Title: IFR SWEDEHEART: iFR Vs FFR Guided Coronary Revascularisation Long-Term Clinical Outcomes
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Dr Matthias Gotberg

"Hello. My name is Matthias Gotberg. I'm an interventional cardiologist and director of the cardiac cath lab at Lund University Hospital in Sweden.

Reasoning Behind This Study

What's the reasoning for conducting this study was really to provide a little bit of background. IFR or instantaneous wave-free ratio is a resting index to measure whether lesion is significant or not. And historically we've been using FFR a lot more fractional fault reserve where we use adenosine to mimic the hyperemia induced by work. In this case, we're using pharmacology or adenosine. IFR is a little bit different because it's a resting index, but it uses the increased flow during the [indistinct] to mimic the hyperemia. And so the reasoning behind that was that we conducted several different trials in the past to see how good IFR and FFR compare to each other and we know that they are about 85% similar.

And we also did two pivotal trials IFR SWEDEHEART and DEFINE FLAIR, looking at whether there was any difference in outcome. And these were non-inferior trials. In other words, we were seeing if we have a similar outcome because we wouldn't expect to be better or worse in terms of outcome. And the one-year results were published in New England Journal Medicine back in 2017 really showing a similar outcome between IFR and FFR in both trials. So last year we published the five-year data set from the IFR-SWEDEHEART trial showing yet again that was a very overall similar outcome between IFR and FFR.

However, this year in May DEFINE-FLAIR was presented at PCR and curiously enough, there was an increase in mortality. We didn't really see any difference in MACE, but the mortality was increased in the treated group, which was a little bit of surprise considering

that if you would have hyperemic index that wasn't really performing well, you would typically see an increase in unplanned revascularization or myocardial infarction. And this was not observed at all, just this increase in mortality and just among the treated group. And this was weird. So we decided to do our own analysis from the SWEDEHEART Registry database.

Patient Cohort and Study Design

We assembled all patients really from our SWEDEHEART Registry who had undergone either IFR or FFR-guided revascularization and this was database from 2014 up until 2022. And we followed these patients up and used the other national registries such as the Population registry we have in Sweden. We have unique personal identifiers where it actually allows us to track every patient indefinitely and we can track mortality population Registry, we can track revascularization with PCI from our National Register SWEDEHEART, but also using the National Patient Registry to track revascularization without bypass and myocardial infarction.

And this really allowed us to track all the patients who had undergone IFR FFR gap revascularization. And for this time period it was 42,887 patients.

Key Findings

Yeah, so we had a couple of really interesting findings. One of the findings was actually that there was some difference between the IFR and the FFR group in terms of baseline demographics and this in itself is not too uncommon and we adjust for this using a multivariate adjustment model.

The interesting thing is that when we actually divided the patients into the deferred and the treated patients, typically in the court, you see that the deferred patients are healthier and the treated patients are more sick. But we got some different patterns, such as in the treated IFR group, patients were more often older, had more women, more diabetes, hypertension, previous MI and previous stroke and actually borderline, bordering failure. So it seems like the baseline characteristics influence the decision of revascularization

or defer differently depending on whether you chose IFR and FFR. So this is one key finding. We can talk about that a little bit more later.

But overall when we looked at outcome, we looked at a five-year outcome which was mace, all cost, death, unplanned revascularization, and myocardial infarction, and we didn't really see any difference at all. The adjusted hazard ratio for that was zero point 99. So virtually overlapping results. And then also we did an analysis on the constituents of MACE and could really see the difference between IFR and FFR in terms of death, MI and revascularisation separately.

And then finally we actually did analysis on deferred and treated subpopulations because obviously of the results from defined flare and we couldn't really see any difference in neither MACE or nor any of the components of MACE, including death. So really I would say our main conclusion was that regardless if you use IFR or FFR to guide your risk association decision, you end up with similar outcome.

Take-Home Messages

Well, my take a message is really that you can use either index to guide risk causation and which one you have a preference for. Now, I personally prefer IFR because of a few key components of IFR, such as it's much easier to do a pullback. You can really assess the entire vessel without having the issue of stenosis interaction, what we call lesion cross talk. And the other thing is, obviously you don't have to use adenosine, so patients don't have any side effects from that. So it's a little bit quicker as well. But you could really use either index. So I hope we can put this debate to rest. Which index is better in terms of outcome?

Further Study

Well, I think like I said, I don't think we need any more outcome studies looking at IFR versus FFR in the overall cohort. What is interesting is the finding we had in terms of baseline, demographics, background, comorbidities that seem to change a little bit depending on whether you had IFR and FFR. And what it tells us that it might be some

issue among the elderly patients who have medical morbidities that they don't get enough increase in flow with adenosine. In other words, a low CFR. And there's been some research on that subject, but I think we want to do more research on that to see if we really get a true answer from IFR and FFR, depending on which comorbidity you have."