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Clinical Experience Using Carbon Fiber Implants in Musculoskeletal Oncology

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Background

Carbon-fiber-reinforced polyetheretherketone (CFR-PEEK) implants offer several potential advantages in the field of musculoskeletal oncology due to their radiolucent properties. However, scarce literature exists describing their use for this indication.

Purposes

Are carbon fiber implants an effective option in musculoskeletal oncology? Do CFR-PEEK implants improve visualization of osseous lesions? Do CFR-PEEK implants allow the use of advanced imaging?

Patients and Methods

All patients treated with a carbon fiber implant by a single musculoskeletal oncologist from January 1st, 2012 to June 1st, 2015 were identified. Radiographic analysis of 74 cases and retrospective review of clinical charts of 66 cases with mean follow-up of 235 days was performed.

Results

For pathologic fractures, overall union rate was 77.8% (14/18). There were two cases of broken CFR-PEEK implants, with two additional non-unions. For stabilization of impending fractures (44 cases), there were no cases of hardware failure and in all cases the implant successfully prevented a pathologic fracture. There were no infections requiring reoperation. In 70 out of 74 cases (94.6%), part of the osseous lesion was visible through the radiolucent implant in at least one view. Interpretation of three CT scans and four MRIs was not adversely affected by artifact from CFR-PEEK implant.

Conclusions

Short-term results indicate that CFR-PEEK implants are effective at stabilizing impending and pathologic fractures in a musculoskeletal oncologic practice, while allowing improved visualization of osseous lesions. The ability to radiographically visualize the tumor region as well as the fracture (or impending fracture or reconstructed site) allows the clinician improved abilities in the treatment and guidance of care for the patient.

Level IV