

FFRctは既存の方法よりも優れている可能性が示された

DeFACTO:非侵襲冠血流予備量比により侵襲的な評価の必要な動脈病変部位をより正確に決定できる

DeFACTO: Non-invasive fractional flow reserve provides a more accurate determination of which arterial lesions require invasive evaluation

2012年European Society of Cardiology学会で発表された、Determination of Fractional Flow Reserve by Anatomic Computed Tomographic Angiography (DeFACTO) 前向きスタディの結果、標準的な冠動脈造影断層撮影(CT)と比較し、コンピュータ断層撮影による冠血流予備量比(FFRct)の非侵襲的な評価は侵襲的な評価を必要とする病変の決定においてより正確であることが示された。DeFACTOでは冠動脈疾患の疑われる安定した患者252人を登録した。全ての患者がCT、侵襲的な冠動脈造影、侵襲的FFRおよびその後FFRct解析を施行された。FFRctはCT単独よりも血流の低下した動脈病変の検出において優れていた。曲線下面積(AUC)解析を用いた結果、患者ごとの感度および特異度もまたFFRctはCT単独よりも高かった(AUC 0.81 vs. 0.68; $P=0.0002$)。診断能の改善は中等度の動脈狭窄において最大であった。この患者集団においては検査感度が37%から82%へと2倍になり、特異度は低下しなかった。これらの患者ではAUCがCT単独では0.53であったものがFFRctにより0.80に改善した($P=0.0002$)。このスタディの結果はJAMAオンライン版に同時に掲載された。

Full Text

Data presented as ESC Congress 2012 from the prospective Determination of Fractional Flow Reserve by Anatomic Computed Tomographic Angiography (DeFACTO) study show that, when compared to standard coronary angiography (CT), the non-invasive assessment of fractional flow reserve by computed tomography (FFRct) provides a more accurate determination of which lesions require invasive evaluation.

The results of the study were presented by Dr. James K. Min, director of Cardiac Imaging Research and co-director of Cardiac Imaging at the Department of Medicine, Imaging and Biomedical Sciences at Cedars-Sinai Heart Institute in Los Angeles, USA. Results were published simultaneously online in JAMA.

The study compared the ability of FFRct and CT alone to identify flow-restricting lesions by assessment of fractional flow reserve, a measurement recognized as the gold standard for determining which lesions require treatment. DeFACTO enrolled 252 stable patients with suspected coronary artery disease at 17 centers in five countries. All patients underwent CT, invasive coronary angiography, invasive FFR and subsequent FFRct analysis.

Results showed that FFRct was better able to identify flow-restricting arterial lesions than CT alone. The per-patient sensitivity and specificity of FFRct were also higher than CT alone using an area under the curve (AUC) analysis (AUC 0.81 vs. 0.68, $p=0.0002$).

The improvement in diagnostic performance was found greatest in arterial blockages of intermediate severity. In this set of patients, there was over a two-fold increase in test sensitivity, from 37 to 82%, with no loss of specificity. In these patients, the AUC improved from 0.53 for CT alone to 0.80 for FFRct ($p=0.0002$).

"One of the central challenges in taking care of patients with coronary artery disease is knowing which ones need further invasive evaluation for determining the need for coronary revascularization," said Dr. Min. "The results of the DeFACTO trial clearly demonstrate that when added to coronary CT angiographic findings, FFRct provides essential physiologic information as to which specific arterial blockages truly restrict blood flow to the heart and heighten patient risk.

"This is an exciting step forward for cardiology that could significantly improve how we guide patients towards the most effective and efficient care. Our findings also suggest that FFRct could be particularly useful for evaluating patients with arterial blockages of an intermediate severity, which are often the most difficult to assess non-invasively. This represents a large group of patients who unfortunately are often prone to frequent misdiagnosis.

"In addition, given the high negative predictive value of FFRct, it may serve as an effective 'gatekeeper' to further unnecessary invasive procedures."

The HeartFlow technology investigated in the study is a web-based service that enables the computation of non-invasive fractional flow reserve and thereby the identification of which lesions are causing ischemia. The technology computes FFRct from patient-specific 3D computational models of the aorta, heart and coronary artery tree obtained from CT scan data and results are transmitted via HeartFlow's secure web interface as an interactive report.

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Conference News

[News 01]

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[News 02]

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[News 03]

僧帽弁閉鎖不全症に対するMitraClipの有希望なデータ

[News 04]

Prasugrelはクロピドグレルよりもイベントを減少させなかった

[News 05]

アスピリン反応性を追加することによりクロピドグレルの予測値が上昇する

[News 06]

FFRctは既存の方法よりも優れている可能性が示された

[News 07]

ステント留置後で抗血小板薬内服中の患者におけるアスピリン中止は安全である

[News 08]

心原性ショックにおいて大動脈内バルーンパンピングの生存率に関する有益性はない

[News 09]

FFRガイド下インターベンションは緊急血行再建術を減少させる

[News 10]

大規模レジストリにおいてもTAVI後の有害イベントは低かった

[News 11]

TAVIは重症大動脈弁狭窄症患者のQOLを改善する

[News 12]

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