Heart Failure: What Can We Offer?
IJN Cath Lab Symposium
8th October 2016

Aizai Azan Abdul Rahim
National Heart Institute
Kuala Lumpur
Heart Failure: The Final Cardiovascular Disease

Coronary Deaths

Heart Failure Hospitalizations

Coronary deaths are down by half...

But heart failure has almost tripled

Enhanced Survival In Other CV Diseases Leads To Expansion In Heart Failure Population

Source: National Hospital Discharge Survey, CDC/NCHS and NHLBI.
Heart Failure (HF): An Epidemic Of The 21st Century

26 MILLION ADULTS WORLDWIDE ARE LIVING WITH HEART FAILURE AND THIS NUMBER IS EXPECTED TO RISE

More than 1 million hospitalisations due to heart failure are reported annually in Europe.1,4

Heart Failure Is A Degenerative And Life Limiting Disease

References:
Heart Failure In Malaysia

Estimated Prevalence in Malaysia

~1-2% of Malaysian population
(300,000-600,000 people)

Hospital

3mil

6-10%

Acute hospital admissions due to Heart Failure\(^1,2\)

Malaysia registered > 3 million total hospital admissions!\(^3\)
- 300,000 hospital admissions due to Heart Failure (estimated)
- 25% rehospitalized within 30 days\(^4\)

>65 years old (~170,000 people)

3. 2013 Health Facts

Opportunity to refine National Data

Malaysia participates in REPORT-HF Registry
## NYHA Functional Class (FC) vs. 1 Year Mortality

<table>
<thead>
<tr>
<th>NYHA Functional Class (FC)</th>
<th>PROGNOSIS OF HF PATIENTS</th>
<th>1 Year Mortality</th>
</tr>
</thead>
</table>
| FC I  
Asymptomatic. Ordinary physical activity does not cause undue fatigue, breathlessness or palpitation. | < 5 % |  
| FC II  
Mild. Such patients are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, breathlessness or discomfort. | 5 – 10 % |  
| FC III**  
Moderate. Although patients are comfortable at rest, less than ordinary activity will lead to symptoms. | 20 – 40 % |  
| FC IV**  
Severe. Symptoms of congestive failure are present at rest. With any physical activity, increased discomfort is experienced. | 50 – 80 % |  

**HF causes 2 to 3 times as many deaths as advanced cancers like bowel & breast cancer!**
Wish List Of HF Patients!

- Feel better
- Less breathless / less cough
- Sleep well
- More energy
- Avoid admissions
- Live longer
- Don’t want too many medications
- Affordable treatment
# Drugs That Reduce Mortality & Improve Symptoms In Heart Failure

<table>
<thead>
<tr>
<th>Drug Categories</th>
<th>Relative Risk Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE-Inhibitors*</td>
<td>↓ 16 - 23%</td>
</tr>
<tr>
<td>B-Blockers*</td>
<td>↓ 34 - 35%</td>
</tr>
<tr>
<td>Aldosterone Antagonists</td>
<td>↓ 24 - 30%</td>
</tr>
<tr>
<td>Diuretics</td>
<td>Improve symptoms</td>
</tr>
</tbody>
</table>

*1st* line drug therapy
**Devices That Reduce Mortality & Improve Symptoms In Heart Failure**

<table>
<thead>
<tr>
<th>Devices</th>
<th>Relative Risk Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implantable Cardiac Defibrillators (ICD)</td>
<td>↓ 23 - 31%</td>
</tr>
<tr>
<td>Cardiac Resynchronization Therapy (CRT)</td>
<td>↓ 34 - 35%</td>
</tr>
</tbody>
</table>
Devices That Reduce Mortality And Improve Symptoms In Heart Failure

ICD & CRT Pacing ± Defibrillator
Devices And Surgical Therapies That Reduce Mortality & Improve Symptoms In Heart Failure

Ventricular Assist Device (VAD)
Mechanical Circulatory Support (MCS)
Heart Transplant Surgery
Congestive Heart Failure
Progression and Therapeutic Approaches

Health status

Medical Therapy

+ CRT

NYHA I  NYHA II  NYHA III  NYHA IV

Novel approaches to fill the gap

Devices
- Mechanical targets
- Diastolic restoration
- Electromyocardial targets
- Renal sympathetic network
- Neuromodulatory targets
- Carotid baroreceptors
- Vaginal nervous system

Bioligies
- Cell therapy
- Tissue patch
- Gene therapy

IVAD → HTX

INTERMACS

6 5 4 3 2 1
First Thoratec IVAD 2005

9.8 kg
New Mechanical Modalities Of HF Treatment

1st Generation

Pulsatile/Volume Displacement

2nd Generation

Continuous/Rotary

Pulsatile vs Continuous Flow LVADs
Long Term LV Support
First Heart Mate II VAD 2010

Pump + controller: 2 kg
First HeartWare VAD In 2011

Potential Benefits
- No pump pocket or abd surgery
- Shorter implant time
- Reduced procedural invasiveness and complexity
- Reduced recovery time

Pump + controller: 1.3 kg
Heart Failure Mortality & Morbidity Remains Substantial Despite New Therapies

Euro Heart Survey II (2007)
Mortality according to number of prescribed drugs (BBs, ACEIs/ARBs, Aldosterone antagonists)

log-rank test \( p < 0.001 \)

Patients at risk
n=2973 2528 2201 2061

Months after discharge

Close This Gap !!
How Can We Improve Outcomes?

- High Technology, Cutting Edge Approach!
  - Biomarker guided therapies.
  - Utilize new tele-monitoring technology.
  - Invest in new devices.
  - Invest in new medications.
Brain Natriuretic Peptides ( BNP/NT-proBNP ) : Role Of Biomarkers

- For diagnosis
- Prognosis / Risk stratification
- Guide therapy based on NP levels

The Evidence For NP Guided Therapy

- Meta-analysis of RCT demonstrated that NP-guided therapy improves survival & reduce hospitalization
- However, NP-guided therapy had NO benefits in 2 subgroups: age >75 years and those with HFpEF
- The ongoing Guiding Evidence Based Therapy Using Biomarker Intensified Treatment ( GUIDE-IT ) & single-centre ( EX-IMPROVE-CHF ) will also help further clarify the role of NP-guided therapy in HF management
Are Other Biomarkers Ready For Primetime?

- NGAL
- Cystatin C
- Cardiac hs-troponins
- ST2
- Galectin-3
Monitoring Device For HF
Expectations Of Hemodynamic Tele-Monitoring

# Symptoms & weights do not provide a reliable early warning system!

- Guide heart failure therapy
- Early detection of HF worsening
- Prevention of HF decompensation
- Reduction of mortality, especially HF mortality
- Reduction of hospitalizations, especially HF hospitalizations
- Improvement of QoL
- Reduction of treatment costs
Trials of implantable monitoring devices in heart failure: which design is optimal?

William T. Abraham, Wendy G. Stough, Ileana L. Piña, Cecilia Linde, Jeffrey S. Borer, Gaetano M. De Ferrari, Roxana Mehran, Kenneth M. Stein, Alphons Vincent, Jay S. Yadav, Stefan D. Anker and Faiez Zannad

Examples of information provided by implanted medical devices

- RV systolic and diastolic pressure
- Estimated pulmonary artery end-diastolic pressure
- Change in pressure over time
- Pulmonary artery pressure
- Left atrial pressure
- Heart rate
- Patient activity
- Temperature
- Impedance
- Respiratory rate
- Respiratory abnormalities
- Rhythm abnormalities
- Heart rate variability

Invasive Hemodynamic Monitoring Using CardioMEMS HF System

PA Sensor and Delivery System

Patient Electronics System

PA Pressure Database

Physician Access Via Secure Website
Implantable Sensors for CHF

- **CardioMEMS**
- Simple **PA artery implant**
- Continuously monitors **PA pressures** (RF-powered, no battery)
- PA measurements by patients from home transmitted to a **secure database** and available to the physician for therapy changes

**CHAMPION trial** (LANCET 2011)
- Evaluate the **safety and efficacy** of the HF Pressure Measurement System in reducing heart failure (HF) related hospitalizations
- **550 randomized pts with HF**
  - **30% reduction in hospitalizations** at 6 months (p=0.0002)
  - **38% reduction in hospitalizations** over entire randomized period (p<0.0001)
Intrathoracic impedance measurements available in Medtronic ICD and CRT devices.

- Provides comprehensive information about a patient's fluid status.
- OptiVol functions by delivering small electrical pulses between the electrodes in the chest and calculating the impedance.
  - When fluid accumulates in the lungs, the impedance will decrease.
- Sensitive to multiple etiologies of fluid accumulation in the thoracic cavity.
- Can assist in therapy titration and disease stabilization through continuous monitoring of fluid status.

Adapted from Medtronic data on file.
Newer Devices Getting Bigger By Becoming Smaller!!

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Surgical</th>
<th>Minimally Invasive</th>
<th>Catheter Delivery System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow</td>
<td>10 L/min</td>
<td>7 L/min</td>
<td>3 L/min</td>
</tr>
<tr>
<td>Patient Class</td>
<td>Late Class IV</td>
<td>Class III &amp; IV</td>
<td>Class III</td>
</tr>
<tr>
<td>Treatable Pop.</td>
<td>100,000</td>
<td>350,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Current status:</td>
<td>IDE</td>
<td>Preclinical studies</td>
<td>Prototype and exploratory</td>
</tr>
</tbody>
</table>
MVAD Clinical Pathway

- **CE Marking**
  - Mechanical Circulatory Support indication
  - 6 to 8 clinical sites
  - 50 patients
  - 6-month follow up
  - Study to feature new controller
  - Commence in H1 2012

- **U.S. IDE**
  - Commencement following initial int'l implants
  - Pre-IDE meetings / define indication
    - H1 2012

HeartWare’s Next-Gen. Pump, the MVAD (1/3 size of the HVAD)...

- HeartWare’s next generation miniaturized device is a full-output pump approximately one third the size of the HeartWare® pump
- The device will be implanted using a minimally invasive surgical procedure

Significantly smaller displaced pericardial volume relative to HVAD may allow for smaller sized patients

Potential for biventricular support (RVAD/LVAD)
HeartMate III

Ultra-Compact, Fully Mag-Lev VAD
(Finalizing Design)

- Full support (10L / min) in ultra-compact size
  - Intrathoracic placement; centrifugal flow

- Incorporates critical HeartMate family design elements (e.g. large gaps, textured surfaces)
  - Reduced adverse event profile
  - Potential for reduced or no anticoagulation

- Full magnetic levitation optimized for efficiency
  - Operate at lower power consumption, allowing miniaturization of external components

- Capable of producing an artificial pulse
  - Physiologic blood flow with potential to help address late bleeding

- Leverage all product development initiatives from HeartMate II
HeartMate X

Dramatically Downsized Chronic Device
(Technology Development)

• Versatile platform, capable of providing partial and full support (1-8 L/min)

• Leverages core HeartMate II technology

• Dramatic size reduction
  - Rapid, less invasive implant
  - Versatile cannulation options

• Meets needs of expanded patient pool
  - Earlier-stage patients
  - RVAD / BiVAD population

• Low power consumption
  - Potential for smaller external batteries and components
The next major advance: TETS

- Transcutaneous Energy Transfer showing significant progress
  - Enables transfer of energy and information across the skin
  - Replaces driveline cable and eliminates risk of driveline complications
  - Enables patient to be un-tethered from the charging system for extended periods
  - Successfully demonstrated feasibility; refining performance attributes
HeartMate Wireless Architecture

**Both SM and PM are required for in-clinic programming and monitoring**

**Project Objectives**

- In-clinic LVAS programming and monitoring platform aimed at reducing cost while improving practice efficiency and usability.

- Integrate wireless hardware into G2 System Controller

- Utilize current System Monitor software & improve
  - Graphic interface (organization, layout)
  - Incorporate Trending (PI, Flow, Speed, Power)

- Combines TLC II and HeartMate monitoring and programming platforms
Cross-Platform Technologies

- Fully Implantable System
- Infection Reduction
- Automated Anastomosis
- Wireless Architecture
- Remote Monitoring

First-In-Man

Also in Development
Fully-Implantable LVAS (FILVAS)

Fully Implantable System (Finalizing Design)

• No percutaneous lead – improved infection and system durability profile

• Quality of life
  – No daily dressings
  – Ability to swim and shower
  – Less limitations on movement

• Advanced battery technology
  – Custom cell technology tailored for implantable LVAD application
  – Targeting “untethered” run times of ~3 hours initially and ~2 hours at 3-year mark

• Reduced size Implanted components with highly reliable electronics
Percutaneous Catheter Based Axial Flow Pump
Impella 2.5 / CP / 5.0

Impella Abiomed
Percutaneous Heart Pump (PHP)

Catheter-based axial flow pump (Finalizing Design)

- Designed to deliver over 4L of flow under normal physiologic conditions
- Percutaneous placement through 11F sheath
- Collapsible elastomeric impeller and nitinol cannula; expands to ~24F

Targeted Applications

- Unstable AMI
- High-risk PCI
- Acutely decompensated heart failure
- Potentially other patient populations
Percutaneous Ventricular Restoration

**Treatment Goal**

Improve hemodynamics by:

- Partition Scar
- LV Volumes Reduction
- LVED Pressure Reduction
- Restoring LV Conical Shape
- Not preventing Torsional Contraction
- Not causing arrhythmias

Procedural aspects similar to a standard PCI

(Duration – 80 min / Fluoroscopy time – 20 min)
New Devices: Parachute LV Partitioning Device

- Nitinol frame cut from a single tube
- ePTFE double-layer membrane for partitioning
- Non-thrombogenic and non-arrhythmogenic
- Radiopaque foot for accurate placement & to prevent ventricle perforation
- 14 F Delivery Catheter
LV Partitioning With Parachute Device

Parachute Device
LV Partitioning With Parachute Device

Deployment

Balloon Dilatation
Parachute In The Newspapers August 2013!

IJN rawat jantung cara paracut

By ELLY FAZANIZA

KUALA LUMPUR: Four heart-attack patients went through the country’s first non-invasive procedure in an attempt to improve the blood supply to their heart, the National Heart Institute (IJN) announced at a media conference yesterday.

Its CEO Tan Sri Dr Robasyah Zambahari said the procedure uses an umbrella-shaped device called the Parachute, which is implanted in the left ventricle of a patient’s heart.

“After the patient is placed under general anaesthetic, the Parachute is first submerged in water, then slowly inserted with a small ‘balloon’ attached to it and inflated for one minute, forcing the left ventricle’s muscles to push the clotted blood to the aorta, thus allowing more oxygen to flow in,” she said, adding that the process only took two hours.

The procedure is not without risks, she added, as it can potentially injure the heart’s valve. “But, we are constantly monitoring the patients. We are also hoping that we can find eight patients as we have bought two more Parachutes,” she said.

Of the four patients who successfully underwent the procedure, she said three are civil servants and retirees, and thus funded by the Health Ministry. “The last patient will bear the cost, which is RM50,000,” she said.

The team first discovered the device in April, and applied for a grant of RM1 million from IJN’s foundation to purchase 10 units from an American medical firm to start their pilot project here. Each device will costs around US$90,000 (RM399,000).
Ongoing PARACHUTE IV Trial

- 65 sites
- Key Inclusion Criteria:
  - NYHA Class III-IV
  - EF 15% - 35%
  - Apical Wall Motion Abnormality
- CT imaging at baseline for sizing and anatomy
- Echo at Baseline, 6M, and annually
- Treated patients on Warfarin and ASA for one year
LCZ696 : A First-in-Class Angiotensin Receptor Neprilysin Inhibitor ( ARNI )

- LCZ696 is a novel drug which delivers simultaneous neprilysin inhibition and AT$_1$ receptor blockade$^{1-3}$
- LCZ696 is a salt complex that comprises the two active moieties:$^{2,3}$
  - sacubitril (AHU377) – a pro-drug; further metabolized to the neprilysin inhibitor LBQ657, and
  - valsartan – an AT$_1$ receptor blocker
  - in a 1:1 molar ratio

- LCZ 696 both suppresses the RAAS system & boosts circulating levels of BNP & other endogenous peptides


3D LCZ696 structure$^2$
LCZ696 simultaneously inhibits NEP (via LBQ657) and blocks the AT1 receptor (via valsartan).

**Natriuretic and other vasoactive peptides***

Enhancing
- Vasorelaxation
- ↓ Blood pressure
- ↓ Sympathetic outflow
- ↓ Aldosterone levels
- ↓ Fibrosis
- ↓ Hypertrophy
- ↑ Natriuresis / diuresis

LCZ696

Sacubitril (AHU377; pro-drug)

LAQ657 (NEP inhibitor)

Valsartan

Inhibiting
- Vasoconstriction
- ↑ Blood pressure
- ↑ Sympathetic tone
- ↑ Aldosterone
- ↑ Fibrosis
- ↑ Hypertrophy

ACEI / ARB

Aldosterone Antagonist

RAAS

Angiotensinogen (liver secretion)

Ang I

Ang II

AT1 Receptor

*Neprilysin substrates listed in order of relative affinity for NEP: ANP, CNP, Ang II, Ang I, adrenomedullin, substance P, bradykinin, endothelin-1, BNP

Aim Of The PARADIGM-HF Trial

Prospective comparison of ARNI with ACEI to Determine Impact on Global Mortality and morbidity in Heart Failure trial (PARADIGM-HF)

LCZ696 400 mg daily ↔ Enalapril 20 mg daily

The study was prematurely stopped in March 2014 after median follow up of 27 months for overwhelming benefit

N = 8399 patients in 47 countries

Specifically designed to replace current use of ACEI and ARB as the cornerstone of the treatment of heart failure
PARADIGM-HF Results

• Compared to Enalapril, LCZ696 was able to:
  - reduced the risk of death from cardiovascular (CV) causes by 20% 
    (p = 0.00004 / NNT* 32)
  - reduced heart failure hospitalizations by 21%
    (p = 0.00004)
  - reduced the risk of all-cause mortality by 16%
    (p < 0.0001)

• Overall there was a 20% risk reduction on the primary endpoint, a composite measure of CV death or time to first heart failure hospitalization 
  (p = 0.0000002 / NNT* 21)

* Number Needed To Treat
ARNI With LCZ696 Doubles Effect On CV Death Of Current Inhibitors Of RAAS

Effect of ARB vs placebo derived from CHARM-Alternative trial
Effect of ACE inhibitor vs placebo derived from SOLVD-Treatment trial
Effect of LCZ696 vs ACE inhibitor derived from PARADIGM-HF trial
2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC)

Developed with the special contribution of the Heart Failure Association (HFA) of the ESC

Authors/Task Force Members: Piotr Ponikowski* (Chairperson) (Poland), Adriaan A. Voors* (Co-Chairperson) (The Netherlands), Stefan D. Anker (Germany), Héctor Bueno (Spain), John G. F. Cleland (UK), Andrew J. S. Coats (UK), Volkmann Falk (Germany), José Ramón González-Juanatey (Spain), Veli-Pekka Harjola (Finland), Ewa A. Jankowska (Poland), Mariell Jessup (USA), Cecilia Linde (Sweden), Petros Nihoyannopoulos (UK), John T. Parissis (Greece), Burtke Pieske (Germany), Jillian P. Riley (UK), Giuseppe M. C. Rosano (UK/Italy), Luis M. Ruilope (Spain), Frank Ruschitzka (Switzerland), Frans H. Rutten (The Netherlands), Peter van der Meer (The Netherlands)

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2016 ESC Heart Failure CPG

Patient with symptomatic HFrEF

Therapy with ACE-I and beta-blocker
(Up-titrate to maximum tolerated evidence-based doses)

Still symptomatic and LVEF ≤35%

No

Add MR antagonist**
(up-titrate to maximum tolerated evidence-based dose)

Yes

Still symptomatic and LVEF ≤35%

No

Yes

Able to tolerate ACEI (or ARB)*

Sinus rhythm, QRS duration ≥130 msec

Sinus rhythm, HR ≥70 bpm

ARNI to replace ACE-I

Evaluate need for CRT

Ivabradine

These above treatments may be combined if indicated

Resistant symptoms

Yes

Consider digoxin or H-ISDN or LVAD, or heart transplantation

No

No further action required
Consider reducing diuretic dose

If LVEF <35% despite OMT or a history of symptomatic VT/VT, implant (ICD)

Diuretics to relieve symptoms and signs of congestion
How Can We Improve Outcomes?

- Low Technology Approach By Improving Delivery Of HF Care!
  - Set up a multidisciplinary HF service
  - Utilize hospitalization as an opportunity to initiate & optimize HF medications
  - Initiate a heart failure management program to cater for both inpatients & outpatients
  - 7-14 days follow up visit after discharge
  - Dedicated Heart Failure Ward / Clinics
  - Use Coordinated HF Clinical Pathways
Benefits Of Multidisciplinary HF Team Approach

❤ Systematic review of 29 trials involving use of multidisciplinary HF clinics showed:
- 28% ↓ in mortality
- 26% ↓ in HF hospitalization
- 19% ↓ in All cause hospitalization

McAlister et al Multidisciplinary Strategies For Management Of HF Patients At High Risk For Admission J Am Coll Cardiol 44(4), 810-819, 2004
Benefits of Multidisciplinary HF Team Approach

A systematic review of 29 trials involving the use of multidisciplinary HF clinics showed:
- 28% in mortality
- 26% in HF hospitalization
- 19% in all-cause hospitalization

McAlister et al. Multidisciplinary Strategies for Management of HF Patients at High Risk for Admission
J Am Coll Cardiol 44(4), 810-819, 2004
# Pre- and post-hospital discharge checklist

## Patient's name: [Name]

### PRE-DISCHARGE VISIT

<table>
<thead>
<tr>
<th>Hospital specialist:</th>
<th>Date of discharge:</th>
<th>1/20</th>
</tr>
</thead>
</table>

### EARLY POST-DISCHARGE VISIT 1

<table>
<thead>
<tr>
<th>Doctor/Hospital</th>
<th>Date of visit:</th>
<th>1/20</th>
</tr>
</thead>
</table>

### EARLY POST-DISCHARGE VISIT 2

<table>
<thead>
<tr>
<th>Doctor/Hospital</th>
<th>Date of visit:</th>
<th>1/20</th>
</tr>
</thead>
</table>

## CLINICAL ASSESSMENT

<table>
<thead>
<tr>
<th>Weight</th>
</tr>
</thead>
</table>

- **kg**: [Input weight]
- **lb**: [Input weight in pounds]

<table>
<thead>
<tr>
<th>Heart rate</th>
</tr>
</thead>
</table>

- **Rhythm**: [Input heart rate in beats per minute]
- **QRS width**: [Input QRS width in milliseconds]

<table>
<thead>
<tr>
<th>Blood pressure</th>
</tr>
</thead>
</table>

- **Systolic**: [Input systolic blood pressure in mmHg]
- **Diastolic**: [Input diastolic blood pressure in mmHg]

<table>
<thead>
<tr>
<th>Clinical symptoms of volume overload</th>
</tr>
</thead>
</table>

- **Signs of congestion**: [Input symptoms]
- **Pulmonary rales**: [Input symptoms]
- **Peripheral edema**: [Input symptoms]

<table>
<thead>
<tr>
<th>NYHA class</th>
</tr>
</thead>
</table>

- **Class I**: [Input NYHA class]
- **Class II**: [Input NYHA class]
- **Class III**: [Input NYHA class]
- **Class IV**: [Input NYHA class]

<table>
<thead>
<tr>
<th>Other measurements</th>
</tr>
</thead>
</table>

- **LV ejection fraction %**: [Input ejection fraction]
- **Serum creatinine**: [Input creatinine level in mg/dL]
- **Potassium**: [Input potassium level in mEq/L]

## PATIENT EDUCATION

<table>
<thead>
<tr>
<th>Nutritional counseling</th>
</tr>
</thead>
</table>

- **Diet**: [Input dietary recommendations]
- **Exercise**: [Input exercise recommendations]
- **Weight monitoring**: [Input weight monitoring instructions]

## OPTIMIZATION OF MEDICAL THERAPY

<table>
<thead>
<tr>
<th>β-blockers</th>
</tr>
</thead>
</table>

- **Prescribed**: [Input if prescribed]
- **Not prescribed (C or intolerance)**: [Input if not prescribed]
- **Not prescribed (patient refused)**: [Input if refused]

<table>
<thead>
<tr>
<th>ACEIs or ARBs</th>
</tr>
</thead>
</table>

- **Prescribed**: [Input if prescribed]
- **Not prescribed (C or intolerance)**: [Input if not prescribed]
- **Not prescribed (patient refused)**: [Input if refused]

<table>
<thead>
<tr>
<th>Nonpharmacologic measures</th>
</tr>
</thead>
</table>

- **Diet**: [Input dietary measures]
- **Exercise**: [Input exercise measures]

## PLANNING OF VISITS

### Date of the next follow-up visit:

- **1/20**

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# Structured Educational Materials

- **My Heart Failure Passport**: [Image of passport]
- **Your guide to managing your heart failure**: [Image of brochure]
Smartphone Apps
Journey is not over yet....
Summary

• Heart failure is a major health problem
• Optimizing therapies for HF requires multiple applications such as:
  ➢ Newer class of HF medications (e.g. LCZ696)
  ➢ New percutaneous device therapies
  ➢ Biomarker and telemonitoring guided therapies
  ➢ Improving delivery of care by adopting a comprehensive HF Disease Management Program run by multidisciplinary HF teams incorporating tools (HF Clinical Pathways, Smart Apps)
• Ultimate goal of improving quality of life, reducing hospitalization, better patient satisfaction & ultimately reducing mortality
• Heart failure is a major health problem with an enormous impact on healthcare burden, particularly with an aging population.

• Optimizing therapies for HF requires multiple applications such as:
  - Newer class of HF medications (e.g., LCZ696)
  - Medications that address comorbidities (e.g., anemia)
  - Biomarker and telemonitoring guided therapies
  - Improving delivery of care by adopting a comprehensive HF Disease Management Program run by multidisciplinary HF teams incorporating tools (HF Clinical Pathways, Smart Apps)

• Ultimate goal of improving quality of life, reducing hospitalization, better patient satisfaction & ultimately reducing mortality.

Have a nice day!