BRAIN AND SPINE TUMOR PROGRAM

The Most Advanced and Comprehensive Cancer Treatment in the Region

Boulder Neurosurgical Associates
Justin Parker Neurological Institute

Exempla Good Samaritan Medical Center
300 Exempla Circle, Suite 270
Lafayette, Colorado 80026

Minimally Invasive Spine Institute
300 Exempla Circle, Suite 130
Lafayette, Colorado 80026

Platte Valley Medical Center
1606 Prairie Center Parkway, Suite 250
Brighton, CO 80601

Rocky Mountain CyberKnife
905 Alpine Avenue
Boulder, Colorado 80304
Boulder Neurosurgical Associates (BNA) brings a full range of the newest technologies, clinical trials and remarkable surgical skills to Colorado. By putting together a multidisciplinary team of expert physicians, BNA has created the most advanced system of care in the region from initial diagnosis through the most aggressive treatment to rehabilitation. Comprehensive treatment plans are individually selected striving to achieve the best outcome for every patient. We use proven cancer treatment strategies along with latest innovations to achieve optimal results and at the same time assure that risks will be minimized.

Our neurosurgeons have advanced training and experience in treating all types of brain and spinal tumors and are on the leading edge of minimally invasive endoscopic surgical technologies. BNA neurosurgeons use the most sophisticated tools available, potentially resulting in both improved survival and a better quality of life. Sometimes even patients with previously designated untreatable lesions can be helped tremendously. Some of these latest technological enhancements include CyberKnife radiosurgery, a fluorescence-guided surgical microscope, awake craniotomy, intraoperative MRI and other real-time intraoperative navigation systems for tumor resections and the latest minimally invasive surgical treatment options.

The Brain and Spine Tumor Program at Boulder Neurosurgical Associates utilizes a multidisciplinary team approach to neurosurgery from pre-operative consultations through surgical intervention and post-operative care. Individualized, patient-focused care is a priority. BNA surgeons and other health care providers take an aggressive approach to fighting the disease and use the most complex and innovative treatment methods available. This includes surgery, radiosurgery, conventional radiotherapy, chemotherapy and the most advanced tumor immunotherapeutic techniques.

Boulder Neurosurgical Associates and The Justin Parker Neurological Institute (JPNI) are involved in ongoing neurological research on several fronts. Collaboration with the leading centers in the nation, including Stanford and Duke University Hospitals, enables patient access to the most advanced clinical trials available.

BNA physicians have recently spearheaded clinical trials that established radiosurgical treatment parameters and treatment strategies for spine tumors and Glioblastoma Multiforme. Similarly, we have previously set the standard for the radiosurgical treatment of skull base meningiomas and evaluated the long-term outcomes for thoracolumbar vertebral reconstruction after surgery for metastatic spinal tumors. BNA surgeons have given dozens of presentations at national and international meetings on the treatment of brain and spinal tumors.

Currently, BNA surgeons are testing vaccine therapy for patients diagnosed with primary and recurrent Glioblastoma Multiforme (GBM) in conjunction with clinical trials at Duke University School of Medicine. Patient immune cells are being activated and multiplied in order to help the body fight off tumor cells in the brain and prevent them from growing.

BNA’s partnerships with leading medical device manufacturers permit us to explore the latest treatment technologies and use the most advanced surgical techniques. We are currently working with Zeiss, one of the world’s best surgical microscopes manufacturers, on real-time neuronavigation that allows neurosurgeons to use fluorescence-guided surgery for brain tumor resection. The OPMI™ Pentero™ microscope assists in the maximal removal of the tumor while safely avoiding normal brain tissues. We plan to enroll patients to test the safety and accuracy of this revolutionary technology in the spring of 2010.

BNA is currently the only practice in the region to offer the full functionality of this revolutionary technology. As a national training center for intraoperative image guidance systems, BNA has first-hand experiences with the most advanced and up-to-date technologies.

References:
CyberKnife is a revolutionary non-invasive treatment option for benign and malignant lesions of the brain and spine. Developed with patient safety and comfort as a primary consideration, CyberKnife delivers extremely high doses of focused radiation to a specific area in the body with incredible accuracy. This technological breakthrough allows another option for patients with tumors previously considered as too dangerous or inoperable. By limiting radiation to the normal surrounding tissues, BNA surgeons can even treat recurrent tumors that have already failed treatment with other types of radiation or surgery.

CyberKnife radiosurgery cannot always replace surgery, chemotherapy or other traditional cancer treatment methods. Instead, it can be an important alternative or adjunct to surgery for patients that have exhausted or are not candidates for other treatment methods. The ability to deliver high dose radiation in a single setting or over several days as opposed to several weeks can be particularly useful in the treatment of large tumors or lesions located near the brainstem, spinal cord, nerves and other sensitive structures.

The extraordinary accuracy and capability to deliver a precisely focused radiation dose around sensitive structures makes CyberKnife indispensable in the treatment of spinal metastases. BNA surgeons often combine CyberKnife with other minimally invasive techniques such as the percutaneous kyphoplasty procedure for spinal tumors which provides stability for the spinal column without the need for extensive reconstructive surgery.

The PoleStar N-20 intraoperative MRI system is the only real-time visualization system of its kind in the four state region of Colorado, Wyoming, Montana and New Mexico. This system allows BNA neurosurgeons to precisely localize tumors during surgery and obtain real-time MRIs while performing surgical resections. Most surgeons' technical skills are limited by an obligatory conservative approach with the goal of avoiding the risk of stroke, paralysis or speech loss. Surgeons often leave a part of the tumor unresected in an attempt to avoid these complications because they cannot see the tumor margin in surgery and thus have to rely on postoperative images for radiographic evaluation. Real-time MRI technology allows BNA surgeons to confirm intraoperatively that the entire tumor has been removed while still in surgery. This can give new hope to patients by potentially reducing the number of additional surgeries required and can result in improved survival through a more complete surgical resection of their tumor.

For patients with tumors in highly functional parts of the brain, BNA surgeons perform a specialized type of surgery with the patient awake and talking during the surgical resection of their tumor. Depending on the region of the brain and the lesion, different electrical or cognitive tests are performed to allow the surgeon to carefully ‘map’ the selected region of the brain. This allows the surgeon to identify the safest possible route and region of resection. to certain craniotomies if necessary. Because we utilize state-of-the-art, short acting anesthetic agents for the initial opening of the skull and the brain has no pain receptors, this can be a relatively painless and comfortable procedure that adds safety.
### Our Neurosurgeons - Experts Providing Unparalleled Care

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<tr>
<th>Alan T. Villavicencio, M.D.</th>
<th>E. Lee Nelson, M.D.</th>
<th>Alexander Mason, M.D.</th>
<th>Sharad Rajpal, M.D.</th>
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<td>Dr. Villavicencio graduated from Harvard Medical School. He then completed a neurosurgical residency at Duke University and a specialty fellowship at Cedars-Sinai Medical Center. “Dr. V” has extensive training in skull base surgery, neurosurgical oncology, peripheral nerve, cerebrovascular, functional, epilepsy surgery and both minimally invasive and major reconstructive spinal surgery. “Dr. V” treats all types of brain and spinal disorders, including benign and malignant tumors, performing upwards of 500 operative cases each year.</td>
<td>Dr. Nelson received his Medical Degree from Baylor College of Medicine in Houston, TX where he also completed his internship and neurological surgery residency program. Dr. Nelson expanded his skill and experience in complex spinal instrumentation at the M.D. Anderson Cancer Center, in Houston. Dr. Nelson’s areas of clinical interest continue to include neurosurgical oncology, including tumors of the pituitary gland, and complex spinal surgery with an emphasis on minimally invasive techniques.</td>
<td>Dr. Mason received his Medical Degree from Ohio State University College of Medicine and Public Health. He went on to complete his neurosurgical residency at the prestigious Cleveland Clinic in Cleveland, Ohio with interests in neuro-oncology, complex and minimally invasive spine, vascular surgery and cerebrovascular disease, and surgical epilepsy. After completing his residency, he underwent a formal fellowship in cerebrovascular and skull base surgery at Emory University in Atlanta.</td>
<td>Dr. Rajpal received his Medical Degree from the University of Wisconsin, where he continued his training and residency in neurological surgery. He completed a combined Orthopedic and Neurosurgical Surgery Spine Fellowship at the Cleveland Clinic where he gained experience in the latest techniques in spinal oncology, minimal access surgery and complex spinal deformity. Dr. Rajpal’s clinical interests include both spine and general neurosurgical conditions.</td>
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### Mission

The mission of the tumor program is to advance scientific discoveries and innovative medical technologies into clinical practice and new therapeutic treatment options.

BNA neurosurgeons have advanced training and experience in the treatment of all types of tumors and are on the leading edge of minimally invasive surgical technologies.

As experts in the field, BNA offers some of the region’s best results in the treatment of brain and spine tumors. We are dedicated to improving clinical outcomes and patient safety by promoting and implementing evidence-based medicine into clinical practice. We welcome patient referrals and requests for second opinion.