I claim:What is claimed is:

1. A method of treating a patient with drug resistant hypertension (DRH) and/or heart failure with preserved ejection fraction (HFpEf) comprising:

treating the patient with angiotensin converting enzyme inhibitor (ACEI) and/or an angiotensin receptor blocking [ARB] drug; and

cardiac pacing the patient with a pacemaker controlled by a BaroPace algorithm.

2. The method of claim 1 further comprising withholding treatment of the patient with a beta-1 selective adrenergic blocking drug.

3. The method of claim 1 further comprising not withholding or adding to the patient's drug regimen treatment with a beta selective adrenergic blocking drug with ISA effect.

4. The method of claim 1 where cardiac pacing the patient as controlled by a BaroPace algorithm comprises monitoring the patient in combination with BaroPacing or PressurePace Al using trend analysis, or Stimulus Architecture Algorithm (SAA).

5. The method of claim 1 further comprising using the method to treat cardiac arrhythmias.

6. The method of claim 1 further comprising using the method to prevent cardiac sudden death.

7. The method of claim 1 further comprising using the method to prevent hypertensive stroke, intracranial bleeding due to hypertension, arterial aneurysm formation due to hypertension, and hypertensive renal dysfunction.

8. A method of providing a cardiac treatment for a patient comprising:

sensing the cardiac electrical activity of the patient;

processing the sensed cardiac activity using trend analysis or Stimulus Architecture Algorithm (SAA) as controlled by artificial intelligence;

pacing the patient using BaroPacing;

simultaneously treating the patient with a class of drugs which with BaroPacing produces a therapeutic response; and

at the same time eliminating one or more other selected drug classes to further improve treatment benefits.

9. The method of claim 8 where treating the patient using a class of drugs comprises treating a patient with ACEI/ARB provides a therapeutic drug effect present only also with BaroPacing the patient, and removing the adverse effects on heart rate modulation experienced with beta-1 selective beta blockers, which are eliminated from the treatment protocol.

10. A method of treating a patient with DRH and/or HFpEf comprising:

BaroPacing the patient; and

administering to the patient a therapeutically effective amount of angiotensin converting enzyme inhibitor (ACEI) and/or an angiotensin receptor blocking [ARB] drug while BaroPacing.

11. The method of claim 10 further comprising withholding administration of any beta-1 selective beta blocker to the patient during BaroPacing.

12. The method of claim 10 further comprising administering any beta blocker with ISA to the patient during BaroPacing.

13. The method of claim 10 where BaroPacing the patient comprises:

activating a blood pressure monitor coupled to the patient;

storing a number of blood pressure readings;

determining a baseline systolic blood pressure reading, or other hemodynamic parameters alone or in combination with systolic blood pressure (SBP);

selecting the following parameters for use in a pacemaker for blood pressure regulation, namely a target SBP, a lower limit of acceptable SBP, a target treatment interval in minutes, and/or target pacing rate change per treatment interval where the pacing rate change ranges from 0 - 40% for each interval change;

monitoring systolic blood pressure; and

if systolic blood pressure exceeds the target SBP, using a pacemaker to treat the patient by:

increasing the atrial pacing rate of the pacemaker by either a default level of 5% per treatment, or by a different predetermined value preset by the treating clinician or prescribed by the AI algorithm;

monitoring the SBP for a predetermined time period to establish the new blood pressure baseline;

comparing SBP and/or other physiologic or chemical variable to a pre-selected optimal SBP;

increasing the atrial pacing rate of the pacemaker by a predetermined incremental amount; and

repeating the steps of comparing SBP and increasing the atrial pacing rate of the pacemaker until either the SBP falls to the target SBP, or the atrial pacing rate of the pacemaker exceeds a predetermined maximal value.

14. The method of claim 13 where the pacing rate of the pacemaker is an atrial, ventricular, or HIS Bundle pacing rate.

15. The method of claim 13 where monitoring blood pressure comprises monitoring peripheral blood pressure, intravascular blood pressure or intracardiac blood pressure.

16. The method of claim 15 where monitoring peripheral blood pressure comprises monitoring peripheral blood pressure with a wrist mounted device, finger or other extremity mounted device, non-invasive ear sensor, or arm cuff.

17. The method of claim 13 further comprising monitoring blood oxygen levels, glucose levels, blood electrolytes levels or other blood parameters and controlling the pacing rate in response to the monitored blood oxygen levels, glucose levels, blood electrolytes levels or other blood parameters.

18. The method of claim 13 where the pacing device is a RA pacemaker,

where selecting the following parameters for use in a pacemaker for blood pressure regulation includes selecting a target RA pacing rate change per treatment interval where the RA pacing rate change ranges from 0 - 40%;

where if systolic blood pressure exceeds the target SBP, using a pacemaker having a RA pacing rate to treat the patient;

where treating the patient increases the KA pacing rate of the pacemaker by either a detault level of 5% per treatment, or by a different predetermined value;

where increasing the pacing rate of the pacemaker by a predetermined incremental amount increases the RA pacing rate; and

where repeating the steps compares SBP and increases the RA pacing rate of the pacemaker until either the SBP falls to the target SBP, or the RA pacing rate of the pacemaker exceeds a predetermined maximal value.

19. A method for operating a pacing device to treat drug resistant hypertension comprising:

monitoring blood pressure; and

controlling rate modulation in the pacing device in response to the monitored blood pressure to selectively prevent excessive pacing to reduce mean arterial blood pressure by either inhibiting rate modulation in the pacing device or by changing rate modulation parameters.

20. The method of claim 19 where changing rate modulation parameters comprises changing acceleration of pacing rate including magnitude of acceleration, and/or duration of acceleration, and changing deceleration of pacing rate including magnitude of deceleration, and/or duration of deceleration.

21. The method of claim 19 where changing rate modulation parameters comprises monitoring the movement of the diaphragm to assess accelerating respiratory rate including magnitude of acceleration, and/or duration of acceleration, and changing deceleration of pacing rate including magnitude of deceleration, and/or duration of deceleration.

22. The method of claim 19 where changing rate modulation parameters comprises monitoring thoracic impedance as a measure of thoracic fluid content and pulmonary blood volume, including magnitude of accumulation, and/or duration of accumulation, and changing accumulation including magnitude of deceleration, and/or duration of deceleration to presumed normal levels.

23. The method of claim 19 where monitoring blood pressure comprises:

monitoring systolic blood pressure; and

where controlling rate modulation in the pacing device in response to the monitored blood pressure controls rate modulation in the pacing device in response to the monitored systolic blood pressure to selectively prevent excessive pacing to reduce mean systolic arterial blood pressure by either inhibiting rate modulation in the pacing device or by changing rate modulation parameters.

24. The method of claim 19 where monitoring blood pressure monitors diastolic blood pressure or other hemodynamic parameters; and where controlling rate modulation in the pacing device in response to the monitored blood pressure controls rate modulation in the pacing device in response to the monitored diastolic blood pressure to selectively prevent excessive pacing to reduce mean diastolic arterial blood pressure by either inhibiting rate modulation in the pacing device or by changing rate modulation parameters.

25. The method of claim 19 further comprising monitoring blood oxygen levels, saturation of hemogloby by oxygen, glucose levels, blood electrolytes levels or other blood parameters and controlling the pacing rate in response to the monitored blood oxygen levels, glucose levels, blood electrolytes levels or other blood parameters.

26. The method of claim 19 where monitoring blood pressure comprises monitoring peripheral blood pressure, intravascular blood pressure or intracardiac blood pressure or other hemodynamic endpoints associated with blood pressure.

27. A system for operating a therapeutic device to treat a patient with drug resistant hypertension (DRH) and/or heart failure with preserved ejection fraction (HFpEf) comprising:

~~means for treating the patient with angiotensin converting enzyme inhibitor (ACEI) and/or an angiotensin receptor blocking [ARB] drug, while withholding treatment of the patient with a beta-1 beta adrenergic blocking drug; and~~

~~a pacemaker for cardiac pacing the patient with a pacemaker controlled by a BaroPace algorithm.~~

~~28. A system for operating a therapeutic device to treat a patient with drug resistant hypertension (DRH) and/or heart failure with preserved ejection fraction (HFpEf) comprising:~~

~~means for treating the patient with angiotensin converting enzyme inhibitor (ACEI) and/or an angiotensin receptor blocking [ARB] drug in combination with a beta adrenergic blocking drug with ISA; and~~

~~a pacemaker for cardiac pacing the patient with a pacemaker controlled by a BaroPace algorithm.~~

~~29. A method of cardiac pacing to treat drug resistant hypertension and heart failure with preserved ejection fraction (HFpEF) comprising:~~

~~administering to a patient a therapeutic amount of a beta blocker having intrinsic sympathomimetic activity (ISA); and~~

~~pacing the heart of the patient using the BaroPace algorithm.~~

~~30. A pacemaker programmed to treat drug resistant hypertension and heart failure with preserved ejection fraction (HFpEF) comprising:~~

~~means for administering to a patient a therapeutic amount of a beta blocker having intrinsic sympathomimetic activity (ISA); and~~

~~a pacemaker to pace the heart of the patient using the BaroPace algorithm.~~

1. A method for determining a pacing rate, the method comprising:

providing an angiotensin converting enzyme inhibitor (ACEI) and/or an angiotensin receptor blocking (ARB) treatment;

providing a beta blocker intrinsic sympathomimetic activity (ISA) treatment;

receiving a first blood pressure value at a first time subsequent to providing the ACEI and/or ARB treatment and subsequent to providing the ISA treatment;

determining that the first blood pressure value deviates from a target blood pressure value by at least a threshold amount;

in response to determining that the first blood pressure value deviates from the target blood pressure value by at least a threshold amount, determining a first pacing rate of a pacing device based on the first blood pressure value; and

outputting the first pacing rate.

2. The method of claim 1, wherein determining the first pacing rate of the pacing device is performed in real-time upon receiving the first blood pressure value or determining that the first blood pressure value deviates from the target blood pressure value by at least the threshold amount.

3. The method of claim 1, wherein the first pacing rate is determined based on an artificial intelligence (AI) trend analysis.

4. The method of claim 1, wherein the first pacing rate is approximately 10% greater than a baseline atrial pacing rate.

5. The method of claim 1, further comprising:

receiving a second blood pressure value at a second time subsequent to the first time;

determining that the second blood pressure value deviates from the target blood pressure value by at least the threshold amount; and

in response to determining that the second blood pressure value deviates from the target blood pressure value by at least the threshold amount, determining a second pacing rate of the pacing device.

6. The method of claim 1, wherein the first blood pressure value is a systolic blood pressure (SBP) value.

7. The method of claim 1, further comprising:

receiving a second blood pressure value at a second time subsequent to the first time;

determining that the second blood pressure value is within the threshold amount of the target blood pressure value; and

in response to determining that the second blood pressure value is within the threshold amount of the target blood pressure value, maintaining the first pacing rate of the pacing device.

8. The method of claim 1, further comprising:

receiving a second blood pressure value at a second time subsequent to the first time;

determining that the second blood pressure value is lower than the first blood pressure value by a threshold pressure value; and

in response to determining that the second blood pressure value is lower than the first blood pressure value by the threshold pressure value, maintaining the first pacing rate of the pacing device.

9. A system comprising:

a first module configured to provide an angiotensin converting enzyme inhibitor (ACEI) and/or an angiotensin receptor blocking (ARB) treatment;

a second module configured to provide a beta blocker intrinsic sympathomimetic activity (ISA) treatment;

a pacing device configured to output electric pacing signals based on pacing rates; and

at least one processor executing instructions to perform a process, the at least one processor configured to:

receive a first blood pressure value at a first time subsequent to providing the ACEI and/or ARB treatment and subsequent to providing the ISA treatment;

determine that the first blood pressure value deviates from a target blood pressure value by at least a threshold amount;

in response to determining that the first blood pressure value deviates from the target blood pressure value by at least a threshold amount, determine a first pacing rate of a pacing device based on the first blood pressure value; and

output the first pacing rate.

10. The system of claim 9, wherein the processor is configured to determine the first pacing rate of the pacing device in real-time upon receiving the first blood pressure value or determining that the first blood pressure value deviates from the target blood pressure value by at least the threshold amount.

11. The system of claim 9, further comprising an artificial intelligence (AI) module configured to output the first pacing rate based on trend analysis.

12. The system of claim 9, wherein the first pacing rate is approximately 10% greater than a baseline atrial pacing rate.

13. The system of claim 9, wherein the processor is further configured to:

receive a second blood pressure value at a second time subsequent to the first time;

determine that the second blood pressure value deviates from the target blood pressure value by at least the threshold amount; and

in response to determining that the second blood pressure value deviates from the target blood pressure value by at least the threshold amount, determine a second pacing rate of the pacing device.

14. The system of claim 9, wherein the first blood pressure value is a systolic blood pressure (SBP) value.

15. The system of claim 9, wherein the processor is further configured to:

receive a second blood pressure value at a second time subsequent to the first time;

determine that the second blood pressure value is within the threshold amount of the target blood pressure value; and

in response to determining that the second blood pressure value is within the threshold amount of the target blood pressure value, maintain the first pacing rate of the pacing device.

16. The system of claim 9, wherein the processor is further configured to:

receive a second blood pressure value at a second time subsequent to the first time;

determine that the second blood pressure value is lower than the first blood pressure value by a threshold pressure value; and

in response to determining that the second blood pressure value is lower than the first blood pressure value by the threshold pressure value, maintain the first pacing rate of the pacing device.

17. A system comprising:

a pacing device configured to output electric pacing signals based on pacing rates; and at least one processor executing instructions to perform a process, the at least one processor configured to:

receive a first blood pressure value at a first time subsequent to administration of an angiotensin converting enzyme inhibitor (ACEI) and/or an angiotensin receptor blocking (ARB) treatment and subsequent to administration of a beta blocker intrinsic sympathomimetic activity (ISA) treatment;

determine that the first blood pressure value deviates from a target blood pressure value by at least a threshold amount;

in response to determining that the first blood pressure value deviates from the target blood pressure value by at least a threshold amount, determine a first pacing rate of a pacing device based on the first blood pressure value; and

output the first pacing rate.

18. The system of claim 17, wherein the processor is further configured to:

receive a second blood pressure value at a second time subsequent to the first time;

determine that the second blood pressure value deviates from the target blood pressure value by at least the threshold amount; and

in response to determining that the second blood pressure value deviates from the target blood pressure value by at least the threshold amount, determine a second pacing rate of the pacing device.

19. The system of claim 17, wherein the processor is further configured to:

receive a second blood pressure value at a second time subsequent to the first time;

determine that the second blood pressure value is within the threshold amount of the target blood pressure value; and

in response to determining that the second blood pressure value is within the threshold amount of the target blood pressure value, maintain the first pacing rate of the pacing device.

20. The system of claim 17, wherein the processor is further configured to:

receive a second blood pressure value at a second time subsequent to the first time;

determine that the second blood pressure value is lower than the first blood pressure value by a threshold pressure value; and

in response to determining that the second blood pressure value is lower than the first blood pressure value by the threshold pressure value, maintain the first pacing rate of the pacing device.