

# Low-dose intracoronary alteplase during primary percutaneous coronary intervention in patients with acute myocardial infarction: the T-TIME three-arm RCT

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## Plain English summary

### The T-TIME RCT

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## Plain English summary

A heart attack is usually caused by a sudden blockage in a main blood vessel that supplies the heart. The best initial treatment is to open the blocked artery as soon as possible. Nearly 50 years ago, a 'clot buster' drug was used by doctors to open the blocked heart blood vessel. The standard of care is now treatment with a stent. The procedure is called primary percutaneous coronary intervention. About half of all heart attack patients will still have reduced blood flow in the heart.

### Microvascular obstruction

When small-vessel blood flow remains reduced after a heart attack, this problem is called microvascular obstruction. It is caused by the persistence of mini blood clots in the small branches of the culprit artery (which are like the tiny branches of a tree). Microvascular obstruction impairs pump function, leading to heart failure. There is no known treatment for microvascular obstruction and it is a problem of unmet need.

### The T-TIME trial

The aim was to determine whether or not a mini dose of the clot-breaking drug alteplase might reduce microvascular obstruction when given directly to the culprit heart artery at the time of the stent procedure. The main outcome of the study was the amount of microvascular obstruction as revealed by magnetic resonance imaging 2–7 days after the heart attack. A double-blind design meant that the patients, doctors and researchers were unaware of the treatment received.

In total, 440 heart attack patients were enrolled from 11 NHS hospitals between 17 March 2016 and 21 December 2017. Follow-up continued up to 3 months. The average age of the patients was 60 years and 15% were women. Seventeen (4%) patients withdrew from the study and seven died, and the other patients ( $n = 396$ ) remained in the study for 3 months. A total of 176 (45%) out of 396 patients were affected by microvascular obstruction. The main finding was that the amount of heart injury, as revealed by microvascular obstruction on the magnetic resonance imaging at 2–7 days after the heart attack, was not different between the three treatment groups (placebo 2.3% vs. alteplase 10 mg 2.6% vs. alteplase 20 mg 3.5% of heart muscle). After 3 months, quality of life and well-being were not different between the groups.

The results do not support giving low-dose alteplase to heart attack patients after opening the culprit heart artery. More research is needed given that microvascular obstruction is a common complication of heart attack and has no known treatment.



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