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HEART FAILURE:
THE NIGERIAN STANDARDS AND PROTOCOLS- ACS 2023.

Dr. Iseko, Iseko I.

Consultant Physician/Interventional Cardiologist,

CardioCare Multispecialty Hospital,

Abuja-FCT, Nigeria.

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PreTest

1. What drugs expected to be a Mandatory part of Standard Heart Failure Therapy?
2. What are the components of a Complete Clinical Heart Failure Diagnosis?
3. List at least seven (7) signs to look out for during outpatient follow up of heart failure?
4. List at least five (5) danger signs in inpatient management of heart failure?
5. When is Device Therapy recommended in Heart Failure?
6. Intractable Heart Failure is often caused by?

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Case 1

- **52yr old Newly appointed Minister**
- Noticed **palpitations at rest**, and **inability to complete his usual golf game**, and **poor sleep** but attributes it to stress of the new office.
- His brother died last week in his sleep.
- **Never been told to have hypertension or diabetes.** Had a **checkup abroad 8 months ago** and nothing significant found.
- On examination, looks well, **not breathless**, leg does not look swollen but mild dimple after pressing for 5-10secs after removing his tight shoes.
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Poll 1: What do you think?

A. Lifestyle Modifications needed and review again in 2 weeks

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D. All of the above

E. I don't know jare, I need to evaluate further.

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What is Heart Failure?

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What is Heart Failure?

- **a chronic, progressive, neurohumoral syndrome perpetuating cardiac dysfunction** characterized during stress and/or at rest by:

  a. Dyspnoea, and

  b. Pulmonary and systemic venous congestion and/or

  c. Inadequate peripheral oxygen delivery,

  d. Shortened life expectancy.

Heart Failure is a Progressive Vicious Cycle!!!

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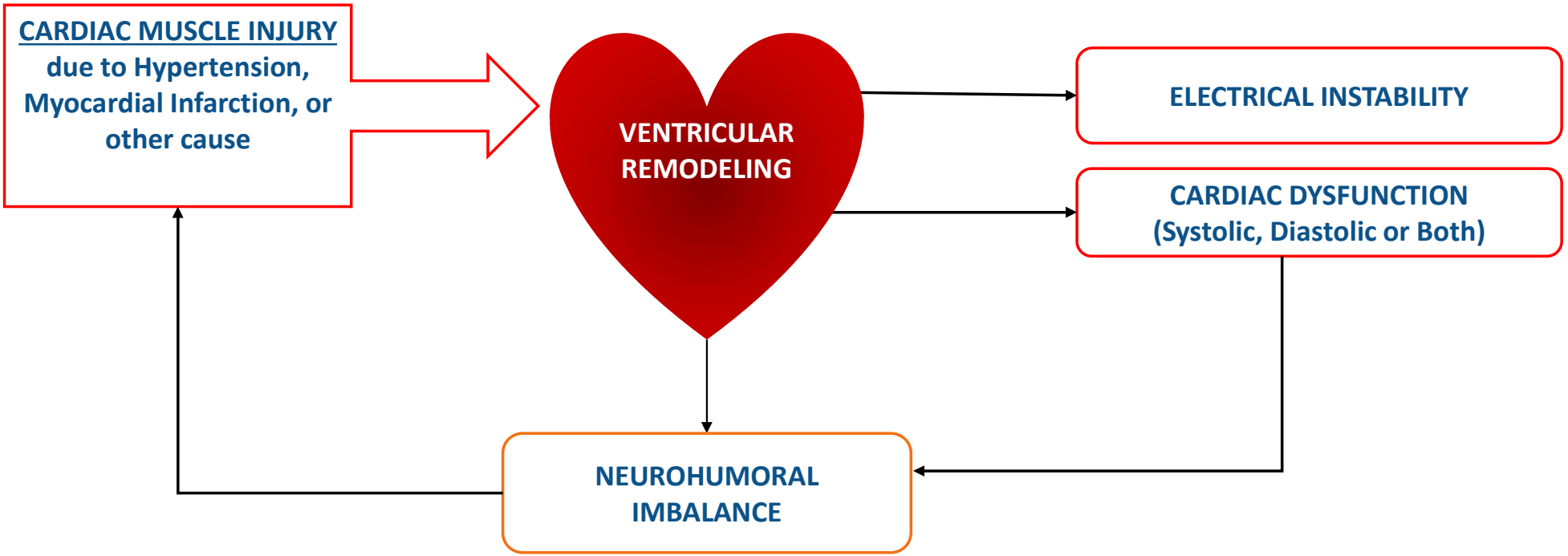

1. McMurray JJ. N Engl J Med 2010;362:228–238
2. Shah AM. Lancet 2011;378:704–712

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Neurohumoral System

- An imbalance occurs in **Three Key Neurohumoral Systems**:
  1. The renin–angiotensin–aldosterone system **RAA**
  2. The sympathetic nervous system **SNS**
  3. The natriuretic peptide system **NP**

- The natriuretic peptide system has a protective function, which can counterbalance these detrimental effects.

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What causes Heart failure?

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Aetiology- Epidemiology

- Clinical Practice from unpublished data in CardioCare Hospital Abuja in order of prevalence:
  1. **Hypertension**
  2. **Cardiomyopathy**
  3. **Coronary artery disease**
  4. Valvular Heart Disease
- SSA Survey of HF ?Ischaemic Heart Disease
  - **Hypertension (43.9%),**
  - Dilated cardiomyopathy (DCM) (19.5%), and
  - RHD (15%)-

Aetiology

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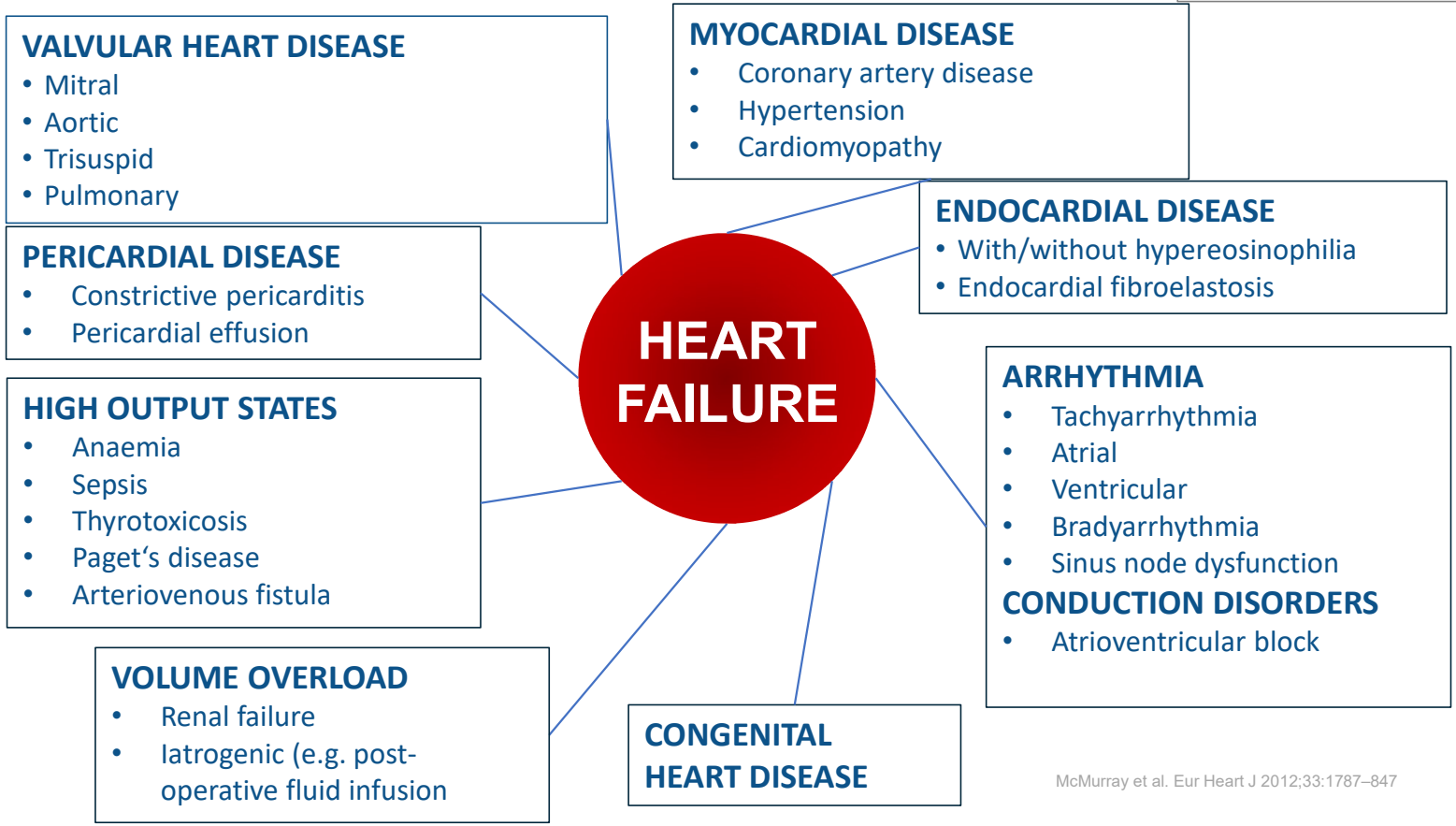

McMurray et al. Eur Heart J 2012;33:1787–847

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How do we classify Heart Failure?

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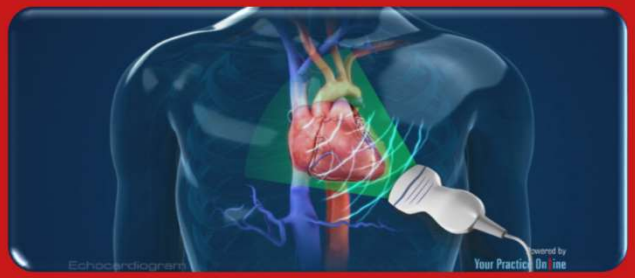
Classification of heart failure



1. Based on ECHO-Ejection Fraction

- HFrEF- Reduced EF
- HFpEF- Preserved EF

2. Based on Dyspnoea Severity

- NYHA Classification *(I - IV)*

3. Based on Cardiac Dysfunction Course

- ACC/AHA Staging (A-D)

Stages & Functional classification of HF

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ACCF/AHA Stages of HF		NYHA Functional Classification	
A	At high risk for HF but **without structural heart disease or symptoms of HF**	None	
B	Structural heart disease but **without signs or symptoms of HF**	I	No limitation of physical activity. **Ordinary physical activity does not cause symptoms of HF**.
C	Structural heart disease with **prior or current symptoms of HF**	II	Slight limitation of physical activity. Comfortable at rest, but **ordinary physical activity results in symptoms of HF**.
		III	Marked limitation of physical activity. Comfortable at rest, but **less than ordinary activity causes symptoms of HF**.
D	Refractory HF **requiring specialized interventions**	IV	Unable to carry on any physical activity without symptoms of HF, or **symptoms of HF at rest**.

Yancy CW et al. 2013 ACCF/AHA Guideline for the Management of Heart Failure. A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation.* 2013;128:e240-e327

How do we recognize and diagnose Heart Failure in our practice?

Clinical Manifestations

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- **Dyspnea (varying levels of exertion occurring progressively)**
- **Orthopnea**
- **Paroxysmal nocturnal dyspnea**
- Weakness/fatigue
- Cough
- Reduced Urine output
- **Tachycardia**
- **Crepitations**
- **Edema**
- Jaundice
- Alternating weak and strong pulse
- Cool, cold, or pale extremities
- **Jugular venous distention**
- Cyanosis
- Third heart sound

Other History to Elicit

- **History Suggestive of Causes**
  - Cardiovascular Risk-Hypertension, Diabetes
  - Alcohol
  - Chronic Pulmonary Disease
  - Structural pathology (e.g. valve stenosis or valve regurgitation
  - Congenital heart disease
  - Ischemic Heart Disease- eg Angina, previous MI
  - Inflammatory conditions (e.g. pericarditis or myocarditis)
  - Infiltrative conditions (e.g. amyloidosis)
- **History Suggestive of Precipitants**
  - Myocardial Infarction
  - Acute infection
  - Electrolyte imbalances (e.g. hypokalaemia or hyponatraemia)
  - Pulmonary embolism
  - Thyrotoxicosis or hypothyroidism
  - Medications eg Thyroxine, NSAIDs
  - Dietary Indiscretion
  - Arrythmias
  - Fluid Overload

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How do we investigate Heart Failure?

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Investigating Heart Failure- Echocardiography

- Transthoracic and/or Transesophageal Echocardiography is **INVALUABLE AND MANDATORY**.
- The following should particularly be looked out for:
  - **Ejection Fraction (EF)** –
    - >55% HRrEF
    - <55% HFpEF
  - **E/E'** a measure that can correlate well with pulmonary capillary wedge pressure: typically
    - >15 in acute cases,
    - >12 in chronic cases,
    - 8-12- indeterminate NT ProBNP is needed
  - **Chamber Sizes-** Left Ventricular Internal Diameter in diastole, LV Mass index
  - **Valve function**
  - **Wall Motion abnormalities**
  - **Speckle Tracking Doppler (GLSS)**

Investigating Heart Failure

- **ECG** to check for abnormalities that could have caused, worsened or complicated heart failure- a completely normal ECG is possible but rare. **MANDATORY**
- **NT-ProBNP** can help diagnosis when unsure and can be used to follow up
- **Thyroid function tests (at least TSH)** in all cases of Heart Failure is recommended
- **E/U/Cr-** complications of disease or of treatment, co-existing renal dysfunction
- **Chest X-ray-** exclude pneumonia, fluid collection and other diagnoses
  - **A**lveolar Edema,
  - Kerley's **B** lines,
  - **C**ardiomegaly,
  - Upper lobe **D**iversion,

Investigating Heart Failure

- **FBC-** Infections/Anaemia that may worsen HF
- **Lipids**
- **Glycemic Profile-** Fasting/Random Blood Sugar, HBA1c
- **Holter ECG-** 24-48hour
- **Other Tests-**
  - D-Dimer,
  - Troponins,
  - etc

What Must a Heart Failure Diagnosis contain?

Diagnosis

- Heart Failure is predominantly a **clinical** diagnosis.
- A complete heart failure diagnosis **MUST** have **five (5) components**
  1. Heart Failure Syndrome (with EF classification if known)
  2. Aetiology
  3. NYHA Class and ACC Stage
  4. Precipitant (if Acute presentation)
  5. Co-Morbidities (where present)
- "Heart Failure with Reduced Ejection Fraction (HFrEF) secondary to Hypertensive Heart Disease, NYHA class 4/ACC Stage 3, precipitated by New onset Atrial Flutter and Chest Infection. Co-morbid Gouty Arthritis"

Case Definition

1. Heart Failure Syndrome
   - *Framingham Criteria*

2. +/- Laboratory
   - *BNP or NT-BNP*

3. +/- Echocardiography
   - *Ejection Fraction,*
   - *E/E',*
   - *LAA index, and LVIDd*

Case 1

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E. I don't know jare, I need to evaluate further.

Poll 2: Is it Possible that he has Heart Failure?

A. Yes

B. No

C. I don't know

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Let's Discuss this case…

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Case 1 Contd'

- Echo showed
  - Ejection Fraction of 56%
  - Dilated LA and LV
  - E/E' 11
- NT ProBNP- 800
- ECG- Tachycardia, PVCs
- TSH normal
- Other tests are normal
- CXR- Cardiomegaly, Upper lobe Diversion

Poll 3: Now, Does the Patient have Heart Failure?

A. Yes

B. No

C. I still don't know

Poll 4: What type of Heart Failure does he have?

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How do we Treat Heart Failure?

The 12 Commandments

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1. Educate/Counsel Patient and Family continuously

- Disease nature
- Adherence to therapy and Follow up
- Follow up
- Specialist review
- Support Groups
- Diet and Lifestyle
- Need for Procedures

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Patient and Relative Education

- Teach patients **rationale for medications** (doses, times, adverse reactions)
- Teach patient to **limit fluid to 2 liters per day**
- Teach patient to follow **a low-sodium diet**
- Teach patient to **weigh daily** and to notify healthcare provider of an increase in weight of 1 kg or more
- Be aware of patient's **psychological needs** and how to **cope with illness and medications**
- Teach **patient alarm signs**, **concurrent drug use**

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2. Reduce Preload/ Afterload

- Use Diuretics cautiously to achieve:
  - 0.5-1kg weight loss per day initially, then
  - Later to maintain symptom-free
- Frusemide 40mg bd, (or IV 20-40mg 8hrly on admission)
- Torsemide 10mg bd (or IV 10-20mg 8hrly on admission)
- Metolazone 1.25-2.5mg od (if refractory edema and good bp and normal sodium)

3. Treat Neurohormonal abnormalities (1)

1. ARB- *Valsartan(40-320mg), Candersartan(4-32mg), Losartan25-100mg bd*)

   OR

   ACEi- *Ramipril(1.25-10mg), Perindopril(2.5-10mg*)

   OR

   ARNI- Sacubutril-Valsartan(25mg -200mg bd)

   - ARNI is Preferred but ensure 36-48hr washout if changing from ACEi, and 24hr for ARB
   - Never combine ARNI and ACEi, etc

3. Treat Neurohormonal abnormalities (2)

2. Aldosterone antagonist-
   Spironolactone or Eplerenone 25mg dly,
   AND
3. Beta blockers-
   Bisoprolol, Carvedilol or Metoprolol succinate
   AND
4. SGLT2 inhibitors e.g. Empaglifozin, Dapagliflozin

- OTHERS that may be considered:
  - Isosorbide-Hydrallazine
  - Ivabradine

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4. Treat Aetiology

- Hypertension- use same drugs for heart failure as much as possible
- Ischemic Heart Disease- beta blockers, PCI
- Valvular Heart Disease- surgery
- etc

5. Find and Treat Precipitant
(especially if Acute presentation)

- Arrhythmias
- Infection
- Fluid Overload
- Electrolyte derangements
- Uncontrolled Hypertension
- etc

6. Optimize other cardiovascular risk factors

- Blood pressure
- Blood Cholesterol
- Blood Sugar
- Uric Acid
- Proteinuria
- etc

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7. Diet & Lifestyle Modification

- Low Salt
- Water Moderation
- Weight Optimization
- Smoking Cessation
- Alcohol Cessation
- Symptom Limited Mild to Moderate Exercise Training

8. Treat Co-Morbidities (where present)

- COPD
- CKD
- Gout
- Diabetes
- etc

9. Assess for the Need for Device Therapy

- After good treatment as above for 6-8 weeks, repeat ECHO (+/- Holter):

- **ALL Guests ≥NYHA 2 with EF <35-40%**
  a. + Normal QRS Duration- Implantable Cardioverter Defibrillator (ICD)
  b. + Wide QRS Duration >135ms or LBBB- Cardiac Resynchronization Therapy (CRT)

- ALL Guests that survive Cardiac Arrest or have high Ventricular Tachycardia burden (NSVT and VT on Holter)

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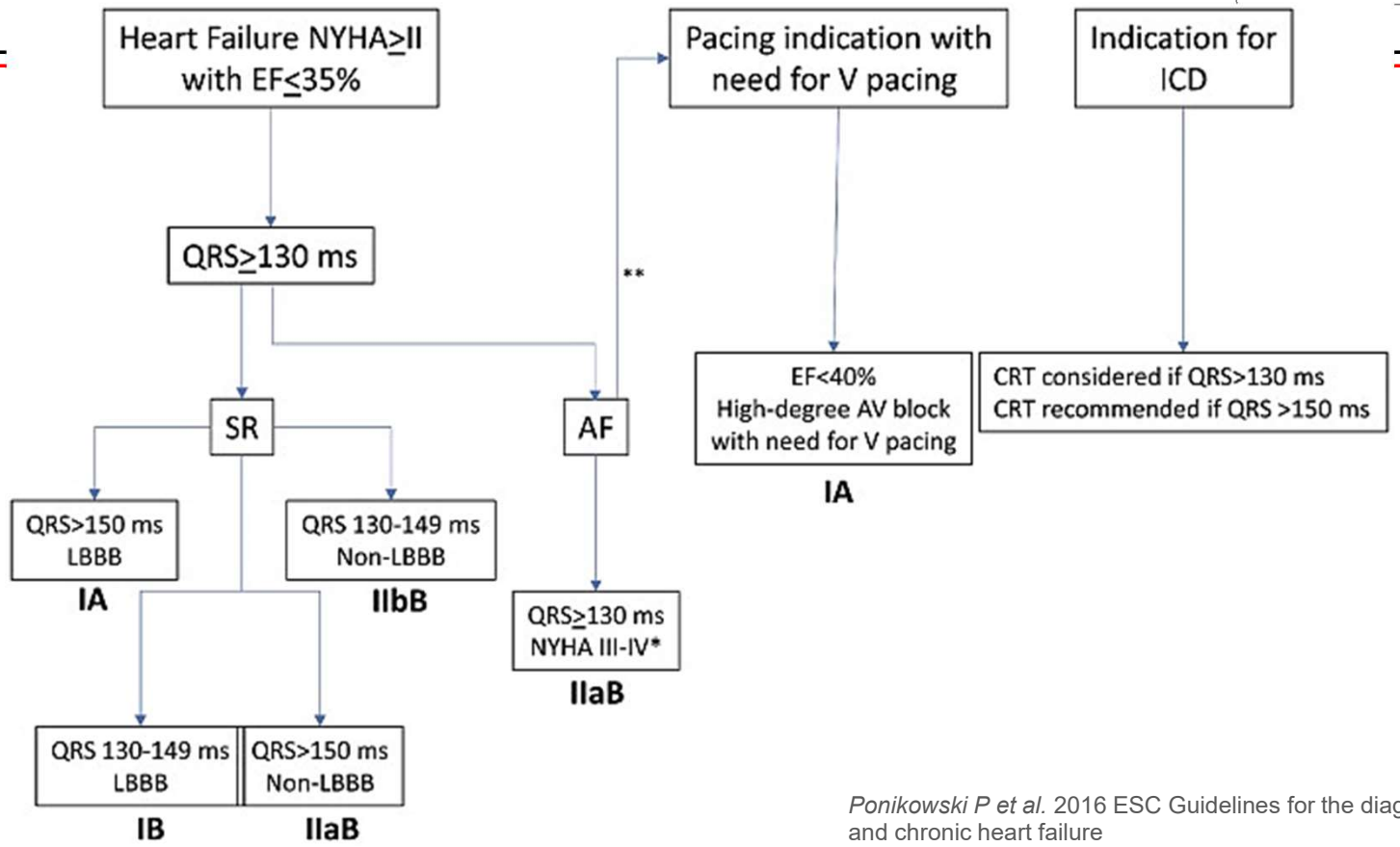
Flowchart showing most important (not all) recommendations for CRT based on the current European Society of Cardiology (ESC) heart failure guidelines



Ponikowski P et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

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Cardiac Devices-Summary by NYHA/QRS

	NYHA Class			
QRS Interval	**I**	**II**	**III**	**IV**
< 120 ms	ICD if there is a high risk of sudden death			ICD and CRT not clinically indicated
120–149 ms without LBBB	ICD	ICD	ICD	CRT-P
120–149 ms with LBBB	ICD	CRT-D	CRT-P or CRT-D	CRT-P
> 150 ms with or without LBBB	CRT-D	CRT-D	CRT-P or CRT-D	CRT-P

Table 1 National Institute of Health and Care Excellent Guidance on treatment options with ICD or CRT for people who have heart failure with left ventricular dysfunction (EF <35%) according to NYHA class and QRS duration[17]

10. Monitor for clinical progress, complications, quality of life

- Minnesota QOL index
- 6 minute Walk Test
- Patient's subjective view of Health and Life
- Clinical Parameters:
  - NYHA
  - BP
  - PR
  - JVP
  - Etc.

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11. Psychosocial support

- Heart Failure Support Groups
- Clinical Psychologist
- Heart Failure Nurse

12. Multidisciplinary Management

- **Cardiologist- Clinical and Interventional**
- Heart Failure Nurse
- Psychologist/Counsellor
- Social Worker
- Primary Care Physician
- Cardiac Surgeon
- Cardiac Device Technologist
- Pharmacist
- Dietitian
- Health Information Management Officer
- Other Physicians

When is Admission Needed?

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Inpatient Management: Indications

1. Worsening Heart Failure
2. NYHA 3/4
3. ACC D- cardiogenic shock,
4. Address New or Chronic Intercurrent problems- Acute MI, Pul embolism, DVT, Renal Failure
5. New therapy with high potential for complications or problems with adaptation

Inpatient Management: Indications

6. Address Precipitant (current or potential) – dysrhythmias, severe blood pressure elevation, sepsis, non-cardiac illness, etc
7. Treatment of clinically significant complications- overdiuresis
8. Non-response to conventional outpatient therapy
9. Optimization of diuresis and treatment
10. Patient Request

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What are the Standards for Inpatient care?

Inpatient and Follow up Considerations (1)

- Urinary Output
  - Aim for >50mls/hour or 1.2L per day
- Daily Weight gain/loss
  - Aim for 0.5-1kg weight loss per day
  - No weight loss or too little loss <0.5kg is not ok
  - Too much weight loss is also not ok >1.5-2kg- may cause renal failure, low blood pressure
  - Weight gain may mean symptoms are worsening
- Bed positioning
  - 30-45 degrees head up
  - Or may prefer to sit up

Inpatient and Follow up Considerations (2)

- Diet
  - Low salt diet
- Other Drugs
  - **Avoid** NSAIDs in any form as much as possible (e.g. Ibuprofen, Naproxen, Diclofenac)
  - Consider withholding drugs that reduce heart rate when heart rate is less than 55-60
    - Digoxin
    - Amiodarone
    - Ivabradine
    - Beta-blockers e.g. Bisoprolol, Metoprolol, Carvedilol, Nebivolol, Atenolol, Propranolol, etc.

Inpatient and Follow up Considerations (3)

- Fluid Management
  - Moderate fluid intake
  - IV Fluids MUST be limited and very well controlled
  - IV fluids not more than 1.5L in 24hours
  - Strict fluid charts must be kept
  - Guests should be asked about fluid taken and passed out if they're conscious
- Anticoagulation
  - Important in admitted guests to prevent clots since blood is not moving well and patients are immobile- prophylactic dose
  - Concurrent Atrial fibrillation- Check CHADsVASC score- therapeutic dose
  - Intracardiac clots - therapeutic dose
  - Consider Transesophageal ECHO in Stroke

Inpatient and Follow up Considerations (4)

- Pulse
  - Check Regularity:
    - If Irregular,
      - Count heart rate or
      - Use ECG HR
  - Check Rate: Aim for >55 -80bpm
    - Raise alarm if less than 50bpm or >120bpm
- Blood Pressure
  - Do multiple checks if pulse is irregular
  - Aim for >90/60 to <130/80

Inpatient and Follow up Considerations (5)

- ECG
  - All guests must have an ECG every admission
  - Use cardiac monitor for unstable guests and record any observation of abnormality
  - Check Regularity
  - Check Rate
  - Check Rhythm
  - Check ST deviations
  - Check for intermittent/persistent arrythmias

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Inpatient Considerations- Raise Alarm if:

- Weight Gain or failure to lose weight
- Persistently Slow or Fast Pulse/Heart Rate
- Reduced urine output <50mls/hour for 3 consecutive hours (on catheter)
- Hyponatremia, Hypokalemia
- Low blood pressure <90/60 with cold extremities
- New Neurological sign- e.g. one-sided weakness, speech abnormalities, alteration in consciousness
- New onset arrythmia
- New onset chest pain with ST elevation or Wide QRS complex

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Intractable Heart Failure

- Wrong Diagnosis
- Wrong or Unidentified precipitant
- Electrolyte derangements
- Wrong treatment intensity (Over- or Under-)
- Co-morbidity not tackled completely
- Advanced Heart Failure- Needs devices, inotropes, etc


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