



## Pathology/Biology Section - 2015

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### H90 Detection of Pulmonary Fat Embolism in Cases With Postmortem CT-Angiography (PMCTA) — Preliminary Results

*Maria Del Mar Lesta, MD\**, Centre Universitaire Romand de Médecine Légale, 21 rue du Bugnon, Lausanne, Vaud 1011, SWITZERLAND; *Patrice Mangin, MD, PhD*, Centre Universitaire, Romand de Medecine Legale, Rue du Bugnon 21, Lausanne CH-1011, SWITZERLAND; and *Marc D. Bollmann, MD*, Centre Universitaire Romand, de Medecine Legale, Rue du Bugnon 21, Lausanne, CH-1011, SWITZERLAND

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After attending this presentation, attendees will understand the repercussions of the realization of a PMCTA with an oily contrast liquid, particularly in cases where a pulmonary fat embolism is suspected, and a method that could be able to diagnose pulmonary fat embolism before the realization of the PMCTA.

This presentation will impact the forensic science community by serving as a key to determine the indication of a PMCTA with oily contrast liquid in the cases where a pulmonary fat embolism is suspected and could be the cause of death, if a method to diagnose this pathology is not available.

**Introduction:** Pulmonary fat embolism can be a cause of death in cases with trauma, during orthopedic surgery, and also in non-traumatic conditions, such as burns, pancreatitis, fatty liver, or sickle cell disease. As PMCTA becomes more widespread, it is important to determine how it affects the diagnosis of pulmonary fat embolism.

**Purpose:** The purposes of this study were to determine if the oily contrast liquid used in PMCTA induces artifactual pulmonary fat embolism, if such artifacts differ from non-artifactual (original) pulmonary fat embolism, and if pulmonary fat embolism can be detected and graded before PMCTA.

**Material and Methods:** Data acquisition for this prospective study was performed between November 2013 and December 2014. Consecutive cases of adults who received PMCTA followed by autopsy were included in this study. Cases were excluded if the state of alteration was too advanced. Pulmonary biopsies of each lung were taken before and after the PMCTA as were fragments of each lung with a twin-edged knife during the autopsy. The samples were examined under the microscope without fixation or staining and after an Oil-Red O staining. Pulmonary fat embolism was graded according to Falci et al.

**Results:** Original pulmonary fat embolism was diagnosed in seven cases out of 23 on biopsies performed before PMCTA, all having presented traumatic events before death or rib fractures due to resuscitation attempts. As expected, structures with the aspect of pulmonary fat embolism were present in almost all cases (21 cases out of 23) after PMCTA. The microscopic aspect of original and PMCTA-induced pulmonary fat embolism was identical. Grading of the pulmonary fat embolism according to Falci et al. depended on the quality of the biopsies.

**Conclusions:** PMCTA with oily contrast liquid induces artifactual pulmonary fat embolism that cannot be visually differentiated from antemortem pulmonary fat embolism; however, antemortem pulmonary fat embolism can be diagnosed with biopsies performed before PMCTA. In order to assure the diagnosis and correct grading of pulmonary fat embolism, the quality of the biopsy should be checked before PMCTA with oily contrast is performed. If it is impossible to obtain biopsies of good quality, the indication of a PMCTA must be discussed in cases where pulmonary fat embolism is suspected, particularly if it is a potential cause of death.

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#### **Pulmonary Fat Embolism, Postmortem CT Angiography, Diagnosis**