Radiation-Induced Sarcoma

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A 35-year old woman came to our office in December 2010 with complaints of pain in the right leg and low back. She had been diagnosed with Hodgkin’s lymphoma in 2005 and treated with both radiation therapy and chemotherapy. After treatment, she had been free of the cancer for the 5 years prior to seeing me. She suffered from severe back and leg pain for 6 to 12 months prior to coming to the office; the pain began acutely and gradually increased to a disabling level. She recalled having injured her back while riding on a motorcycle in January 2004. She re-injured her back “pushing and pulling” at work in July 2007. She stopped working at the end of November 2010 due to the severity of her pain. There was no memorable injury this time.

An MRI of the lumbar spine and a nuclear medicine bone scan were performed in December 2010. The sagittal (side-view) MRI showed an obvious burst fracture of the L3 vertebral body (Figure 1). The axial (cross-section) MRI showed bone and tumor compressing the spinal canal and the sciatic nerve endings (Figure 2). Given her young age and history of minimal trauma, the obvious concern was that cancer or infection had weakened the L3 bone causing it to fracture. A needle biopsy was performed of the L3 vertebral body to confirm the cause of her fracture. The results of the biopsy indicated a high grade sarcoma (cancer), called a spindle cell tumor invading the L3 bone of her lumbar spine.

The patient’s leg and back pain escalated to the point where she was essentially bedridden by February 2011. Surgery was scheduled to stabilize her spine and free the sciatic nerve branches which were compressed by the fractured bone. When the bone fracture is due to tumor infiltration, it is known as a pathologic fracture. The surgery could stabilize her spine and improve her pain, but could not cure her cancer alone. It was not possible to remove the entire tumor. She would require additional chemotherapy and radiation after her spinal surgery.

Surgical Procedure

The patient was placed in the side-lying position with the left side of the torso between the ribcage and the hip exposed. The area was prepped and draped in the usual sterile fashion. A curved incision was made along this area, paralleling the ribcage. The transversus abdominis musculature was divided, the rectus muscle was identified, and the retroperitoneal space entered. Dissection in this area identified the lateral aspect of the spine as well as the disc spaces and vertebral bodies. The appropriate L3 vertebral body was
identified using fluoroscopic guidance and marked with the placement of a marking pin into the disc space adjacent to the diseased vertebral body (Figure 3). The discs above and below the L3 vertebra were aggressively removed, then the tumor was removed in small pieces. There was significant bleeding noted. After excision of the spinal segment, the thecal sac (which is the spinal fluid sac containing the sciatic nerve branches) and the exiting nerve roots at the L3 level were visible (Figure 4).

The appropriate implant to reconstruct the spine was designed using a cylindrical titanium cage filled with cancellous cadaver (donor) bone (Figure 5). The space between the adjacent vertebral bodies was distracted and the titanium cage was impacted into the spine to take the place of the fractured vertebral body. Screws and rods were used to stabilize the spine (Figure 6). The patient was taken to recovery in stable condition.

**Postoperative Course**

An x-ray was obtained to check the placement of the titanium cage and the screws (Figure 7). Imaging studies demonstrated realignment of the spine. There was excellent vertebral body reconstruction with the titanium cage, stabilized with a paired rod and screw system. The patient had excellent relief of her pain involving both the back and leg and began ambulating almost immediately with a brace. She ultimately did require additional chemotherapy for treatment of the spindle cell sarcoma.