●特別講演

Pacing Therapy for Congestive Heart Failure and Atrial Fibrillation

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Congestive Heart Failure

Cardiac pacing as a therapeutic tool for congestive heart failure has been the most active area of research in recent years. Multiple trials have now been reported.Uncontrolled trials of significance include InSync OUS and the French Pilot Study. Controlled trials include MUSTIC-SR, CONTAK-CD, and InSync(MIRACLE). Although study designs and endpoints vary, there is consistency regarding functional improvement when cardiac resynchronization is applied in patients with NYHA Class III and IV heart failure on stable and optimized medical therapy. Although many parameters have been evaluated those endpoints evaluated in multiple studies with consistent improvement include quality-of-life, six-minute hall walk, NYHA function class, and VO2. There is also limited data to suggest that hospitalizations for congestive heart failure may decrease following cardiac resynchronization therapy.

There is also limited data available regarding monoventricular resynchronization, i.e. left ventricular (LV) pacing only. In some patients LV pacing only may provide as much, or in some patients more, clinical benefit that biventricular pacing. However, at this point, there are no clinical criteria by which the superiority of one pacing configuration can be determined prior to implant.

Only one controlled trial to date has addressed biventricular pacing in patients with chronic atrial fibrillation. In the MUSTIC-AF trial, sustained benefit from cardiac resynchronization was sustained at 12 months of follow-up.

This discipline will continue to evolve rapidly in the next few years with multiple additional ongoing trials including COMPANION; InSync III; CARE-HF; PAVE; VECTOR and others. At this time, the patient that should be considered for therapy would be one in NYHA function class III or IV on a stable and optimized medical regimen. Features would include a significant left ventricular systolic dysfunction (as determined by LV ejection fraction and LVEDD), and a QRS duration of $>$120ms. Controversy persists regarding the absolute QRS duration and whether benefit may be seen in patients with congestive heart failure and narrow QRS complex. There is also controversy regarding the importance of change in the QRS duration after implementation of biventricular pacing. Initially this electrocardiographic change was felt to be necessary to see subsequent response and the controlled trials have shown an overall shortening of the QRS duration of 20 to 25 msec. Conversely, reports from smaller uncontrolled cohorts have shown improvement regardless of QRS change.

At least one controlled study has shown that patients with RBBB improved with biventricular pacing. However, only a small number of patients with RBBB were included and more data is needed to

decide on the role of biventricular pacing in this subset.

In addition, trials that assess the added benefit of ICD therapy with biventricular pacing are underway. Although cardiac resynchronization may have some antiarrhythmic effect, given the high incidence of sudden death in this patient population, it is likely that they would benefit from ICD therapy also. Small early experiences confirm this but larger trials are needed. Data will soon be available from the InSync ICD study.

Atrial Fibrillation

The topic of permanent pacing in the prevention of atrial fibrillation has become one of intense interest given the growing incidence and prevalence of atrial fibrillation and the significant costs to health care systems to treat this arrhythmia. There are multiple issues to consider including dual-site and alternative-site pacing for prevention of atrial fibrillation and atrial overdrive and algorithms which respond to APCs (atrial premature contractions) to prevent PAF and/or reduce AF burden. The DAPPAF (Dual-site Atrial Pacing for the Prevention of Atrial Fibrillation) Trial did show a reduction in atrial fibrillation compared to standard pacing modes. Padeletti and colleagues have demonstrated lower atrial fibrillation burden with atrial septal pacing. However, the SYMBIPACE did not show any significant reduction in atrial fibrillation with dual-site pacing. Other trials with dual-site and alternative-site atrial pacing are ongoing.

Trials assessing atrial overdrive algorithms are just emerging. The ADOPT-A trial demonstrated lower atrial fibrillation burden with atrial overdrive pacing. The AT 500 investigators have also demonstrated efficacy of algorithms for atrial rate stabilization, atrial pacing preference and post-mode switch overdrive pacing. Data from the AFT (Atrial Fibrillation Treatment) Trial is expected in the fall of 2001. This trial includes 4 different atrial-pacing algorithms. Early data from PIPAF (Pacing in Prevention of Atrial Fibrillation) Trial is not encouraging regarding overall effect of atrial pacing algorithms. Pacing techniques to prevent episodes of atrial fibrillation include not only different pacing configurations but also various algorithms that react to alterations in the atrial rhythm that may be precursors to atrial fibrillation. Results of ongoing clinical trials will be necessary to definitively answer the question of when to use atrial pacing algorithms and in whom. However, the analysis of underlying rhythm and onset triggers discussed above, would suggest that the algorithms would have potential benefit in any patient that display bradycardia or PACs as part of the arrhythmia mechanism.

In addition to pacing algorithms and alternative pacing configurations, anti-tachycardia pacing (ATP) and atrial defibrillation may play a significant role in some patients. The AT 500 is capable of termination of atrial fibrillation by AF termination functions by pacing such as Burst + , Ramp and 50Hz Burst pacing. In the Medtronic Jewel ^{TM} AF clinical study, ATP and /or atrial shock significantly improved the quality of life and reduced symptoms. This therapy allows early restoration of sinus rhythm and at the same time gives the patient some degree of control of their atrial fibrillation therapy. The Medtronic Jewel ^{TM} also provides ventricular arrhythmia protection and in the clinical study 7.6% of patients experienced new onset VT/VF during the 12-month follow-up period.

In the near future we will undoubtedly be using a number of these therapeutic tools in a given patient to prevent and reduce atrial fibrillation burden.