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Bone defect reconstruction with an antibiotic-eluding bone substitute in a large uncontained partial distal femoral defect

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Introduction: Most existing options for reconstruction of larger bone defects after tumor resection are unfortunately associated with a substantial risk of infection. Recently, CERAMENTTM|G, a biphasic antibiotic eluding bone substitute has been shown to be highly successful for treatment of chronic osteomyelitis1. The ultra-high local antibiotic concentrations achieved with this product, make it an attractive option for all clinical situations where local co-delivery of a bone substitute and high dose Gentamycin are desired with either prophylactic or therapeutic intention.

Methods: We report a unique case of a 35-year-old man who underwent wide resection of a low-grade surface chondrosarcoma from his right posterior distal femur in October 2013. Joint preserving multi-planar femoral osteotomies and placement of a lateral locked plate (LISS, Synthes), to augment the anterior cortical remnant, were performed with help of intra-operative 3-D CT based computer navigation. The bone defect was then reconstructed using 20ml of demineralised bone matrix (20ml, DBX, Synthes), fashioned into a shallow wall around the entire circumference of the resection area, followed by implantation of 30ml CeramentTM |G and 36 ml of CeramentTM |BVF into the remaining bone defect.

Results: Immediate post-op X-rays showed incomplete filling of the defect, which had developed into a large radio-dense regenerate with a sclerotic rim surrounding a central lucency at 6 weeks post-operatively. Gradual reduction in its overall size could then be observed at each subsequent follow-up X-ray, while the sclerotic rim intensified up to the 3 month mark, before slowly regressing again. CT-scans at 3, 5 and 10 months post-operatively showed increasing remodelling, most prominently in the distal and medial femur. The patient revovered full ambulatory and unrestricted knee function and xrays showed near complete defect remodelling at 14months.

Conclusion: Antibiotic-eluding bone substitutes may represent an valuable addition to the established reconstruction options for bone defects in general. Further research is needed to better understand the optimal indications, implantation technique and radiological remodelling patterns.

Reference:

M McNally, J Ferguson, R Giordamaina, N Jacobs, M Sutherland, D Stubbs, A Woodhouse. A pro-spective clinical outcome study of a new biphasic absorbable composite carrier with Gentamicin in the treatment of chronic osteomyelitis. Abstract F093, 33rd EBJIS Annual Meeting, Utrecht, 2014