

**Tab. 1.** TIMI Flow Grade (39)

<b>Grade 0 (No Perfusion)</b>	There is no antegrade flow beyond the point of occlusion.
<b>Grade 1 (Penetration Without Perfusion)</b>	Contrast material crosses the area of obstruction but fails to opacify the entire artery distal to the obstruction during cinema-angiography.
<b>Grade 2 (Partial Perfusion)</b>	contrast material crosses the obstruction and opacifies the arteries in the area distal to the obstruction. However, the rate of filling of the contrast material into the artery distal to the obstruction or the rate of clearance distally (or both) appears to be slower than that of filling or clearance in comparable areas.
<b>Grade 3 (Complete Perfusion)</b>	Antegrade flow to the area distal to the obstruction occurs as quickly as antegrade flow to the proximal portion of the obstruction, and clearance of the contrast material in the involved area is as fast as that of the uninvolved area in the same or opposing arteries.

**Tab. 2.** TIMI Thrombus Grade (12)

<b>Grade 0</b>	There are no cinematic-angiographic characteristics of the thrombus.
<b>Grade 1 (Flurry, Possible Thrombus)</b>	Angiography shows characteristics such as decreased contrast density, haziness, an irregular contour of the lesion, or a fine convex "meniscus" at the site of total occlusion that is suggestive but not diagnostic of a thrombus.
<b>Grade 2 (Small Size)</b>	A definitive thrombus with the greatest linear dimension less than or equal to 1/2 the vessel diameter
<b>Grade 3 (Medium Size)</b>	Definitive thrombus with greatest linear dimension greater than 1/2 but less than 2x the vessel diameter
<b>Grade 4 (Large Size)</b>	A definitive thrombus with the greatest linear dimension greater than 2x the vessel diameter
<b>Grade 5 (Total Thrombotic Occlusion)</b>	May involve some collateralization but usually does not involve extensive collateralization. It tends to have a "beak" shape with blurred edges or a distinctive thrombus appearance.

In the long term, resolution of an abluminal thrombus can lead to stent malposition, which leads to an increased risk of stent thrombosis. Delaying stent placement for primary PCI has been investigated as an option to reduce this complication. However, the DANAMI 3-DEFER trial reported that delayed stenting had no effect on composite all-cause mortality, non-fatal MI, or ischemia-driven revascularization in non-IRA lesions. Based on these findings, delaying routine stenting is not recommended (Class III; LOE B) (2).

In a meta-analysis of five small single-center studies with 754 patients, direct stenting appeared to improve reperfusion, as evidenced by a significant increase in ST segment resolution and a decrease in in-hospital cardiac death. In this study, there was no single use of contemporary DES or adjunctive medical treatment (19). Saad et al. also reported a significant reduction in infarct size and a lower incidence of heart failure hospitalization and death in the case of direct stent insertion without a pre-dilated balloon strategy. However, the major limitation of direct stent placement in this study was the presence of a thrombus, which limited the choice of stent. Other limitations of

direct stent insertion include underestimated arterial size, failure to penetrate a tortuous or calcified lesion, inadequate stent expansion, and late stent malposition, which can increase the risk of stent re-stenosis or thrombosis (20). These data suggest that direct stenting with or without balloon angioplasty and/or thrombus aspiration can be applied safely (Class I; LOE A) (2), particularly in certain ACS patients with low TIMI thrombus levels (1–3). To date, there has been no single strategic recommendation in the guidelines that would fit our case scenario. The large thrombus burden (TIMI thrombus grade > 3) and slow blood flow (TIMI flow grade 0) require a special management approach. In fact, we perform several strategies, namely MAT, balloon angioplasty, and intracoronary thrombolysis, during PCI.

### Aspiration Thrombectomy

MAT is one of the most frequently used thrombectomy methods for primary PCI because the procedure is simple and has a low risk of vascular injury and distal embolism. Several small-scale or single-center studies and one meta-analysis of 11 small trials suggest that there may be an advantage to MAT

in primary PCI (21). However, data from several studies to date still report inconsistent results in terms of the benefit in primary PCI.

The TASTE (n > 7,000) and TOTAL (n > 10,000) randomized controlled trials showed no benefit of MAT on mortality, re-hospitalization, stent thrombosis, or overall clinical outcome, while the TOTAL study also reported an increased rate of stroke incidence (1, 22–25). However, 1–5% of randomized patients in these studies switched from PCI alone to MAT (1, 22). In the subgroup with high thrombus burden (TIMI thrombus grade ≥ 3), MAT was associated with lower cardiovascular mortality (2.5% vs. 3.1%; HR 0.80, 95% CI 0.65–0.98; P = 0.03) and a higher incidence of stroke or transient ischemic attack (0.9% vs. 0.5%; odds ratio [OR] 1.56, 95% CI 1.02–2.42, P = 0.03) (26). These results may be related to thrombus aspiration and inadequate restoration of coronary blood flow in cases of massive intracoronary thrombosis.

Randomized controlled trials have reported that rheolytic thrombectomy is more effective than MAT in thrombus removal and myocardial reperfusion in patients with STEMI (27, 28). The AngioJet rheolytic thrombectomy (RT) catheter uses a high-velocity saline jet, creating a strong suction of about 600 mmHg at the catheter tip and producing a venturi effect that leads to dissolution and suction of the thrombus. However, study reports failed to show differences in infarct size or adverse cardiac events after PCI between RT and MAT (29, 30).

Based on recent data and meta-analyses, routine thrombus aspiration is not recommended (Class III; LOE A), but can be considered when a high thrombus load is encountered after penetrating the lesion with a guidewire or balloon (2). Safe and feasible alternative strategies are needed when MAT fails during primary PCI.

### Balloon Angioplasty

Balloon angioplasty remains an integral part of PCI for pre-dilating lesions, helping to traverse the lesion easily without complications and being useful for estimating coronary size, stent placement, insertion, and further development of stents (2). Simple balloon angioplasty can also be used to expand the lumen by stretching, compressing, and redistributing the thrombus along the longitudinal axis of the arterial wall to