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PATHOLOGY AND STAGES OF DEVELOPMENT OF MYOCARDIAL INFARCTION

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Abstract:

This article provides a scientific and critical analysis of myocardial infarction, including its etiology, pathogenesis, clinical signs, and treatment methods. Myocardial infarction is a disease that can pose a significant risk to human health. The article extensively explores these aspects and analyzes them based on various medical sources. It also highlights modern diagnostic and treatment methods, as well as preventive measures. The Ministry of Health is currently developing and implementing modern strategies to prevent this and similar diseases.

Keywords: Myocardial infarction, treatment, diagnostics, pathology, folk medicine methods, diet, causes, types.

INTRODUCTION Myocardial infarction is a condition resulting from the blockage or compression of the coronary arteries of the heart by a thrombus, which disrupts the blood supply to the heart muscle and causes necrosis (localized cell death) of the heart muscle layer. This disease typically affects individuals between the ages of 45 and 60. Men are more frequently affected by myocardial infarction than women; in fact, men aged 40–50 are five times more likely to suffer from it.

In recent years, the incidence of myocardial infarction has been increasing, especially among individuals aged 45–60. As noted, men are more prone to the condition, with women typically developing it 10–15 years later than men. However, cases have also been reported among younger individuals under the age of 40. Myocardial infarction is most commonly observed in patients who already suffer from atherosclerosis, hypertension, and diabetes.

ETIOLOGY AND PATHOGENESIS. In 97–98% of patients, myocardial infarction occurs due to atherosclerosis of the coronary arteries. Blockage of the coronary artery often results from the rupture of atherosclerotic plaques, hemorrhaging into the plaque, and disrupted blood clotting processes. If the acute compression of the coronary artery persists for a long time, myocardial infarction can develop. The ischemic areas of the myocardium stimulate sympathetic nerve fibers.

The development of myocardial infarction is largely caused by the rupture of the fibrous cap of the atherosclerotic plaque. Factors leading to this rupture include the large size and soft nature of the plaque core (due to high levels of extracellular lipids and liquid cholesterol, and low collagen content), a thin fibrous cap, and inflammation driven by macrophages. After the plaque ruptures, its contents mix with the blood, initiating platelet aggregation. This activates the blood clotting system. Fibrin and red blood cells combine to form a solid thrombus. The occlusion of the coronary artery disrupts the blood supply to the myocardium, leading to myocardial necrosis, which most frequently develops in the wall of the left ventricle. Due to the necrosis of myocardial tissue, both systolic and diastolic functions of the heart are impaired.

Pathological Anatomy Depending on the size of the necrosis in the myocardium, myocardial infarction is classified as **large-focal** or **small-focal**.

Large-focal myocardial infarction includes:

- **Transmural** infarction – where necrosis spans the full thickness of the myocardium.

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- **Intramural** infarction – where large focal necrosis occurs within the myocardial layers.

Small-focal myocardial infarction includes:

- **Subepicardial** infarction – where necrosis is located near the epicardium.
- **Subendocardial** infarction – where necrosis is located near the endocardium.

Depending on the location of the necrosis, the infarction is named accordingly:

- **Anterior wall**, **inferior diaphragmatic tip**, **posterior wall**, **lateral wall**, and **posterior-septal wall** infarctions.

Myocardial infarction most commonly occurs in the **left ventricular wall**. Infarction in the **right ventricular wall** is rare. It usually first appears in the **anterior wall of the left ventricle**, followed by the **posterior wall**. Examination of the heart of individuals who died from myocardial infarction often reveals atherosclerosis of the coronary arteries. Changes in the myocardium are observed in **three zones**.

Patient's Condition Before Onset of Myocardial Infarction: Patients begin to feel frequent, unfamiliar pain in the heart area.

In **initial angina attacks**, pain episodes become more prolonged and intense than before. Pain can occur **not only during physical exertion but also at rest**. Other symptoms include shortness of breath, irregular heartbeat, and fatigue. If such patients are hospitalized in a cardiology unit, it may be possible to prevent the development of myocardial infarction or limit it to a small-focal infarct.

Clinical Forms Based on Onset and Symptom Progression: Acute Phase: Myocardial infarction usually begins with **severe chest pain**. According to researchers such as **A.L. Sirkin (1991)**, pain is present in **94% of cases**, and **F.I. Komarov** and colleagues reported pain in **86–95%** of cases. The pain is intense and often unbearable for the patient. Some patients self-medicate due to the severity. Descriptions vary:

- Some say: *"It feels like a hot iron is pressing on my chest."*
- Others: *"It's like a horse is stomping on my rib cage."*

Pain can last from several hours to **one or two days**.

Symptoms:

- Pale complexion
- Cold, moist, and sweaty skin
- Normal breathing
- Heart rate may rise to **100–120 beats per minute**
- Blood pressure may rise slightly on the first day, then decreases
- Heart sounds become muffled
- In some patients, **systolic murmurs** are heard at the heart's apex due to weakened contraction of the myocardium
- In the early days, a **pericardial friction rub** may be heard due to dry inflammation of the pericardium
- **Extrasystoles** occur in **90–95%** of cases
- Body temperature may rise to **37–38°C**, depending on the size of the infarct
- Necrotic substances formed in the heart muscle enter the bloodstream, triggering **inflammatory responses** (increased leukocytes, enzymes)

Subacute (Intermediate) Phase: This phase usually lasts **from one week to 30 days**. The patient's condition gradually improves, the most dangerous days pass, and physical activity while lying down increases. **Post-infarction angina** attacks may still occur. Blood pressure tends to stabilize during this stage.

Post-Myocardial Infarction Period. During this stage, the patient's condition improves. They begin to move around more actively but may still occasionally experience pain in the chest area. Blood pressure and pulse are typically normal. Heart rhythm becomes regular, though **extrasystoles** may still occur. Overall, this stage is considered a **chronic phase** of ischemic heart disease, which can vary in its progression. Complications are less likely. Gradually, a **scar forms** in place of the necrotic tissue in the myocardium. The clinical picture stabilizes, and signs of **aseptic inflammation** subside. This stage can last from **1 to 3 months**.

Types of Myocardial Infarction:

- **Gastralgic Type**

This type mimics diseases of abdominal organs. Symptoms include **pain in the upper abdomen**, **nausea**, **vomiting**, **belching**, **hiccups**, **bloating**, and **diarrhea**. The abdominal pain may radiate to the **shoulder blades**, **inter-scapular area**, or **sternum**. The general condition worsens, and the patient feels uneasy. This type must be differentiated from **peptic ulcers**, **cholecystitis**, and **pancreatitis**.

- **Asthmatic Type**

Occurs in **20%** of cases, mostly in the elderly. It starts with **shortness of breath and**

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breathing difficulties due to acute left ventricular failure. It may lead to **cardiac asthma** or **pulmonary edema**. Often seen in patients with a previous heart attack or hypertension. This type is severe and may result in **chronic heart failure**. **40–60%** of patients may experience serious complications.

- **Arrhythmic Type** A life-threatening form beginning with **irregular, erratic heartbeats**. It may involve **fibrillation**, **ventricular extrasystole**, **varying degrees of heart block**, and **paroxysmal tachycardia**—most often of ventricular origin. Dangerous arrhythmias develop early, leading to rapid deterioration and even **death**. Patients usually feel palpitations, **chest pressure**, **shortness of breath**, and **weakness**.
- **Cerebrovascular Type** This type involves **disturbed cerebral circulation**. It starts with **mental changes**, **dizziness**, or **loss of consciousness**. Poor brain circulation is due to the **heart's inability to pump blood adequately** to vital organs. It may co-occur with **arrhythmic forms** of myocardial infarction.
- **Silent (Asymptomatic) Type** Some patients may not realize they've had a heart attack. Changes suggestive of a past infarct are discovered **incidentally during ECG** for unrelated reasons. Clinical symptoms may be **mild or unnoticeable**, such as short episodes of chest pain, slight breathlessness, or fatigue that are easily forgotten. Diagnosis is typically confirmed **later via ECG**.
- **Prolonged Myocardial Infarction** Usually, the acute attack lasts **from several minutes to several hours**, or even **1–2 days**. In some cases, the acute phase lasts several days, during which the **area of necrosis expands** in the myocardium. In **prolonged infarction**, necrosis continues to develop for **48–72 hours**.
- **Recurrent Myocardial Infarction** Patients who have previously suffered a heart attack are at risk of experiencing another. A **recurrent infarct** is defined as the appearance of a new area of necrosis within the myocardium **8–12 weeks** after the first one. According to **A.L. Sirkin (1981)**, any infarction occurring between **72 hours and 8 weeks** after the first is considered **recurrent**. This form usually presents with **worse symptoms**, **severe arrhythmia**, and **cardiovascular failure**.

Differential Diagnosis Some heart and vascular diseases present with **symptoms similar** to myocardial infarction and must be differentiated:
Aortic dissection often causes **severe chest pain** behind the sternum, radiating to the back or waist. Unlike MI, it begins **suddenly and violently**.
The **pulse may be absent**, fingertips appear **cyanotic**, blood pressure **drops sharply**, and **consciousness may be lost**. Medications are typically ineffective.

Complications of Myocardial Infarction In **10–15%** of cases during the acute phase, **shock** is observed, due to damage to the heart muscle. Shock may occur in three forms:

1. **Reflex shock**
2. **True cardiogenic shock**
3. **Arrhythmic shock**, caused by erratic heart rhythm

Signs of shock include:

- **Low blood pressure**: systolic below **80 mmHg**, diastolic below **40–50 mmHg**
- In people with normally high pressure, systolic may drop to **95–120 mmHg**
- In some cases, **no measurable BP** is found
- **Pulse pressure** drops below **30 mmHg**
- **Urine output decreases** drastically (**oliguria**)
- The patient's skin becomes **pale**, **cold**, and **clammy**, with barely detectable pulse
- The **primary cause** of shock is **sudden heart pump failure** due to myocardial necrosis

Treatment. Myocardial infarction is treated by **emergency medical teams**, in **hospitals**, **clinics**, and **sanatoriums**.

Immediate pre-hospital care is critical. Painkillers and medications to slow heart rate are administered. Patients are admitted to **intensive care units**, where they are kept **bedridden**, with **mental and physical rest** ensured.
Pain relief includes:

- **1 ml of 2% Promedol**
- **1–2 ml of 1% Morphine**, along with **0.5 ml of 0.1% Atropine Sulfate** to mitigate side effects
- For enhanced effect:
  - **1 ml of 2.4% Pipolfen**,
  - or **1% Diphenhydramine or Suprastin**,
  - mixed with **2 ml of 50% Analgin** [2]

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CONCLUSION MYOCARDIAL INFARCTION is a highly significant condition that must never be overlooked. It mostly affects the **elderly** and is characterized by **blockage or compression** of the coronary arteries. Cardiologists are responsible for treating this disease. Treatment starts with **identifying the cause**, followed by the use of **pain-relieving medications**, **physical therapy**, and **therapeutic exercise**. Prevention requires a **case-by-case approach**, **accurate diagnosis**, and **personalized care**, which should be a **core strategy** of the modern healthcare system.

REFERENCES

1. Abdullaev A.A. *Fundamentals of Cardiology*. Tashkent: Tibbiyot, 2019.
2. Sharipov Sh.Sh. *Propedeutics of Internal Diseases*. Tashkent: Ilm Ziyo, 2020.
3. *Harrison's Principles of Internal Medicine*, 20th Edition. McGraw-Hill Education, 2018.
4. WHO (World Health Organization). *Cardiovascular Diseases (CVDs) – Fact Sheet*, 2023.
5. American Heart Association. *Heart Attack (Myocardial Infarction) – Symptoms and Treatment Guidelines*.
6. *Classification of Diseases*, Ministry of Health of the Republic of Uzbekistan, 2022.