Surgeons Rebuild Pelvis Of Cancer Patient

In a rare and medically remarkable operation, a multi-disciplinary team of surgeons at the Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (OSUCCC – James) removed the left leg, hip and pelvis of a cancer patient, and used the healthy, living bones from his amputated leg to completely rebuild the connection between his spine and remaining right pelvis to support a high-tech prosthetic leg.

“This procedure itself is actually the first time it’s ever been performed in the United States,” says Dr. Joel Mayerson, an orthopedic oncologist who collaborated with a surgical team that included Dr. Ehud Mendel, a spine neurosurgeon, and Dr. Michael Miller, a plastic surgeon, on the complex case.

The pelvic reconstruction surgery was so unusual that the surgical team submitted it as a case study to the Journal of Neurosurgery: Spine, which recently published it online.

In addition, the case was voted the “Reconstructive Surgery Case of the Year” by those attending the American Society of Reconstructive Microsurgeons annual meeting last year.

The surgery is called an “En Bloc” procedure, which translated from French means “as a whole, or in mass,” meaning that the surgeon must remove the entire tumor intact.

Surgeries for bone tumors of the pelvis usually feature artificial parts or cadaver bones to reconstruct the pelvis. Often patients are confined to wheelchairs after surgery because their pelvises do not heal strongly enough to support their body weight using a prosthetic leg.

The surgical team removed the tumor and worked together to design a method to rebuild the patient’s pelvis using titanium supports along with parts of the patient’s leg – including bones, muscles, skin and blood vessels.

“Removing the tumor required removing the leg, yet many of the tissues in the leg were healthy,” says Miller, interim chair of Ohio State University Medical Center’s Department of Plastic Surgery, who specializes in reconstructive surgical oncology. “We wondered if it was possible to use the healthy parts of the patient’s leg to reconstruct his pelvis.”

The custom device that Mendel fashioned features two large rods and a couple of smaller rods fixed to the pelvis and spine with 14 screws to help provide support while the leg bones fused together.

The Ohio State surgery marked the first time that surgeons used living bone from the patient's amputated limb to reconstruct the pelvis in this fashion.

This allowed the bones to fuse together to create an intact pelvic ring strong enough to allow the patient to walk again on a prosthetic leg, according to Mayerson, director of the division of musculoskeletal oncology in the department of orthopedics.

"Once you disrupt the pelvic ring to the extent done in this case, the stability of your spine connected to your pelvis is not nearly as good. The surgical team came up with a way to reconstruct the patient's pelvic ring to provide solid support, so that he could be as active as possible," adds Mayerson.

The surgical team amputated the patient's leg, but preserved the femur (thigh bone) and fibula (lower leg bone), along with their still-attached blood vessels, skin and muscles that Miller then transferred into the pelvis.

The patient, 53-year-old Mike Prindle of Baltimore, Ohio, was a mail carrier who developed a chondrosarcoma tumor on his pelvis and sacrum (tailbone) that, if left untreated, would have eventually killed him. Since this type of bone cancer does not respond to chemotherapy or radiation, surgery was his only treatment option.

The surgery and recovery proved successful with no major complications. Earlier this year, Prindle was fitted with a high-tech computerized prosthetic leg, and has been undergoing physical therapy rehabilitation sessions twice a week at Ohio State's Medical Center.

The prosthetic leg is equipped with mini-computers at the hip joint, knee joint and foot that gauge his step, pressure and speed and adapt accordingly to support his body. At night, his leg is charged through a USB port that also stores data from the day to track to his progress.

"Every time he takes another step, the prosthetic leg learns more about his gait," says Mayerson. "The computer actually decreases the amount of energy that he has to spend to move the prosthesis and allows him to move easier. He's one of the first people in the United States to have a computerized artificial hip and a computerized artificial knee in a prosthetic working at the same time."

The operations required a team of hundreds of OSUCCC – James staff members, including oncologists, urologists, neurosurgeons, plastic surgeons and general surgeons, along with nurses and surgical technicians.

"We take a multidisciplinary approach, and that makes The James unique," says Mendel, director of spinal neurosurgery. "We are able to bring together surgeons from many different disciplines to decide the best care for each patient."

Others at Ohio State involved in the published study are Drs. Narendra Nathoo, Rick Edgar and Carl Schmidt.

The Ohio State University Comprehensive Cancer Center – Arthur G. James Cancer Hospital and Richard J. Solove Research Institute (cancer.osu.edu) is one of only 40 Comprehensive Cancer Centers in the United States designated by the National Cancer Institute. Ranked by U.S. News & World Report among the top cancer hospitals in the nation, The James is the 205-bed adult patient-care component of the cancer program at The Ohio State University. The OSUCCC – James is one of only seven centers in the country funded by the NCI to conduct both phase I and phase II clinical trials.

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