Introduction – Supplement on brain metastases

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As therapeutic interventions for systemic solid neoplasms continue to improve, so do median survival times and the incidence of “safe harbor” metastases. Improvements in oncologic armamentaria for the cancers that have a predilection to metastasize to the central nervous system – breast, lung, melanoma, and renal cancers – have subsequently increased the likelihood of developing brain metastases. As neurosurgeons, we are involved in delivering two of the three most common therapies for brain metastases, surgery and stereotactic radiosurgery.

With the discovery of metastatic disease in the brain, a patient, by definition, has stage IV cancer. However, unlike glioblastoma, there is a significant tail to the survival curve for stage IV cancer. Although glioblastoma carries a better median survival than brain metastases (12-13 months versus 8-10 months, respectively), glioblastoma carries a much lower 5-year survival rate (less than 5% versus almost 20%). While this is important to consider when choosing among treatment options, it also leads to a difficult clinical conundrum: Should we choose treatments based on the majority of patients, or do we treat patients as though they will be long-term survivors? While this may seem prima facie obvious, every treatment carries risks as well as benefits. Complicating this issue is the fact that current standard therapies have relatively equivalent impacts (as measured by local recurrence at one year and by median survival). Furthermore, as long as brain metastases are treated, the vast majority of patients will succumb to progression of systemic disease, not to their brain metastases. Brain metastases are a harbinger of systemic disease progression.

Choosing brain metastasis therapy can be straightforward. A large, solitary, posterior fossa metastasis, with secondary hydrocephalus, in a young healthy patient with controlled systemic disease and a good performance status should undergo surgical resection. A patient with miliary brain metastases, too numerous to count, is best served by whole brain radiotherapy. A patient with three asymptomatic, inoperable metastases might best be treated with stereotactic radiosurgery. Unfortunately, these clear-cut cases are the exception. Proponents of each of these treatments must temper their enthusiasm and accept the need for a multi-faceted therapeutic approach, taking into account each patient’s unique way of balancing length of survival and quality of life.

The overarching goal of this Surgical Neurology International Supplement is to provide the neurosurgical community with an eclectic perspective. While we must rely on our medical oncology and radiation oncology colleagues to provide systemic treatments, in order to optimize patient care for brain metastases, neurosurgeons must participate in multidisciplinary teams that make decisions driven by consensus. Multidisciplinary teams offer an improved knowledge base and a greater likelihood of evidence-based decision-making. Hopefully, this collection of reviews will provide the reader with an improved understanding of the current state of knowledge of brain metastases development, epidemiology, pathology, treatment options, controversies, and future directions.

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DEDICATION

Robert Goodkin, M.D. (May 22, 1939–October 15, 2012)

This Surgical Neurology International Supplement on Brain Metastases is dedicated to Dr. Robert Goodkin, friend, colleague, mentor, and mensch. Throughout his distinguished career in neurosurgery, Dr. Goodkin, aka “Dr. G” and “The General,” demonstrated great communication skills. Whether teaching residents, lecturing at national and international meetings, or speaking with patients and their families, Dr. G set the standard as an “ethical barometer.” He constantly questioned the status quo and held fast to the pillars of honesty, morality, and disclosure. At times, this relegated him to an unpopular position, but he persisted with a “Promethean will.” At other times, he was recognized as an important leader and spokesman for a cause. Dr. G understood that it is hard to find out and harder to hand out the simplest of truths.

Dr. G left footprints on the sands of time. He will be remembered by satisfied patients, who were always well informed about the risks, goals, and options. He will also be fondly remembered by residents whom he taught the pearls of a long neurosurgical career, and (perhaps more importantly) a standard of ethical medicine rarely seen. To honor the significance of these attributes, as much as his many academic and clinical accomplishments, the Robert Goodkin Endowed Lectureship in Neurological Surgery was established at the University of Washington in 2011. During the last few years of his neurosurgical career, Dr G did pioneering work in skull base surgery, spinal cord injury research, expanded the Seattle VA service, and was instrumental in establishing both the deep brain stimulator and Gamma Knife programs at the University of Washington. Despite these contributions, he did not seek out the limelight. Among his greatest accomplishments was his work behind the scenes, providing young neurosurgeons with guidance in their professional and personal lives. Dr. G’s unshakeable loyalty and true concern for the well-being of others was an extension of the support and love he shared with his family. He was intensely proud of his sons Howard and Jarett and their growing families and cherished his wife and partner of over 50 years, Sandy. Undoubtedly, he considered these relationships his greatest accomplishments.

Patients with malignant disease are a challenge. It is not always easy to relay the overwhelming message of cancer and its repercussions. Those of us fortunate enough to have crossed paths with Dr. G have an exemplary role model in this regard, a role model we can strive to emulate when communication becomes difficult. In our hearts and minds we hold close those who have touched us with truths, those such as Dr. Robert Goodkin.