



H129 Coronary Calcifications in Sudden Cardiac Death (SCD) Cases in Postmortem Computed Tomography (PMCT)

*Katarzyna Michaud, MD**, Centre Universitaire Romand de, Lausanne 1000, SWITZERLAND; *Stefano Draisci, MD*, Dipartimento Interaziendale Ad Attività Integrata, Modena, ITALY; *Diego Proccichiani, MD*, Dipartimento di Diagnostica per Immagini, Modena 41100, ITALY; *Silke Grabherr, PhD*, Centre Universitaire Romand de Médecine Légale, Lausanne 25, Vaud 1000, SWITZERLAND; *Fabrice Dedouit, MD, PhD*, Centre Universitaire Romand De Médecine Légale, Lausanne 1000, SWITZERLAND

Learning Overview: After attending this presentation, attendees will understand modern postmortem imaging of coronary arteries. Attendees will understand how to evaluate the calcifications of coronary arteries of sudden death victims in PMCT and which cases could be a pitfall.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by showing the advantages and possible pitfalls of modern radiological methods used in the evaluation of sudden death cases.

The Coronary Artery Calcium Score (CACS) is an independent predictor of coronary artery disease events in clinical practice and has been found to be a marker of a vascular injury that correlates closely with the atherosclerotic burden. Traditionally, coronary calcification is quantified radiologically by the Agatston score. The radiological grading of coronary artery disease, based on this score, is classified as no evidence of coronary artery disease (0 calcium score), minimal (1-10), mild (11-100), moderate (101-400), and severe (>400). In a living patient, a zero CACS is considered the most powerful negative risk factor for development of a coronary event and the assessment of CACS appears to be the most predictive in the intermediate-risk group. However, it is known that about 4% of patients present non-calcified plaques with a zero CACS.

In postmortem examination, it is possible to measure the CACS after the PMCT examination and before the opening of the body. However, up to the present, the CACS was not evaluated in postmortem practice. Therefore, the goal of this pilot study was to assess the CACS in PMCT in cases of SCD related to Ischemic Heart Disease (IHD).

Consecutive cases of SCD related to IHD for which the postmortem CT and CACS evaluations were available were retrospectively studied. The autopsies were performed in 2017 according to international guidelines. Violent deaths, such as hanging and gunshots, were included in the control group. The radiological examination was performed on a 64-row CT unit using a specific cardiac CT protocol with a non-enhanced sequential acquisition mode. The CACS was calculated by using the software Smartscore 4.0 from Advantage Windows® using a standard Agatston/Janowitz method. Board-certified radiologists trained in postmortem imaging assessed the CACS. All cases were classified into four groups according to the CACS as zero, 1-100, 101-400, and >400.

Twenty-five cases were selected in the study group; 5 women and 20 men; the mean age was 63.2±13.3 years. The CACS was 1-100 for 3 cases, 101-400 for 12 cases, and >400 for 10 cases. All female cases presented CACS below 400 and there were no cases with zero CACS. An acute coronary thrombosis was found in 14 cases, in 9 cases related to a rupture and in 5 cases to an erosion of a coronary plaque. In the control group, 27 cases were included (9 women and 18 men); the mean age was 55.9±6.9 years. The CACS was zero for 10 cases, 1-100 for 11 cases, 101-400 in 3 cases, and >400 in 3 cases.

This pilot study showed that the postmortem CACS was higher in the group of SCD related to IHD than in the control group. In 81.5% of the control population, the CACS was zero or below 100. The severe CACS (>400) was observed in IHD cases but also in controls. More interesting and representing the potential pitfalls, in 12% of SCD cases the CACS was mild, and in 48% of SCD cases it was between 101 and 400, corresponding to a moderate risk in clinical practice. This indicates that forensic pathologists and radiologists should evaluate very carefully all coronaries of sudden death victims, even if calcifications of coronary arteries are not very extensive in PMCT. The correlations found between postmortem imaging of SCD victims and autopsy could further the understanding of coronary syndromes in clinical practice.

Sudden Cardiac Death, Coronary Calcifications, Postmortem Imaging