Impact of motion correction algorithm on the image quality and diagnostic utility in patients undergoing coronary CT angiography: A randomized controlled trial.

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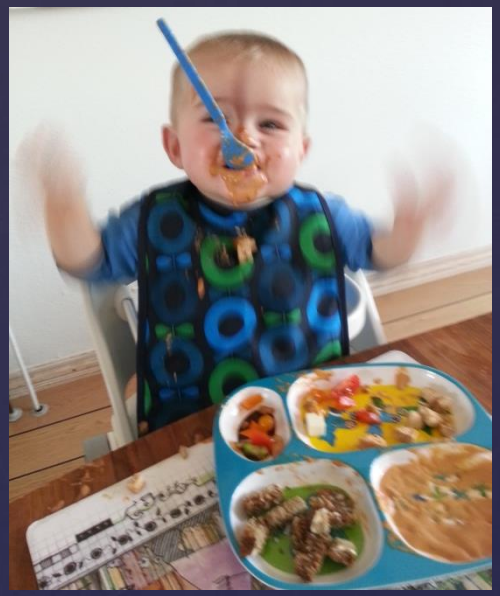
Background:



Motion artifacts cause a decline in diagnostic accuracy in up to 12% of coronary CT angiography.

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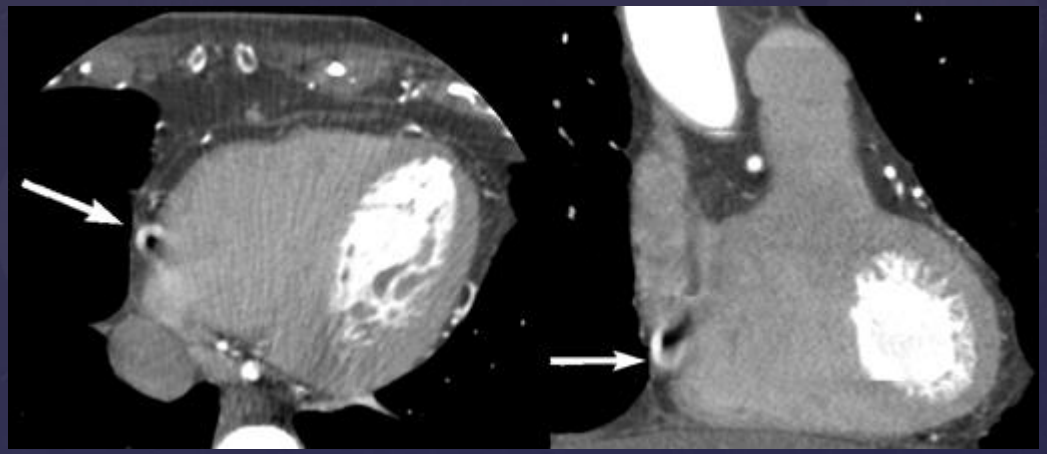

Motion artifacts are predominantly in the right coronary artery (RCA) due to its faster velocity compared to the LAD and the CX artery.

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Aims:

- To investigate the diagnostic utility of motion correction algorithm Snapshot Freeze (SSF) compared to standard reconstruction algorithm (STD), in patients randomized to receive intravenously beta-blockers (BB) or no beta-blockers (non-BB) before coronary CT angiography (CCTA).

- To investigate if SSF can compensate for the absence of BB.

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Method:

One hundred and forty unselected patients scheduled for CCTA and with heart rate (HR) between 60 and 85 bpm were randomized.

All images were reconstructed by SSF and STD algorithm

Two blinded experienced readers evaluated the image quality according to Likert score (1:Excellent, 2:Good, 3:Adequate, 4:Non-diagnostic) and noted the presence of artifacts.

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Results:

Twenty five patients were excluded because of tachycardia, bradycardia or reconstruction error.

Images from 115 patients were analyzed.

BB group, N = 64 patients, mean HR 56±4 bpm.

Non-BB group, N = 51 patients, mean HR 67±7 bpm.

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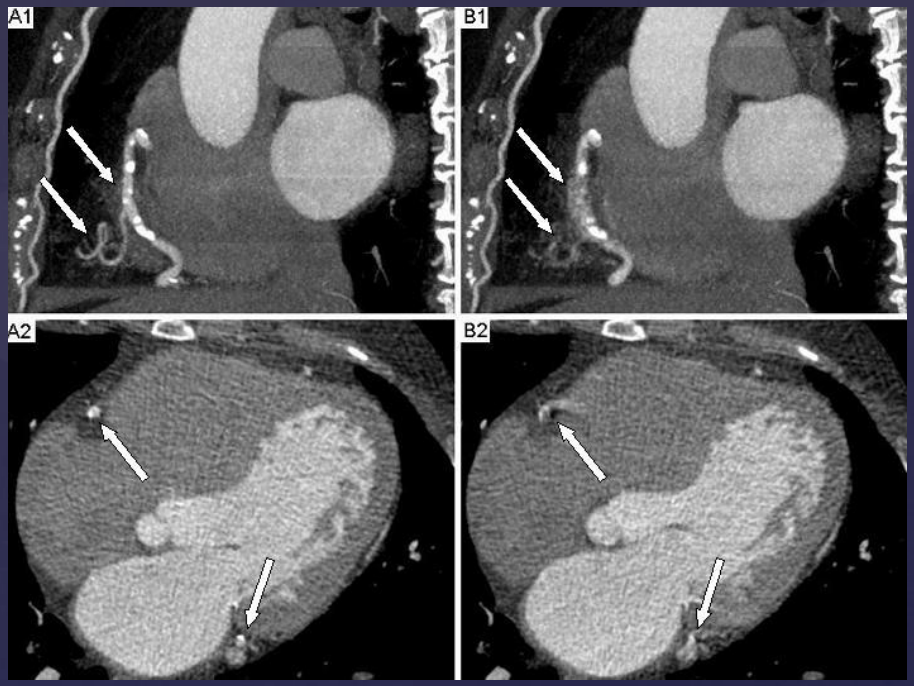

SSF STD

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Motion artifacts “per-patient” level:

SSF reduced the presence of motion artifacts

- BB: SSF 11% vs. STD 31% (P<0,0002)
- Non-BB: SSF 49% vs. STD 75% (P<0,001)

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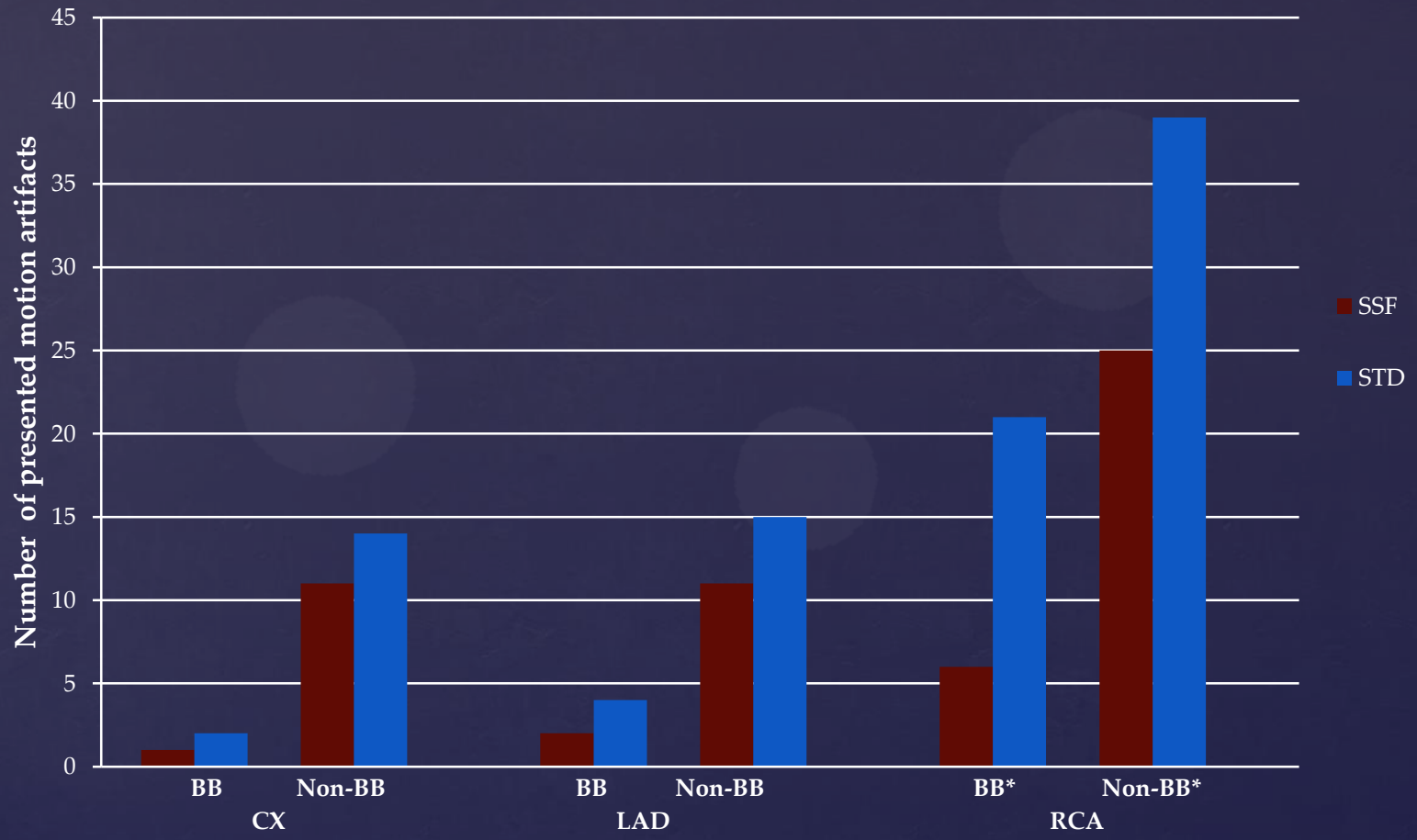
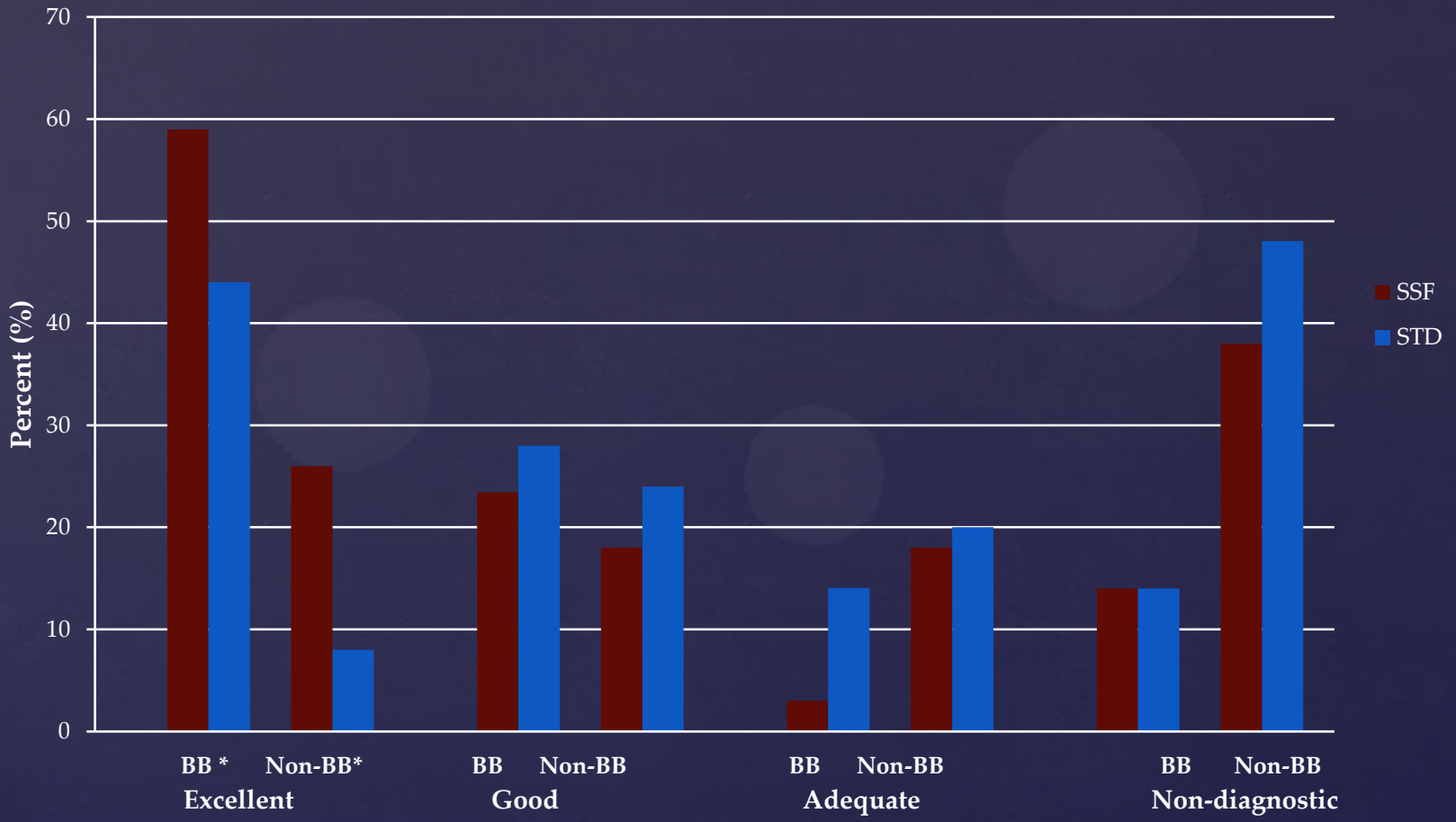
Presence of motion artifacts "per-vessel" level



* Significant reduction

Presentation of Likert score, Patient Level



* Significant improvement

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Conclusion:

If optimal HR before CCTA cannot be achieved, the use of SSF reduce the motion artifacts and improve the image quality in CCTA, but this does not reduce the number of non-diagnostic examinations, and cannot fully compensate for the absence of heart rate lowering medication.

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