Complex left main angioplasty in Patient with cardiogenic shock

Dr Kais Mrabet – Interventional Cardiologist

Dr Saad Abbas – Intensivist

Dr Nitin Tarale – Intensivist

International Modern Hospital

Dubai – United Arab emirates

Case Summary

- 53 years-old patient, type II diabetes history of NSTEMI 1 month ago managed conservatively
- **Clinical presentation:**

  Brought by ambulance for acute onset of chest pain and dyspnea since 03 days
- **Clinical examination:**

  BP 85/60, HR 130, SaO2 92%, cold peripheries

  Acute heart failure with bilateral crepitation
- **ECG:**

  ST depression inferolateral leads, ST elevation AVr &V1
- **Biology:**

  Troponin I = 6.63ng/ml , creatinine = 0.62mg/dl, hemoglobin = 12.6g/dl
- **Chest X ray:**

  bilateral pulmonary edema
- **Echocardiography:**

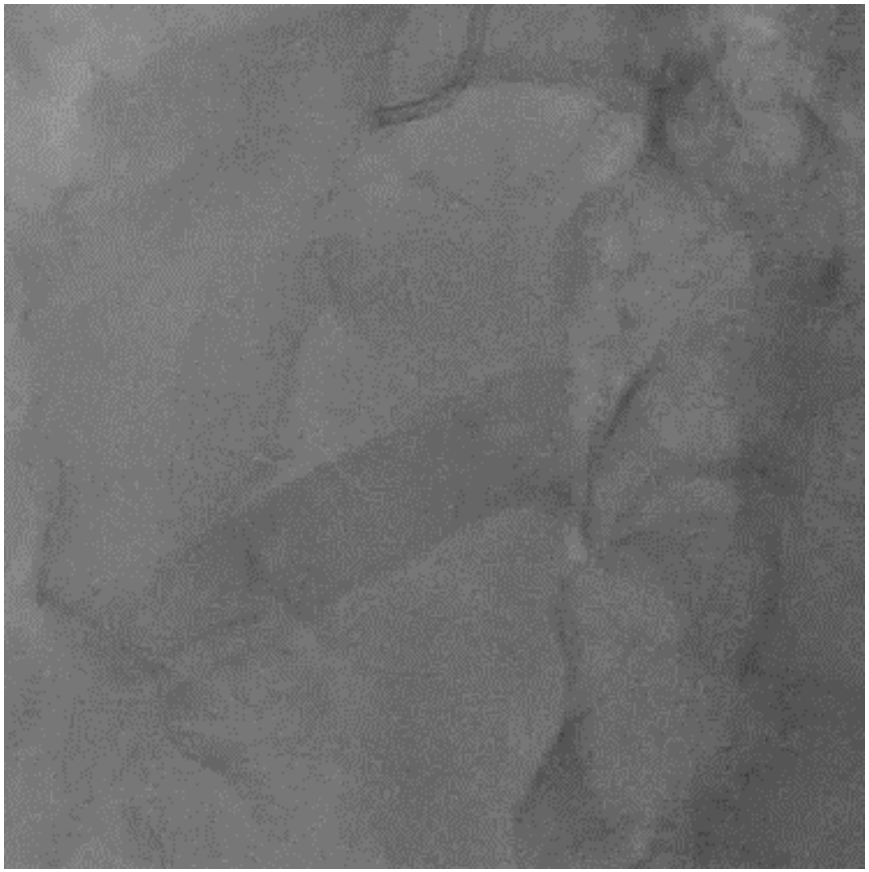
  LVEF = 25%, severe diffuse hypokinesia, No mechanical complication.

Coronary angiography

- Three vessel disease
- Tight stenosis left main
- Syntax score 44

1. Tight bifurcation stenosis distal LM- LAD- LCx medina (1-1-1).
2. Subtotal occlusion ostium of the LAD with TIMI 2 flow in the artery, tight and long stenosis LCx.

Coronary angiography



- Three vessel disease
- Tight stenosis left main
- Syntax score 44

The right coronary artery present tight stenosis in the mid part and total occlusion of the posterolateral artery the distal bed is filled by ipsilateral anastomosis.

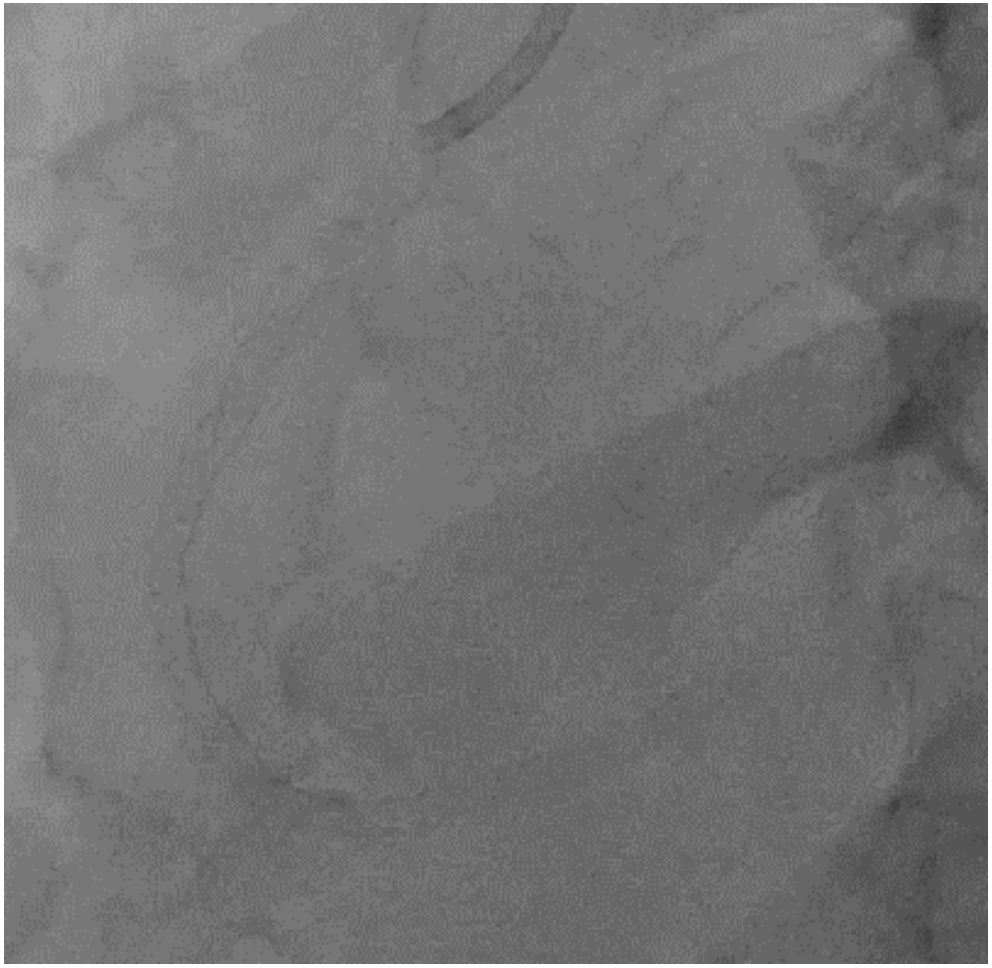
Strategy & myocardial revascularization

- The patient clinical situation and anatomical finding discussed in the heart team (cardiologist, intensivist and cardiac surgeon from another hospital) and we decided on the following:
  - **Stabilization and resuscitation:** norepinephrine and non invasive ventilation will be initiated first for hemodynamic stabilization. If no improvement will consider mechanical support and invasive ventilation.
  - **Myocardial revascularization strategy:** complete and early coronary revascularization is required in order to improve the outcome. Due to the necessity to shift the patient by ambulance to another center for CABG with the risk of transportation we decided to go for coronary angioplasty.
- **Coronary angioplasty intended strategy:**
  - Angioplasty of the right dominant posterolateral first due to the potential support of the this artery in case of complication during the angioplasty of the left main.
  - Angioplasty of the distal left main:
    - **02 stents strategy**
    - Predilatation of the left main - left anterior descending - circumflex in order to restore TIMI 3 flow in the left anterior descending than evaluation of both the risk of side branch occlusion after main branch stenting and the hemodynamic status :

Low risk of side branch occlusion or hemodynamic deterioration	**TAP technique**
High risk of side branch occlusion or hemodynamic improvement	**Mini-Crush**

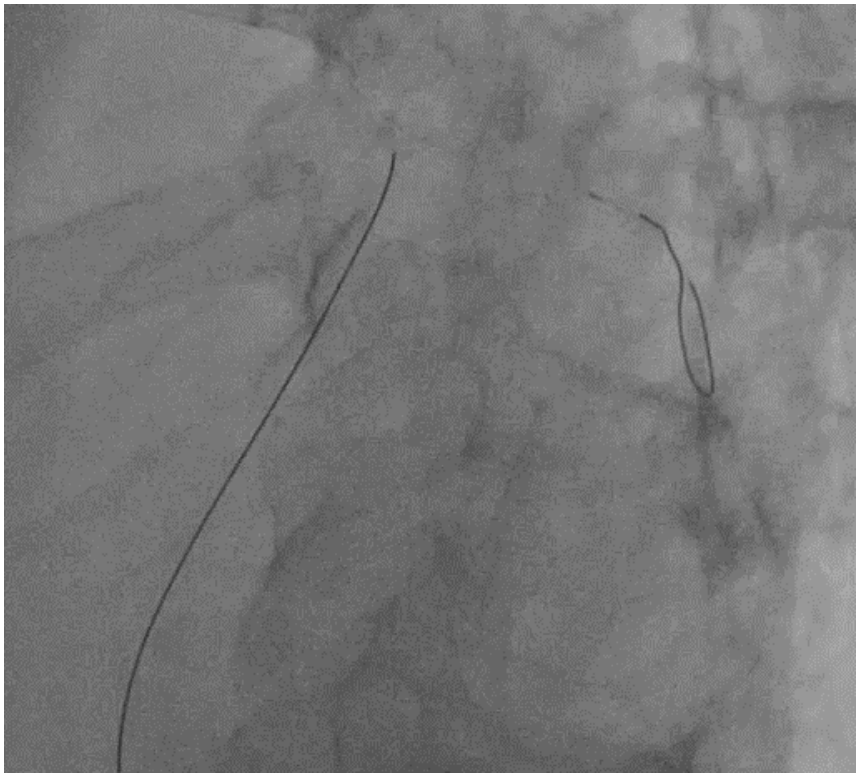
Coronary angioplasty: Right coronary artery

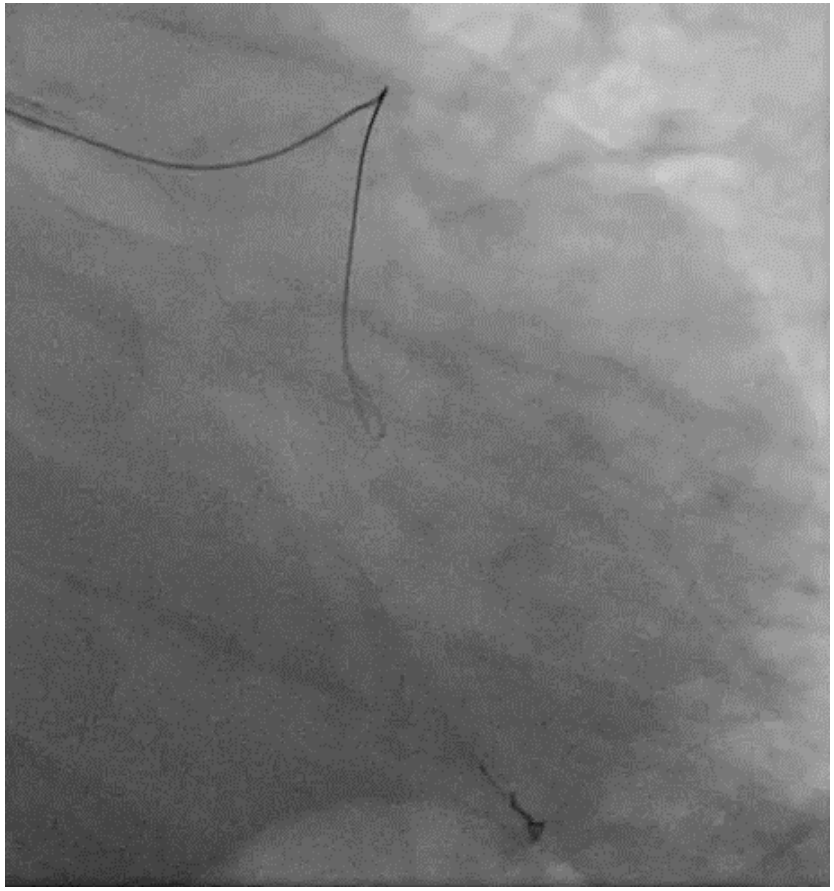
- Right radial artery, 6french
- Aspirin 300mg, ticagrelor 180 mg
- Heparin 100 UI/kg
- Noradrenaline 0.2 mcg/kg/mn
- Non invasive ventilation support
- Furosemide 120 mg/day
- Filder XT
- Serial balloon predilatation than implantation of 3 DES
    1. Orsiro 2.25×40mm in posterolateral
    2. Yukon chrome PC 2.75×40mm mid and distal right coronary artery
    3. Yukon chrome PC 3×24mm in proximal and mid right coronary artery



Coronary angioplasty: left main

- 1. EBU 6 fr, radial approach
- Filder XT in LAD BMW in OM
- Predilatation LM- LAD Pantera pro 1.5×20mm and 2×20mm
- Predilatation LM- LCx NC Pantera Leo 3.25×20mm

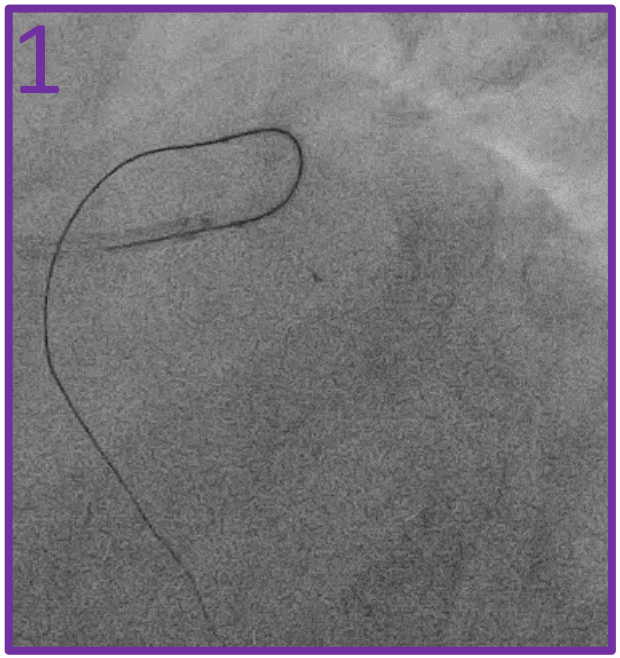




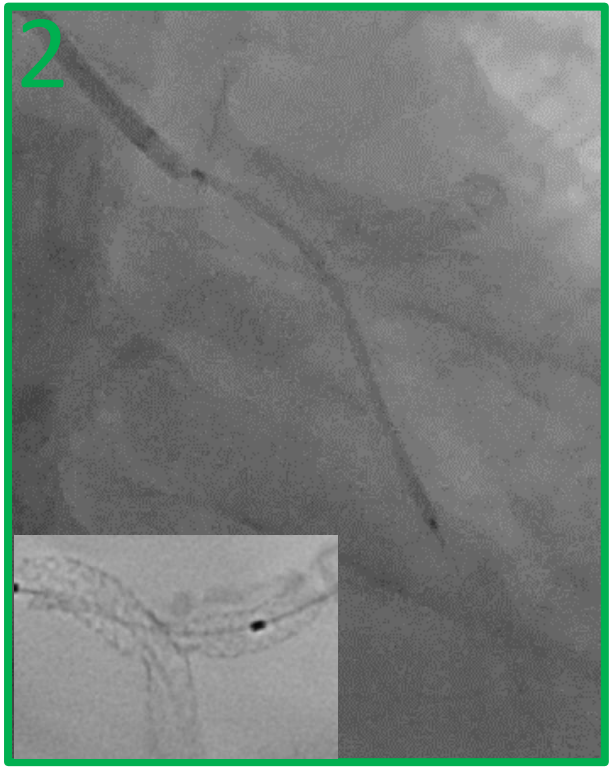
2. Control angiography showed complex and long dissection of the left circumflex. Hemodynamic slightly improved after restoring TIMI 3 flow in the left anterior descending.

Mini-Crush technique

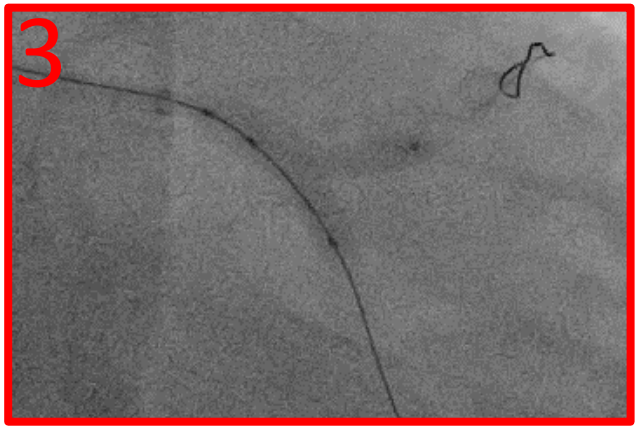
Coronary angioplasty: left main mini-crush step by step



Stenting left anterior descending with Orsiro 3×35mm with 02 mm protrusion in the left main than the stent crushed with NC Pantera Leo 3.25×15mm balloon after removal of the guidewire and the balloon catheter.



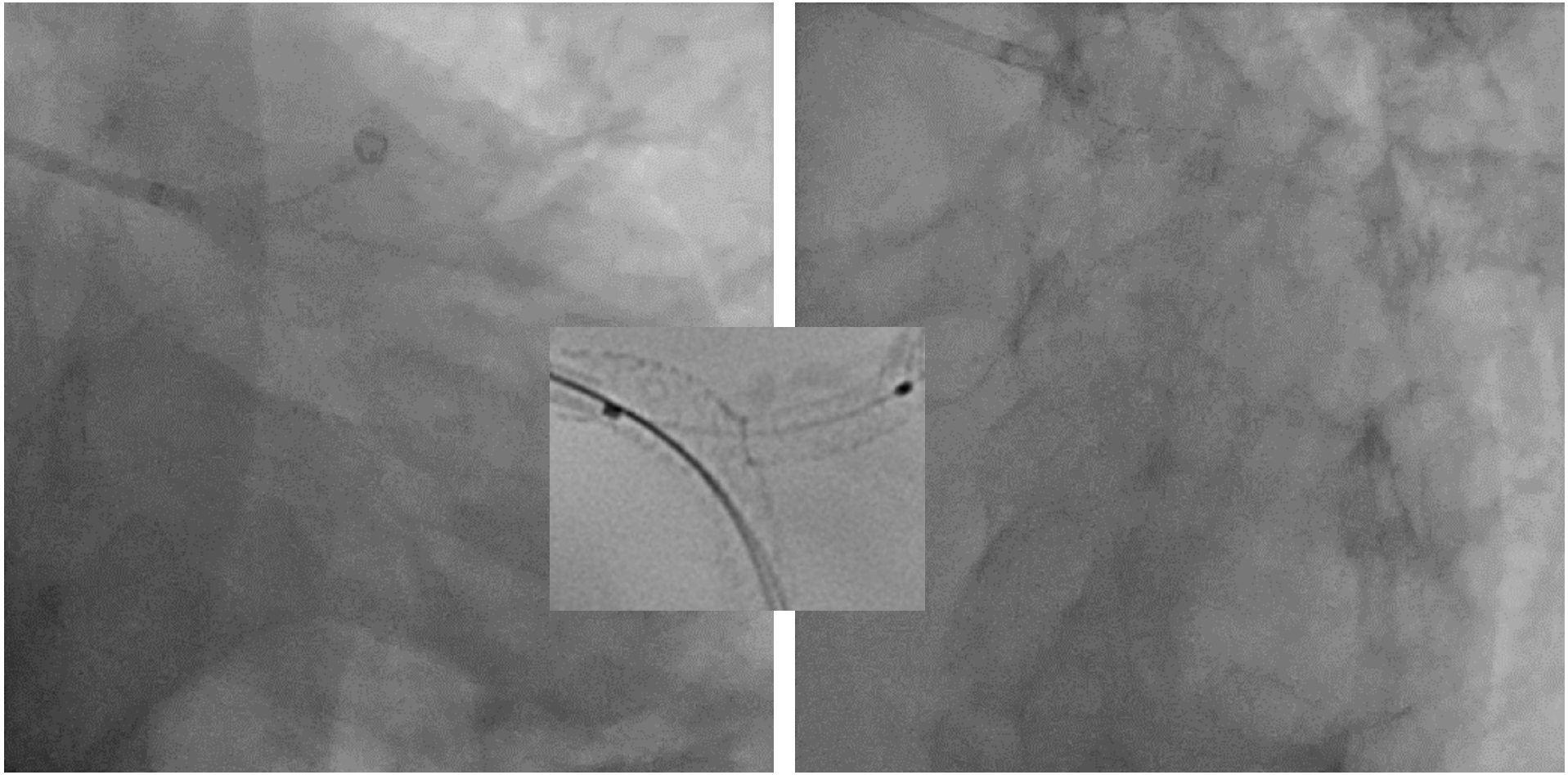
Ostial left main to obtuse marginal stenting performed with Orsiro 3.5×40mm, than distal obtuse marginal stented with Orsiro 3×18mm



Final kissing balloon:

- Left anterior descending rewired with BMW than predilatation of the ostium performed with Nic Nano 0.85×10mm and Pantera pro 2×20mm
- Final kissing balloon:
  - ➢ Left main-left anterior descending NC Pantera Leo 3.25×15mm
  - ➢ Left main-circumflex NC Pantera Leo 3.5×12mm

Coronary angioplasty: left main mini-crush
Final result



Final angiography showed good result of the angioplasty of the left main-left anterior descending and circumflex, good apposition of the stents and TIMI 3 flow in left anterior descending and circumflex.

Evolution and outcomes

Post Angioplasty

- No procedural complications
- Mechanical ventilation weaning after 12 hours
- Noradrenaline stopped 18 hours post angioplasty, intravenous diuretics stopped 48 hours
- Echocardiography J3: improvement of the LVEF from 25 to 40 %
- Discharge J4 post angioplasty

1 week follow up

- No angina pectoris, dyspnea grade I-II NYHA
- LVEF 45 %

Conclusion

- Early and complete myocardial revascularization is the cornerstone treatment of myocardial infraction complicated cardiogenic shock without mechanical complications. The strategy of revascularization remain unclear for multivessel and left main diseases patients. Recent survey among physicians showed wide heterogeneity in their standard approach: 28% will perform only single vessel PCI of the infract related artery, 11.9% will perform multi-vessel PCI during the index procedures and 4.9% will indicate CABG for such patients [(1)] .
- Coronary angioplasty is feasible even in very complex cases with some advantages over the CABG: immediate availability, shorter recovery time, less complications. The CABG remains the gold treatment for cardiogenic shock with mechanical complications, unsuccessful or incomplete revascularization with PCI.
- The indication and the efficacy of the mechanical circulatory support devices remains uncertain: should be indicated to all patients with cardiogenic shock or restrained to cardiogenic shock refractory to inotrope positive ?
- Radial approach is possible for cardiogenic shock coronary angioplasty.

(1) Smilowitz &al Coronary revascularization and circulatory support strategies in patients with myocardial infarction, multi-vessel coronary artery disease, and cardiogenic shock: Insights from an international survey American Heart Journal Volume 225, July 2020, Pages 55-59