Heart Failure - Current Concepts

Dear Editor,

This is in reference to the article, "Heart Failure-Current Concepts", published in MJAFI 2003;59(4):283-285. The article is very well written and will be of immense use to the junior physicians in peripheral hospitals. I would like to add a few more recent advancements in diagnosis and management of heart failure (HF) which have further taken place recently.

B-Type Natriuretic Peptide (BNP) as diagnostic and prognostic marker in HF:

1. BNP level of 100pg/ml has 90% sensitivity, 76% specificity and an accuracy of 83% for diagnosis of heart failure. At 100pg/ml, BNP is more accurate than either NHANES criteria (67% accuracy) or Framingham criteria (73% accuracy) in diagnosing HF[1]. BNP levels can also be used to guide therapy for HF by titrating doses of standard anti-failure drugs to the desired BNP levels. A commercial BNP assay, "Triage BNP Test" for diagnosing HF in emergency departments, has recently been approved by the FDA.
2. Natriuretic Peptides as Therapeutic Modalities in heart failure: Nesiritide, a synthetic human BNP, decreases PCWP, systemic vascular resistance and systolic BP, with an increase in cardiac index in patients with CHF[1]. It has been approved by FDA for treatment of decompensated CHF, in infusion rate of 0.015-0.030 microgram/kg/min.
3. Eplerenone: Use of spironolactone, in HF, is somewhat limited by its adverse-effect profile. Eplerenone is the first drug of newer generation of selective aldosterone receptor antagonist (SARA) which has better safety profile[2]. It has recently been approved by FDA, in Oct.2003, for use in CHF in doses of 50-100mg OD[3].
4. Non-pharmacological (Device) Therapy: Ventricular Assist Devices have recently been approved by FDA as "Destination Therapy" for patients with end-stage HF, who are not candidates for transplantation. Recent COMPANION trial, has shown clinically significant decline in combined mortality and hospitalization in CRT arm and all-cause mortality in the combined CRT-ICD arm [3]. Surgical ventricular restoration techniques have shown to be associated with increased survival benefits.
5. Future Directions: Some promising approaches to prevent or treat HF, which are under evaluation, are as follows:
 - (a) The partial fatty acid oxidation inhibitor, ranolazine, which shifts cardiac substrate metabolism towards glucose oxidation to conserve oxygen and maintain myocardial function in the face of cardiac ischemia, is being considered for morbidity/mortality trial in HF.
 - (b) Selective A1-adenosine receptor blockade, which may promote natriuresis and diuresis without altering

glomerular filtration rate, represents a plausible approach to HF with azotemia.

- (c) Matrix metalloproteinase inhibitor (BMS-186716) is being assessed in the IMPRESS trial.
- (d) Nolomirole, a compound that may blunt sympathetic outflow and cardiac fibrosis under conditions of increased load by stimulating prejunctional (inhibitory) dopamine (DA2) receptors, holds promise.
- (e) Antithrombotic agents, being studied in WATCH trial, will attempt to determine the optimal antithrombotic strategy in patients with HF.
- (f) Levosimendan, a calcium-sensitizing agent, is being evaluated in randomized multicenter REVIVE trial for use in decompensated HF.
- (g) Newer device therapies like CorCap Cardiac Support Device, has shown good results as adjunctive treatment for patients with cardiac enlargement (in moderate HF) that consists of a mesh-like "jacket" that is placed around (and sutured in place) the heart to limit further enlargement. Cardiac replacement therapy with the development of the AbioCor Implantable Replacement Heart, holds promise in near future.
- (h) Cellular/Genetic Era: In heart failure therapy timeline-pre-1980s was "Non-pharmacologic Era", after which began the "Pharmacologic Era".

The year 2000 marked the beginning of the "Device Era" which included the emergence of therapy with CRT, ICDs, LVADs, total implantable artificial hearts, cardiac reshaping devices, ultrafiltration, revascularization and valve repair/replacement. It is difficult to project how long the "device era" will last, it is predicted that sometimes between years 2010 and 2020 we are likely to enter "Cellular/Genetic Era". Treatment of heart failure will be anchored in gene therapies, cell implantation, regeneration and xenotransplantation.

References

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2. Tera DM, James JN, Joe RA. Eplerenone: A selective aldosterone receptor antagonist for hypertension and heart failure. Heart Disease 2003 Oct;5(5):354-63.
3. Bradley DJ, Bradley EA, Baughman KL. Cardiac resynchronization and death from progressive heart failure: a meta-analysis of randomized controlled trials. JAMA 2003;289:730-40.

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