

ED Pitfalls Series:

Triage

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1

Preface

- The duty and specialty of emergency physicians are correct and immediate diagnosis.
- Physiological approach for non-traumatic patients and Anatomical approach for traumatic ones
- Logics: comparable with chief complaints.
- To err is human who includes the patients.

2

Preface: Sources of Errors

- Atypical presentations
 - Typical is sometimes minor whereas atypical is major.
- Missing the key points
 - What causes him (she) visit the ED? (What is the true chief complaint?)
- Incorrect exclusion
- Finding one abnormality is sometimes not enough. (Tip of the Iceberg)
- The first minute is not the same as the last minute.
- Consultation does not mean resolution.

3

Preface: Major Principles

- Revisiting means Complete Study.
- Always keep clinical suspicion.
- Keep flexible attitude.
- Always re-evaluate from the very beginning.
- Review carefully the old charts or records.
- Keep what should be maintained.
- Learn from READ triage.

4

Case A

- A 29 year-old female pregnant (GA 28 wks) was brought to ED after a traffic accident.
- Vital signs: GCS E3M6V4 BP 112/70 mmHg, PR 90 bpm, RR 20/min, BT 37.2°C, SpO2 95%.
- PMH: G1P1, Nil
- ABG: pH 7.350 PaO2 88 PaCO2 40 HCO3 20.2

5

Physiologic changes in pregnant woman

- **Cardiovascular system**
 1. Heart:
move upward, hypertrophy of cardiac muscle
 2. Cardiac Output
increase by 30%, reach to peak at 32nd –34th week
 3. Blood pressure
early or mid pregnancy BP ↓ . late pregnancy BP↑ .Supine hypotensive syndrome

6

Physiologic changes in pregnant woman

■ Hematology

1. Blood volume
 - 1) Increase by 30%-45% at 32nd –34th (peak)
2. Composition
 - 1) Red cells
Hb:13→11g/dL, HCT:38%→31%.
 - 2) White cells: slightly increase
 - 3) Coagulating power of blood: ↑
 - 4) Albumin: ↓, 35 g/L

7

Physiologic changes in pregnant woman

■ The Respiratory system

1. Resp. rate: slightly ↑
2. Vital capacity: no change
3. Tidal volume: ↑ 40%
4. Functional residual capacity: ↓
5. O₂ consumption: ↑ 20%

8

Physiologic changes in pregnant woman

■ The urinary system

1. Kidney
 - 1) Renal plasma flow (RFP): ↑ 35%
 - 2) Glomerular filtration rate (GFR): ↑ 50%
2. Ureter
 - 1) Dilated (P ↑)
3. Bladder
 - 1) Frequent micturition

9

Physiologic changes in pregnant woman

■ Gastrointestinal system

- 1) Gastric emptying time is prolonged → nausea.
- 2) The motility of large bowel is diminished → constipation
- 3) Liver function: unchanged

10

Physiologic changes in pregnant woman

■ Endocrine

1. Pituitary (hypertrophy)
 - 1) LH/FSH: ↓
 - 2) PRL: ↑
 - 3) TSH and ACTH: ↑
2. Thyroid
 - 1) enlarged (TSH and HCG ↑)
 - 2) thyroxine ↑ and TBG ↑ → free T₃ T₄ unchanged

11

Case A

■ Normal Lab values

- Hct 32% -42%
- WBC count 5,000-12,000/L
- Arterial pH 7.40-7.45
- Bicarbonate 17-22 mEq/L
- PaCO₂ 25-30 mmHg

12

Case A

- Respiratory alkalosis is normal in late pregnancy, whereas “normal” CO₂ partial pressure (a PaCO₂ 35-40 mmHg) may indicate CO₂ retention, even impending respiratory failure.

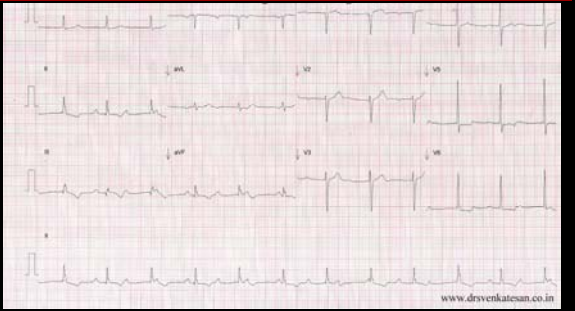
13

Case B

- A 70 year-old male complains of general weakness for 1 day.
- Vital signs: BP 112/70 mmHg, PR 61 bpm, RR 22/min, BT 39.9°C, SpO₂ 95%. GCS E4M6V5
- PMH: Hypertension with medications

14

Case B



15

Case B

- Different vital signs should be integrated together instead of reading separately!
- Everyone's normal range may not be the individual's “normal range”.
- In case B, TTAS II → Should be modified as **Triage I**

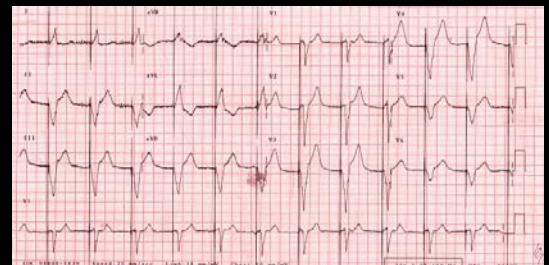
16

Case C

- A 77 year-old female has been noted tarry stool for 1 day.
- Vital signs: BP 106/78 mmHg, PR 69 bpm, RR 24/min, BT 36.2°C, SpO₂ 96%. GCS E3M6V3-4
- PMH:
 - Dementia for 5 years
 - some kind of heart problem (according to her Indonesia care-giver)

17

Case C



18

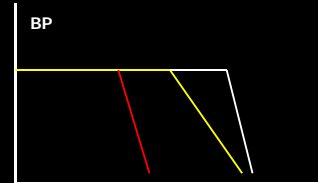
Case C

- Those who lack adequate compensation mechanisms
 - Known sympathovagal imbalance
 - Diabetes: sympathovagal imbalance
 - Drugs: Beta-adrenergic agents
 - Extreme elderly
 - Pacemaker for symptomatic bradycardia
 - Heart transplant recipients

19

Case C

- Those who have too good compensation mechanisms
 - Little kids
 - Athlete



20

Triage Decision Scheme (Trauma)

- STEP 1: Measure Vital Signs and Level of Consciousness
 - GCS<14
 - SBP<90
 - RR<10 or >29 (<20 for infant less than 1y)
 - RTS<11
 - PTS<9

21

Triage Decision

RTS

Revised Trauma Scoring			
Glasgow Coma Scale	Systolic Blood Pressure, mm Hg	Respiratory Rate, Breaths/Min	Revised Trauma Score
13-15	>89	10-29	4
9-12	76-89	>29	3
6-8	50-75	6-9	2
4-5	1-49	1-5	1
3	0	0	0

22

Triage Decision

RTS

Revised Trauma Score - Table 1					
Glasgow Coma Scale	Systolic Blood Pressure, mm Hg	Respiratory Rate, Breaths/Min	Revised Trauma Score	Glasgow Coma Scale	Systolic Blood Pressure, mm Hg
13-15	>89	10-29	4	13-15	>89
9-12	76-89	>29	3	9-12	76-89
6-8	50-75	6-9	2	6-8	50-75
4-5	1-49	1-5	1	4-5	1-49
3	0	0	0	3	0

REVISED TRAUMA SCORE FAST REFERENCE CHART

23

Triage Decision

PTS

Table 1. Pediatric Trauma Score			
Patient features	+2	+1	-1
Size (kg)	> 20	10-20	< 10
Airway	Patent	Maintainable	Non maintainable
Systolic BP	> 90	50-90	< 50
Mental status	Awake	Obtunded	Comatose
Open wound	None	Minor	Major
Extremity fracture	None	Close	Open or multiple

24

Triage Decision Scheme

STEP 2: Anatomic and Physiologic Approach

- All penetrating injuries to head, neck, torso, and extremities proximal to elbow and knee
- Flail chest
- Two or more proximal long-bone fractures
- Crush, degloved, or mangled extremity
- Amputation proximal wrist/ankle
- Pelvic fractures
- Open and depressed skull fractures
- Limb paralysis
- Combined with burn

25

Triage Decision Scheme

STEP 3: Trauma Mechanisms

- Falls
 - Adults: >20 ft (1 story = 10 ft)
 - Children: >10 ft or 2 or 3 times the height of the child
- High-risk auto crash
 - Intrusion into passenger compartment >12 inches (30cm); occupant site: > 18 in, any site
 - Major auto deformity >20 inches (50cm)
 - Extrication time > 20 minutes
 - Ejection (partial or complete) from auto
 - Death in same passenger compartment
 - Vehicle telemetry data consistent with high risk of injury (Initial speed >40mph (64 kph))
 - Auto vs. Pedestrian / bicyclist thrown, run over, or with significant (>20 mph) impact
 - Auto-pedestrian injury with > 5mph (8kph) impact
 - Motorcycle crash > 20 mph (32 kph) or with separation of rider and bike

26

Triage Decision Scheme

STEP 4: Special Patient or System Considerations

- Age
 - Older adults: Risk of injury / death increases after age 55
 - Children: Should be triaged preferentially to pediatric-capable trauma centers (<5 y)
- Anticoagulant and bleeding disorders
- Time-sensitive extremity injury
- Pregnancy >20 wks
- EMS provider judgment
- End-stage renal disease requiring dialysis
- Immunosuppressed patients
- Cardiac disease; respiratory disease
- Insulin-dependent diabetes; cirrhosis; morbid obesity

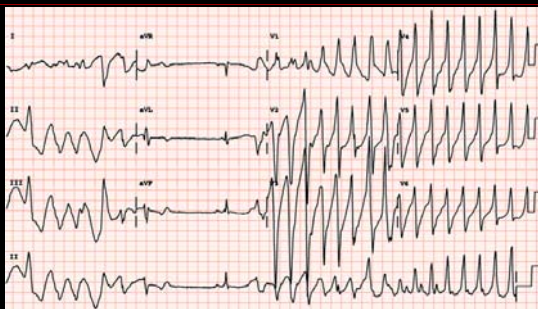
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Case D

- A 26-year-old female has found falling down 20 minutes ago. She regained consciousness 3 minutes later.
- Vital signs: BP 120/68, PR 62, RR 20, BT 35.8, SpO2 98% GCS E4M6V5
- PMH: PID/leukorrhea under treatment

28

Case D



29

Case D

- Long QT syndrome (LQTS)

Type of LQTS	Chromosomal Locus	Mutated Gene	Ion Current Affected
LQT1	11p15.5	KVLQT1 or KCNQ1 (heterozygote)	Potassium (I_{Kr})
LQT2	7q35-36	HERG, KCNH2	Potassium (I_{Kr})
LQT3	3p21-24	SCN5A	Sodium (I_{Na})
LQT4	4q35-27	ANKK2, ANKB	Sodium, potassium and calcium
LQT5	21q22.1-22.2	KCNE1 (heterozygote)	Potassium (I_{Kr})
LQT6	21q22.1-22.2	MIRP1, KCNE2	Potassium (I_{Kr})
LQT7 (Anderson syndrome)	17q23.1-q24.2	KCNJ2	Potassium (I_{Kr})
LQT8 (Timothy syndrome)	12q13.3	CACNA1C	Calcium (I_{CaT})
LQT9	3p25.3	CAV3	Sodium (I_{Na})
LQT10	11q23.3	SCN4B	Sodium (I_{Na})
LQT11	7q21-q22	AKAP9	Potassium (I_{Kr})
LQT12		SNTA1	Sodium (I_{Na})
JLN1	11p15.5	KVLQT1 or KCNQ1 (homozygotes)	Potassium (I_{Kr})
JLN2	21q22.1-22.2	KCNE1 (homozygotes)	Potassium (I_{Kr})

30

Case D

- Acquired long QT
 - Antibiotics
 - Antidepressants
 - Antifungals
 - Antihistamines
 - Diuretics
 - Heart medications
 - Lipid-lowering medications
 - Oral hypoglycemics (for diabetes)
 - Psychotropic medications

31

Case D

- Medications that triggers TdP in inherited LQTS
 - Appetite suppressants
 - Bronchodilators
 - Catecholamines
 - Certain common antibiotics (e.g., erythromycin)
 - Decongestants
 - Uterine relaxants
 - Vasoconstrictors

32

Case D

- Conscious Change
 - GCS 14-15 → TTAS Triage III-V
 - GCS 9-13 → TTAS Triage II
 - GCS 3-8 → TTAS Triage I
- Syncope right now or just before
 - Always implicates Triage I
 - TTAS Triage III-V (can be modified as Triage I)

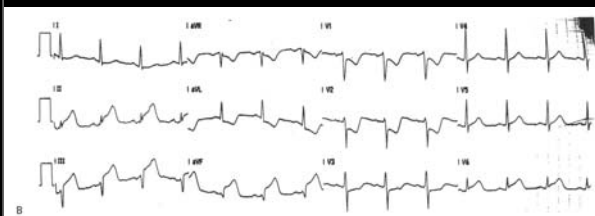
33

Case E

- A 45-year-old male complains of chest pain and cold sweating for 30 minutes
- Vital signs: BP 140/82, PR 80, RR 18, BT 36.5, SpO2 97% GCS E4M6V5
- PMH: smoking

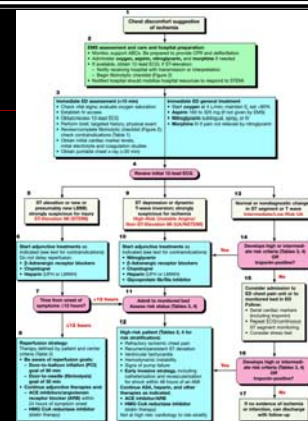
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Case E



35

Case E

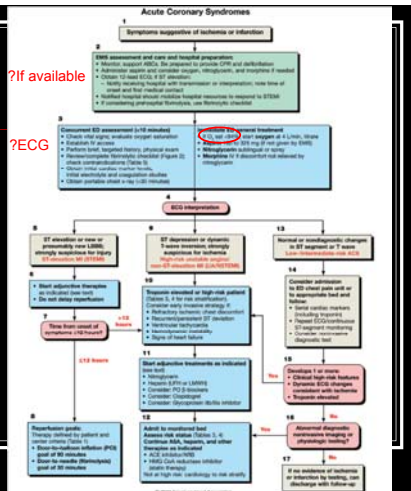


Circulation 2005;112:IV-89-IV-110

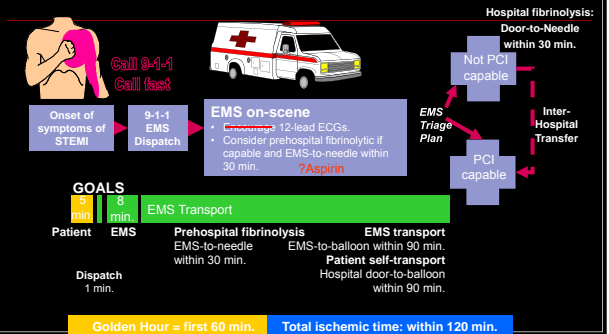
Learn and Live

ACS Algorithm

- Morphine
 - I → IIa
- Avoid hyperoxemia
- Beta blocker
 - Early iv → oral 24h after hospitalization



Options for Transport of Patients With STEMI and Initial Reperfusion Treatment



ESC STEMI Guidelines 2012

PG Steg (Hôpitaux de Paris, France)

ESC 2012

- The new document supplants the guidelines released in 2008 and complements the non-STEMI treatment guidelines released at the ESC 2011 Congress.
- It is hoped that better coordination and organization of STEMI care will reduce delays in the treatment of this urgent population.
- The new standard for time from medical contact to ECG is 10 minutes, and target time to primary PCI should be 60 minutes. Two hours is the limit of acceptable delay for a patient transferred from a non-PCI center to a PCI center, but the target should be 90 minutes.
- If PCI within two hours of presentation appears to be impossible, then fibrinolysis should be administered within 30 minutes.
- If fibrinolysis succeeds, angiography can begin with the expectation of PCI within three to 24 hours. If fibrinolysis fails, the interventionalist should consider PCI immediately.

the heart.org

New ESC STEMI Guidelines

Further guideline recommendations:

- Interventionalists should monitor and report their performance, including door-to-balloon times and any other treatment delays.
- Implanting drug-eluting instead of bare-metal stents in patients who are not contraindicated for dual antiplatelet therapy and are likely to stick to their prescribed regimen. The guidelines advise newer antiplatelet drugs, such as prasugrel or ticagrelor, over clopidogrel.
- The guidelines also support employing transradial catheterization rather than the transfemoral approach, but only in the hands of experienced operators.
- Areas in need of further research are identified in the guidelines—such as questions about early prehospital care to long-term management.

the heart.org

ESC STEMI Guidelines 2012: Commentary*

"[The new guidelines] emphasize the need to have geographic networks to care for patients so that the decisions and protocols are not simply coordinated at one site or one department, but across geographic regions between the various stakeholders.

"[They are] much more demanding [than the 2008 guidelines] in terms of delays. The new standard for time from medical contact to ECG is 10 minutes, and the fact that you use primary PCI should not lead to complacency about the delays. You should target 60 minutes.

"If I had to pick one area as the most critical, I'd highlight the challenge of integrating the various concomitant drug therapies, especially triple therapy in stent recipients who have to have anticoagulation. That's a vexing clinical problem for which we have very little data."

- Dr Gabriel Steg

*All comments from New European STEMI guidelines emphasize care coordination (<http://www.theheart.org/article/1438277.do>)

the heart.org

Case E

Role of Emergency Physician on STEMI

- Prompt and Correct Diagnosis
 - Atypical presentations: DM, Female, Elderly, medical modifications
 - Unusual ECG findings: hyperacute T, BBB
- Successful Resuscitation for Witnessed VF/VT (Cardiac Arrest)
 - Peak of VF/VT vs. AMI
- Always implicates Triage I
 - TTAS Triage II (can be modified as Triage I)

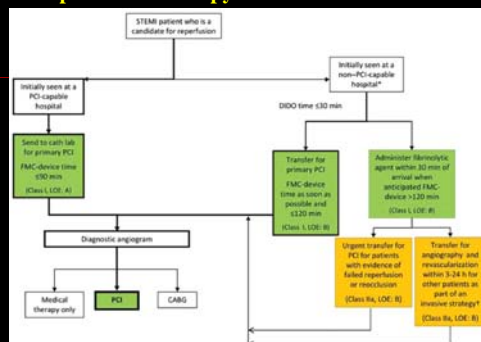
Case E

■ Role of Cold Sweating

- Excessive Activation of Sympathetic Tone
- Extreme Physical Stress
- Atypical Presentations: Masking by Underlying Conditions or Medications
- Always implicates **Triage I**
 - TTAS Triage II (can be modified as Triage I)

43

Reperfusion Therapy for Patients with STEMI



*Patients with cardiogenic shock or severe heart failure initially seen at a non-PCI-capable hospital should be transferred for cardiac catheterization and revascularization as soon as possible, irrespective of time delay from MI onset (Class I, LOE B). †Angiography and revascularization should not be performed within the first 2 to 3 hours after administration of fibrinolytic therapy.

44

Adjunctive Antithrombotic Therapy to Support Reperfusion With Primary PCI

	COR	LOE
Antiplatelet therapy		
Aspirin		
• 162- to 325-mg load before procedure	I	B
• 81- to 325-mg daily maintenance dose (indefinite)*	I	A
• <u>81 mg daily</u> is the preferred maintenance dose*	IIa	B
P2Y₁₂ inhibitors		
Loading doses		
• Clopidogrel: 600 mg as early as possible or at time of PCI	I	B
• Prasugrel: 60 mg as early as possible or at time of PCI	I	B
• Ticagrelor: 180 mg as early as possible or at time of PCI	I	B

*The recommended maintenance dose of aspirin to be used with **ticagrelor** is 81 mg daily.

45

Adjunctive Antithrombotic Therapy to Support Reperfusion With Primary PCI (cont.)

	COR	LOE
P2Y₁₂ inhibitors		
Maintenance doses and duration of therapy		
DES placed: Continue therapy for 1 y with:		
• Clopidogrel: 75 mg daily	I	B
• Prasugrel: 10 mg daily	I	B
• Ticagrelor: 90 mg twice a day*	I	B
BMS† placed: Continue therapy for 1 y with:		
• Clopidogrel: 75 mg daily	I	B
• Prasugrel: 10 mg daily	I	B
• Ticagrelor: 90 mg twice a day*	I	B
DES placed:		
• Clopidogrel, prasugrel, or ticagrelor* continued beyond 1 y	IIIb	C
• Patients with STEMI with prior stroke or TIA: prasugrel	III, Harm	B

*The recommended maintenance dose of aspirin to be used with **ticagrelor** is 81 mg daily.
†Balloon angioplasty without stent placement may be used in selected patients. It might be reasonable to provide P2Y₁₂ inhibitor therapy to patients with STEMI undergoing balloon angioplasty alone according to the recommendations listed for BMS. (LOE: C).

46

Adjunctive Antithrombotic Therapy to Support PCI After Fibrinolytic Therapy

	COR	LOE
Antiplatelet therapy		
Aspirin		
• 162- to 325-mg loading dose given with fibrinolytic agent (before PCI). (Section 5.1.4.1 and Table 7)	I	A
• 81- to 325-mg daily maintenance dose after PCI (indefinite)	I	A
• 81 mg daily is the preferred daily maintenance dose	IIa	B
P2Y₁₂ receptor inhibitors		
Loading doses		
For patients who received a loading dose of clopidogrel with fibrinolytic therapy:		
• Continue clopidogrel 75 mg daily without an additional loading dose	I	C
For patients who have not received a loading dose of clopidogrel:		
• If PCI is performed ≤24 h after fibrinolytic therapy: clopidogrel 300-mg loading dose before or at the time of PCI	I	C
• If PCI is performed >24 h after fibrinolytic therapy: clopidogrel 600-mg loading dose before or at the time of PCI	I	C
• If PCI is performed >24 h after treatment with a fibrin-specific agent or >48 h after a non-fibrin-specific agent: prasugrel 60 mg at the time of PCI	IIa	B
For patients with prior stroke/TIA: prasugrel	III, Harm	B

47

Adjunctive Antithrombotic Therapy to Support PCI After Fibrinolytic Therapy (cont.)

	COR	LOE
P2Y₁₂ receptor inhibitors		
Maintenance doses and duration of therapy		
DES placed: Continue therapy for at least 1 y with:		
• Clopidogrel: 75 mg daily	I	C
• Prasugrel: 10 mg daily	IIa	B
BMS* placed: Continue therapy for at least 30 d and up to 1 y with:		
• Clopidogrel: 75 mg daily	I	C
• Prasugrel: 10 mg daily	IIa	B

*Balloon angioplasty without stent placement may be used in selected patients. It might be reasonable to provide P2Y₁₂ inhibitor therapy to patients with STEMI undergoing balloon angioplasty after fibrinolysis alone according to the recommendations listed for BMS. (Level of Evidence: C)

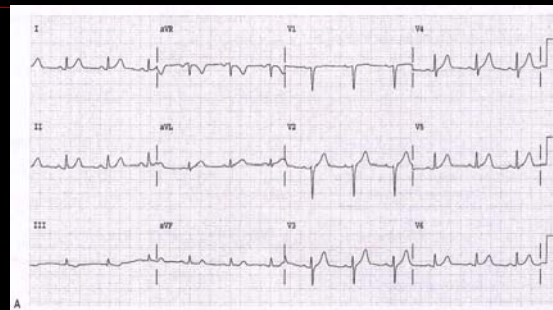
48

Case F

- A 60-year-old female complains sudden onset of epigastralgia 30 minutes ago
- Vital signs: BP 126/74, PR 75, RR 22, BT 36.3, SpO2 95% GCS E4M6V5
- PMH: diabetes under OHA for 7 years

49

Case F



50

Case F

- Unusual presentations
 - Sudden onset
 - Severe symptoms that never experienced
 - Extreme gaps between symptoms and signs
 - Sense of dying (or end of the world)
 - Illusion or hallucination of ghosts / gods
- Esp. in
 - those with atypical presentations
 - Low socio-economic status or special culture background

51

AHA/ACCF recommendations of OAPs in ACS

Guidelines	OAP	COR	LOE	Recommendations
STEMI (2013) [1]	Ticagrelor	I	B	1. In patients subjected to primary PCI, a 180mg ticagrelor loading should be given as early as possible or at time of PCI. 2. In patients receiving a BMS or DES during PCI for STEMI for 1 year
NSTEMI/UA (2012) [2]	Ticagrelor	I	B	1. Patient at medium or high risk and in whom an initial invasive strategy is selected should receive dual antiplatelet therapy, ticagrelor before PCI and at the time of PCI. 2. Loading dose of ticagrelor 180mg should be given as early as possible. 3. Ticagrelor 90mg twice daily should be given for at least 12 months.
ACS-PCI (2011) [3]	Ticagrelor	I	A	Patients with an initial conservative strategy selected should be given ticagrelor added to aspirin and anticoagulant therapy as soon as possible after admission and administered for up to 12 months.

1. Circulation 2013; [in Press]

2. Circulation 2012;126:875

3. J Am Coll Cardiol 2011;58:2432

52

ESC recommendations of OAPs in ACS

2011	ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation [1]	I	B
	Ticagrelor (180-mg loading dose, 90 mg twice daily) is recommended for all patients at moderate-to-high risk of ischaemic events (e.g. elevated troponins), regardless of initial treatment strategy and including those pre-treated with clopidogrel (which should be discontinued when ticagrelor is commenced).		
	Clopidogrel (300-mg loading dose, 75-mg daily dose) is recommended for patients who cannot receive ticagrelor or prasugrel.	I	A
 Ticagrelor is the preferred drug from our point of view because it reduces mortality. It's better than clopidogrel..... - Christian W. Hamm, Chairperson		
2012	ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation [2]		
	An ADP-receptor blocker is recommended in addition to aspirin. Options are:		A
	• Prasugrel in clopidogrel-naïve patients, if no history of prior stroke/TIA, age <75 years.	I	B
	• Ticagrelor.	I	B
	• Clopidogrel, preferably when prasugrel or ticagrelor are either not available or contraindicated.	I	C
The preferred ADP-receptor blockers are prasugrel or ticagrelor; these drugs have a more rapid onset of action and greater potency and have proved superior to clopidogrel in large outcome trials.....		

1. Eur Heart J 2011;32:2999

2. Eur Heart J 2012;33:2569

53

Case G

- A 25-year-old female complains gradual onset of headache and general weakness for 1 hour. She found her cat also sick.
- Vital signs: BP 98/54, PR 98, RR 22, BT 36.3, SpO2 98% GCS E4M6V5
- PMH: Nil

CO Intoxication

54

Case G

■ Limitations of Pulse Oximetry

- motion artifact
- abnormal hemoglobins (primarily carboxyhemoglobin [COHb] and met-hemoglobin [methb])
- intravascular dyes
- exposure of measuring probe to ambient light during measurement
- low perfusion states
- skin pigmentation
- nail polish or nail coverings with finger probe
- inability to detect saturations below 83% with the same degree of accuracy and precision seen at higher saturations
- inability to quantitate the degree of hyperoxemia present
- Hyperbilirubinemia has been shown *NOT* to affect the accuracy of SpO₂ readings

55

Case G

■ Hypoxia

- Hypoxemia (reduced arterial oxygen content)
 - a. Reduced PaO₂
 - b. Reduced SaO₂
 - c. Reduced hemoglobin content (anemia)
- Reduced oxygen delivery
 - a. Reduced cardiac output
 - b. Leftto right systemic shunt (e.g., septic shock)
- Decreased tissue oxygen uptake
 - a. Mitochondrial poisoning (e.g., cyanide)
 - b. Leftshifted hemoglobin dissociation curve (e.g., abnormal hemoglobin structure)

56

Case G

■ Hypoxia

Table 8-6 A Classification of the Causes of Hypoxia

Classification	PaO ₂	PiO ₂	CaO ₂	PvO ₂	CvO ₂	Increased P ₅₀ helpful?
Hypoxic hypoxia	Low	Low	Low	Low	Low	Yes
Low alveolar P _{O2}	Low	Low	Low	Low	Low	Yes
Diffusion impairment	Normal	Low	Low	Low	Low	Yes
Right-to-left shunts	Normal	Low	Low	Low	Low	No
V/Q mismatch	Normal	Low	Low	Low	Low	Yes
Anemic hypoxia	Normal	Normal	Low	Low	Low	No
CO poisoning	Normal	Normal	Low	Low	Low	Possibly
Hypoperfusion	Normal	Normal	Normal	Low	Low	No
Hypoxia	Normal	Normal	Normal	High	High	No
Historic hypoxia	Normal	Normal	Normal	High	High	No

57

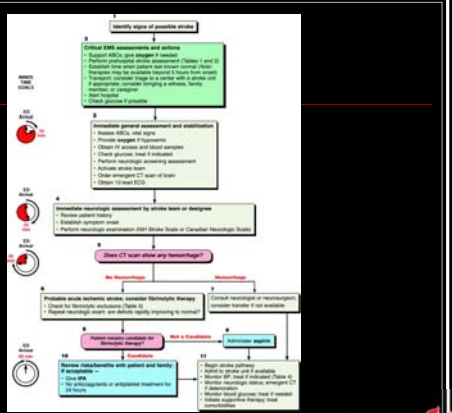
Case H

- A 68-year-old male was noted to have acute onset of right-sided weakness and speech difficulty 45 minutes ago.
- Vital signs: BP 170/122, PR 64, RR 22, BT 36.0°C, SpO₂ 96% GCS E4M6V5
- PMH: Nil

58

Case H

Seven D's

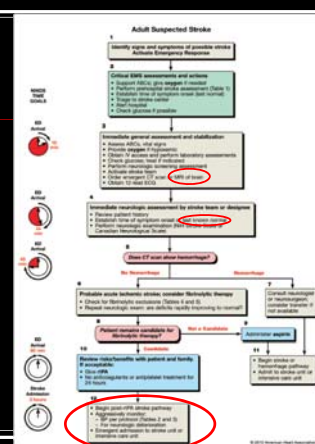


Circulation 2005;112:IV-111-IV-120

Learn and Live

Acute Stroke Algorithm (AHA)

Seven D's ↓ Eight D's



60

Case H

■ Other presentations?

- Dizziness, vertigo?
- Neck pain?
- Headache?
- Conscious change?
-

61

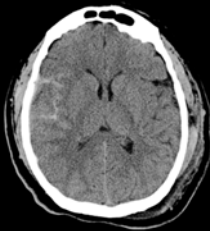
Case I

- A 21-year-old female complains sudden onset of severe headache (grade 10/10) for 1 hour.
- Vital signs: BP 140/96, PR 70, RR 24, BT 36.5°C, SpO2 98% GCS E4M6V5
- PMH: Nil

62

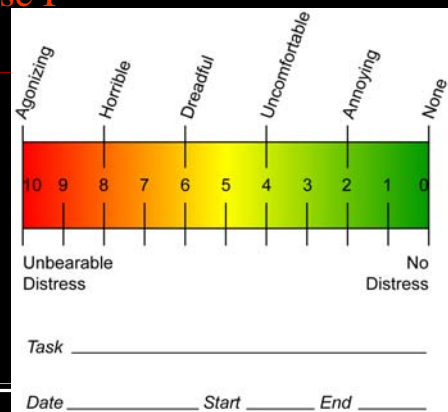
Case I

Pain Scale is Usually Under-estimated!



63

Case I



64

Case I

■ Life-Threatening Pain

- AMI, DAA, PE, Cardiac Tamponade, Tension Pneumothorax, Esophageal Rupture
- Hollow organ perforation, SMA Occlusion, Internal Hernia
- Necrotizing Fasciitis
- SAH

■ Organ-Threatening Pain

- Glaucoma
- PAOD

65

Case J

- A 45-year-old female was injured by her husband 1 hour ago. Multiple bruising over her trunk and left forearm deformity were noted.
- Vital signs: BP 122/68, PR 95, RR 22, BT 35.6°C, SpO2 98% GCS E4M6V5
- PMH: Nil

66

Case J

- Social Indication as Triage I
 - Domestic Violence
 - Child Abuse
 - Sexual Assault
 - Attempted Homicide
- Highly Clinical Suspicion
- Usually Under-triaged

67

Case J

- Child Abuse
 - Screening
 - More than 3 episodes of trauma from ED recordings
 - Inconsistent medical history
 - Inconsistence between history and physical findings
 - Delayed transportation / consultation
 - Any fracture or head injury for those < 1y

68

Case J

- Child Abuse
 - Physical Findings
 - Skin: Blunt Injury, Burn, Bite
 - Face: Raccoon Eye, ENT, Teeth, Lip, Hair
 - Head: Abusive Head Injury, Shaken Baby
 - Abdomen: Liver Laceration, Duodenal Hematoma, Traumatic Pancreatitis, Mesentery Laceration
 - Fracture:
 - Much younger; Multiple; Varying stages; Spiral or Oblique
 - Eg: post. ribs; scapula; sternum; complex skull

69

Case J

- Child Abuse
 - High Specificity (for example)
 - Metaphyseal fractures
 - Rib fractures
 - Scapular fractures
 - Fractures of the outer end of the clavicle
 - Fractures of differing ages
 - Vertebral fractures or subluxation
 - Digital injuries in non-mobile children
 - Bilateral skull fractures
 - Complex skull fractures

70

Case K

- A 70-year-old patient was transferred to our ED under the diagnosis of ACS. His present chief complaint is SOB for more than 2 days (R1 recorded). He consulted another ED and has gotten the treatment of Clexane for 2 days.
- BP 136/72, PR 100/min, RR 18/min, SpO2 97%, GCS E4M6V5
- PMH: Hypertension

71

Case K



72

Case K

- MONA
- ECG Monitoring
- Continue Bokey, Clexane

73

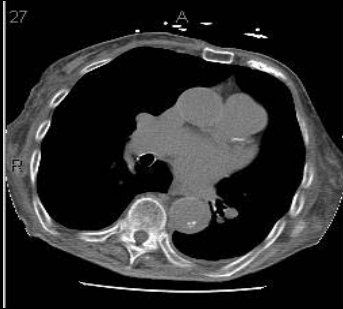
Case K

- Review his history, sudden-onset unexperienced chest pain that radiated from anterior chest to middle back with cold sweating was noted initially 3 days ago.

TASUM-1

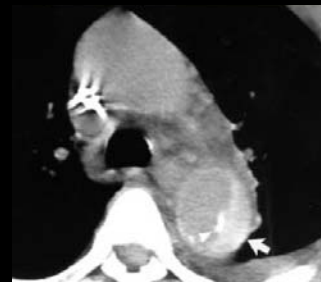
74

Case K



75

Case K



Crescent Sign

76

Case K

- Inter-Hospital Transfer
 - Usually treated as Triage I
 - Over-triage rather than Under-triage
- Complete history taking
 - From the very beginning
 - Chief complaint at the 1st visit
 - Complete exclusion or NOT
 - Life-threatening chest pain
 - ACS
 - DAA
 - PE
 - Tension pneumothorax
 - Cardiac tamponade
 - Esophageal rupture

77

Case L

- A 63-year-old male suffered from sudden onset of left eye blindness.
- BP 158/92, PR 84/min, RR 20/min, SpO2 96%, GCS E4M6V5
- PMH: DM and Hypertension for 10 years

TIAS?

78

Case L

Amaurosis Fugax

- Embolic and hemodynamic origin
 - Atherosclerotic carotid artery
 - Atherosclerotic ophthalmic artery
 - Cardiac emboli due to (1) atrial fibrillation, (2) valvular abnormalities including post-rheumatic valvular disease, mitral valve prolapse, and a bicuspid aortic valve, and (3) atrial myxomas.
 - Temporary vasospasm
 - Giant cell arteritis
 - Systemic lupus erythematosus
 - Periarteritis nodosa
 - Eosinophilic vasculitis
 - Hyperviscosity syndrome
 - Polycythemia
 - Hypercoagulability
 - Protein C deficiency
 - Antiphospholipid antibodies
 - Anticardiolipin antibodies
 - Lupus anticoagulant
 - Thrombocytosis
 - Subclavian steal syndrome
 - Malignant hypertension
 - Drug abuse-related intravascular emboli
 - Iatrogenic

79

Case L

Amaurosis Fugax

- Ocular origin
 - Iritis
 - Keratitis
 - Blepharitis
 - Optic disc drusen
 - Posterior vitreous detachment
 - Closed-angle glaucoma
 - Transient elevation of intraocular pressure
 - Intraocular hemorrhage
 - Coloboma
 - Myopia
 - Orbital hemangioma
 - Orbital osteoma
 - Keratocconjunctivitis sicca
- Neurological origin
 - Optic neuritis
 - Compressive optic neuropathies
 - Papilledema
 - Multiple Sclerosis
 - Migraine
 - Pseudotumor cerebri
 - Intracranial tumor
 - Psychogenic

80

Case M

- A 12-year-old boy was sent to ED due to progressive dyspnea for several hours. He was just discharged 1 week ago after successful extubation.
- BP 110/66, PR 120/min, RR 28/min, SpO2 92%, GCS E4M6V5. No wheezing
- PMH: Asthma

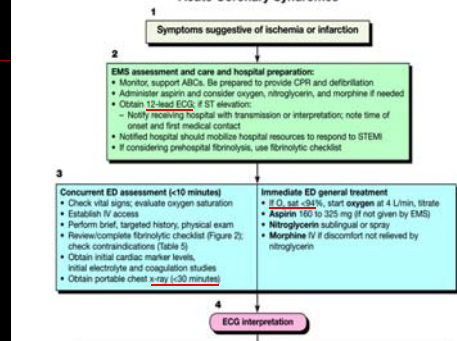
81

ACS Pitfalls

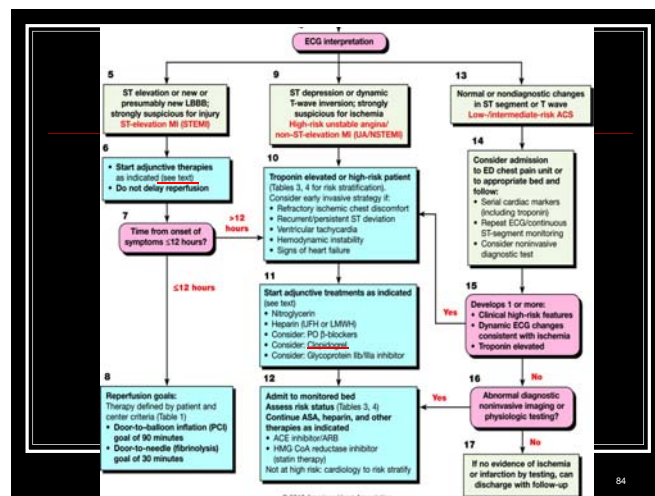
- Absence of typical chest pain
- Chest wall tenderness can exclude cardiac ischemia
- Assumption that a young patient could not have ACS
- Assumption that a normal ECG rules out cardiac ischemia
- Fail to identify AMI in presence of LBBB or ventricular arrhythmia
- Discharge patients after a single set of negative cardiac enzyme
- Missed RV infarct in inferior STEMI
- ...

82

Acute Coronary Syndromes



83



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84

Current Status of ACS Management

- ECG within 10 min
 - *At first FMC: EMT transport time <8 min*
 - *At arrival: Atypical presentations*
- Aspirin use
 - *Tablets or Capsules*
 - *Timing: at first min or at last min during ER stay*
- Double anti-platelet
 - *Choice of drug*
 - *If contra-indication (+)? : e.g. Viagra etc.*
 - *Timing*

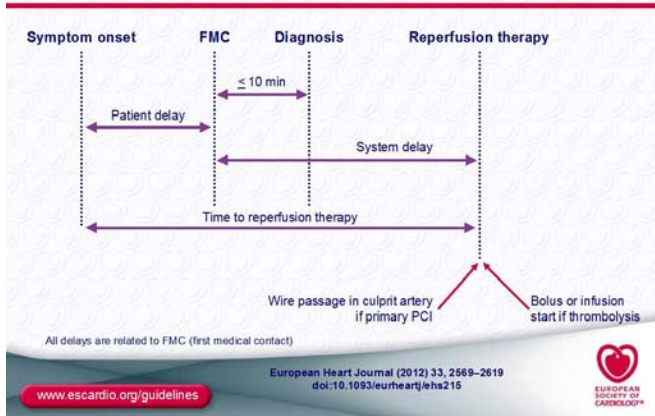
85

Further Problems of Anti-Platelet

- If patients have already used anti-platelet
 - *No: Aspirin 160-325 mg + Brilinta or Plavix loading*
 - *Yes: Aspirin or Plavix resistance?*
- If patients have already used double anti-platelets
 - *No (just single aspirin use): Aspirin resistance? → Still Aspirin 160-325 mg + Brilinta or Plavix loading?*
 - *Yes (usually aspirin + Plavix): Aspirin / Plavix resistance? → Aspirin 160-325 mg + Brilinta (or Plavix?) loading?*

86

Components of delay in STEMI and ideal time intervals for intervention



Thanks for Your Attention

88