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Editorial

Quantitative Flow Ratio is Set to Revolutionize the Interventional Cardiology Era, But are we there yet?

Muhammad Ali Tariq[1]*, Usama Nasir[2], and Atif Ameer[3]

[1]*Shaikh Zayed Hospital, Pakistan*

[2]*University of health and sciences, Pakistan*

[3]*Lahore medical and dental college, Pakistan*

***Corresponding author**

Muhammad Ali Tariq, Dept of internal Medicine, Shaikh Zayed medical college, Pakistan, Tel: +923216822646, Email: alitorque@gmail.com

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Quantitative flow ratio is the technique to assess the degree of ischemia in a coronary vessel and derive the fractional flow reserve (FFR) without the conventional use of a pressure wire or induction of hyperemia. We believe that this technique advances the field forward by using 3D reconstruction of the entire coronary tree and using computer generated automatic lumped modeling for the calculation of QFR. Statistics reported on the comparison of invasive fractional flow reserve (FFR) and the newly introduced QFR are exceedingly high for a new diagnostic tool. However, there are still a few hurdles in the way.

It has been a matter of long debate, whether QFR could be as sensitive and specific as the invasive FFR in patients with acute coronary syndrome (ACS). Recently, the agreement is that non culprit segments could be reliably assessed by invasive FFR. Nevertheless, Gaur's et al [1] reported in a STEMI population that a comparable approach to QFR, which is FFRct, failed to achieve clinically meaningful sensitivities and specificities and hence, the study did not support the use of FFRct (QFR) in the post-STEMI setting. The discrepancy in the measurement may be attributed to the volume-to-mass ratio of the vessel in the post-STEMI

Table: Studies in support of the test.

First Author	Year	Index	Study Objective	Clinical setting	N, total	N, ACS Subjects	Main findings
Indolfi et al [3]	2015	FFR/iFR	iFR vs FFR comparison in ACS vs Stable patients	UA, STEMI, NSTEMI, Stable	82	53	Diagnostic accuracy was 79.5% in ACS and 84.4% in stable, p=0.497
Engstrom et al [4]	2015	FFR	PCI in IRA vs FFR guided revascularization in non-IRCA	STEMI	627	627	Significant risk reduction by FFR guided revascularization in the future events.
Arena et al [5]	2017	FFR	FFR guided risk stratification in NSTEMI patients referred for invasive management.	NSTEMI	2728	150	FFR a reliable predictor for long term cardiovascular outcome among NSTEMI patients undergoing cardiac catheterization.
Thim et al [6]	2017	FFR/iFR	Follow-up FFR vs iFR comparison among patients with recent STEMI. Median follow-up: 16 days	STEMI	157	157	Overall Classification agreement was 84% between follow-up FFR and iFR.
Smits et al [7]	2017	FFR	PCI in IRA vs FFR guided revascularization in non-IRCA	STEMI	885	885	Significant risk reduction by FFR in non-IRCA with composite cardiovascular outcome.

Studies that do not support the test:							
Gaur et al [1]	2016	FFR/FFRct	FFR vs FFRct comparison 1 month after STEMI in patients with multivessel disease	STEMI	124	124	Diagnostic accuracy depends on volume to mass ratio with 83% in upper tertile and 56% in lower tertile range. Not reliable in STEMI patients.
Hoeven et al [8]	2017	FFR/iFR	FFR vs iFR comparison among patients with acute STEMI and after 1 month in non-culprit vessels.	STEMI	43	43	Difference between baseline and follow up values was 23.3% for FFR vs 11.6% for iFR.

setting and so the vessels with lowest volume-to-mass ratio <49 mm^3/g showed a poor diagnostic performance [1]. Briefly, after an episode of a STEMI, the coronary vessel undergoes a reduction in the size and decrease in the microvasculatory vasodilator response [2]. This is comparable to the invasive FFR in which, hyperemia is induced by the nitroglycerine prior to the procedure leading to an epicardial vasodilation and providing improved diagnostic accuracies [3].

Given, there are really few studies done which do not support the use of QFR in a setting of ACS patients still raises the question regarding the reliability of the test and hence it would be immature to use the test in a real clinical setting.

Below is a Table showing the recent studies done in patients with acute coronary syndrome to evaluate the diagnostic accuracies of FFR and QFR.

REFERENCES

1. Gaur S, Taylor CA, Jensen JM. FFR derived from coronary CT angiography in nonculprit Lesions of Patients With Recent STEMI. JACC Cardiovasc Imaging. 2017; 10: 424-433.
2. Min JK, Taylor CA, Achenbach S, Koo BK, Leipsic J, Nørgaard BL, et al. Noninvasive fractional flow reserve derived from coronary CT angiography: clinical data and scientific principles. J Am Coll Cardiol Img. 2015; 8:1209–1222.
3. Indolfi C, Mongiardo A, Spaccarotella C, Torella D, Caiazzo G, Polimeni A, et al. The instantaneous wave-free ratio (iFR) for evaluation of non-culprit lesions in patients with acute coronary syndrome and multivessel disease. Int J Cardiol. 2015; 178: 46-54.
4. Engstrøm T, Kelbæk H, Helqvist S, Høfsten DE, Kløvgaard L, Holmvang L, et al. Complete revascularisation versus treatment of the culprit lesion only in patients with ST-segment elevation myocardial infarction and multivessel disease (DANAMI-3—PRIMULTI): an open-label, randomized controlled trial. Lancet. 2015; 386: 665-671.
5. Arena M, Gistri R, Caretta G, Jabri AA, Tonelli G, Scardigli V. Economic evaluation of Fractional Flow Reserve in all-comers patients from both a hospital and payer perspective: the La Spezia registry. JACC. 2017; 70: 949.
6. Thim T, Götberg M, Fröbert O, Nijveldt R, van Royen N, Baptista SB, et al. Nonculprit Stenosis Evaluation Using Instantaneous Wave-Free Ratio in Patients With ST-Segment Elevation Myocardial Infarction. JACC Cardiovasc Interv. 2017; 10: 2528-2535.
7. Smits PC, Abdel-Wahab M, Neumann FJ, Boxma-de Klerk BM, Lunde K, Schotborgh CE, et al. Compare-Acute Investigators. Fractional Flow Reserve-Guided Multivessel Angioplasty in Myocardial Infarction. N Engl J Med. 2017; 376: 1234-1244.
8. Hoeven NN, Janssens G, Waard G, Everaars H, Beijnink C, Nijveldt R. Assessment of the non-culprit lesion in patients with STEMI: a comparison between FFR. JACC. 2017; 70: 90-91.

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