people with stroke also have a diagnosis of diabetes as reported in Europe.[5, 6] A higher percentage was recently reported in the US (Cincinnati area): 30% of whites and 36% of African Americans with stroke also had diabetes diagnosed prior to stroke.[7] These percentages will likely increase with the increasing prevalence of diabetes in the population.

There have been two reports on the impact of diabetes on people after a stroke from large databases in Europe.[5, 6] An analysis of 1135 patients in the Copenhagen Stroke Study found that people with both stroke and diabetes were less likely to have an hemorrhagic stroke and had similar initial stroke severity although mortality was increased.[6] Eventual outcome at discharge (measured by the Scandanavian Stroke Scale) was comparable between the groups, but the rate of recovery was slower in the subjects with diabetes. Results from 4537 patients with acute stroke in the European BIOMED stroke project confirmed that diabetic patients were less likely to have hemorrhagic stroke, but found that they were more likely to have initial motor deficits and dysarthria, and more likely to have disability (measured by Barthel Index) and handicap (measured by Rankin Scale) at 3 months following stroke.[5] These studies show differences in the type of stroke and the rate of recovery for people with both stroke and diabetes, but very general measures of recovery were used, and the subjects were not followed beyond 3 months.

A longitudinal study of older Mexican Americans in the southwestern United States found that 40% of this sample who had a stroke also had diabetes.[8] The

Type 2 diabetes mellitus is a known risk factor for stroke

researchers performed in-home interviews with 76 people who had stroke and diabetes and 114 people who had stroke alone, and found that a higher percentage of people with stroke and diabetes were obese, had difficulty with activities of daily living, and rated their health as "poor".

Although it is clear that both stroke and diabetes individually contribute to disability, little is understood about the effect of their interaction on the systems of the body. For example, although there is growing evidence that physical exercise is beneficial for people who have had a stroke,[9-14] the presence of diabetes and diabetic complications may limit an individual's tolerance for exercise and their ability to fully reap the benefits associated with exercise.[15-21]

References

1. American Heart A. *Heart Disease and Stroke Statistics: 2004 Update.* Dallas, Tex: American Heart Association; 2003.
2. Center for Disease C. Chronic Disease Prevention: Diabetes. 2004/02/18/. Accessed 2004/03/15/.
3. Lehto S, Ronnemaa T, Pyorala K, Laakso M. Predictors of stroke in middle-aged patients with non-insulin-dependent diabetes. *Stroke.* 1996;27(1):63.
4. Tuomilehto J, Rastenyte D, Jousilahti P, Sarti C, Vartiainen E. Diabetes mellitus as a risk factor for death from stroke: Prospective study of the middle-aged Finnish population. *Stroke.* 1996;27(2):210.
5. Megherbi SE, Milan C, Minier D, et al. Association between diabetes and stroke subtype on survival and functional outcome 3 months after stroke. *Stroke.* 2003;34:688.
6. Jorgensen HS, Nakayama H, Raaschou HO, Olsen TS. Stroke in patients with diabetes: The Copenhagen stroke study. *Stroke.* 1994;25:1977.
7. Kissela BM, Khoury J, Kleindorfer D, et al. Epidemiology of ischemic stroke in patients with diabetes. *Diabetes Care.* 2005;28(2):355.
8. Otiniano ME, Du XL, Ottenbacher K, Markides KS. The effect of diabetes combined with stroke on disability, self-rated health, and mortality in older Mexican Americans: Results from the Hispanic EPESE. *Archives of Physical Medicine and Rehabilitation.* 2003;84:725.
9. Gordon NF, Gulanick M, Costa F, Fletcher GF, Franklin B, Roth E. AHA Scientific Statement: Physical activity and exercise recommendations for stroke survivors *Stroke.* 2004;35:1229-1239.
10. Kluding P, Billinger SA. Exercise-induced changes of the upper extremity in chronic stroke survivors. *Topics in Stroke Rehabilitation.* 2005;12(1):58-68.
11. Potempa K, Lopez M, Braun LT, Szidon JP, Fogg L, Trincknell T. Physiological outcomes of aerobic exercise training in hemiparetic stroke patients. *Stroke.* 1995;26(1):101-105.
12. Rimmer JH, Riley B, Creviston T, Nicola T. Exercise training in a predominantly African-American group of stroke survivors. *Medicine and Science in Sports and Exercise.* 2000;32(12):1990-1996.
13. Car M, Jones J. Physiological effects of exercise on stroke survivors. *Topics in Stroke Rehabilitation.* 2003;9(4):57-64.
14. Duncan PW, Studenski S, Richards L, Gollub S, Lai SM, Reker D. Randomized clinical trial of therapeutic exercise in subacute stroke. *Stroke.* 2003;34(9):2173-2180.
15. Hickner RC, Brunson MA, McCammon M, Mahar MT, Garry JP, Houmard JA. Diabetic groups as defined by ADA and NDDG criteria have a similar aerobic capacity, blood pressure and body composition. *Diabetologia.* 2001;44:26.
16. Ostenson CG. The pathophysiology of type 2 diabetes mellitus: An overview. *Acta Physiologica Scandinavia.* 2001;171:241.
17. Comi G, Corbo M. Metabolic neuropathies. *Current Opinion in Neurology.* 1998;11(5):523.
18. Mueller MJ, Minor SD, Sahrmann SA, Schaaf JA, Strube MJ. Differences in the gait characteristics of patients with diabetes and peripheral neuropathy compated with age-matched controls. *Physical Therapy.* 1994;74(4):299.
19. Simoneau GG, Ulbrecht JS, Derr JA, Becker MB, Cavanagh PR. Postural instability in patients with diabetic sensory neuropathy. *Diabetes Care.* 1994;17(12):1411.
20. Vinik AI, Maser RE, Mitchell BD, Freeman R. Diabetic Autonomic Neuropathy. *Diabetes Care.* 2003;26(5):1553.
21. Endo A, Kinugawa T, Ogino K, et al. Cardiac and plasma catecholamine responses to exercise in patients with type 2 diabetes: Prognostic implications for cardiac-cerebrovascular events. *The American Journal of the Medical Sciences.* 2000;320(1):24.

Fatigue Scales for Individuals Post Stroke

Bernadette Currier, PT, DPT, MS, NCS

Fatigue is increasingly becoming recognized as an effect of stroke. Physical function and quality of life post stroke can be limited by many factors, including fatigue. Mead, Lynch, Greig, Young, Lewis, and Sharpe evaluated the usefulness of fatigue scales in individuals with stroke. Use of these scales within the clinical setting is recommended in order to develop a better understanding of the degree to which fatigue is present post stroke. In addition, assessing the presence of fatigue pre- and post- physical therapy intervention may begin to answer questions regarding the effectiveness of physical therapy on fatigue in individuals following stroke.

Mead G, Lynch J, Greig C, Young A, Lewis S, Sharpe M. Evaluation of fatigue scales in stroke patients. *Stroke* **2007;38:2090-2095.**

Fatigue is a common symptom in individuals with neurologic disorders. Fatigue is defined as "a feeling of lack of energy, weariness, and aversion to effort." While the effects of fatigue have been studied extensively in persons with multiple sclerosis and Parkinson's disease, the effects of fatigue on individuals with stroke is a relatively new topic of study. Many fatigue scales exist, but there is little knowledge as to which are the most appropriate to measure fatigue. Scales that have studied fatigue have primarily been developed using populations other than stroke, and the purpose of this review article was to discuss evaluation of fatigue scales in patients with stroke.

Fifty two fatigue scales were initially identified via a MEDLINE search (1966 to February 2004) using the terms "fatigue" (and related terms),"instrument," "assessment," "scale," and "measurement." Five fatigue scales were chosen by a group of 4 observers with clinical or research experience dealing with individuals with stroke and/or fatigue. These five scales were chosen due to their adequate face validity for stroke. They included the vitality subscale of the SF-36v2, the fatigue subscale of the Profile of Mood States (POMS-fatigue), the Fatigue Assessment Scale (FAS), the general subscale of the Multidimensional Fatigue Symptom Inventory (MFSI-general), and the Brief Fatigue Inventory (BFI). Individuals at least 1 week post stroke were recruited to participate in patient interviews to determine feasibility, reliability, and convergent construct validity of these scales. Fifty five individuals consented and were interviewed. Fifty one were interviewed again 3-7 days later. The same rater administered the fatigue scales each time.

The results demonstrated that five scales out of 52 appeared to had the best face validity. The BFI was dropped due to difficulty with administration. The poorest internal consistency was within the FAS; however, this scale had the best test-retest reliability. There was no significant difference for inter-rater reliability for individual questions between the scales. Convergent validity was moderate to high. In conclusion, the vitality subscale of the SF-36v2, the POMS-fatigue, the FAS, and the MFSI-general are appropriate scales to be used with patients following stroke.