Sub-Total Femoral Resection, Vascular Dissection and Reconstruction for Parosteal Osteosarcoma

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Background:
Parosteal osteosarcoma is a rare primary malignant bone tumor, characteristically occurring at the bone surface and representing only 1-2% of all osteosarcomas. Classic pathologic features are low-grade spindle cell stroma intermyxed with osteoid while molecular profile reveals MDM overexpression and staining. Elective treatment consists of en-bloc excision with wide margin. Femoral resection with vascular dissection and reconstruction is a complex procedure aimed at avoiding amputation while ensuring tumor local control. This technique allows for limb sparing with good functional outcomes but is associated with a high rate of perioperative complications in the literature. This technique highlights how preoperative planning, implant/graft selection and coordination among surgical specialties for vascular and soft-tissue reconstruction are key to success and critical to optimize outcome.

Purpose:
This video overview and case presentation demonstrates the resection and reconstruction of a femur parosteal osteosarcoma with femoral and vascular reconstruction and local flap coverage.

Methods:
The diagnosis and treatment options for reconstruction and limb salvage of a femur periosteal osteosarcoma is reviewed. A case of a 31-year-old female with a history of periosteal osteosarcoma is presented. After a thorough discussion of risks, benefits and prognosis, the patient elected to proceed with limb sparing surgery of her right lower extremity. The patient underwent right femur subtotal resection and reconstruction using a modular cemented megaprosthesis hinged total knee arthroplasty combined with proximal allograft and plating, right femoral vein resection and reconstruction, and a medial gastrocnemius pedicled flap.

Results:
Patient underwent wound revision at 3 and 4 weeks from surgery, followed by complete wound healing and an uneventful clinical course. Outcome at 1.5 years shows no local recurrence and excellent overall function, with independent unlimited gait and functional knee range of motion.

Conclusion:
Complex limb preserving surgery including tumor excision and femoral reconstruction, vascular restoration and soft tissue coverage, has been associated with overall satisfactory functional recovery and local control in this case. However, complications' rate remains high in the literature. Multidisciplinary surgical management, meticulous preoperative planning and coordination among surgical specialties for skeletal, vascular and soft-tissue reconstruction are critical to minimize risk of complications and optimize oncologic and functional outcome.