Does Pregabalin Relieve Lumbosacral Radicular Pain?

The Efficacy and Safety of Pregabalin in the Treatment of Neuropathic Pain Associated With Chronic Lumbosacral Radiculopathy.

Baron R, Freynhagen R, et al:

Pain 2010; May 19 (): epub ahead of print

Pregabalin improves sleep, depression, and anxiety but not chronic lumbosacral radicular pain.

**Background:** Pregabalin (Lyrica®) is presently approved for neuropathic pain from diabetes and post-herpetic neuralgia, for fibromyalgia, and for general anxiety (EU only). It is not yet approved for lumbosacral radicular pain. Nevertheless, it is being frequently prescribed for this common disorder.

**Objective:** To determine if pregabalin is truly effective in relieving chronic lumbosacral radicular pain.

**Design:** Double-blind randomized placebo-controlled multicenter study.

**Participants/Methods:** Patients had lumbosacral pain for ≥3 months, radiating to the calf or foot without sensory and/or motor loss. To eliminate the placebo responders and pregabalin nonresponders, this study was done in 5 stages over 77 days: screening (n=544); single-blind placebo (n=378); single-blind pregabalin (n=363); double-blind pregabalin (n=111) versus placebo (n=107); and taper (n=98 + 89). The total duration of the study was 77 days. Mean and median dose of pregabalin were 410 and 300 mg/day after randomization. Exclusion criteria included pain for >4 years, back surgery in the past 6 months, and epidural injection in the past 6 weeks. Prior medications except antiepileptics and potent opiates could be continued. Placebo responders had a ≥50% decrease in their pain and pregabalin nonresponders had a <30% decrease in their pain. Nine scales were used to evaluate the effect of the treatment. The primary outcome measure was the time to loss of response.

**Results:** At 5 weeks within the double-blind stage there was no difference between the 2 groups on the primary outcome measure. There was, however, an improvement in sleep, depression, and anxiety in the pregabalin group.

**Conclusions:** Despite the negative result, pregabalin remains an excellent drug to treat neuropathic pain.

**Reviewer's Comments:** The choice to taper off pregabalin over 7 days in the placebo group during the transition from the single-blind to the double-blind portion of the study might have produced prolonged analgesia from a residual effect of pregabalin. It is possible that by extending the double-blind phase to 10 weeks, the 2 groups would have shown different results. While pregabalin is a rather innocuous drug, the message from the present study is that when we prescribe it for lumbosacral radiculopathy, if patients report no pain relief, most likely they are right. (Reviewer-Luc Jasmin, MD).

© 2010, Oakstone Medical Publishing

Keywords: Lyrica, Neuropathic Pain, Back Pain, Double Blind, Negative Result

Print Tag: Refer to original journal article
Intraventricular hemorrhage and proteinaceous cerebrospinal fluid should not hinder early ventriculoperitoneal shunt placement.

**Background:** Hydrocephalus is commonly seen following aneurysmal subarachnoid hemorrhage (SAH) and occurs in 6% to 30% of cases. Treatment involves external ventricular drain (EVD) placement, and a large number of patients can progress to chronic hydrocephalus therefore requiring permanent cerebrospinal fluid (CSF) shunting. Risk factors for permanent shunting post-SAH include intraventricular hemorrhage (IVH) and poor admission Hunt and Hess/Fisher grade. Risk factors for EVD-related infections include SAH, IVH, and longer EVD duration. In an effort to minimize infection and immobilization in patients with SAH-induced hydrocephalus, the authors challenge their EVDs 4 to 5 days post-insertion to proceed to ventriculoperitoneal shunt (VPS) placement early on in those who could not be weaned.

**Objective:** To assess the outcome of early shunt placement in patients with poor SAH and the effect of IVH and elevated CSF protein on VPS function.

**Participants/Methods:** Of 476 patients presenting with acute intracranial aneurysmal rupture over a 2-year period, 33 patients with Fisher 3/4 SAH undergoing early VPS placement were retrospectively studied. Hydrocephalus was diagnosed clinically as well as on CT by using the bicaudate index. EVD weaning was initiated at 4 to 5 days post-insertion in the absence of vasospasm and ventriculomeningitis. EVD challenge failure occurred with high ICP, CSF leak, and hydrocephalus on CT at 24 hours post-clamping. EVD challenge failure prompted VPS placement irrespective of IVH or CSF protein count. Patients undergoing VPS placement were grouped into sedimentation-type IVH and diffuse IVH based on CT. The ratio of IVH/total ventricular volume was calculated and used to determine percentage of blood in CSF. A Codman-Hakim programmable valve was always used.

**Results:** Of the 33 patients studied, 24 were in the sedimentation-type IVH and 9 had diffuse IVH. Mean age was 57.8 years. Mean interval from EVD to VPS placement was 6.4 days. Mean IVH volume was 9.44 mL immediately prior to VPS placement. Mean percentage of blood in CSF was 9.81% and mean CSF protein was 149 mg/dL. No complications during VPS placement were encountered. During a mean follow-up of 25.3 months, no VPS-related infections occurred and 6.1% underwent VPS revision due to malfunction from obstruction. IVH type was not related to shunt malfunction.

**Conclusions:** Early EVD conversion to VPS can be performed in the setting of SAH-induced hydrocephalus with low revision and infection rates. Moreover, IVH and proteinaceous CSF minimally affected shunt functioning and should not hinder early VPS placement.

**Reviewers’ Comments:** These results are quite interesting. In our neurosurgical ICU, patients with EVDs inserted for SAH-induced hydrocephalus will generally not be challenged before the CSF RBC count is ≤10,000/mm3 and in the absence of other ongoing active issues such as cerebral vasospasm. Moreover, as long as the EVD is in place, daily CSF gram stain/cultures are obtained. This study suggests that currently used CSF RBC thresholds might need to be reassessed and that low revision rates might be acceptable in comparison with the morbidity/cost of prolonged ICU stay. (Reviewer-Ziad A. Hage, MD).

© 2010, Oakstone Medical Publishing

Keywords: Hydrocephalus, Intraventricular & Subarachnoid Hemorrhage, Shunt Malfunction

Print Tag: Refer to original journal article
**Background:** Tethered cord syndrome (TCS) is the abnormal spinal cord fixation with resultant low-lying and immobile conus medullaris. Common symptoms are pain, neurological and urological dysfunction, and scoliosis. As many as 18% of patients presenting with congenital scoliosis have a contributory intraspinal abnormality and as many as 20% to 58% of cases of congenital scoliosis may be associated with intraspinal abnormalities.

**Objective:** To determine the incidence rate, time course, and patient subgroups most likely to stabilize or progress after tethered cord release.

**Methods:** From a database, 27 of 115 children who underwent cord untethering between 1996 and 2006 had associated scoliosis. The Risser sign and Cobb angle were used for analysis. All patients underwent primary cord untethering to address symptoms without a planned postoperative scoliosis surgery. Clinical and radiographic follow-up were done at 1, 3, 6, and 12 months after surgery. Only patients with a Cobb angle >10° were included. Postoperative scoliosis progression was defined as a >10° increase in Cobb angle.

**Results:** 27 of 115 children (23%) had associated scoliosis. Mean age at surgery was 8.9 ± 3.0 years and mean follow-up was 6 ± 2 years. Seventeen children (63%) were classified as Risser Grades 0 to 2 and 10 children (37%) as Risser Grades 3 to 5. Nineteen (70%) patients presented with a primary curve <40° (mean 26° ± 9°) and 8 (30%) with >40° (mean 50° ± 12°). Twenty-one (78%) patients experienced Cobb angle improvements postoperatively. Twelve patients (44%) experienced scoliotic progression. Eight (30%) required subsequent fusion for curve progression. Scoliosis progressed after untethering in 32% of patients with curves <40° compared to 75% with curves >40°. Nearly all scoliosis progressed following untethering in patients with Risser Grades 0 to 2 with curves >40°, while no patients with Risser Grades 3 to 5 and curves <40° did so.

**Conclusions:** Patients with Risser Grades 0 to 2 and Cobb angles >40° were at greatest risk of curve progression after tethered cord surgery. Patients with Risser Grades 3 to 5 and Cobb angles <40° did not experience curve progression after tethered cord release. Pediatric patients with TCS-associated scoliosis should be monitored closely for curve progression using standing radiographs after spinal cord untethering, particularly those with curves >40° or with Risser Grades 0 to 2.

**Reviewer's Comments:** I find this article very helpful for communicating with our orthopedic colleagues who, in many if not most occasions, are the ones encountering the patients first and referring them to our clinic. The practical application of the article is that it helps making a more objective decision on how and if necessary to stage the 2 procedures, the untethering and the spinal fixation. (Reviewer-Amir Kershennovich, MD).

© 2010, Oakstone Medical Publishing

Keywords: Scoliosis Outcome, Spinal Cord Untethering, Children

Print Tag: Refer to original journal article
Oxygen Tx for Severe TBI Represents a Graduated Effect

A Prospective, Randomized Clinical Trial to Compare the Effect of Hyperbaric to Normobaric Hyperoxia on Cerebral Metabolism, Intracranial Pressure, and Oxygen Toxicity in Severe Traumatic Brain Injury.

Rockswold SB, Rockswold GL, et al:

J Neurosurg 2010; 112 (May): 1080-1094

Hyperbaric oxygen therapy might prove to be a useful adjunct in the management of severe traumatic brain injury.

Background: Severe traumatic brain injury (TBI) impairs oxygen diffusion via various diffusion barriers as well as leading to mitochondrial dysfunction, which in turn leads to decreased cerebral oxidative metabolism. Hyperbaric oxygen therapy has a potential to ameliorate these effects.

Objective: To review the safety and effectiveness of hyperbaric oxygen (HBO) versus normobaric hyperoxia (NBH) in severe TBI on intracranial pressure (ICP), cerebral metabolism, and oxygen toxicity.

Design: Prospective randomized non-blinded clinical trial.

Participants: 69 patients with severe TBI (mean Glasgow Coma Scale score of 5.8) were evaluated -- 26 patients in the HBO group, 21 in the NBH group, and 21 in the control group.

Methods: Within 24 hours of TBI, and after surgical and neurocritical care stabilization, patients were randomized to 1 of 3 groups. The HBO group received 1 hour of 100% inspired O$_2$ at 1.5 ATA every 24 hours for 3 days; the NBH group received 3 hours of 100% O$_2$ at 1.0 ATA every 24 hours for 3 days, and the control group received standard neurocritical care management. Brain tissue O$_2$ tension, ICP, microdialysate fluid, cerebral blood flow, arteriovenous differences in O$_2$, cerebrospinal fluid (CSF) lactate, cerebral metabolic rate of oxygen (CMRO$_2$), and oxygen toxicity were all monitored. Both monoplace and multiplace chambers were successfully used for the HBO therapy.

Results: Brain tissue PO$_2$ levels were significantly increased in the HBO group (mean 223 mm Hg) and the NBH group (mean 86 mm Hg). In the HBO group this effect lasted until the next treatment session. Cerebral blood flow, CMRO$_2$, microdialysate lactate, and the L/P ratio had significantly greater improvement when a brain tissue PO$_2$ $>$200 mm Hg was achieved during treatment. ICP was significantly lower in the HBO group after treatments, with this effect persisting until the next treatment session.

Conclusions: Hyperbaric O$_2$ has a more robust post-treatment effect than NBH on oxidative cerebral metabolism related to its ability to produce a brain tissue PO$_2$ $\geq$200 mm Hg. No signs of pulmonary or cerebral O$_2$ toxicity were present.

Reviewer's Comments: This study aimed to identify the effects of HBO versus NBH on various measures of cerebral metabolism, ICP, and potential O$_2$ toxicity. As such, it showed it was not designed as a clinical outcome study, but it demonstrates the potential benefit of HBO therapy in severe TBI and it paves the way for an outcome-based trial. In short, HBO therapy might prove to be a potentially beneficial adjunct in the treatment of this group of patients. (Reviewer-Richard D. Murray, MD).

© 2010, Oakstone Medical Publishing

Keywords: Hyperbaric Oxygen, Normobaric Hyperoxia, TBI, Intracranial Pressure, Cerebral Metabolism

Print Tag: Refer to original journal article
Patients with unprovoked pulmonary embolism are candidates for indefinite anticoagulation with periodic reassessment of the risk-benefit ratio.

**Discussion:** A recent review article in the *New England Journal of Medicine* reviewed indication for testing, predictive values of different diagnostic tools, and treatment options for acute pulmonary embolism (PE), which I will summarize here: Hemodynamically stable patients with a high clinical probability for a PE should undergo a CT pulmonary angiography. Hemodynamically unstable patients with a high clinical probability should be started on anticoagulation while the work-up continues. An echocardiogram showing right ventricular dysfunction is confirmation enough. The PE can be confirmed with CT scan later when the patient is more stable. Negative predictive value of a chest CT is 95% and can only be marginally improved by 3% when performing concomitant lower-limb CT venography. Because of the additional radiation exposure, this is not recommended. The literature supports treating the patient based on positive lower extremity sonography only, which would avoid about 10% of CT scans. Markers of myocardial dysfunction or injury, like B-type natriuretic peptide (BNP) or troponin, can be useful for risk stratification. Hemodynamically stable patients with positive BNP or troponin should not be discharged. Acute PE requires initial short-term therapy with prompt onset followed by Coumadin. Low-molecular-weight heparin and intravenous unfractionated heparin have the same efficacy and safety profile proven by a meta-analysis. Bleeding risk during the hospitalization is 3%. Hemodynamically unstable patients are candidates for pharmacological or mechanical thrombolysis. The risk of bleeding is higher with intravenous (pharmacological) thrombolysis. The mortality of untreated patients is 60%. Therapy should only be carried out beyond 3 months if the initial PE is idiopathic. The risk for recurrent PE after anticoagulation if the initial PE is associated with temporary risk factors is 3% per year. Inferior vena cava (IVC) filters are a good alternative if the patient has temporary contraindications for anticoagulation, but IVC filter by itself is an indication for lifelong anticoagulation. Although more retrievable IVC filters have been placed to spare the patients’ lifelong anticoagulation, it has not resulted in increased filter retrieval. **Reviewer’s Comments:** The clinical presentation of acute PE ranges from shock to sustained hypotension to mild dyspnea. As neurosurgeons, we encounter this entity far more often than we wish and have to include it in our differential diagnosis even more frequently. This article provides a good summary of diagnosis and treatment of acute PE. (Reviewer-Martina Stippler, MD).

© 2010, Oakstone Medical Publishing

Keywords: Pulmonary Embolism, Diagnosis, Management

Print Tag: Refer to original journal article
The left-sided approach for treating cervical disc disease reduces the rate of vocal cord paralysis compared with those treated with a right-sided approach.

**Objective:** To determine the effect of right- versus left-sided approach as well as endotracheal cuff pressure on the development of recurrent laryngeal nerve palsy.

**Participants/Methods:** Patients treated at one site from 2005 to 2007 who were undergoing anterior cervical surgery with a left-sided approach were examined with indirect laryngoscopy to evaluate the status of the vocal cords postoperatively. Reduction of endotracheal cuff pressure was performed during surgery when possible. This cohort was compared with a historical cohort in whom right-sided surgical approach was used and no attempt was made to reduce the endotracheal cuff pressure.

**Results:** 242 patients from 2005 to 2007 underwent anterior cervical disc surgery and fusion using a left-sided approach. The rate of vocal cord paralysis in the historical group (right-sided approach [120 patients]) was 13.3%. In 93 of 242 patients, the endotracheal cuff pressure was not reducible, with a rate of persisting vocal cord paralysis of 6.5%. The rate of vocal cord paralysis was reduced to 1.3% when endotracheal cuff pressures could be lowered (149 of 242 patients) >20 mm Hg.

**Conclusions:** The left-sided approach for treating cervical disc disease reduces the rate of vocal cord paralysis compared with those treated with a right-sided approach. In addition, the rate of vocal cord paralysis was further lowered when the endotracheal cuff pressure was reduced, although these differences were not statistically significant.

**Reviewer's Comments:** The authors should be congratulated for investigating the mechanism that might explain complications of recurrent laryngeal nerve injury following anterior cervical spine surgery. It should be noted that the rate of vocal cord injury quoted in this study is higher than what is observed clinically. In the majority of cases in this study, vocal cord paralysis was asymptomatic. The overall numbers in this study were relatively small and therefore differences in rates of development of vocal cord paralysis were not statistically different. In addition to the low numbers that made statistical comparisons difficult, this study has other design problems. The use of a historical comparative group (right-sided approach) introduces the potential for bias. In addition, in the prospective cohort, the control group in whom endotracheal cuff pressure could not be lowered might not truly represent a control group. There might be other reasons why the cuff pressure could not be lowered. Multi-level surgery or longer surgical times are other variables previously reported to be relevant when considering the risks of vocal cord paralysis. A prospective comparative study comparing right-sided versus left-sided approach for treating cervical disc disease is necessary before making any conclusions about the differences in risk of developing vocal cord paralysis following anterior cervical spine surgery. In addition, randomly assigning the reduction of endotracheal cuff pressure would be important. (Reviewer-Zoher Ghogawala, MD).

© 2010, Oakstone Medical Publishing

Keywords: Cervical Spine Surgery, Complications, Outcomes, Vocal Cord Paralysis

Print Tag: Refer to original journal article
Surgical decompression of the paralyzed facial nerve, by the middle cranial fossa approach, is indicated in selected severe cases of Bell's palsy. Determination of candidacy is based upon strict electrophysiological criteria.

**Classic Article Review -**

**Background:** While the majority of patients with Bell's palsy recover to acceptable levels of cosmesis and functions, there are a select group of patients with severe degeneration that have a high likelihood of poor outcome. These are classified as high-risk, and can be detected by evoked nerve conduction studies as having >90% degeneration.

**Objective:** To report facial nerve functional outcomes in a prospective multicenter trial, comparing those patients who underwent labyrinthine facial nerve decompression to those who did not.

**Methods:** Patients presenting with Bell's palsy underwent surface evoked nerve conduction testing with supramaximal stimulation and recordings at the nasolabial fold by a standard described protocol. Patients whose nerve were considered to have degenerated beyond 90% and underwent surgical decompression were compared to those with like degeneration and but did not undergo decompression. The long-term outcome was also reported for those who never degenerated beyond 90% and were classified as low-risk.

**Results:** All of the patients in the low-risk group returned to either normal or minimally perceptible weakness. In total, 91% of patients in the high-risk group who underwent decompression returned to normal or minimally perceptible weakness as opposed to only 42% of those considered high-risk who did not undergo decompression.

**Conclusions:** Surgical decompression was considered effective if performed within the first 2 weeks of progression to complete paralysis.

**Reviewer's Comments:** Surgical decompression of Bell's palsy is still considered a controversial procedure by some. This landmark article is the most carefully constructed series with statistical significance in the range of $P = 0.0002$. The critical factor in the successful treatment of Bell's palsy is close cooperation between the primary care physician, neurologist, neurotologist, and neurosurgeon so that decompression by the middle cranial fossa approach can be performed in a timely fashion. (Reviewer-Andrew J. Fishman, MD).

© 2010, Oakstone Medical Publishing

Keywords: Facial Nerve Paralysis, Cranial Base Surgery

Print Tag: Refer to original journal article
Surgical extirpation using variants of the far lateral approach is the treatment of choice for schwannomas of the craniocervical junction.

**Background:** While schwannomas comprise 5% to 10% of all intracranial tumors, they are considered rare tumors in the craniocervical junction. Meningiomas and chordomas on the other hand are the most common lesions of this region.

**Objective:** To report surgical outcome and management over 20 years at the Barrow Neurological Institute for schwannomas of the craniocervical junction.

**Design:** Clinical case series and review of the current literature.

**Participants/Methods:** 36 patients with lesions originating either from the jugular foramen, hypoglossal canal, or upper cervical nerves C1 or C2 were reviewed. Complications and outcome as well as surgical approach and completeness of resection were reported.

**Results:** Headache and neck pain were the most common presenting symptoms with many patients presenting with lower cranial nerve involvement as well. Gross total resection using the far lateral approach or one of its variants was achieved in nearly three fourths of the patients, with adjuvant radiosurgery in 8 patients. All patients in the group ultimately had tumor control.

**Conclusions:** The far lateral approach with its variants is the treatment of choice for management of schwannomas of the craniocervical junction with adjuvant radiosurgery reserved for cases of subtotal resection.

**Reviewer's Comments:** It is clear that surgery is the treatment of choice for tumors of this region. There is little room for monitored growth in this confined anatomic space. We favor the transtemporal modification of the para- and supracondylar variants of the extreme lateral, which allows for ample access and direct views of the lower cranial nerves and vascular structures. Our standard technique includes at minimum, a limited pre-sigmoid dissection for anterior mobilization of the sigmoid sinus at craniotomy and transtemporal resection of the jugular process through an extended retro-facial drillout. This is a fast and safe route, maximizing bone removal and minimizing risk to the facial nerve. For very larger tumors, we have also used the pre-sigmoid translabyrinthine and transcochlear extensions if necessary. We agree that gross total removal should be the primary goal with adjuvant radiation reserved for cases where total removal would place the neurovascular structures at undue risk. (Reviewer-Andrew J. Fishman, MD).

© 2010, Oakstone Medical Publishing

Keywords: Skull Base Surgery; Schwannoma; Jugular Foramen

Print Tag: Refer to original journal article
**Medical Imaging -- Time for a Second Look With a Geiger Counter?**

*Cumulative Radiation Dose in Patients Admitted With Subarachnoid Hemorrhage: A Prospective Study Using a Self-Developing Film Badge.*

Mamourian AC, Young H, Stiefel MF:

AJNR Am J Neuroradiol 2010; July 1 (): epub ahead of print

At this time, the FDA does not supervise or standardize the dose associated with most x-ray exams, including CT scans.

**Background:** Patients admitted with a diagnosis of subarachnoid hemorrhage (SAH) are likely to be exposed to a high dose of radiation from medical imaging. Currently, there is no monitoring of the amount of radiation patients are receiving in the hospital.

**Objective:** To determine the cumulative dose of radiation to the cranium in patients during their stay in the intensive care unit with a diagnosis of SAH.

**Design:** Prospective open-label single-center study.

**Participants/Methods:** 17 patients were enrolled. Of these, 12 patients completed the study (11 women and 1 man). The aneurysm was confirmed in 10 patients. Of these, 8 patients had one or more endovascular procedures to obliterate the aneurysm or to treat vasospasm. The dose of radiation was measured by placing a self-developing film on the side of the cranium.

**Results:** The average dose of radiation to the patients who did not have endovascular treatment was 0.4 Gy, while the average dose for those who underwent interventional therapy was 0.9 Gy. The patient who had the highest dose (1.8 Gy) had 10 CT scans. The only patient who died had the shortest stay in the ICU, and only one CT scan had a cumulative dose of 0.22 Gy. The authors acknowledge that the dose measured is likely to be underestimated because the dose of radiation from the CTs performed in the referring hospitals is unknown. Also, some badges were lost, and the amount radiation given after the patients left the ICU was not measured.

**Conclusions:** An average dose of 0.9 Gy is given to patients admitted for possible SAH.

**Reviewer's Comments:** While the present study is limited because of the small number of patients, less than adequate design, and poor presentation of the data, it does increase our awareness of the problem of possible excess radiation. Medical imaging is now the source of 50% of the radiation to which Americans are exposed yearly. Among the highest sources of radiation is CT scan (Brenner, *JAMA* 2010). The number of CT scans increases by 10% per year, with the biggest increase in pediatric diagnosis and adult screening cases (Brenner, *N Engl J Med* 2007). Approximately 70 million CT scans will be performed this year. Epidemiologic studies show that the risk of cancer increases with the number of normal CT scans. Recent incidents of hundreds of patients unintentionally exposed to high-dose radiation have increased public awareness. There is a need for dose consistency and a reduction of the total dose in both the population in general and over the lifetime of individuals (Smith-Bindman, *Arch Intern Med* 2009). The FDA has released a draft of future guidelines to reduce exposure to radiation from medical imaging. (Reviewer-Luc Jasmin, MD).

© 2010, Oakstone Medical Publishing

Keywords: Subarachnoid Hemorrhage, CT Angiography, Fluoroscopy, Interventional Radiology

Print Tag: Refer to original journal article
Decompressive hemicraniectomy is the treatment of choice for malignant middle cerebral artery infarctions, unless a person would place a very low value on survival with significant disability.

**Background/Objective:** Mortality rates for maximal medical management of malignant, middle cerebral artery (MCA) infarcts are reported to be as high as 80%. Hemicraniectomy is often a life-saving procedure, but survivors are left with significant disability. Stroke patients usually cannot participate in the decision-making process; therefore, decision makers need to be advised on what functional outcomes to expect. The value assigned to different health states with significant disability varies widely and may influence decisions.

**Methods:** Survival data and the probability of various functional outcomes at 1 year were abstracted from previously published trials (the DECIMAL, HAMLET, and DESTINY studies). A medical decision model was created that evaluated different outcomes based on quality-adjusted life-years (QALYs). QALYs were calculated by assigning a utility value to a specific health state and multiplying this by the amount of time spent in that state (1 being perfect health and 0 being death). In the primary analysis, utility values were assigned based on values obtained from stroke patients, thus aiming to accurately reflect the survivor experience. Utility values were also assigned to operative morbidity, bone flap replacement, death, etc. Utility scores for modified Rankin states were abstracted from the literature. A Rankin score of 2 to 3 represented moderate disability, and a score of 4 to 5 represented severe disability. Sensitivity analyses were performed to study results over a wide range of utility values.

**Results:** Hemicraniectomy was associated with more QALYs over the course of the first year (0.4 for surgery vs 0.14 for medical management). Hemicraniectomy remained the preferred method of treatment, except when the utility values for a Rankin outcome of 2 to 3 decreased from 0.7 to 0.4, and a Rankin score of 4 to 5 changed from 0.4 to 0.04. When surgical mortality was evaluated, the hemicraniectomy pathway was still associated with more QALYs than medical management until the operative mortality in the first week increased from 5% to 67%.

**Conclusions:** Stroke patients tend to rate their quality of life higher than surrogates, demonstrating a large capacity to adapt to new circumstances. This study finds that hemicraniectomy is associated with more QALYs compared to maximal medical management. This is in keeping with pooled analysis from several clinical trials. In this specific analysis, it was only when the decision maker valued the resultant health state after stroke as “very poor” that medical management became the preferred method of treatment. This study also demonstrated that unless surgical mortality in 1 week was >67%, hemicraniectomy was the treatment of choice.

**Reviewer's Comments:** Hemicraniectomy is the treatment of choice for patients with malignant MCA infarctions. Even though this leaves patients alive with significant disability, it should be the preferred treatment option, unless there are compelling reasons not to pursue this course. (Reviewer-Richard D. Murray, MD.)

© 2010, Oakstone Medical Publishing

Keywords: Malignant, Middle Cerebral Artery Infarction, Stroke, Decompressive Hemicraniectomy

Print Tag: Refer to original journal article