# NEURO-ONCOLOGY TODAY

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### Virtua Advances a Super Sub-Specialization: Spinal Cancer

Expertise in all forms of, and options for, cancer of the spine is a rare and valuable super sub-specialization of neurosurgery and oncology. The focus is critical given the delicacy of spinal interventions and expanding differential approaches to treatment plans than can make the difference in cancer control, retention of function, or curative care.

"Most spine cancers are metastatic, but we also treat a variety of primary spine tumors," said Kyle Mueller, MD, a fellowship-trained and board-certified neurosurgeon with the Penn Medicine Virtua Health Neurosciences Program. "Our close work with medical and radiation oncologists helps to define our distinct capability in this realm."

#### **Coordinated, Highly Tailored Radiotherapy**

Spine tumors in or around the vertebrae, spinal cord, nerve roots, and surrounding soft tissue tend to grow slowly. Most are benign, but any spinal neoplasm may cause pain, cord compression, or fracture. Their characterization requires biopsy and imaging studies that may include PET. Secondary cancers spread from lung, prostate, colon, blood system, or other cancer sites. Primary malignant spine tumors (chondrosarcoma, chordoma, Ewing sarcoma) are rare and don't usually spread to the brain.

Radiation therapy for cancers of the spine requires precision due to the proximity of tumors to the spinal cord. Consecutive treatments must be perfectly replicated in their field of effect. For intense beam delivery at a high degree of exactitude and with fewer sessions needed for completion, Virtua has invested significantly in stereotactic body radiotherapy (SBRT). To reduce artifacts in imaging needed for subsequent radiation therapy, the surgeons use carbonfiber materials for implants. And primarily for spine tumors, the team may sometimes use proton therapy (available at the Penn Medicine | Virtua Health Proton Therapy Center in Voorhees), which avoids collateral radiation to the chest and abdomen. Whole-brain-and-spine radiation also has a role for craniospinal tumors. "For spine tumors, we deliver highly individualized treatments according to type of tumor, size, and location," said Penn Medicine | Virtua Health Cancer Program radiation oncologist Graeme Williams, MD.

#### Experienced, Multidisciplinary Spinal Oncology

Virtua's neuro-oncology tumor board includes neurologists, neuro-radiologists, pathologists, a nurse navigator, research nurse (organizing access to clinical trials), and other specialized personnel and therapists. Caring for thousands of patients annually and conducting some 750 surgical procedures in the past year—all led by the team's senior surgeons—neuro-oncology at Virtua has produced exceptional outcomes.

The neurosurgical team performs surgery at Virtua Our Lady of Lourdes Hospital, a medical center with robust quality control and advanced focus on high-acuity patients. Neuro-hospitalists manage patients requiring around-theclock inpatient care on the hospital's dedicated spine unit. The nurse navigator guides the patient experience in a treatment plan that receives ongoing review by the team. Early, aggressive inpatient rehabilitation at the Virtua Acute Rehabilitation Center helps to decrease hospital length of stay and facilitates outpatient therapy and return to function.



The combined Penn Medicine and Virtua teams perform complex surgeries (conducted in the hybrid operating room with MR imaging guidance), precision radiation therapy, and other oncologic care to treat metastatic spinal cancer and primary spinal tumors.

For emergency neurosurgical referral, call the Virtua Transfer Center at 856-757-3284. For neurosurgical consultation, call 888-644-4484.





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## Spine-Tumor Surgical Wound Reconstruction to Ensure Closure and Healing

Immediately after a lengthy operation to remove a spinal tumor, patients with complex wounds at risk for complications at the site benefit when a fresh, designated team of plastic reconstructive surgeons closes the incision. Infections, dehiscence, seroma, or other wound issues are not uncommon after significant spine surgery, especially for spine tumors. And, the chance of such wound problems among those with risk factors is much higher. Key to avoiding these developments is experienced, specialized, prophylactic wound closure at the time of surgery.

Unless a minimally invasive approach is possible, the incision length for tumor removal may be significant, typically 4 to 8 inches along the length of the spine. In addition, many patients may need subsequent radiation or chemotherapy, increasing the risk of wound complications. Or, they have had previous radiation to the site, causing radiation-induced tissue damage and decreased blood flow.

"While our spine surgeons perform simple closures for a variety of spine patients, the oncology population is at higher risk for wound complications, partly because tumor removal typically leaves space at the site. We deem almost half of spinal oncology patients at considerable danger for surgical site problems without complex closures," said plastic surgeon, Prakash Mathew, MD, who is a fellowship-trained expert in soft-tissue reconstruction with the Penn Medicine | Virtua Health Cancer Program. "Bacterial invasion of the site can be an extraordinarily costly setback. Likewise, patients who are smokers, have a high BMI, or are poorly nourished or diabetic are at added risk for wound complications and benefit from our help with closure, to complete surgery." The neuroplastics program uses local tissue transfer from superficial muscles, preferably the paraspinal muscles, which retains blood flow to the flap and avoids the need for microvascular surgery, while maintaining perfusion to the overlying skin for good, stable midline coverage. Skin flaps may complete the repair in some cases.

Negative-pressure vacuum therapy proves highly beneficial to healing these sites. Patients leave with one to three drains and take advantage of the wound vacuum for a few days. The small, portable, take-home wound covering and vacuum unit removes wound exudate and other infectious material on a set cycle to expedite wound healing. It is wearable and disposable.

Preventive or salvage reconstructive plastic surgery procedures such as these lead to faster wound healing, which in turn accelerates next steps in the treatment plan for spinal tumors. While the cosmetic appearance of the resultant scars is not of foremost concern for patients, the team can often achieve an aesthetic result with an almost imperceptible scar along the incision line.



Expert closure is used for a variety of spine patients at Virtua to ensure against subsequent separation of wound edges or other complications. It is particularly beneficial for spine cancer patients. This wound reconstruction shows a paraspinous muscle-advancement flap with total coverage over the spinal cord and spine, with a drainage tube.