o the cardiovascular effects of hypotension, myocardial depression and arrhythmias. The anticholinergic effects may delay gastric emptying, and a large, single dose of activated charcoal administration should be considered, particularly if ingestion has occurred within an hour of presentation. Any hypoxia and electrolyte or metabolic disturbances should be corrected. Seizures should be treated with diazepam, as other anticonvulsant agents. Recreational drugs are complex and can induce profound changes in cardiovascular function, both acutely and chronically. Recreational drugs are often taken together, which can result in complex synergistic interactions with potentially detrimental effects. A high index of suspicion with early intervention and management is often the key to successful treatment.

Резюме

Более 10% больных, принимающих лечение дигоксином имеют признаки интоксикации проявляющиеся различными видами нарушения ритма и проводимости сердца. Для лечения аритмии, возникающей вследствие токсического действия дигоксина, препаратом выбора является Digibind. Прием и передозировка антидепрессантами сопровождается высокой летальностью, вызванной нарушениями сердечнососудистой системы: гипотонией, угнетением миокарда и аритмии. Промывание желудка, прием активированного угля в первые часы после приема имеют положительный эффект. Лечение судорог проводится противосудорожными препаратами. При нестабильной желудочковой тахикардии показана кардиверсия. Прием наркотических средств приводят к глубокими нарушениям сердечнососудистой системы. Одновременный прием двух и более препаратов приводит к возникновению опасных для жизни нарушений, что затрудняет процесс лечения этих больных.

SPECIAL CONSIDERATIONS IN ACUTE CORONARY SYNDROMES

Gheorghe Ciobanu, prof., MD, DMSc*i*
Medical University
"Nicolae Testemitsanu" National Center of
Emergency Medicine, Kishinev, Moldova

Secondary unstable angina

A number of conditions alter the myocardial supply/demand relationship through mechanisms other than arterial obstruction and may also result in myocardial ischemia (table 1). It is important to note that presence of one of these conditions does not preclude the possibility of concomitant obstructive coronary disease. Thus, any patient with symptoms of angina should be evaluated for obstructive coronary disease before the syndrome is considered secondary to an unrelated condition [1].

Acute coronary syndrome in patients with diabetes mellitus

Patients with diabetes are at increased risk for coronary artery disease in general, and ACS in particular.

In addition to higher risk of developing ACS, diabetics have worse outcomes compared to nondiabetics. Adverse events are more frequent, including arrhythmia, cardiogenic shock, heart failure, renal failure, and death. At angiography, diabetics are more likely to have left main or three-vessel coronary disease.

Primary ACS therapy in diabetics

The treatment for ACS in patients with diabetes is similar to that for nondiabetics. Medical therapies including aspirin, beta-blockers, ACE inhibitors, statins, and IIB/IIIA inhibitors have been shown to have similar or greater impact on outcomes among diabetics compared to nondiabetics. Primary PCI and thrombolysis for STEMI also have similar or greater efficacy among diabetics. Older literature suggested that beta-blockers should be avoided in diabetics due to concerns of masking hypoglycemic episodes through blockade of the sympathetic nervous system. In recent years, however, many trials have shown definitive benefit for beta-blockers following ACS in diabetic patients. Patients must be advised that beta-blockers at high closes may mask symptoms of hypoglycemia, which should provide further motivation for close blood glucose monitoring in this population [1,2].

Glycemic control in diabetics with ACS

There is some evidence that tighter glycemic control among diabetics with ACS improves outcomes. The DIGAMI trial randomized 620 diabetic patients with STEMI to routine care or intensive therapy with intravenous insulin infusion, and found that intensive therapy reduced long-term mortality,6 However, more recent studies have not confirmed this benefit [4].

The ACC/AHA guidelines for STEMI give a class I recommendation to insulin use to normalize blood glucose in patients with a complicated course, regardless of whether they have diabetes. A class IIa recommendation was given to use of an insulin infusion in all other patients with Ml with hyperglycemia. table 2 illustrates sample insulin orders for an ACS patient based on blood glucose levels [11].

A special area of consideration for diabetics with ACS is revascularization with coronary artery bypass surgery (CABG). For patients with STEMI, CABG is usually not an option for primary therapy given the need for rapid revascularization, which

Table1

Representative causes of secondary unstable angina/myocardial infarction

Condition	*Mechanism of ischemia*	*Goals of therapy*
Severe aortic stenosis	• ↑LV mass→ ↑ O_2 demand • Compression of intramyocardial cona-ry arteries • Impaired myocardial relaxation • Tachycardia in the setting of «fixed» cardiac output • ↓Coronary flow reserve	Aortic valve replacement (percutane-ous balloon valvuloplasty if AVR not feasible)
Severe anemia	• ↓O_2delivery	Transfusion
Hypotension	↓Myocardial tissue perfusion	Correction of underlying cause of hypotension; avoidance of pure vasoconstrictors during treatment
Tachycardia	↓Diastolic coronary perfusion	Treat arrhythmia itself; treat underlying cause of sinus tachycardia
Fever	↑Myocardial metabolic demand ↓Diastolic coronary perfusion	Treat underlying cause of fever
Thyrotoxicosis	Coronary vasospasm ↓Diastolic coronary perfusion	Treat hyperthyroidism

Table 2

Sample insulin sliding scale for diabetics with ACS

Glucose	Insulin dose
0-50mg/dl	4 oz. juice
51-150 mg/dl	0 units
151-200 mg/dl	2 units
201-250 mg/dl	4 units
251-300 mg/dl	6 units
301-350 mg/dl	8 units
351-400 mg/dl	10 units
>400 mg/dl	Notify M.D.

can be more easily accomplished with thrombolytics or primary PCI [6]. However, among diabetics undergoing angiography post-thrombolysis or for UA or NSTEMI, careful consideration must be given to the choice between stenting or CABG [5].

CABG is still the preferred revascularization strategy for diabetics with left main and/or three-vessel coronary disease, even if a predominantly drug-eluting stent-based PCI strategy is employed [7].

Metabolic syndrome and ACS

The metabolic syndrome (MetS) is a cluster of disorders known to promote atherosclerosis and increase cardiovascular risk. The Adult Treatment Panel III (ATP III)14 report has defined five criteria for MetS [9]:

1 Abdominal obesity (waist > 40 inches for men, 35 inches for women).

2 Elevated triglycerides (>150 mg/dl).

3 Low HDL cholesterol (<40 mg/dl for men, <50 mg/dl for women).

4 Elevated blood pressure (>130/>85 mm Hg).

5 Elevated fasting glucose (>110 mg/dl).

The reported incidence of MetS following ACS is high, ranging from 29 to 46%, Met5 is particularly prevalent among those who present with ACS at a younger age. Among patients with myocardial infarction, MetS is associated with worse in-hospital adverse outcomes, especially severe heart failure.15 Patients with ACS and MetS should be targeted for aggressive lifestyle and risk factor modification [14].

Chronic kidney disease in ACS.

Chronic kidney disease (CKD) is highly prevalent in patients with ACS and is associated with poor outcomes. The observational SYCOMORE study found that one-third of patients presenting with ACS to a French university hospital had a creatinine clearance < 60 ml/min. After adjusting for confounders, the study found that decreased renal function was independently associated with higher rates of in-hospital death and bleeding complications [12].

Patients with CKD should be carefully selected for angiography and should have limited exposure to contrast media during the procedure. Other preventative measures include avoidance of volume depletion and nonsteroidal anti-inflammatory drugs. Beyond this, several therapeutic measures have shown benefit in clinical trials for prevention of CIN. These are summarized in table 3.

Table 3

Preverrtative measures for contrast-induced nephropathy

Measure	*Dose/administration*
N-acetylcysteine	600 mg PO bid on the day before and the day of angiography
Sodium bicarbonate infusion[a]	3 mg/kg/h of isotonic bicarbonate solution for one hour before procedure followed by 1 mg/kg/h for 6 hours after procedure
Isotonie saline infusion	1 mg/kg/h for at least 2 hours and preferably 5-12 hours before procedure, and continued for 6-12 hours after procedure

[a]**The randomized REMEDIAL trial found bicarbonate infusion superior to isotonc saline. At many centers, sodium bicarbonate is preferred to isotonic saline for "prehydration" before angiography, particularly for CKD patients.**

The most important impact of CKD on therapy of ACS is in the need to adjust medications for renal function. The glomerular filtration rate, using once of the two commonly used formulae (table 5), should be estimated for every patient admitted with ACS. As compared with a simplified MDRD equation, the Cockcroft-Gault equation provides higher estimated GFR in younger patients and lower estimated GFR in patients older than 70 years. Table 5 lists the dosing adjustments for recommended therapies for ACS in patients with CKD.

Young patients with ACS

ACS can occur in patients aged less than 60 years, often termed "premature" coronary disease. Younger patients with CAD are more likely to have conventional risk factors than older patients. Smoking is the single most important modifiable risk factor seen in young patients. Glucose abnormalities are common and may be subtle, but frank diabetes is less prevalent than in older patients." Aggressive risk factor modification is recommended for any young patients with ACS. If marked lipid abnormalities are discovered, screening of first-degree relatives is reasonable.

ACS In the setting of cocaine use

Myocardial ischemia and infarction are well-documented complication of cocaine use, and cocaine intoxication as a precipitant should be considered in any young patient with ACS. When ACS occurs in cocaine users, symptom onset is typically within

Table 4

Estimation of glomerular filtration rate {gfr) with common methods

Cockroft-Gault formula

$$GFR\ (ml/min) = \frac{(140 - age) \times mass\ (in\ kilograms) \times [0.85\ if\ female]}{72 \times serum\ creatinine\ (in\ mg/dl)}$$

MDRD formula

$$eGFR = 186 \times serum\ creatinine^{-1,154} \times age^{-0,203} \times [1.21\ if\ Black] \times [0.742\ if\ female]$$

Table 5

Adjustment of common acs medications for patients with ckd

Medication	*Creatinine clearance*		
	30-50 ml/min	*30 ml/min*	*Dialysis*
Aspirin	None		
Clopidogrel	None		
Beta-blockers	Metoprolol is often preferred in CKD patients due to hepatic metabolism.		
Unfractionated heparin	None		
LMWH	None	Once daily dosinq instead of bid	Not FDA approved for use in dialysis patients and may cause severe bleeding
Glycoprotei IIB/IIIA Inhibitors	Decrease dose based on CrCI and specific IIB/IIIA agent	Decrease dose based on CrCI and specific IIB/IIIA agent	Eptifibatide contraindicated in dialysis patients
Bivalarudin	None	Decrease infusion rate to 1 mg/kg/h	Decrease infusion rate to 0.25 mg/kg/h
Statins	None	None	Avoid highest dose

Table 6

ACC/AH a recommended therapies for cocsfne-assoeiated chest pain

Class I	*Class II*	*Class III*
• Benzodiazepine	• Calcium channel blorkers	• Beta-blockers
• Aspirin	• Phentolamine	• Labetalol
• Nitroglyterin		

3 hours of exposure, but may occur up to 4 days later- The syndrome ranges from ischemic chest pain with or without biomarker elevation to ST elevation with complete arterial occlusion. The mechanism of cocaine-induced Ml involves coronary vasospasm, increased myocardial oxygen demand secondary to tachycardia, and increased platelet adhesion [10].

Treatment for ST-elevation Mi in the setting of cocaine is the same as in patients without cocaine use. Aspirin, beta-blockers, heparin, IIB/IIJA inhibitors, and thrombofysis or PCI are indicated. For patients without ST elevation, management is often conservative, since as many as 40% of patients with cocaine-associated ACS have angiographically normal coronary arteries. The ACC/AHA has released guidelines for management of patients with chest pain after cocaine use (table 6).

In contrast to noncocaine-associated chest pain, benzodiazepines can be used (IB) and selective beta-blockers should be avoided (IMC). In the setting of cocaine use, benzodiazepines relive chest pain and favorably effect hemodynamics, apparently through anxiolyitc properties and inhibition of the central stimulatory effects of cocaine. Beta-blockers may precipitate unopposed ct-adrenergic effects in the setting of cocaine. This may lead to coronary vasoconstriction and elevated blood pressure. An overall treatment strategy is outlined in figure 1.

ACS in a pregnant woman

Myocardial infarction (ST-elevation and non-ST-elevation) can occur in the peripartum period. The incidence is very low, although it may be slightly higher than for age-matched, nonpregnant women. A report from California found that from 1991 through

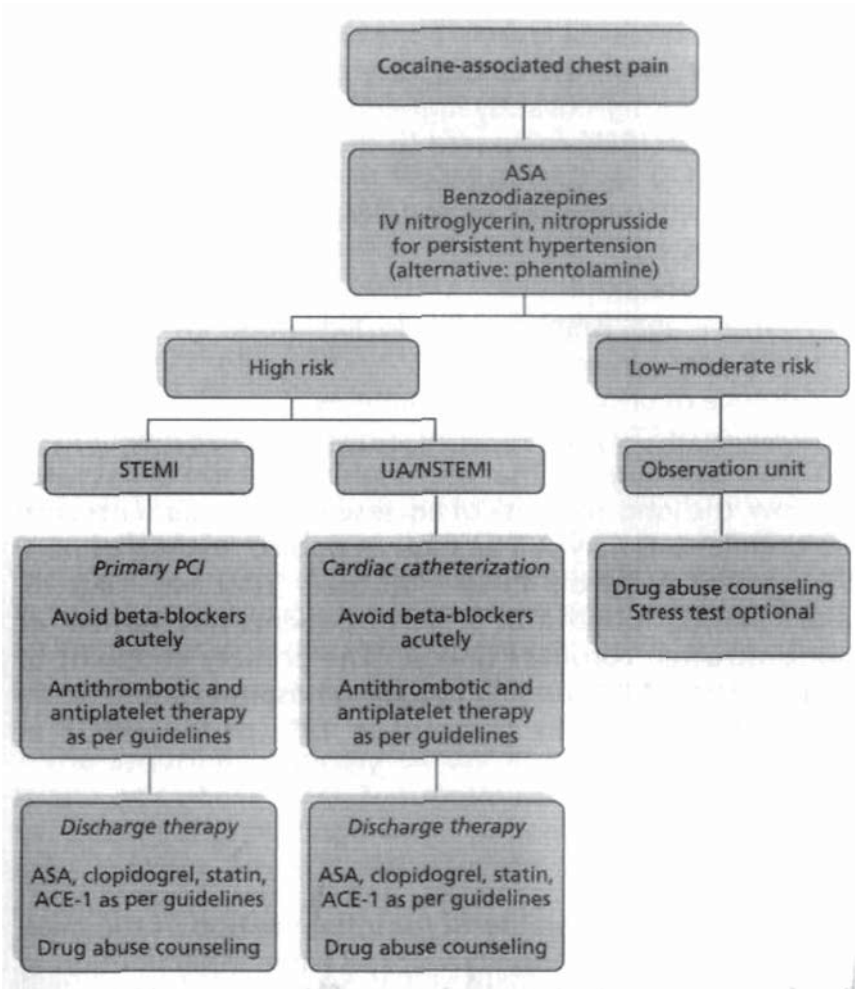

Figure 1. *Diagnostic ant therapeutic strategies in cocaine-associated chest pain (adapted, with permission, from McCord et al. Circulation 2008; 117: 1897-907).*

2000, there were 151 cases of pregnancy complicated by acute Ml, resulting in an incidence of 2.8 per 100,000 deliveries [8].

Most cases of peripartum MI occur in the third trimester or within 6 weeks postpartum. The anterior wall is commonly involved. The major risk factors appear to be older age, hypertension, and diabetes.

The mechanism of acute MI during pregnancy may be different that in nonpregnant patients. One study found that underlying atherosclerosis was present in less than half of cases. The same study found that 21% of cases had normal coronary arteries, with a superimposed thrombus suggesting that hypercoaguability may play a role [13].

Spontaneous coronary artery dissection as a cause of acute MI appears to be more common during pregnancy. It most often occurs in the immediate peripartum period and is more frequent among mothers with hypertension. Initial ECG often demonstrates ST elevation, and management is the same as for other causes of ST-elevation MI. Because dissection of the arterial wall usually causes vessel occlusion, management typically involves percutaneous coronary intervention to restore flow to the myocardium.

The management of ACS during pregnancy is generally similar to that of nonpregnant patients with caveats for certain medications (table 7). In most cases, a plan for urgent delivery of the fetus should be made in case of deterioration in maternal condition. Because of the hemodynamic stress associated with labor and delivery, some clinicians recommend delaying birth for 2-3 weeks after an MI if possible. Others recommend a cesarean section to minimize the workload for the mother. No randomized clinical trials have prospectively assessed timing or method of delivery after pregnancy-related MI [13].

In cases with minimal symptoms and only mild elevation of biomarkers, patients can be managed expectantly with aspirin, beta-blockers, and heparin. When severe symptoms, hemodynamic compromise, or ST elevations are present, urgent revascularization with PCI is usually indicated. There are no controlled studies examining thrombolysis during pregnancy, and pregnancy is considered a relative contraindication to thrombolysis in the 2004 American College of Cardiology Guidelines.

Trauma and ACS

Rarely, myocardial infarction may complicate blunt chest wall trauma. Case reports have demonstrated causes such as coronary artery dissection and thrombosis. The LAD appears to be most frequently involved, although any coronary artery may be affected. Few data are available to guide treatment due to the rare nature of the disorder Coronary angiography with stenting may be appropriate. Thrombolysis has been successfully used, but it may lead to severe bleeding depending on the nature of the trauma.

ACS because of coronary occlusion in trauma may be difficult to differentiate from cardiac contusion, which can also present with chest pain, ECG abnormalities, and cardiac biomarker release. However, unlike ACS, cardiac contusion is caused by direct trauma to the myocardium, often “from blunt contact with the chest wall. This condition is generally treated with supportive care, and patients are monitored for development of arrhythmia in the early post-trauma period.

Table 7

ACS medications in pregnancy

Medication	*Pregnancy class*	*Comment*
Aspirin	C	A low dose of aspirin (75-162 mg/day) appears to be safe
Heparin	C	Does not cross placenta, safe for fetus, but maternal bleeding may occur
Nitrates	C	Generally safe, although maternal hypotension must be avoided
Beta-blockers	C	Often used, although occasional cases of fetal growth restriction, hypoglycemia, respiratory depression, and bradycardia have been reported
ACE inhibitors	D	Contraindicated
Statins	X	Contraindicated
Thrombolytics	C	Relatively contraindicated due to high rates of maternal bleeding; some women have been safely treated
Clopidogrel	B	Limited experience in pregnancy
IIB/IIIA inhibitors	B	Limited experience in pregnancy
Direct thrombin inhibitors	B	Limited experience in pregnancy

References

1. Amman E.M., Anbe D.T., Armstrong P.W., et al. *ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction - executive summary*. A report of the American College of Cardiofogy/Amerkan Heart Association Task Force on Practice Guidelines (Writing Committee to revise the 1999 guidelines for the management of patients with acute myocardial infarction). J Am Coll Cardiol 2004; 44: 671-719.

2. Fleisher L.A., Beckman J.A., Brown K.A., et al. *ACC/AHA 2007 guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery; a report of the American College of Cardiology*/ American Heart Association Task Farce on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery) developed in collaboration with the American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, and Society for Vascular Surgery. J Am Coll Cardiol 2007; 50: e159-e241.

3. Freeman R.V., Mehta R.H., Al. Badr W., Cooper J.V., Kline-Rogers E., Eagle K.A. *Influence of concurrent renal dysfunction on outcomes of patients with acute coronary syndromes and implications of the use of glycoprotein IIb/IIa inhibitors.* J Am Coll Cardiol 2003; 41: 718-24.

4. Haffner S.M., Lehto S., Ronnemaa T., Pyorala K., Laakso M. *Mortality from coronary heart disease in subjects with type 2 diabetes and in nondiabetic subjects with and without prior myocardial infarction.* N Engt J Med 1998; 339: 229-34.

5. Influence of diabetes on 5-year mortality and morbidity in a randomized trial comparing CABG and PTCA in patients with multivessel disease: the Bypass Angioplasty Revalorization Investigation (BARI). Circulation 1997; 96: 1761-9.

6. Juutilainen A., Lehto S., Ronnemaa T., Pyorala K., Laakso M. T*ype 2 diabetes as a «coronary heart disease equivalent»: an 18-year prospective population-based study in Finnish subjects.* Diabetes Care 2005; 28: 2901-7.

7. Kapur A. *Coronary artery revascularization in diabetics:* The CARDia trial. Presented at the European Society of Cardiology, Munich, Germany, August/ September 2008.

8. Ladner H.E., Danielsen B., Gilbert W.M. *Acute myocardial infarction in pregnancy and the puerperium: a population-based study.* Obstet Gynecol 2005; 105: 480-4.

9. Malmberg K., Ryden L., Wedel H., et al. *Intense metabolic control by-means of insulin in patients with diabetes mellitus and acute myocardial infarction (DIGAMI 2):* effects on mortality and morbidity. Eur Heart J 2005; 26: 650-61.

10. McCord J., Jneid H., Hollander J.E., et al. *Management of cocaine-associated chest pain and myocardial infarction: a scientific statement from the American Heart Association Acute Cardiac Care Committee of the Council on Clinical Cardiology.* Circulation 2008; 117: 1897-907.

11. Mehta S.R., Yusuf S., Diaz R., et al. *Effect of glucose-insulin-potassium infusion on mortality in patients with acute ST-segment elevation myocardial infarction: the CREATE-ECLA randomized controlled trial.* Jama 2005; 293: 437-16.

12. Reddan D.N., Szczech L., Shapkar M.V., et at. *Renal function, concomitant medication use and outcomes following acute coronary syndromes.* Nephroi Dial Transplant 2005; 20: 2105-12.

13. Roth A., Elkayam U. *Acute myocardial infarction associated with pregnancy,* Ann Intern Med 1996; 125: 751-62.

14. Zeller M., Steg P.G., Ravisy J., el al. *Prevalence and impact of metabolic syndrome on hospital outcomes m acute myocardial infarction.* Arch Intern Med 2005; 165: 1192-8.

Rezumat

În articol sunt prezentate particularitățile clinice şi de tratament a SCA. Patologii numeroase se asociază cu alterarea echilibrului miocardic aport/necesități prin alte mecanisme decât obstrucția arterelor coronare. Cu toate acestea prezența semnelor de angină necesită a fi evaluate pentru a exclude obstrucția coronarelor. Tratamentul SCA la diabetici asociat sindromului metabolic, bolilor renale cronice, utilizării de droguri la pacienții tineri, la gravide şi în traume prezintă anumite particularități care necesită a fi luate în considerație în asigurarea calitativă a tratamentului.

Summary

This paper reflects clinical and treatment specific consideration of acute coronary syndrome. Many heart diseases are associated with necessities/input mismatched balance, produced by other mechanism than coronary heart diseases. Beside this, patient with clinical signs of instable angina should be assessed for coronary artery obstruction. Treatment of acute coronary heart syndrome patient with diabetes mellitus associated with metabolic syndrome, chronic renal diseases, history of drug consumption in young, pregnancy and trauma present some specific features that should be considered in order to assure the quality of delivered treatment.

Резюме

В статье рассматриваются особенности клинического течения и лечения острого коронарного синдрома. Многочисленные патологические состояния сопровождаются нарушениями равновесия между доставкой и необходимостью миокарда в O_2 вследствие других механизмов, кроме окклюзии коронарных артерии. Лечение ОСС у больных диабетом, метаболическими синдромом, хронической почечной патологии, при травмах и беременности, а также у молодых и лиц употребляющих наркотиков имеет некоторые особенности, которых нужно принимать во внимание для обеспечения качественного лечения.