Incidental Findings Discovered at Computed Tomography Scan for Noninvasive 3D Cardiac Mapping Using the CardioInsight System

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Introduction: Noninvasive 3D cardiac mapping, CardioInsight™ Cardiac Mapping System, (Medtronic, Inc. Minneapolis, MN) provides useful information prior to catheter ablation of cardiac arrhythmias. Analysis requires the patient to wear a multi-electrode mapping vest and then undergo a CT from the neck through the abdomen in order to spatially locate each vest electrode and relate it to the cardiac surface. A larger field of imaging is required as compared to typical CT exams performed for image registered catheter guidance systems, and thus more incidental findings may be discovered during imaging. Objective: To investigate the prevalence and analyze the location and clinical significance of incidental findings detected at CT for noninvasive cardiac 3D mapping system as compared with CT for typical catheter guidance.

Methods: A total of 168 patients (19-89 years, 94% male) underwent noninvasive cardiac 3D mapping integrated with CT imaging prior to AF ablation (130), PVC/VT ablation (17) or CRT implant (21) from February 2017 to June 2019. Exam reports were reviewed for presence and clinical significance of incidental findings. Images were reviewed for location of findings. Incidental findings were categorized by organ system (thyroid, pulmonary, liver, kidney, adrenal, spleen, GI, vascular, bone), clinical significance, and by location outside a typical CT scan range.

Result: Eighty percent (111/168) of patients had incidental findings. A total of 188 incidental findings were present with thirty-seven warranting further investigation or follow up. One hundred and twenty of the incidental findings were located outside of the typical scan range, with ninety-two being clinically significant. The most common organs outside the typical scan range with significant clinical findings (order of frequency) were kidney, thyroid and liver.

Conclusion: A greater number of incidental findings were detected using a CT for 3D mapping as compared to CT for typical catheter guidance. Seventy-three percent (122/188) of the clinically significant findings were located outside of the typical scan range. Larger CT field of imaging for 3D mapping may have important clinical implications beyond catheter ablation.