# EVERY DAY CASE

DR / KHALED EL TOHAMY
CONSULTANT OF CARDIOLOGY ( NHI )

## History

55 female patient ,obese with a history of hypertension 10 years ago and type II diabetes 5 years ago, presented to ER with exertional dyspnea for 2 weeks progressed to SOB at rest with orthopnea , PND with no chest pain .

# Examination

- **Vital data**
  - Temperature: 36.5 °C
  - Blood pressure 180/90
  - pulse 95 regular equal in both sides
  - Respiratory rate: 22/min
  - Oxygen saturation while breathing in ambient air 90 %

## Physical Examination

- ***General :*** alert, awake, and oriented but slightly agitated
- ***Neck :*** slight jugular venous distention, no lymphadenopathy, and no carotid murmur
- ***Cardiovascular :*** S1,S2 , S4 no murmurs

## Physical Examination (Cont.)

- **Lungs :** breath sounds diffusely decreased, in particular at the lung bases, and rales up to medium shots bilaterally.
- **Abdomen :** plain, no pulsatile masses, normal bowel sounds in all four quadrants, no High pitched or tinkling sounds, resonant to percussion , soft, non distended , non tender, no rebound or guarding, no hepatomegaly costal margin, no splenomegaly.
- **Neurological :** negative cerebellar test, cranial nerve intact, no focal deficit.

# Routine Laboratory Tests

- **Complete blood count :**

leukocytosis with neutrophilia (WBC 10.760/mmc, 91.20 % neutrophils),

hemoglobin 13.5 g/dl, and platelets 248,000/ mmc

- **Inflammatory markers :** ESR 29 mm/h and

CRP 0.6 mg/dl

- **Hepatic function :**

SGOT normal, SGPT withslight increase (61 U/l), γ-GT 121 U/l, and

ALP, total bilirubin (direct and indirect), and coagulation : normal

- **ABG :** performed in ambient air showed

pH = 7.41, pO2 = 58 mmHg , pCO 2 = 40 mmHg

- **Normal renal function** ,creatinine 0.82 mg/dl, BUN 38 mg/dl, eGFR 92.8 ml/min/1.73 m 2 )
- **Electrolytes**(Na + , K + , Ca ++ , Mg ++ , Cl − ) : normal
- **Fasting blood glucose:** 179 mg/dl
- **Myocardial necrosis markers :** normal CK-MB and Hs-TnI 0.059 ng/ml (n.v. 0–0.055)
- **BNP :** 744 pg/ml
- **Thyroid function:** normal TSH , ( fT4 and fT3 ) 2.10 pg/ml

(n.v. 2.2–4.2 pg/ml)

- **D-dimer :** negative

## Chest X-Ray :

X-ray showed cardiomegaly with signs compatible with lung congestion.

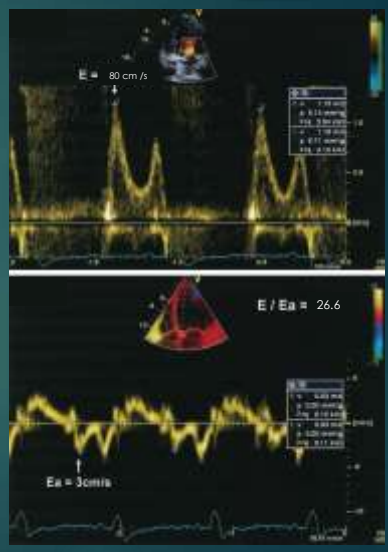
**EKG :** NSR with insignificant changes

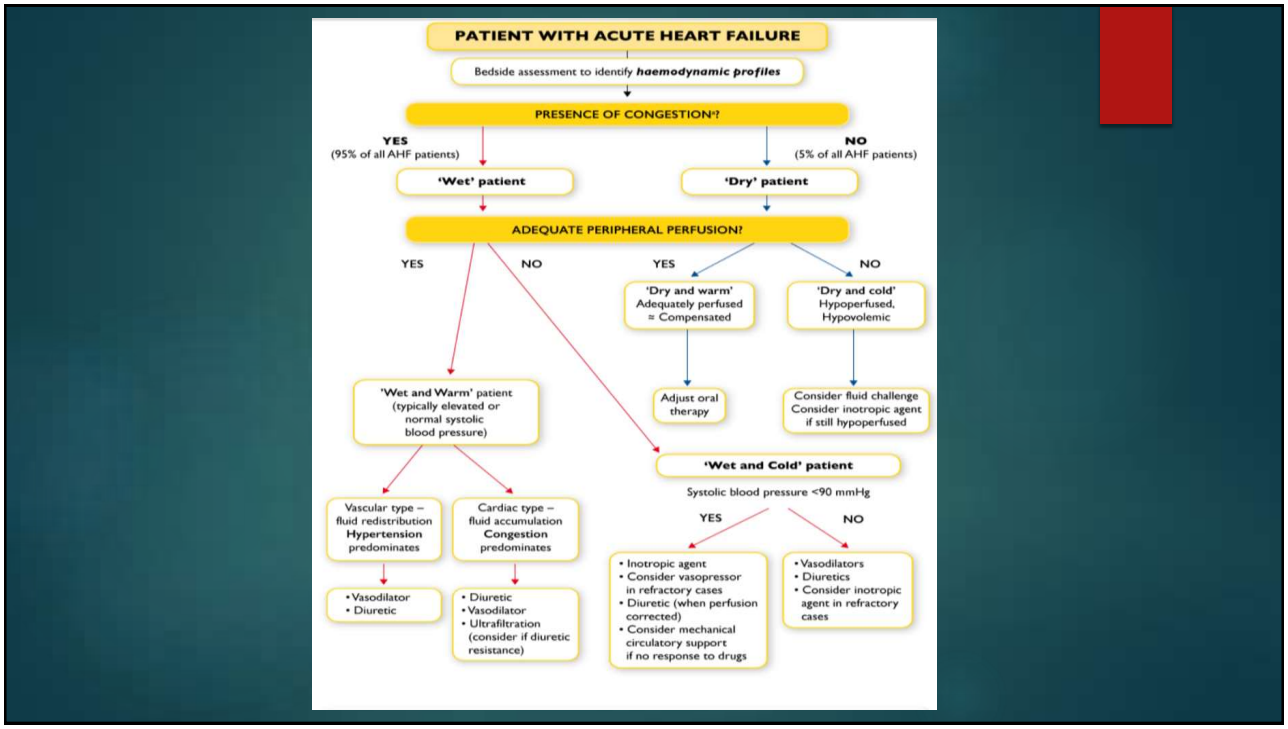
## Possible Causes of Worsening Dyspnea

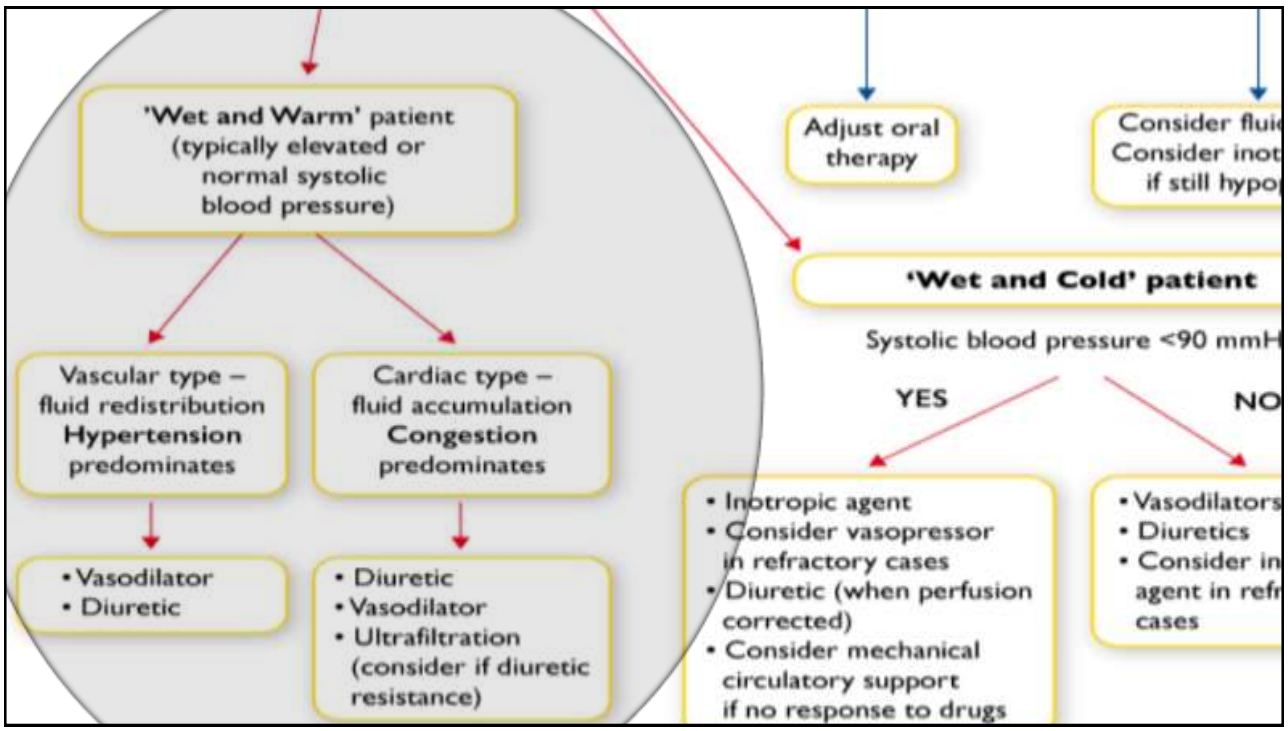
- Acute myocardial infarction
- Hypertensive emergency
- Arrhythmias
- Acute myopericarditis
- Lung diseases (bacterial pneumonia)
- ARDS
- Pulmonary embolism
- Valvular disease (acute mitral regurgitation)

## Echocardiography

- ❑ Normal lv internal dimensions with normal LV systolic function **( EF 65 % )**
- ❑ No SWMA
- ❑ **Concentric LVH**
- ❑ **Dilated left atrium**
- ❑ **Abnormal LV relaxation pattern ( grade 3 )**
- ❑ Normal mitral valve with mild MR
- ❑ Normal RT side
- ❑ No pericardial effusion




PATIENT WITH ACUTE HEART FAILURE
Bedside assessment to identify haemodynamic profiles
PRESENCE OF CONGESTION?
YES
(95% of all AHF patients)
NO
(5% of all AHF patients)
'Wet' patient
'Dry' patient
ADEQUATE PERIPHERAL PERFUSION?
YES
NO
YES
NO
'Dry and warm'
Adequately perfused
≈ Compensated
'Dry and cold'
Hypoperfused,
Hypovolemic
'Wet and Warm' patient
(typically elevated or
normal systolic
blood pressure)
Adjust oral
therapy
Consider fluid challenge
Consider inotropic agent
if still hypoperfused
'Wet and Cold' patient
Systolic blood pressure <90 mmHg
YES
NO
Vascular type –
fluid redistribution
Hypertension
predominates
Cardiac type –
fluid accumulation
Congestion
predominates
• Vasodilator
• Diuretic
• Diuretic
• Vasodilator
• Ultrafiltration
(consider if diuretic
resistance)
• Inotropic agent
• Consider vasopressor
in refractory cases
• Diuretic (when perfusion
corrected)
• Consider mechanical
circulatory support
if no response to drugs
• Vasodilators
• Diuretics
• Consider inotropic
agent in refractory
cases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## Goals of treatment in Acute heart failure

| |
|---|
| **Immediate (ED/ICU/CCU)** |
| Improve haemodynamics and organ perfusion. |
| Restore oxygenation. |
| Alleviate symptoms. |
| Limit cardiac and renal damage. |
| Prevent thrombo-embolism. |
| Minimize ICU length of stay. |
| **Intermediate (in hospital)** |
| Identify aetiology and relevant co-morbidities. |
| Titrate therapy to control symptoms and congestion and optimize blood pressure. |
| Initiate and up-titrate disease-modifying pharmacological therapy. |
| Consider device therapy in appropriate patients. |

# Initial Management

- The patient was then treated with **furosemide bolus and infusion of nitroglycerin**

to reduce high blood pressure initially encountered.

- **A CPAP** ( continuous positive airway pressure) was positioned and was set

FiO2 of 50 % and PEEP (positive end-expiratory pressure) of 10 cmH2O.

**The patient showed : -**

marked improvement of dyspnea, and blood gas analysis showed a significant increase in pO2 (pO2 = 58 mmHg → 139 mmHg).

**This favorable response to treatment could make us exclude a non-cardiogenic acute pulmonary edema (ARDS),**

which is characterized by severe hypoxemia refractory to increased FiO2 and reduced lung compliance.

## Coronary Angiography

- An invasive coronary angiography documented the absence of hemodynamically significant stenosis .

## According to these data : -

- Acute myocardial infarction
- Hypertensive emergency
- Arrhythmias
- Acute myopericarditis
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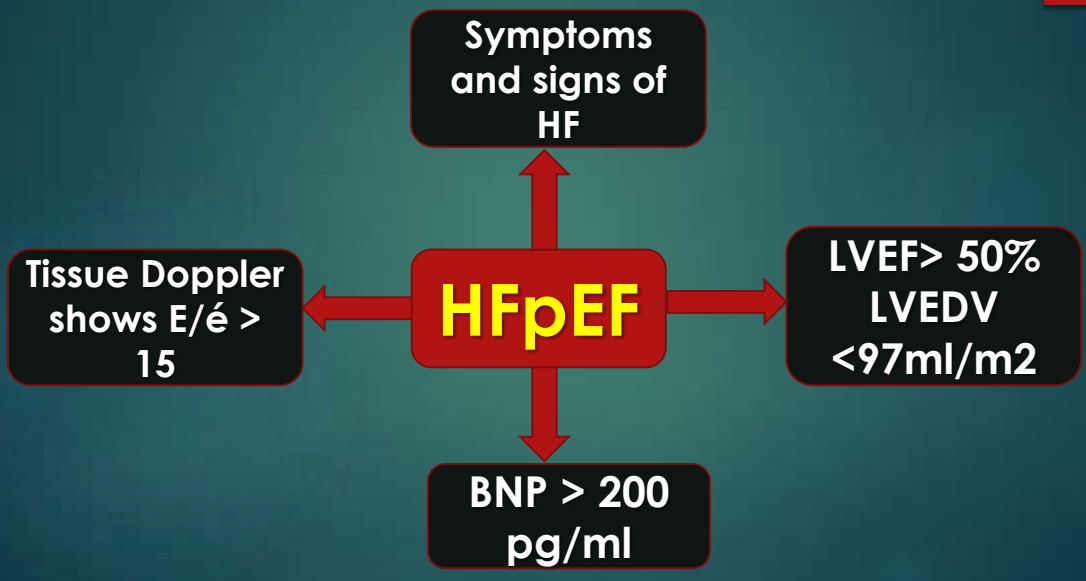
Associated with → **HFpEF**

# According to guidelines




HFpEF results from abnormalities of active &passive ventricular relaxation leading to decrease SV &COP.

High ventricular filling pressure stimulates release of ANP,BNP to inhibit RAS system with diuresis effects

BNP has protective effects on myocardium [prevent remodaling &fibrosis]

elevated levels of BNP correlated with more increased LV filling P&L V dysfunction

The prognosis is comparable with HFrEF& worsened by high level of BNP, old age , MI , DM

# AHA Guidelines 2017 update

**AHA Guidelines 2017 focused mainly on**

1 Biomarkers [BNP]

2 Uses of aldosterone antagonists

3 anemia

4 Hypertension management

5 Biomarkers of myocardial injury

# Biomarkers NP

**Prevention Utilizing NP as screening for those at risk for developing HF to optimizing medical therapy to prevent LV dysfunction**

[class ll a –level of evidence B]

**Diagnosis Measurement of NP for patients presented by dyspnea to support the diagnosis of HF or exclusion**

[class 1 level of evidence A]

**Prognosis Measurement of NP for establishing the prognosis ,severity of HF**

[class 1 level of evidence A]

Pre discharge Measurement of NP during hospitalization for post discharge prognosis

[class IIa level of evidence B]

Measurement biomarkers of myocardial injury in patients with chronic HF for additive risk stratification

[class IIa level of evidence B]

# Aldosterone Antagonists

Uses of aldosterone antagonists in selected patients with HFpEF [ EF >45% ,elevated NP ,GFR>30,Cr <2.5,serum K>5meq/L]for decrease hospitalization

[class IIa level of evidence B]

Routine uses of nitrates or phoso diasterase inhibitors for increase QoL

[class III level of evidence B] [No benefit]

Routine uses of nutritional supplements

[class III level of evidence B][ No benefit]

# Anemia

I V iron in patients with NYHA CLASS II-III with serum ferritin <100ng/ml or 100-300ng/ml with transferrin<20% to improve QoL

[class IIb level of evidence B]

Erythroprotein stimulating agents should not be used to improve morbidity and mortality

[class III level of evidence B]

# Hypertension

Optimal treatment of hypertension targeting B/P >130/80 mmhg in those patients with increased risk of AHF

[class I level of evidence B]

Titration of GDMT to attain SBP>130mmhg

[class I level of evidence C]

Titration of GDMT to attain SBP>130mmhgin patients HFpEF after treating volume overload

[class I level of evidence C]

# CHRONIC MANAGMENT

| Recommendations for treatment of patients with heart failure with preserved ejection fraction and heart failure with mid-range ejection fraction | | |
|---|---|---|
| **Recommendations** | **Class[a]** | **Level[b]** |
| It is recommended to screen patients with HFpEF or HFmrEF for both cardiovascular and non-cardiovascular co-morbidities, which, if present, should be treated provided safe and effective interventions exist to improve symptoms, well-being and/or prognosis. | I | C |
| Diuretics are recommended in congested patients with HFpEF or HFmrEF in order to alleviate symptoms and signs. | I | B |

## Take Home

- Diastolic heart failure is common , especially in elderly,hypertensive , females
- Symptoms are similar to systolic heart failure.
- Impaired LV relaxation results in stiffness of the left ventricle.
- BNP , ECG ,chest X ray and transthoracic ECHO are simple initial investigations .
- Treatment consists of diuretics and spironolactone as well as maintaining sinus rhythm and good blood pressure control .

# Thank You