Trakia Journal of Sciences, Vol. 10, Suppl. 2, 13-16, 2012

Available online at:
http://www.uni-sz.bg

ISSN 1313-7050 (print)
ISSN 1313-3551 (online)

ST – SEGMENT ELEVATION MYOCARDIAL INFARCTION (STEMI). MODERN TREATMENT.

S. Karadaliev[1]*, M. Koceva[1], I. Nikolova[1], D. Matev[1], Z. Kamenova[2], D. Micov[3], G. Stoev[3], M. Stojnev[3]

[1] Students of medicine, Medical Faculty, Trakia University, Stara Zagora, Bulgaria
[2]Department of Internal Diseases, Medical Faculty, Trakia University, Stara Zagora, Bulgaria
[3] Specialized Hospital for Active Treatment of Cardiology – Yambol, Bulgaria

ABSTRACT

Myocardial infarction is an acute coronary syndrome (ACS) which occurs as a result of sudden interruption of the blood flood in a section of the coronary system, leading to fresh ischemic necrosis of the myocardium. In the prevailing number of cases the immediate reason for the blood flood obstruction is the formation of an occlusive thrombus in the complicated plaque zone. The plaques are predominantly "soft" – they contain considerable quantity of semi-liquid detritus content when the acute coronary infarction is the first manifestation if the ischemic disease.

The tolerance of the normothermic myocardium towards hypoxia is very short. After the 15th minute changes of the intracellular structures begin, while the initial necrotic changes start in about 30 minutes time. Three to six hours after the offset of the disease the non-perfused tissue necroses completely. (3)

Modern methods of acute myocardial infarction treatment

Modern treatment includes the earliest, quickest and maximum efficient blood flood restoration of the occluded coronary artery. There are two main methods of coronary reperfusion:

- Thrombolytic therapy;
- Emergency coronarography and primary angioplasty.

In 2008 the European Society of Cardiology and the American Heart Association approved the primary angioplasty with stent placement as the only and most efficient method of acute myocardial infarction treatment. (4)

Key words: ACS, Occlusive thrombus, Ischemic necrosis, pPCI.

The "TIME" factor

Time is the most important factor in acute myocardial infarction treatment. The severity of the irreversible damages of the heart muscle correlates to the occlusion duration, which, metaphorically said means that "time is life". According to modern recommendations the primary angioplasty must be carried out within the first 90 minutes from the symptoms manifestation ("golden hour"). The recommendations requires close correlation and organization of all units involved in the treatment of a patient with acute myocardial infarction – pre-hospital, hospital and invasive care or direct and quick transportation of the patient to a specialized angioplasty unit, working 24/7.

***Correspondence to**: *Stefan Karadaliev, Student of Medicine, Medical Faculty, Trakia University, Stara Zagora 6000, Bulgaria; E- mail: stefan_pl@abv.bg*

Clinical Case 1

A risk profile 38-year-old patient – male gender, overweight (BMI – 35.5), smoker, alcohol drinker, with a newly found type 2 diabetes and a family history of arterial hypertension. Admitted for the first time to the hospital with the following complaints: *chest pain described as a pressure sensation with radiation to the arms and numbness of the arms, accompanied by a sudden nausea at rest and excessive sweating*.

Admittance tests (about two hours after the first symptoms)

ECG **(fig. 1)**	ST-elevation, lack of R-wave and QS forms in II, III and aVF, depression in I and aVL, sinus tachycardia (114/min), incomplete right hip block
Laboratory tests	TnI – 15.0 (reference values < 1.0 ng/ml); CK-758 (N<200 UI); CK-MB-124.8 (N<25 UI)
Echocardiography	Hypokinesia of the lower wall of the left ventricle; Mitral regurgitation 0-1 stage
GRACE –score* on admittance	174
Selective coronary arteriography **(fig. 2)**	STEMI of the lower wall of the left ventricle at 70% stenosis in distal segment of RCA. Right dominant coronary circulation.

*Global Registry of Acute Coronary Events is a risk index, including: Age, Heart rate, Systolic blood pressure, Creatinin, Congestive heart failure, ST-segment deviation and Elevated cardiac enzymes. It determines the individual's risk of ischemic disease. High-risk patients are those whose score is above 140 on hospitalization and above 118 on dehospitalization.

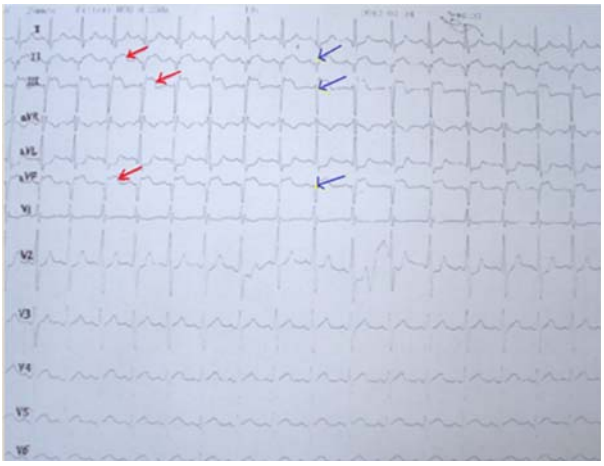

Fig. 1

Fig. 2

Primary percutaneous coronary intervention (pPCI) was carried out with implantation of stent PRO-kinetic 3.5/20 mm on RCA with an optimal angiographic result – TIMI-3 blood flood towards the periphery of the vessel. **(fig. 4)**

TIMI Grade Flow' is a scoring system from 0-3 referring to levels of coronary blood flow assessed during percutaneous coronary angioplasty.

TIMI 0 flow (no perfusion) refers to the absence of any antegrade flow beyond a coronary occlusion.
TIMI 1 flow (penetration without perfusion) is faint antegrade coronary flow beyond the occlusion, with incomplete filling of the distal coronary bed.

TIMI 2 flow (partial reperfusion) is delayed or sluggish antegrade flow with complete filling of the distal territory.

TIMI 3 flow (complete perfusion) is normal flow which fills the distal coronary bed completely

No complications followed the procedure.
After pPCI:

ECG **(fig. 3)**	Sinus rhythm (74/min) lack of ST-elevation, negative T-wave in II, III, aVF.
Laboratory examinations	TnI – in reference values, CK-513 (almost two times ↓) CK – MB – 35.6 (3.5 times ↓).
Echocardiography	Discreet Hypokinesia of lower segment of left ventricle. Normal heart pump function of left ventricle – ejection fraction by Simpson 57%.
GRACE – score at dehospitalization	50

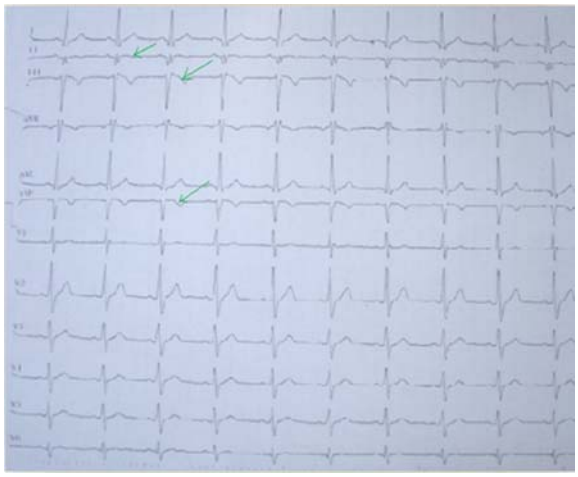

Fig. 3

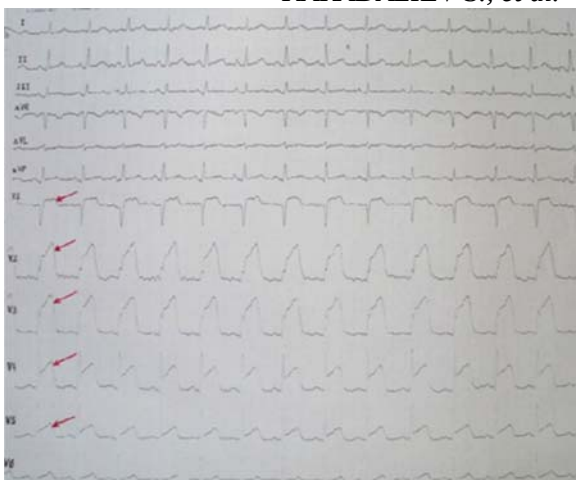

Fig. 5

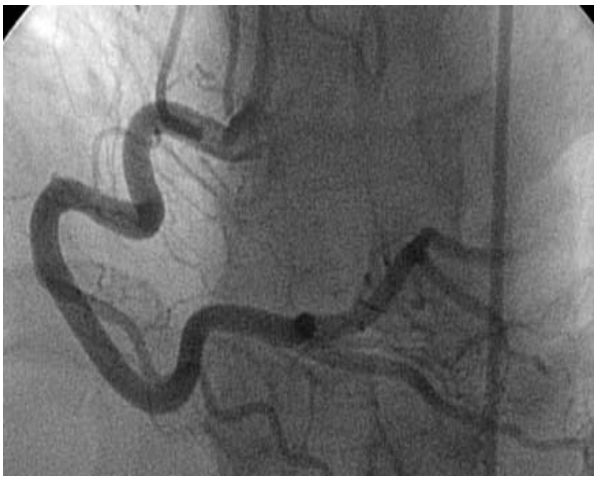

Fig. 4

Clinical Case 2

A risk profile 51-year-old patient – age, smoker, arterial hypertension, dyslipidaemia, alcohol drinker, family history – a brother died from acute myocardial infarction. Hospitalized for the first time in the clinic with *chest pains radiating to the arms accompanied by perfuse sweating*.

The beginning of the symptomatics is at 7.30hrs in the morning. Hospitalization at 14.00hrs.

ECG **(fig. 5)**	Data for an acute myocardial infarction on the anterior wall of the left ventricle –ST – elevation in V1 – V5
Laboratory examinations	Troponin – over 99.99; CK – 3296; CK – MB - 584
Echocardiography	Concentric hypertrophy. Left ventricle hypertrophy. Akinesia of the anterior wall of the left ventricle, septoapically and posterioapically.
GRACE – score at dehospitalization	194
Selective coronary arteriography (at 14.45 hrs) **fig. 6**	Thrombotic occlusion of LAD in the medial segment. D1 – 60% stenosis in medial third. LCx – with unevenness, without stenosis. RCA – calcified vessel 40% stenosis on anterior segment. Weak heterocollaterals on LAD. Left dominant type of coronary circulation.

pPCI of LAD was carried out. Triple thrombaspiration was accomplished and a stent was implanted Integrity 3.5/ 15 mm of LAD.

Optimal angiography result – TIMI – 3 blood flood to the periphery of the vessel. **(fig.8)**

After pPCI:

ECG **(fig. 7)**	Sinus rhythm, heart rate 60/min., persisting of ST – elevation in V1 – V5.
Laboratory examinations	Tnl – 62.0; CK – 901.0; CK – MB – 90.3
Echocardiography	Septal diskinesia of medial apical segment of left ventricle. Without thromboses in the cardiac cavities. MR I stage. Ejection fraction by Simpson 42%
GRACE – score at dehospitalization	94

Fig. 6

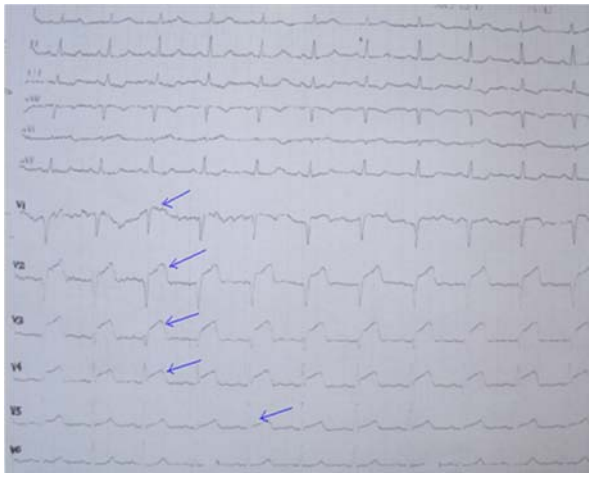

Fig. 7

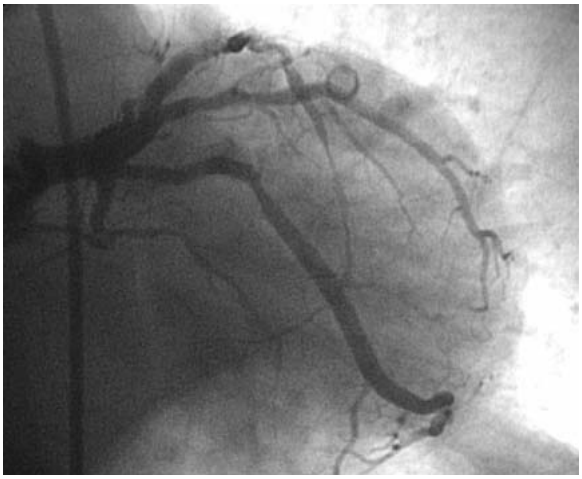

Fig. 8

Inferences

- Time is a crucial factor for an acute myocardial infarction – the earlier the reperfusion the more distinct the effect.
- According to specialized literature data though 63 % of the people in this condition do not get in time to the doctor and to modern treatment.(4)

CONCLUSION

The invasive methods of diagnosis and treatment of ACS are the most important of all due to:

- High informative values
- High efficiency
- Low risk (4)

REFERENCES

1. Guidelines on the management of acute myocardial infarction in patient presenting with persistent ST- segment elevation- European Society of Cardiology, 2909-2945, 2008.
2. Joint ESC/ EACTS Guidelines on Myocardial Revascularisation- European Society of Cardiology, 2501- 2555, 2010.
3. Internal Diseases, Volume2, edited by Prof. Konstantin Chernev, Medical publishing house APCO, 125-139, 2003
4. 5th national congress on intervention cardiology – 7-9 October 2011
5. Clinical cases from Specialized Hospital for Active Treatment of Cardiology - Yambol