

More poles and more configurations: Seeking the Holy Grail for cardiac resynchronization therapy

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Complications of cardiac resynchronization therapy (CRT) are not infrequent and include high pacing thresholds, lead micro-dislodgement and phrenic nerve stimulation, all of which may necessitate coronary sinus (CS) lead repositioning [1]. The technology from the manufacturers of these devices is evolving in a bid to reduce the need for repeated surgery, which is recognized to be associated with increased morbidity and mortality [2].

St Jude Medical has developed a new quadripolar lead designed to be placed in a branch of the coronary sinus (Quartet[®] Model 1458Q, Sylmar, CA, USA) with the ability to pace from a distal electrode (D1) and from three additional poles (M2, M3, P4) allowing up to 10 different pacing configurations. The properties of this quadripolar lead allow the operator to pace the left ventricle at different locations within the branch of the CS using different pacing configurations with the aim of significantly increasing the possibility of obtaining a low pacing threshold and simultaneously reducing the likelihood of phrenic nerve stimulation.

In a recent study assessing the use of this quadripolar lead, 71 out of 75 patients underwent successful implantation of this lead [3]. The ability to identify a suitable pacing site within a branch of the CS increased from 86% (with a traditional true bipolar configuration) to 97% using 2 or more alternate configurations. The reduction of phrenic nerve stimulation using the Quartet[®] lead has also been evaluated separately by Mehta et al. [4]. They reported a reduction not only in phrenic nerve stimulation at the time of implantation, but were able to overcome this problem in 5 patients that subse-

quently developed this complication during follow-up by changing to a different pacing configuration, thereby avoiding the need for further surgical intervention.

In a further study by Forleo et al. [5], a comparison between quadripolar and bipolar leads in 45 patients demonstrated a significant reduction in phrenic nerve stimulation during the first 3 months following implantation in the group receiving the quadripolar lead.

In this volume of *Cardiology Journal*, Arias et al. [6] describe their experience in prospectively comparing 21 patients receiving the Quartet[®] lead with 21 patients receiving a conventional bipolar lead and provide the longest follow-up available to date (9 months). In keeping with previous studies, implantation of the lead was successful in all patients. Of note, in the group receiving the conventional bipolar lead, the likelihood of using more than one lead was significantly higher ($p = 0.04$) and the procedure associated with longer fluoroscopy times ($p = 0.03$). In addition, in the present study, phrenic nerve stimulation was seen more frequently in the group receiving the bipolar lead with surgical re-intervention required in 1 case. In contrast, no patients in the group receiving the quadripolar lead required surgical intervention to correct phrenic nerve stimulation.

The results of this study extend previous findings, although as recognized by the authors, comes with the caveat that it lacks randomization which may have therefore introduced a possible selection bias.

A simple, reliable means of delivering a CS lead with good pacing thresholds and avoiding phrenic stimulation remains the Holy Grail for CRT implantation. Arias et al. [6] have contributed to this search, demonstrating that the use of the Quartet[®] quadripolar lead adds to the armamentarium avail-

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able to the operator. Although our search for the Holy Grail continues, we may be inching closer.

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