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Hybrid technique of hybrid gold/gadolinium nanoparticles injection in Chronic Total Occlusion (CTO) as diagnostic marker of viability and intervention

Usama Abdel Rahime Omar National Heart Institute, Egypt

One of the important properity of Gadolinium has a higher atomic number (Z = 64) and a higher k edge (50 keV) than iodine (Z = 53; k edge, 33 keV). These properties allow gadolinium and iodine to absorb X rays in the diagnostic energy spectrum. The higher K edge of gadolinium allows the use of imaging at a higher kilovolt peak level (in the range of 96 kVp) without the loss of contrast, as compared with a lower kilovolt peak level used for imaging with iodinated media (in the range of 73 kVp). So, radiographic images of similar volumes of gadolinium exhibit one-eighth to one-fourth strength iodine preparation, however, gadolinium chelates are limited as an angiographic contrast media because of the relatively low concentration of gadolinium chelate molecules in the preparations available in the United States. Gadolinium, occupying central position in the lanthanide series has 7 unpaired electrons and gives excellent signal in MRI. Adding gold chelates can give rise to nanosystems detectable both by X-Ray CT and MRI. They encapsulate gold nanoparticles with a multilayered organic shell composed of gadolinium chelates bound to each other with disulfi de bonds. This nanoparticle complex could be served both as X-ray and MRI contrasting agent due to presence of radiopaque gold and superparamagnetic gadolinium ions.

Beam hardening results in increased image contrast for a given concentration of gadolinium relative to that of iodine and accounts for some of the differences noted between theoretical models and calculations and *in vivo* observations of image contrast which give us an idea about viable tissue with enhaced gadolinuim this gives agreat evidence based medicin of successful reperfusion and tissue viability by post procedure MRI.

Biography

Usama Abdel Rahime Omar has completed his FEBIC at the age of 35 years from National Heart Institute, FEBC at age of 31 year and MSc from Cairo School of Medicine. He is the Director of Cath Lab at International Medical Center IMC, a largest militery hospital in Egypt. He has published two papers in reputed journals.

usama_omar2003@yahoo.com

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