Causes for Most Suboptimal CT Pulmonary Arteriography Exams

By Diagnostic Imaging Staff [4]

Suboptimal DE-CTPA often caused by respiratory motion artifacts and incorrect technique, from RSNA 2016.

Respiratory motion artifacts, incorrect scan techniques, and large body habitus are the main causes of suboptimal dual-energy CT pulmonary angiography (DE-CTPA) examinations, according to a study presented at RSNA 2016.

Researchers from Boston, MA, sought to determine reasons for suboptimal CTPE examinations performed on DE-CTPA in suspected pulmonary embolism. They reviewed 1,251 consecutive DE-CTPA exams that were performed in 1,120 patients with a mean age of 60; 502 were male, 618 female. All exams were performed with identical contrast volume, concentration and rate of injection using bolus tracking technique at a threshold of 100 HU in the right ventricle. Structured radiology report template was used for determination of suboptimal and optimal examination for evaluation of pulmonary embolism. Information regarding artifacts (motion, metal, beam hardening), patient weight, location of region of interest (ROI) for bolus tracking, and pulmonary arterial enhancement were assessed for all suboptimal studies. The presence of pulmonary embolism (PE) was recorded in all cases. Statistical analysis was performed with Fisher’s exact test.

The results showed in 80 cases (6%), and of these 80, 14 (17%) were suboptimal at all levels of pulmonary arteries. Sixty-six of the 80 (83%) were suboptimal at main (8%), lobar (18%) and segmental (78%) levels.

Two or more causes were recorded in 37% of all non-diagnostic CTPA. The most common causes of non-diagnostic DE-CTPA at all levels of pulmonary arteries were:
• Bolus timing (57%)
• Large body habitus (43%) (mean weight 144±44 kg)
• Incorrect scanning technique (35%)
• Severe motion artifacts (21%)

Most common causes of partial non-diagnostic DE-CTPA were:
• Mild to moderate respiratory motion artifacts (55%)
• Large body habitus (39%) (mean weight 138±40 kg)
• Incorrect scanning techniques (26%)
• Beam hardening and metal artifacts (14%)
• Bolus timing (8%)

PE was diagnosed in six partial non-diagnostic exams. Respiratory motion artifacts were significantly more common in single source than dual energy CT. The researchers concluded that respiratory motion artifacts, incorrect scan techniques, and large body habitus are the main causes of suboptimal DE-CTPA examinations.

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