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APIXABAN VERSUS WARFARIN FOR ATRIAL FIBRILLATION

New oral anticoagulants have been found to be equivalent or superior to warfarin in preventing stroke or systemic embolism. Apixaban is a direct oral factor Xa inhibitor, with rapid absorption, a 12-hour half-life and 25% renal excretion. This study compared Apixaban with warfarin for the prevention of stroke or systemic embolism in patients with atrial fibrillation and at least one additional risk factor for stroke.

This randomized, double-blind trial included 18,201 patients, randomized to receive either Apixaban at five mg twice daily or warfarin, adjusted for a target international normalized ratio of two to three. The primary efficacy outcome was stroke or systemic embolism. The primary safety outcome was major bleeding.

At a median of 1.8 years' follow-up, the primary outcome was realized in 1.27%/year in the Apixaban group and in 1.6%/year in the warfarin group ($p=0.01$ for superiority). The rate of hemorrhagic stroke was 49% lower in the Apixaban group than in the warfarin group, while the rate of ischemic or uncertain type stroke was eight percent lower in the Apixaban group. The rate of death from any cause was lower in the Apixaban group than in the warfarin group ($p=0.047$). In addition major bleeding was less frequent in the Apixaban group than in the warfarin group ($p<0.001$).

Conclusion: This study of patients with atrial fibrillation found the factor Xa inhibitor, Apixaban, to be superior to warfarin for preventing stroke or systemic embolism, resulting in lower mortality.

Granger, C., et al. Apixaban versus Warfarin in Patients with Atrial Fibrillation. *N Engl J Med.* 2011, Sept 15; 365(11): 981-992.

RIVAROXABAN VERSUS WARFARIN FOR ATRIAL FIBRILLATION

As food and drug interactions necessitate frequent monitoring and dose adjustments, many patients find warfarin difficult to use in clinical practice. Rivaroxaban, a direct factor Xa inhibitor, has been found to be more consistent and predictable as an anticoagulant than is warfarin. This study compared once daily oral rivaroxaban with dose adjusted warfarin for the prevention of strokes in patients with nonvalvular atrial fibrillation.

The subjects included 14,264 patients identified with non-valvular atrial fibrillation who were at moderate to high risk for stroke. The patients were randomized to receive either a fixed dose of 20 mg/day of rivaroxaban or adjusted dose warfarin, using the target international normalized ratio (INR). For the rivaroxaban group, sham INR results were generated. The primary efficacy endpoint was the composite of stroke and systemic embolism. Secondary efficacy endpoints included a composite of stroke, systemic embolism or death from cardiovascular causes.

Stroke or systemic embolism occurred in 1.1%/year in the rivaroxaban group and in 2.2%/year in the warfarin group ($p<0.001$ for non-inferiority). Major and clinically relevant nonmajor bleeding occurred in 14.9% patients in the rivaroxaban group and in 14.5% patients in the warfarin group ($p=0.44$). During treatment, myocardial infarction occurred in 101 patients in the rivaroxaban group and in 126 patients in the warfarin group ($p=0.12$). In the same analysis population, 208 deaths occurred in the rivaroxaban group and 250 in the warfarin group ($p=0.07$).

Conclusion: This trial, comparing a once daily fixed dose of rivaroxaban to adjusted dose warfarin in patients

with nonvalvular atrial fibrillation found that rivaroxaban is not inferior to warfarin for the prevention of subsequent stroke or systemic embolism.

Patel, M., et al. Rivaroxaban versus Warfarin in Nonvalvular Atrial Fibrillation. *N Engl J Med.* 2011, September 8; 365: 10: 883-891.

WEEKEND ADMISSIONS AND POST-STROKE MORTALITY

Disparities in care and outcomes of patients exist between those hospitalized on weekends versus weekdays. This investigation was designed to compare the mortality rates of those with ischemic stroke admitted on weekends versus weekdays, as well as to compare those admitted to specialty stroke units.

This study utilized a myocardial infarction data acquisition system (a database review of the outcomes of 134,441 patients with a primary diagnosis of cerebral infarction). All subjects were admitted between 1996 and 2007 to a primary stroke center (PSCs) a comprehensive stroke centers (CSC) or a nonstroke center (NSC). The primary outcome variable was all cause mortality within 90 days of hospital admission, with the primary independent variable of admission on a weekend or holiday versus a weekday. The in-hospital and community death rates were assessed at 30, 60, 90 and 365 days.

Of the total population, 23.4% (31,417) were admitted to a CSC, 51.5% (69,275) to a PSC, and 25.1% (33,746) to a NSC. Ninety-day mortality was significant higher for weekend admissions than weekday admissions ($p=0.0001$). While the adjusted, 90-day mortality was significantly greater with weekend admissions to PSCs and NSCs, no significant increase was seen for

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weekend stroke admissions to a CSC.

Conclusion: This study of patients admitted with stroke between 1997 and 2007 found a significantly higher 90-day mortality for patients who were admitted during a weekend, with the exception of those who were admitted to a comprehensive stroke center.

McKinney, J., et al. Comprehensive Stroke Centers Overcome the Weekend versus Weekday Gap in Stroke Treatment and Mortality. **Stroke**. 2011, September; 42(9): 2403-2409.

DECREASED SHOULDER RANGE OF MOTION AS A RISK FACTOR FOR SHOULDER AND ELBOW INJURIES

Retrospective and cadaveric studies have demonstrated that decreased range of motion in the shoulder is associated with injuries among overhand throwing athletes. This study was designed to prospectively identify shoulder range of motion factors that place high school softball and baseball players at an increased risk of upper extremity injury.

A total of 246 high school athletes of various skill levels were included in this cohort study. Participants completed a questionnaire regarding prior injuries, sports participation and hand dominance. At the start of the season, the athletes were measured for range of motion at internal rotation, external rotation, total rotation and horizontal adduction of both the dominant and nondominant shoulders. Injuries were then reported after practice or games, and were categorized by severity, including time lost from participation.

Twenty-seven shoulder and elbow injuries were reported during the season. Pitchers sustained 12 of 27 (44.4%) of the upper extremity injuries. Of the total injuries, 67% were categorized as minor, resulting in less than seven days of time lost. The dominant shoulder of each injured player was significantly lower for horizontal adduction (27.7°) as compared with the uninjured players' dominant shoulders (32.5°), with the mean difference being statistically significant (p=0.05). In addition, injured baseball players had a significantly greater side-to-side loss

of passive internal rotation than did uninjured players (p=0.04). For the entire cohort, those with decreased passive internal rotation in the dominant shoulder, as measured at preseason, were four times more likely to sustain an arm injury.

Conclusion: This prospective study of throwing athletes demonstrated that significant preseason deficits in shoulder internal rotation and horizontal adduction are more common among athletes who later sustain shoulder and elbow injuries.

Shanley, E., et al. Shoulder Range of Motion Measures as Risk Factors for Shoulder and Elbow Injuries in High School Softball and Baseball Players. **Am J Sport Med**. 2011, September; 39(9): 1997-2006.

ENERGY EXPENDITURE AFTER VIGOROUS EXERCISE

High intensity, long duration exercise is known to elevate the resting metabolic rate, although the magnitude and duration of this elevation has not been clearly defined. This study compared energy expenditure before and after 45 minutes of vigorous bicycling.

Ten healthy males, ranging in age from 22 to 33 years, all capable of high intensity exercise, were selected. Each subject completed both a day of rest and a day of exercise while in a metabolic chamber. On the day of exercise, the subjects completed 45 minutes of cycling at 70% of VO₂ Max. Two energy expenditure curves, one for the exercise day and one for the rest day, were generated for each subject.

For all participants, the relative heart rate and oxygen consumption data indicated that the exercise bout was at a vigorous level, as defined by the American College of Sports Medicine. The exercise bout resulted in a net energy expenditure of 519 kcal. Hour-by-hour analysis showed that energy expenditure was significantly elevated on the exercise day for 14.2 hours after exercise. This increase in resting energy expenditure included 3.5 h of the early sleep period, accounting for 32.0 kcal (p = 0.03).

Conclusion: This study demonstrates that, after 45 minutes of high intensity exercise, energy

expenditure can remain elevated for more than 14 hours.

Knab, A., et al. A 45-Minute, Vigorous Exercise Bout Increases Metabolic Rate for 14 Hours. **Med and Sci in Sports and Exer.** 2011; 43(9): 1643-1648.

MICROGLIAL ACTIVATION IN TRAUMATIC BRAIN INJURY

Microglial cells react to injury within minutes of trauma, and, once transformed, can be indistinguishable from peripheral macrophages, secreting cytokines and acting as antigen presenting cells. Postmortem studies have found microglial activation many years after TBI. This study investigated patients in the chronic phase after TBI, in order to test whether a persistent inflammatory response is present in injuries of varying severity.

Eleven patients with a history of moderate to severe TBI were recruited from 0.9 to 17 years after injury. Conventional neuroimaging was reviewed. Five patients had no visible abnormalities on T1 MRI, with five demonstrating significant focal lesions. Two nonoverlapping groups of control subjects were used. Patients underwent neuro-psychological assessment and volumetric and diffusion tensor MRI, and were studied for microglial activation using the positron emission tomography ligand PK, which binds to a translocator protein expressed by activated microglial cells.

The patients' PK binding potentials were significantly higher than were those of controls in a number of brain regions distant from any focal damage. This finding was higher in the thalamus ($p < 0.001$), putamen ($p = 0.002$) occipital cortices ($p = 0.015$), and in the posterior limb of the internal capsule ($p = 0.017$). An increase in PK binding was significantly related to the degree of cognitive impairment, as measured by neuropsychological testing. In particular, high PK binding in the thalamus was associated with more severe cognitive impairment. No persistent increase in PK binding was seen in the areas of focal injury, as evident on MRI.

Conclusion: This study of patients with chronic traumatic brain injury demonstrates that microglial activation persists years after a

traumatic brain injury, suggesting that this injury triggers a long-term inflammatory response. This response was found to be most prominent within subcortical structures remote from the site of the focal injury.

Ramlackhansingh, A., et al. Inflammation after Trauma: Microglial Activation and Traumatic Brain Injury. **Ann Neurol.** 2011, September; 70: 374-383.

THERMAL INTERVENTION FOR BALANCE AFTER STROKE

Despite rehabilitation, over 50% of patients who have sustained a moderate to severe stroke remain impaired in their ability to walk after hospital discharge. Previous studies have demonstrated that repetitive sensory stimulation and mass motor practice facilitate neuroplasticity and cortical reorganization. Additionally, previous studies have found that thermal stimulation facilitates recovery of motor function in the upper limb after acute stroke. This study assessed the efficacy of thermal stimulation for the recovery of balance and motor function of the lower limb after moderate to severe stroke.

This study recruited 35 patients within four weeks of the onset of a first-ever stroke. All participants received standard rehabilitation, including 40 minutes of physical and occupational therapies once per day, five days per week, for six weeks. The experimental group received 48 minutes of treatment with alternating hot (75°C) and cold (0°C) packs, placed over the region of the calf or foot. Outcome measures were obtained at baseline and after four and six weeks, using the Modified Ashworth Scale, the Modified Motor Assessment Scale, and the Fugl-Meyer Scale for the Lower Extremity. The Medical Research Council Scale for the Lower Extremity was used to measure the strength of the paretic hip flexors, knee extensors and ankle dorsiflexors.

A total of 33 patients were included in the analysis. No adverse effects were reported after six weeks of therapy. The average values of the Fugl-Meyer Assessment Scale for the Lower Extremity, the Medical Research Council Scale for the Lower Extremity, the Modified Motor

Assessment Scale, the Berg Balance Scale and the Functional Ambulation Classification Scale were all better for the thermal group than for the control group ($p < 0.05$ for all comparisons). After six weeks, the thermal group also produced more walkers

Conclusion: This study found that thermal stimulation may enhance lower extremity motor recovery in patients with moderate to severe stroke.

Chen, J., et al. Facilitation of Motor and Balance Recovery by Thermal Intervention for of the Paretic Lower Limb of Acute Stroke: a Single-Blind Randomized Clinical Trial. **Clinical Rehab.** 2011, September; 25(9): 823-832.

DYNAMIC HUMERAL CENTERING FOR IMPINGEMENT SYNDROME

As the first recommendation for treating degenerative rotator cuff disease is conservative, a number of therapeutic interventions have been proposed. Dynamic humeral centering (DHC) involves selective solicitation of depressors of the humeral head, pectoralis major and latissimus dorsi during active abduction of the arm in the scapular plane. This study assessed the efficacy of DHC for the treatment of impingement syndrome.

This prospective, single center, randomized, controlled trial included patients who were at least 30 years of age, all with complaints of shoulder pain of longer than one month's duration. All had at least two positive impingement signs. The subjects were randomized to either a treatment group or to a control group providing nonspecific mobilization. Each group received 15 sessions over six weeks of intervention and all were given a home exercise program, with follow-up at one year. The primary outcome measures included pain, activity, mobility and strength at three months. Secondary outcomes reviewed the same variables at 12 months, as well as medication use for pain at three and 12 months.

No significant differences were noted between the treatment and control groups in mobility, activity or strength at three months. The treatment group did report decreased pain levels and pain medication use as compared to the control group at three months. At 12 months, the

treatment group continued to trend toward improved pain levels, although this finding did not reach statistical significance.

Conclusion: This study of patients with impingement syndrome found that dynamic humeral centering treatment can be effective in reducing pain and in decreasing pain related medication use.

Beaudreuil, J., et al. Assessment of Dynamic Humeral Centering and Shoulder Pain with Impingement Syndrome: A Randomized Clinical Trial. *Ann Rheum Dis.* 2011, September; 70(9): 1613-1618.

DIPYRONE INHIBITS NEURONAL CELL DEATH AFTER BRAIN INJURY

Over 80% of all strokes are a consequence of permanent or prolonged arterial occlusion, resulting in hypoxic-ischemic neuronal death. A critical cell death triggering event is the release of cytochrome C and other mitochondrial proteins into the cytoplasm. It has been speculated that blocking the release of these mitochondrial factors may inhibit cell death. The release of cytochrome C, considered to be a commitment step in this cascade, results in caspase-9 activation, a critical step in the late, irreversible process of cell death. In a previous report, the authors had noted that dipyrone, an analgesic and antipyretic drug, prohibited from clinical use in the United States, inhibits cytochrome C release and has strong antiapoptotic activity. This study investigated whether dipyrone can ameliorate hypoxic-ischemic injury, and whether this neuroprotective property is associated with the inhibition of mitochondrial cell death pathways.

This animal study involved surgically induced middle cerebral artery ischemic strokes. In the study animals, dipyrone was injected 30 minutes prior to ischemia. Each animal was assessed for neurologic deficits at two and 24 hours after the onset of focal ischemia. Mitochondrial physiology was measured, and infarction size was determined after sacrifice, with infarct volume expressed as a percent of the contralateral hemisphere volume.

Treatment with dipyrone inhibited cytochrome C release from isolated mitochondria, but did not affect

mitochondrial respiration or permeability transition. In a dose dependent manner, dipyrone inhibited Ca^{2+} induced cytochrome C release in isolated mitochondria by 22.5% (at 10mMol) or 46.4% (at 20mMol). Dipyrone treatment reduced cerebral infarct volume by 42.8% of that seen in vehicle-treated mice ($p<0.01$). The mice injected with dipyrone had significantly improved neurobehavioral scores both at two and 24 hours, relative to the vehicle treated controls ($p<0.01$).

Conclusion: This animal study of middle cerebral artery ischemic strokes found that dipyrone, an inhibitor of cytochrome C release from mitochondria, and an analgesic/antipyretic drug, demonstrates significant neuroprotective effects, decreasing infarction size and improving behavioral sequelae.

Zhang, Y., et al. Dipyrone Inhibits Neuronal Cell Death and Diminishes Hypoxic/Ischemic Brain Injury. *Neurosurg.* 2011, October; 69: 942-956.

MEMANTINE FOR MILD ALZHEIMER'S DISEASE

Memantine is indicated in the United States and Europe for the treatment of moderate to severe Alzheimer's disease (AD). Despite questions concerning its efficacy for less severe forms of AD, memantine is frequently prescribed for patients with mild cognitive impairment or mild AD. This metaanalysis was designed to clarify the efficacy of this drug for mild AD.

The authors reviewed the literature for placebo-controlled clinical trials that included subjects with mild AD. Effect sizes were calculated for memantine versus placebo, using information extracted from three trials that included 431 patients with mild AD and 697 patients with moderate AD.

In each of the three individual trials reviewed, no evidence was found for the efficacy of memantine in the subjects with mild AD for any outcome measure. For the subset of subjects with moderate AD, no significant difference was seen between the treatment and placebo groups on the Alzheimer's Disease Assessment Scale-Cognitive Subscale (ADAS-Cog) in any one trial, although a significant effect was

found when all trials were combined ($p=0.006$). No significant differences were found between the two groups on the Alzheimer's disease Cooperative Study-Activities of Daily Living (ADCS-ADL) Scale or the Neuropsychiatric Inventory (NPI) in any one trial or when the data were combined.

Conclusion: This meta-analysis of studies of the efficacy of memantine found no evidence for the efficacy of this medication in subjects with mild Alzheimer's disease.

Schneider, L., et al. Lack of Evidence for the Efficacy of Memantine in Mild Alzheimer's Disease. *Arch Neurol.* 2011, August; 68(8): 991-998.

MASSAGE VERSUS USUAL CARE FOR CHRONIC LOW BACK PAIN

Massage is one of the most popular complementary and alternative medical therapies for neck and back pain. The majority of massage therapies are focused on relaxation, rather than on correcting structural abnormalities. This randomized, controlled trial evaluated the effectiveness of relaxation massage and structural massage, as compared to usual care, for the treatment of chronic low back pain (LBP).

This study included 402 adults with nonspecific LBP, present for at least three months. The patients were randomized to receive usual care, relaxation massage or structural massage. The massage groups underwent 10 weekly massage treatments by a licensed therapist, and were allowed home exercises to complete between sessions. Usual care subjects did not receive any specific treatment over the course of the study, but were paid 50 dollars for their participation. Subjects rated back pain and dysfunction using the modified Roland Disability Questionnaire (RDQ) at baseline, and again at 10, 26 and 52 weeks.

All subjects reported decreased back pain and dysfunction at 10 weeks. Compared to those with usual care, RDQ scores were 2.9 points lower among relaxation massage recipients and 2.5 points lower among structural massage recipients ($p<0.001$ for both). The effects decreased after the 10-week treatment, although differences in functional improvement among the

treatment groups remained statistically significant at 26 and 52 weeks. Despite this functional improvement, no significant differences in symptoms were observed among the 3 groups at 26 or 52 weeks.

Conclusion: This study of patients with chronic low back pain found that both relaxation and structural massage are more effective than usual care for the treatment of chronic, nonspecific low back pain.

Xherkin, D, et al. A Comparison of the Effects of Two Types of Massage and Usual Care on Chronic Low Back Pain. *Ann Intern Med.* 2011, July 5; 155(1): 1-9.

MUSCLE WEAKNESS AND PATELLOFEMORAL PAIN

The mechanics of the patellofemoral joint are thought to be influenced by segmental interactions of the lower extremity. Studies prospectively identifying risk factors for patellofemoral dysfunction syndrome have focused on risk factors directly on or close to the site of pain, with little attention to proximal risk factors. This study investigated the effect of hip muscle weakness on the development of patellofemoral dysfunction syndrome.

Seventy-seven female, novice, recreational runners were studied. None of the participants played other sports during the program, and all had been previously sedentary. All participants had joined a "start to run" program, sponsored by a Belgian track and field club. Before the program's onset, all participants underwent Q angle measurement and isometric muscle strength testing of the six major muscle groups of both hips. During the course of the running program, an orthopedic surgeon diagnosed and registered all musculoskeletal injuries of the lower extremities among those who sought medical attention.

During the 10-week program, patellofemoral dysfunction syndrome was diagnosed in 16 of the 77 runners. No significant differences were noted in height, age, weight, body mass index or Q angle between those who did and those who did not sustain this injury. In addition a univariate analysis did not reveal significant differences in isometric strength in any of the assessed hip

muscle groups between the runners who did and those who did not develop patellofemoral pain.

Conclusion: This prospective study did not find a connection between hip muscle strength and the development of patellofemoral dysfunction syndrome of the knee.

Thijs, Y., et al. Is Hip Muscle Weakness a Predisposing Factor for Patellofemoral Pain in Female Novice Runners? *Am J Sports Med.* 2011, Sept; 39(9): 1877-1822.

PLATELET RICH PLASMA IN SPORTS MEDICINE

Platelet rich plasma (PRP) is a concentrate of platelets and associated growth factors, obtained through withdrawal and centrifugation of the patient's own blood. The use of PRP has increased among practitioners treating tendon and ligament injuries. With a recent increase in pilot studies, this study was designed as a systematic review of the literature, in an effort to obtain a better overview of the efficacy of this treatment.

This literature review included articles in Pub Med/Medline and EMBASE, limited to in vivo application of PRP in tendon and ligament injuries. Thirteen studies met the criteria for review, although only three were prospective, randomized, controlled trials (RCT), and three were prospective cohort studies.

Of the studies reviewed, eight found favorable outcomes after PRP use in rotator cuff surgery, elbow tendinosis, patellar tendinosis and Achilles tendon injuries. Only one of these studies was a RCT, and another a cohort study. One prospective RCT found no improvement after the use of PRP in chronic Achilles tendon tendinopathy. Three studies reporting on the use of PRP during ACL reconstruction found no statistically significant difference in tunnel widening or graft integration. No studies reported adverse events.

Conclusion: This review of the literature found that the current evidence for the use of PRP in soft tissue applications remains weak.

Taylor, D., et al. A Systematic Review of the Use of Platelet Rich Plasma in Sports Medicine as a New Treatment

for Tendon and Ligament Injuries. *Clin J of Sports Med.* 2011, July; 21 (4): 344-352.

STEROID INJECTION VERSUS MANIPULATION AND ARTHROLYSIS FOR ADHESIVE CAPSULITIS

Shoulder adhesive capsulitis is characterized by significantly reduced active and passive range of motion in the glenohumeral joint. This study was designed to determine whether intra-articular steroid injections are as effective for pain relief and range of motion restoration as is arthroscopic surgical release.

This prospective, randomized, non-blinded study included 82 patients with signs and symptoms of adhesive capsulitis, of at least three months' duration. All were diagnosed with stage II adhesive capsulitis, with unsatisfactory response to conservative treatment. The patients were randomized to undergo shoulder manipulation under general anesthesia, with subsequent arthroscopic arthrolysis, or by intra-articular steroid injections, using 4 mL of 2% lidocaine and 1 mL of Depo-medrol. Injections were completed once per week for three weeks with ultrasound guidance. The patients participated in physical therapy beginning the day after the first injection. Those in the surgery group underwent manipulation until recovery of range of motion was obtained. Thereafter, an arthroscopic procedure was completed, focused upon areas of synovitis, and attempting to visualize possible lesions. A glenohumeral circumferential capsule release was then performed using radiofrequency. The subjects were followed at three, six and 12 weeks with clinical evaluations, including the Constant Murley test, the University of California at Los Angeles Shoulder Score, the American Shoulder and Elbow Surgeons Score and the Simple Shoulder Test.

At 12-week follow-up, range of motion testing revealed satisfactory results in both groups. All evaluation scale results had increased significantly by final follow-up in both groups. Patients in the surgical group had reached significant improvement at six-week follow-up, with this recovery apparent at week 12 in the conservative group.

Conclusion: This study of patients with adhesive capsulitis, comparing surgical manipulation with intra-articular steroid injection, found both treatments to be effective in returning range of motion and in reducing pain. The effects were apparent at six weeks in the surgery group and at 12 weeks in the injection group.

Carli, A., et al. Shoulder Adhesive Capsulitis: Manipulation and Arthroscopic Arthrolysis or Intra-Articular Steroid Injections? *International Orthopedics*. 2011. DOI.1007/s00264-011-1330-7.

LOW EJECTION FRACTION AND VERBAL MEMORY

Cognitive deficits have been reported in 30% to 80% of patients with heart failure. There remains a conflict in the evidence associating ejection fraction with cognitive dysfunction, suggesting a complex relationship between patient variables and cardiovascular factors that influence cognition. This study sought to further evaluate the role heart failure plays in cognitive impairment.

This retrospective study identified patients with heart failure who were treated at a single academic medical center, and who underwent neurocognitive assessments as a part of their routine evaluation for potential heart transplantation. Neuropsychological functioning, verbal memory, and visual memory were measured. Assessments were made of associations between age, ejection fraction, and cognitive function including memory. A multivariate linear regression analysis was applied.

In the primary model a low ejection fraction was associated with low memory function among patients ages 63 years and older ($p=0.008$). Patients ages 63 years or older demonstrated a decreased memory composite score, if their ejection fraction was below 30% ($p=0.02$). In the final multivariate analysis, other factors associated with a low memory composite score included low attention composite score, low executive function composite score ($p<0.001$), and self-reported depressive scores, as measured by the CES-D.

Conclusion: This prospective study suggests that an ejection fraction of less than 30% is

associated with reduced memory composite scores in patients ages 63 years of age or older.

Festa, J et al. Association of Low Ejection Fraction with Impaired Verbal Memory in Older Patients with Heart Failure. *Arch Neurol*. 2011. August; 68(8): 1021-1026

THROMBOLYSIS: POSTERIOR VERSUS ANTERIOR CIRCULATION STROKE

Intravenous thrombolysis (IVT) is approved for treatment of ischemic stroke in both posterior and anterior circulation infarction. No prior study has investigated the use of IVT with regard to stroke territory. This study explored the safety and clinical outcomes of IVT according to stroke territory.

Eight hundred eighty-three patients at three Swiss stroke centers underwent IVT for acute ischemic stroke. These subjects were prospectively studied for symptomatic intracranial hemorrhage, mortality and favorable outcomes. Ninety-five patients sustained posterior circulation strokes (PCS), while 788 sustained anterior circulation strokes (ACS). Clinical outcomes included frequency of intracranial hemorrhages, all-cause mortality and modified Rankin Scale scores for the level of independence at three months.

A total of 36 patients sustained intracranial hemorrhages, including 10 fatal outcomes. Symptomatic intracranial hemorrhage occurred in five percent of the patients with ACS, and in none of the patients with PCS ($p<0.026$). Further analysis identified atrial fibrillation, antiplatelet medication and diastolic blood pressure as independent predictors of symptomatic intracranial hemorrhage. More subjects with PCS (66%) enjoyed a favorable outcome than did those with ACS (47%), independent of the other predictors. Factors independently associated with favorable outcomes included NIHSS score ($p<0.001$), blood glucose ($p<0.001$), age ($p=0.006$), antiplatelet medication ($p=0.008$) and anticoagulation ($p=0.022$). Stroke territory no longer predicted favorable outcome after adjustment for these predictors.

Conclusion: This study demonstrates that favorable clinical

outcomes are more frequent in patients with posterior circulation strokes and that patients with posterior circulation strokes are at lower risk of symptomatic intracranial hemorrhage after intravenous thrombolysis.

Sarikaya, H., et al. Outcomes of Intravenous Thrombolysis in Posterior versus Anterior Circulation Strokes. *Stroke*. 2011, September; 42 (9): 2498-2502.

SURGICAL VERSUS CONSERVATIVE TREATMENT OF CHRONIC LOW BACK PAIN

Previous studies of patients with chronic low back pain (LBP) have produced mixed results when comparing conservative with surgical interventions. As fusion surgery implies involvement of back muscles, including possible denervation, surgical techniques have recently been developed to minimize injury to muscles and nerves. This study compared the long-term effects of lumbar fusion and cognitive intervention and exercises on muscle strength, cross-sectional area, density and self-rated function among patients with chronic LBP and disc degeneration.

This study involved 55 patients, all 25 to 60 years of age, with reported LBP for a least one year's duration. All had earned a score of 30/100 points on the Oswestry Disability Index, and exhibited degenerative changes at L4-L5 and/or L5-S1 on plain radiographs. The subjects were randomized to either undergo instrumented posterolateral fusion or a three-week treatment including cognitive intervention and exercise. Outcome measures included trunk muscle strength testing, cross-sectional area and density of back muscles and back related disability, as measured by the General Function Score (GFS).

Twenty-four patients were originally allocated to undergo lumbar fusion, and 31 were allocated to undergo exercise and cognitive interventions. Nine subjects in the exercise group crossed over after one-year follow-up and underwent surgery. One patient who was assigned to the surgery group refused. Thirty-two patients underwent fusion, and 23 underwent conservative treatment.

At long-term follow-up (seven to 11 years), no significant differences were found between the two groups in cross-sectional area, self-rated function, muscle density or muscle strength. The conservative group increased trunk muscle extension significantly, while both groups performed better on trunk muscle flexion at long-term follow-up. Self-rated function improved in both groups.

Conclusion: This randomized study of patients with chronic low back pain found similar outcomes between those who underwent fusion and those who underwent conservative treatment, including exercise and cognitive therapy.

Froholdt, A., et al. No Difference in Long-Term Trunk Muscle Strength, Cross-Sectional Area and Density in Patients with Chronic Low Back Pain 7 to 11 Years after Lumbar Fusion versus Cognitive Intervention and Exercises. *Spine J.* 2011, August; 11 (8): 718-725.

THE 10-SECOND STEP TEST FOR CERVICAL MYELOPATHY

Cervical compression myelopathy is a neurologic disorder commonly seen in the elderly. Assessment of myelopathy can be difficult, especially early in the course of the disease. Despite its prevalence, few, easily performed tests for myelopathy are available. This study evaluated the usefulness of the newly developed 10-Second Step Test as a means to assess cervical myelopathy.

One hundred sixty-eight patients, all diagnosed with cervical compression myelopathy (CCM), were enrolled in this prospective study. All were scheduled for cervical expansive laminoplasty. The diagnosis was confirmed by both neurologic examination and imaging studies. The subjects performed the Grip and Release Test, the 30 Meter Walking Test and the 10-Second Step Test. For the 10-Second Step Test, the subjects were asked to march in place, raising their thighs parallel to the floor, and to take as many steps as they could in 10 seconds. The Japanese Orthopedic Association Cervical Myelopathy Evaluation Questionnaire (JOACMEQ-L) and the lower limb section of the Japanese Orthopedic Association (JOA) Score were completed at baseline and at one year post-

surgical correction. The primary outcome measure was the reproducibility of the test and its ability to anticipate outcomes on the JOACMEQ-L.

Upon testing the repeatability of the tests, the average difference between two repeated measurements was not found to be statistically significant on any of the study's measures. Univariate regression for the JOA revealed that any test was a significant predictor of JOA, although the 10-Step Test had the largest R^2 for pre-surgery, and the Walking Test (time) for post-surgery. For the JOACMEQ-L, the largest R^2 involved the 10-Second Step Test, both at pre-surgery and post-surgery.

Conclusion: This prospective study found that the newly described, 10-Second Step Test is easily performed, valid and useful for the assessment of patients with cervical myelopathy.

Nakashima, H., et al. Validity of the 10-S Step Test: Prospective Study Comparing it with the 10-S Grip and Release Test and the 30-M Walking Test. *Eur Spine J.* 2011, August; 20 (8): 1318-1322.

DOES DROP SHOULDER CAUSE CERVICAL RADICULOPATHY

Cervical radiculopathy is a pathological process involving nerve roots of the cervical spine. The most common causes of radiculopathy are cervical disc herniation, followed by cervical spondylosis. The "dropped shoulder syndrome" is the name suggested by the authors to describe a visually detectable, bilateral drop shoulder, a commonly observed phenomenon in Yemeni people. This study was designed to determine the role of dropped shoulder as a cause of lower cervical radiculopathy.

A total of 132 patients in Azal Hospital in Sana'a, Yemen, presenting with a chief complaint of shoulder pain, were studied. Of these, 96 patients exhibited visually detectable drop shoulder. Each patient was examined for signs of neural, arterial and/or venous compression. Plain cervical x-ray, muscle enzyme and electrodiagnostic assessments were performed.

All of the patients presented with shoulder pain, with their pain radiating to the neck, ipsilateral scapular region, lateral chest wall, anterior chest wall, arm and forearm,

or to the hand. The pain was associated with numbness of the palm of the hand in 72 (54.5%). Of the patients with visibly dropped shoulder, cervical plain x-rays revealed a long neck in all patients with lateral x-rays with eight or more visible vertebrae. Electrodiagnostic results revealed lower values for sensory nerve conduction studies of the ulnar, median, medial/lateral, antibrachial, axillary and musculocutaneous nerves, while the amplitude of the sensory nerve action potential was low in 114 patients. The EMG revealed a denervation pattern for the muscles supplied by the lower cervical roots.

Conclusion: This study of patients with dropped shoulder syndrome found pain in a consistent anatomical distribution, x-ray abnormalities and EMG/NCS abnormalities consistent with lower cervical root irritation.

Abdul-Latif, A., et al. Dropped Shoulder Syndrome: A Cause of Lower Cervical Radiculopathy. *J Clin Neurol.* 2011, June; 7(2):85-89.

PIVOT STRESS TEST FOR ANTERIOR CRUCIATE LIGAMENT DEFICIENCY

Patients with anterior cruciate ligament (ACL) deficiency often complain of rotational instability, which can be reproduced by the pivot shift test. While various experiments have attempted to quantify this rotational instability, no established measurement system is available in clinical practice. The purpose of this study was to measure the knee kinematics during clinically feasible manual testing procedures.

Thirteen patients with unilateral ACL injury, diagnosed by clinical findings and magnetic resonance imagery, were evaluated just prior to reconstructive surgery. Three manual tests were performed, including external rotational stress tests, internal rotational stress tests and pivot stress tests. All were performed by a single examiner while the patient was under general anesthesia. Using electromagnetic sensors, axial rotation angle and tibial anterior posterior translation were measured at five degree increments of flexion from 0° to 90°. The results were compared between ACL intact and ACL deficient knees.

(Continued from page 2)

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The results demonstrated significantly increased tibial anteroposterior translation in ACL deficient, as compared to ACL intact knees during the pivot shift test, when performed from 20° to 40° of flexion ($p < 0.05$). The coupled anterior tibial translation during the pivot shift test was significantly different between ACL intact and deficient knees ($p < 0.01$). In addition, the acceleration of the tibial posterior translation was greater in ACL deficient knees ($p < 0.01$). Of note the pure rotational stress tests demonstrated similar knee rotation and coupled tibial anteroposterior translation in both ACL intact and injured knees.

Conclusion: In this study, rotational instability of ACL deficient knees was not produced by pure rotation stress tests, but detected only by measuring the tibial anteroposterior translation and acceleration of the tibial posterior reduction.

Hoshino, Y., et al. Optimal Measurement of Clinical Rotation Test for Evaluating Anterior Cruciate Ligament Insufficiency. **Knee Surg Sports Traum Arthroscopy**. 2011; August. Doi 10.1007/S00167-011-

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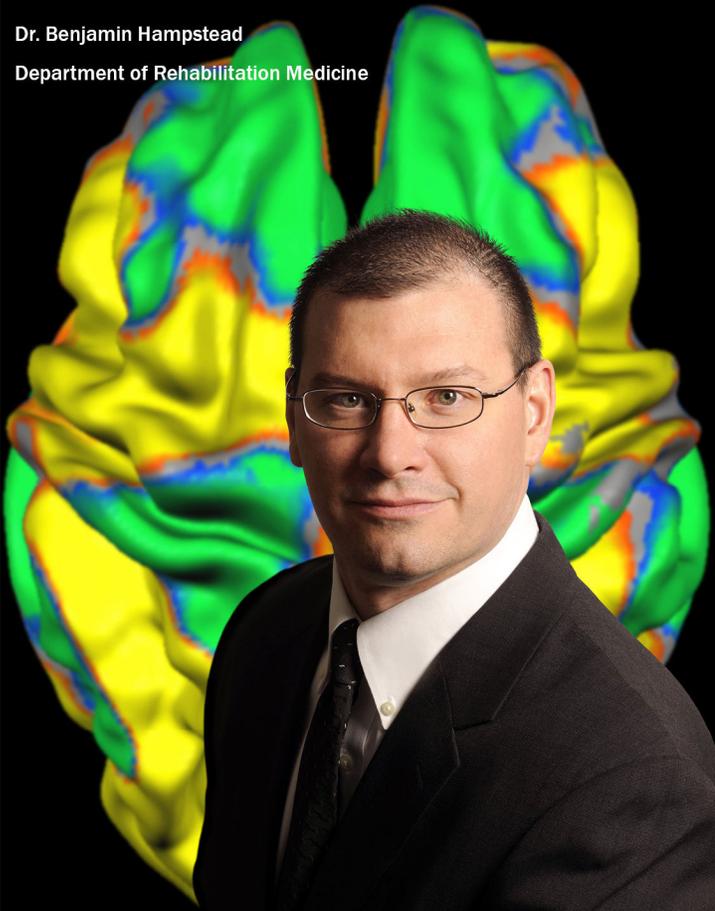
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