

COMMENTARY - NEUROSURGERY

In this issue we have selected three abstracts from recently published literature.

First article is published in journal of Neurosurgery (April, 2012) from International Neuroscience Institute, Hannover, Germany. The authors have taken into account recent rise in use of radiosurgery for patients with vestibular schwannomas and its effects including treatment failure or secondary growth. Patients who received radiosurgery and required surgery secondary to symptomatic increase in size of lesion were compared to patients who did not receive radiosurgery. Authors concluded that though complete excision of the lesion was possible, a higher neurological morbidity as well as surgery site complications was observed in patients who received radiosurgery.

Second article is a peer review report by Federico Alfonso Landriel Ibañez et al, published in World Neurosurgery, 2011. The authors attempted to grade neurosurgical complications on the basis of their need for treatment. After categorizing the complications into four grades they applied this to a cohort of 1190 patients at the Hospital Italiano de Buenos Aires. The results on one hand helped to categorize the neurosurgical morbidity & on the other hand provided a way forward for application of this model to compare surgical results and morbidity between different centers. This can help to standardize the care for neurosurgical patients and also provide basis for future meta-analyses.

Third article is a multicenter analysis by John R. W. Kestle et al, published in Journal of Neurosurg Pediatrics, 2011. In attempt to reduce infection rate in patients undergoing VP shunt a standard protocol was developed and implemented in four centers of Hydrocephalus Clinical Research Network (HCRN). Over a period of one and a half years 1571 patients underwent VP shunt insertion according to standard protocol practices. The results were significant in terms of reduction of rate of infection. This study provides a basis for need of standardization of common surgeries like VP shunt as well as identification of correctable factors associated with infection.

Dr. Muhammad Mehboob Alam
Neurosurgery Resident
Aga Khan University

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Venelin M. Gerganov; Mario Giordano; Amir Samii; Madjid Samii
International Neuroscience Institute, Hannover, Germany.

SURGICAL TREATMENT OF PATIENTS WITH VESTIBULAR SCHWANNOMAS AFTER FAILED PREVIOUS RADIOSURGERY

Objective: An increasing number of patients with vestibular schwannomas (VSs) are being treated with radiosurgery. Treatment failure or secondary regrowth after radiosurgery, however, has been observed in 2%–9% of patients. In large tumors that compress the brainstem and in patients who experience rapid neurological deterioration, surgical removal is the only reasonable management option. **Methods:** The authors evaluated the relevance of previous radiosurgery for the outcome of surgery in a series of 28 patients with VS. The cohort was further subdivided into Group A (radiosurgery prior to surgery) and Group B (partial tumor removal followed by radiosurgery prior to current surgery). The functional and general outcomes in these 2 groups were compared with those in a control group (no previous treatment, matched characteristics). **Results:** There were 15 patients in Group A, 13 in Group B, and 30 in the control group. The indications for surgery were sustained tumor enlargement and progression of neurological symptoms in 12 patients, sustained tumor enlargement in 15 patients, and worsening of neurological symptoms without evidence of tumor growth in 1 patient. Total tumor removal was achieved in all patients in

Groups A and B and in 96.7% of those in the control group. There were no deaths in any group. Although no significant differences in the neurological morbidity or complication rates after surgery were noted, the risk of new cranial nerve deficits and CSF leakage was highest in patients in Group B. Patients who underwent previous radiosurgical treatment (Groups A and B) tended to be at higher risk of developing postoperative hematomas in the tumor bed or cerebellum. The rate of facial nerve anatomical preservation was highest in those patients who were not treated previously (93.3%) and decreased to 86.7% in the patients in Group A and to 61.5% in those in Group B. Facial nerve function at follow-up was found to correlate to the previous treatment; excellent or good function was seen in 87% of the patients from the control group, 78% of those in Group A, and 68% of those in Group B. **Conclusions:** Complete microsurgical removal of VSs after failed radiosurgery is possible with an acceptable morbidity rate. The functional outcome, however, tends to be worse than in non-treated patients. Surgery after previous partial tumor removal and radiosurgery is most challenging and related to worse outcome.

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Federico Alfonso Landriel Iba ez, Santiago Hem, Pablo Ajler, Eduardo Vecchi, Carlos Ciraolo, Matteo Baccanelli, Ruben Tramontano, Fernando Knezevich, Antonio Carrizo

Department of Neurosurgery of the Hospital Italiano de Buenos Aires, Argentina. E-mail: fedelandriel@gmail.com

A NEW CLASSIFICATION OF COMPLICATIONS IN NEUROSURGERY

Objective: To define and grade neurosurgical and spinal postoperative complications based on their need for treatment. **Methods:** Complications were defined as any deviation from the normal postoperative course occurring within 30 days of surgery.

A four-grade scale was proposed based on the therapy used to treat the complications: grade I, any non-life-threatening complications treated without invasive procedures; grade II, complications requiring invasive management such as surgical, endoscopic,

and endovascular procedures; grade III, life-threatening adverse events requiring treatment in an intensive care unit (ICU); and grade IV, deaths as a result of complications. Each grade was classified as a surgical or medical complication. An observational test of this system was conducted between January 2008 and December 2009 in a cohort of 1190 patients at the Hospital Italiano de Buenos Aires. **Results:** Of 167 complications, 129 (10.84%) were classified as surgical, and 38 (3.19%) were classified as medical complications. Grade I (mild) complications accounted for 31.73%, grade II (moderate)

complications accounted for 25.74%, and grade III (severe) complications accounted for 34.13%. The overall mortality rate was 1.17%; 0.84% of deaths were directly related to surgical procedures.

Conclusions: The authors present a simple, practical, and easy to reproduce way to report negative outcomes based on the therapy administered to treat a complication. The main advantages of this classification are the ability to compare surgical results among different centers and times, the ability to compare medical and surgical complications, and the ability to perform future metaanalyses.

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John R. W. Kestle¹; Jay Riva-Cambrin¹; John C. Wellons III²; Abhaya V. Kulkarni³; William E. Whitehead⁴; Marion L. Walker¹; W. Jerr y Oakes²; James M. Drake³; Thomas G. Luerssen⁴; Tamara D. Simon⁵; and Richard Holubkov⁶

¹Primary Childrens Medical Center, University of Utah, Salt Lake City, Utah;

²Birmingham Childrens Hospital, University of Alabama, Birmingham, Alabama;

³Hospital for Sick Children, University of Toronto, Ontario, Canada;

⁴Texas Childrens Hospital, Baylor College of Medicine, Houston, Texas;

⁵Seattle Childrens Research Institute, University of Washington, Seattle, Washington;

⁶Hydrocephalus Clinical Research Network Data Coordinating Center, Department of Pediatrics, University of Utah, Salt Lake City, Utah

A STANDARDIZED PROTOCOL TO REDUCE CEREBROSPINAL FLUID SHUNT INFECTION: THE HYDROCEPHALUS CLINICAL RESEARCH NETWORK QUALITY IMPROVEMENT INITIATIVE

Objective: Quality improvement techniques are being implemented in many areas of medicine. In an effort to reduce the ventriculoperitoneal shunt infection rate, a standardized protocol was developed and implemented at 4 centers of the Hydrocephalus Clinical Research Network (HCRN). **Methods:** The protocol was developed sequentially by HCRN members using the current literature and prior institutional experience until consensus was obtained. The protocol was prospectively applied at each HCRN center to all children undergoing a shunt insertion or revision procedure. Infections were defined on the basis of CSF, wound, or pseudocyst cultures; wound breakdown; abdominal pseudocyst; or positive blood cultures in the presence of a ventriculoatrial shunt. Procedures and infections were measured before and after protocol implementation. **Results:** Twenty-one surgeons at 4 centers performed 1571 procedures between June 1, 2007, and February 28, 2009. The minimum follow-up was 6 months. The Network infection rate decreased from 8.8% prior to the protocol to 5.7% while using the protocol ($p = 0.0028$,

absolute risk reduction 3.15%, relative risk reduction 36%). Three of 4 centers lowered their infection rate. Shunt surgery after external ventricular drainage (with or without prior infection) had the highest infection rate. Overall protocol compliance was 74.5% and improved over the course of the observation period. Based on logistic regression analysis, the use of BioGlide catheters (odds ratio [OR] 1.91, 95% CI 1.19–3.05; $p = 0.007$) and the use of antiseptic cream by any members of the surgical team (instead of a formal surgical scrub by all members of the surgical team; OR 4.53, 95% CI 1.43–14.41; $p = 0.01$) were associated with an increased risk of infection. **Conclusions:** The standardized protocol for shunt surgery significantly reduced shunt infection across the HCRN. Overall protocol compliance was good. The protocol has established a common baseline within the Network, which will facilitate assessment of new treatments. Identification of factors associated with infection will allow further protocol refinement in the future.