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## **Outpatient Physician Office Impedance Cardiography (ICG) Protocol**

### **I. Purpose**

Impedance Cardiography provides noninvasive hemodynamic measurements of flow, resistance, pressure and indices of ventricular performance. These measurements include: cardiac output, stroke volume, systemic vascular resistance, and indices of contractility, and fluid status. The BioZ is the device used to conduct an impedance cardiography test.

### **II. Implementation**

#### **A. Office Staff**

1. An inservice conducted by CardioDynamics (CDIC) personnel will educate office staff how to conduct a test using the BioZ.
2. Post installation clinical support and training will be provided as needed by CDIC.
3. Identify office staff for device operation (RN's, LPN's, technicians, etc.)

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4. Identify one primary staff member to be the 'Certified ICG Specialist' (after training completed) with one alternative.

\_\_\_\_\_ (alternate)

5. Identify staff member(s) for interpretation of BioZ ICG Status Reports (MD, DO, NP, PA, RN, etc.)

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## **B. Device**

1. Identify one location to house the BioZ in the office, near an electrical outlet.
2. The device should be plugged into the outlet at all times to maintain a battery charge.
3. When the BioZ is to be used to conduct a test in an examination room, unplug the device, maintain it in the “on” position and once beside the patient, plug the device into an outlet so the printer is functional.

## **III. Clinical Applications**

### **A. Patient Diagnosis**

1. Heart Failure
2. Hypertension / Hypotension Evaluation
3. Pacemaker Syndromes
4. Coronary Artery Disease
5. Dyspnea
6. Pericardial Disease with Effusion
7. Critical Multi-System Illness
8. Acute / Chronic Renal Failure and ESRD / Dialysis

### **B. Procedure for Patient Identification**

1. Identify patients for a BioZ test either the evening before or morning prior to patient arrival
2. Place an ICG test “flag” on the front of the medical record should they have one of the above diagnosis listed in IIIA.
3. Conduct the test prior to physician evaluation
4. Place the BioZ status report in a separate section of the medical record for easy comparison to previous results
5. Assure that the MD/NP/PA writes an interpretation and plan on the Status Report

## **IV. Reimbursement**

National CMS-Approved Indications for ICG Monitoring\*:

- a. Differentiation of cardiogenic from pulmonary causes of acute dyspnea
- b. Optimization of atrioventricular (A/V) interval for patients with A/V sequential cardiac pacemakers
- c. Monitoring of continuous inotropic therapy
- d. Evaluation for rejection in patients with a heart transplant
- e. Optimization of fluid management in patients with congestive heart failure
- f. Management of drug-resistant hypertension in patients who are adhering to full doses of an appropriate three-drug regimen that includes a diuretic, and have failed to achieve goal BP.

\*For full coverage details, please refer to CMS coverage policies 50-54.

Local ICD-9 Codes:

(Insert appropriate codes here)

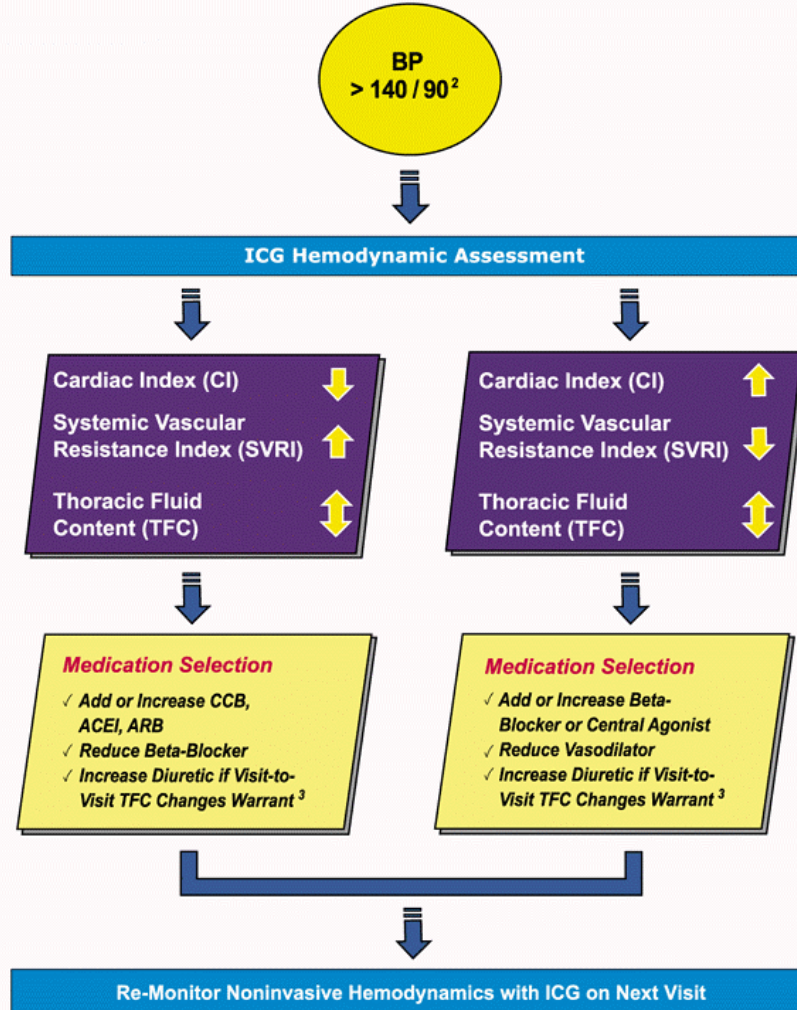
## **V. BioZ ICG Treatment Algorithm**

Refer to the attached clinical protocols:

Hypertension Drug Management and Heart Failure Drug Management Algorithm

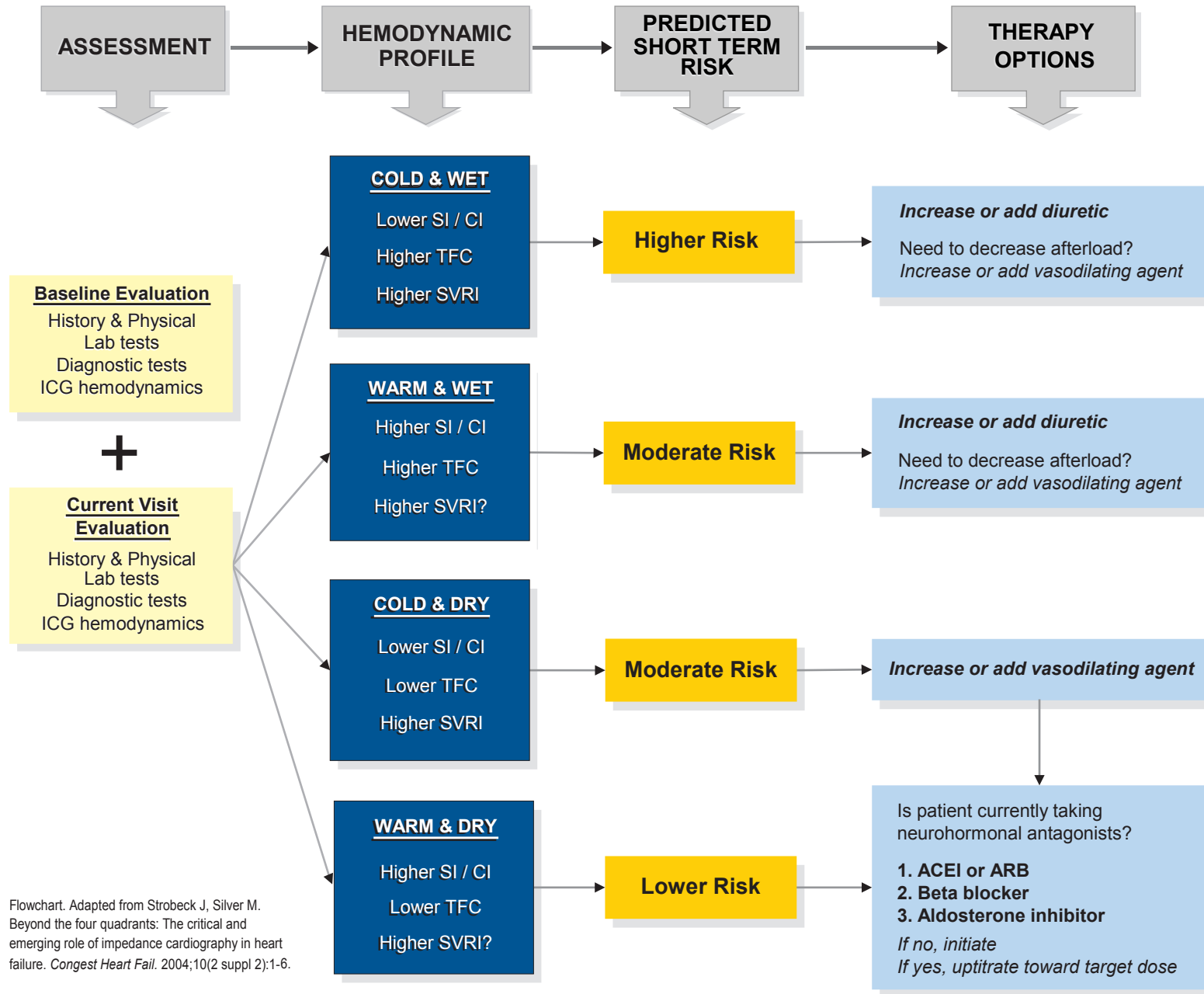
# HYPERTENSION

## TREATMENT ALGORITHM<sup>1</sup>



<sup>1</sup>Adapted from Mayo Clinic study, Taler SJ, Textor SC, Augustine JE. Resistant hypertension: Comparing hemodynamic management to specialist care. *Hypertension*. 2002;39:982-988. <sup>2</sup>JNC VI Guidelines. Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Arch Intern Med*. 1997;157:2413-2446. The JNC VI Report does not endorse or recommend this hypertension treatment algorithm. <sup>3</sup>Decreases in supine TFC can indicate reduced fluid levels. This algorithm describes the use of TFC, which is the inverse of baseline impedance, or TBI. The investigators in this study utilized TBI, not TFC. This is a general guideline to assist in the management of patients and is not designed to replace clinical judgement or individual patient needs.

# Algorithm for Utilizing ICG in Heart Failure



Flowchart. Adapted from Strobeck J, Silver M. Beyond the four quadrants: The critical and emerging role of impedance cardiography in heart failure. *Congest Heart Fail.* 2004;10(2 suppl 2):1-6.