



INTERPOLITAN ARTIFACT ON CORONARY ARTERY CT ANGIOGRAPHY WITH DUAL-SOURCE CT

Introduction

Dual-source CT (Somatom Definition, Siemens) has a gantry rotation time of 330 ms. This system has two x-ray sources and two detector arrays mounted orthogonally on the gantry. When the two tubes and detector systems are used, each tube provides the half of the required data on one quarter of the gantry rotation time. Therefore, the temporal resolution is 83 ms.

Dual-source CT provides adaptive pitch that can be adjusted according to the changes in heart rate of the patient during the examination. A specific pitch value can be selected between 0.2 and 0.5 Increase of pitch decreases the acquisition time and reduces the radiation exposure.

Both high pitch values and high temporal resolution provides the excellent evaluation of the coronary arteries, independent from heart rates. Even the patients with more than 100 bpm heart rates can be clearly examined, without prominent motion artifacts. Patients with high heart rates can be evaluated with dual source CT, with lower radiation exposure.

Interpolation artifact seems as a discontinuity in anatomic structures when the pitch is higher than the expected critical value created for different heart rates. To avoid this artifact the heart rate of the patient should be monitored before the examination. The minimum heart rate observed during the monitoring must be used to select the suitable pitch value.

If the heart rate during the examination is lower than the presumed heart rate, the pitch value will be high for the real heart rates, therefore, a gap occurs between the segments.

Case Report

The patient has been evaluated for coronary artery disease with dual-source CT (Somatom Definition 2x64x0.6 mm collimation, Siemens). The heart rate has the lowest value of 62 bpm during the monitoring before the examination. We selected estimated heart rate >60 bpm for the examination and the CT selected the pitch value of 0.26 for this presumed heart rate. During the examination minimum heart rate was 38 bpm. The pitch value CT used (0.26) was high for 38 bpm. So that, a gap occurred between segments of each heart beat. Postprocessing software produces an interpolation artifact between these segments to alert us that there is a gap, if a mismatch occurs between the selected pitch value and the real heart rate during the examination. (Figure 1-2).

References

- 1) Kang JW, Do KH, Chung JY, Cho HJ, Seo JB, Lim TH. Concept of minimal heart rate for each pitch value to avoid interpolation artifact when using dual-source CT: a phantom study. *Int J Cardiovasc Imaging*. 2010 Feb; 26 Suppl 1:103-9. Epub 2010 Jan 30
- 2) T. Flohr, H. Bruder, K. Stierstorfer, C. McCollough Radistion Dose with Dual Source CT. Article from the customer magazine Medical Solutions, June 2006

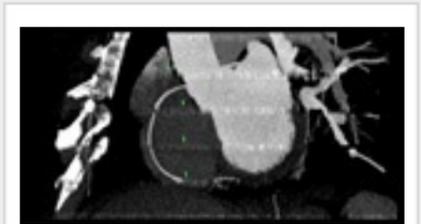


Figure-1

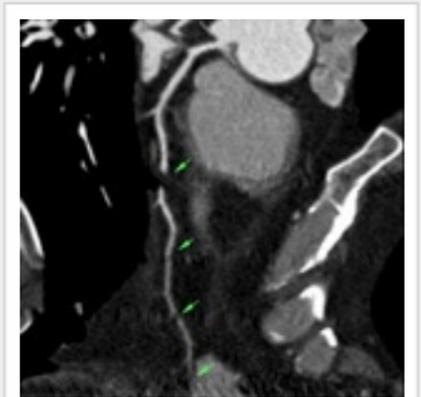


Figure-2