Title: EuroPCR 24: Influence of Pathophysiological Patterns of CAD on PCI
Participants: Dr Carlos Collet
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Dr Carlos Collet

"My name is Carlos Collet. I'm an interventional cardiologist at the Cardiovascular Centre Aalst in Belgium.

Evolution of Coronary Physiology

The field of coronary physiology has evolved, and it was basically developed to answer the question if a lesion was significant or not significant. Now, we have expanded the use of physiology using pressure pullbacks. And when you do these manoeuvres of pressure and pullbacks, you basically understand what is the pattern of coronary artery disease. We have identified that there are two main patterns, one that we call diffuse disease, another one that is focal disease. And the response to PCI to stenting is different in cases of focal versus diffuse coronary artery disease.

Study Rationale

The rationale of this study was to understand what were the outcomes, the procedural outcomes, after PCI in focal versus diffuse coronary artery disease.

Study Design

So this was an investigative trial. We performed the study globally. Basically, we included patients in Asia, the US, and Europe. We included 1000 patients. The trial recruited stable patients with significant lesions based on fractional flow reserve less than 0.8 with intention to be treated with PCI. In those patients, we carried out a physiological protocol that consisted of a measurement of distal point fractional flow reserve, and a manual pullback manoeuvre with a calculation of a novel index called

PPG. After PCI, a new measurement of fractional flow reserve to understand what was the result of the PCI in terms of the improvement in blood flow.

Findings

What we found was that the pattern of coronary artery disease as quantified by the PPG predicted the result of the procedure in terms of the improvement in flow. In other words, patients with focal coronary artery disease, defined by the PPG close to one, had a significant improvement in blood flow that was not observed in patients that had a low PPG or diffuse coronary artery disease. Even after stenting and a successful angiographic procedure, the flow remained suboptimal after the PCI.

Predicting Results and Procedure-Related Events

In addition to predicting the result before the intervention, we also observed that patients with diffuse coronary artery disease have double the event rates related to the procedure itself. I'm referring to the fact that patients with diffuse coronary artery disease had a rate of periprocedural myocardial infarction that was significantly higher than patients with focal coronary artery disease. This can be translated into the fact that PCI is more effective and safer when performed in patients with focal coronary artery disease.

Future Directions

Now, the big question that we have is, what to do with diffuse coronary artery disease? We know that we're very good at treating focal disease. Now, what to do with diffuse coronary artery disease? And the answer is, we don't know.

But basically, with the advent of PPG as a tool that standardised the definition of diffuse disease, we're now ready to go into a randomised clinical trial to test new treatment strategies for patients with low PPG or diffuse coronary artery disease.

Next Steps

The next step is a randomised clinical trial, basically using the PPG to define the need for PCI. So we're going to randomise patients not based on the classical FFR, less than 0.8 or more than 0.8, but now we're going to use PPG to refine the indication of PCI and see whether that translates into improved clinical outcomes.