ABSTRACT

Objective: To evaluate the magnitude of artifacts created by different materials commonly used in orthopaedic implants and their variation with the distance from the implants.

Patients and Methods: Metallic orthopaedic implants made of 3 different types of materials (stainless steel, brass, and titanium) were placed in a body computed tomography phantom, and variation of computed tomography numbers at different distances and angles from the implants were recorded. The variability of the computed tomography numbers was then compared between different materials.

Results: Implants made of stainless steel created a significantly higher magnitude of artifacts, while artifacts created by titanium and brass implants were comparable. The magnitude of artifacts reached a plateau beyond 5 cm from the implant regardless of either the implant material or density of the surrounding medium.

Conclusion: Using orthopaedic implants made of titanium or brass instead of stainless steel can reduce metallic artifacts. However, the beneficial effect becomes insignificant beyond a point 5 cm from the implant.

Key Words: Artifact, Computed tomography, Prosthesis