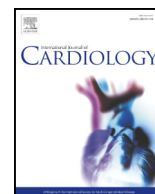




Contents lists available at ScienceDirect

## International Journal of Cardiology

journal homepage: [www.elsevier.com/locate/ijcard](http://www.elsevier.com/locate/ijcard)

## Editorial

## Pacing in hypertrophic obstructive cardiomyopathy: First choice therapy in low volume centers?

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Hypertrophic cardiomyopathy (HCM) is a very intriguing heritable disease, defined as left ventricular hypertrophy in the absence of a secondary cause. The heterogeneity in phenotypic expression makes treatment of patients very challenging. Fortunately, most patients have a benign prognosis, however in a subset of patients the clinical outcome is less favourable as patients present with symptoms of congestive heart failure or sudden cardiac death [1]. Symptoms are often related to left ventricular outflow tract (LVOT) obstruction. In patients with drug-refractory symptoms treatment of LVOT obstruction comprises surgical myectomy (SM), alcohol septal ablation (ASA) and short atrio-ventricular delay pacing in DDD-mode. The optimal therapy remains unclear given the lack of randomized trials providing head-to-head comparison between the different LVOT reduction therapies [1].

In the study by Javidgonbadi et al. clinically equivalent patients with hypertrophic obstructive cardiomyopathy (HOCM) received intervention with myectomy or pacing and were compared with respect to periprocedural ( $\leq 30$  days) and long-term complications/re-interventions, hospital length of stay and cost of initial hospitalization. Patients were recruited from ten hospitals of the West Götaland region in Sweden. By case-control methodology 31 pairs of matching patients were selected to compare the results of either intervention. Data presenting periprocedural outcome, late complications and re-interventions were disquieting: 9.7% of patients needed definitive pacemaker therapy within 30 days after myectomy and another 25.8% of patients during a mean follow up of 10.4 years respectively. After myectomy, the need for re-intervention for residual LVOT obstruction was as high as 16.1% during follow up and only 3.2% after pacing therapy [2].

These data are clearly inferior to that achieved at highly experienced centers. For instance, perioperative and late results of myectomy in 3 different HCM Centers of Excellence demonstrate perioperative mortality of  $<1\%$ , 2–5% of patients need definitive pacemaker therapy within 30 days and reintervention is necessary in 0–2% of cases during follow-up. [3–5]. Osman et al. presented a systematic review and meta-analysis in 23 different SM cohorts from different parts of the world showing a comparable clinical outcome: during a mean follow up of 6.8 years, perioperative mortality was 2%, periprocedural

definitive pacemaker therapy 5% and the need for re-intervention 1.5% [6]. These excellent data come from high volume centers with special expertise in treating HCM patients. It is well known that the myectomy procedure in high volume centers go hand in hand with lower mortality and morbidity [7]. This point of view is confirmed by the study of Kim et al. [8]. In this US Nationwide study in-hospital outcomes after SM and ASA were examined by hospital volume within a large, national inpatient database. From 2003 to 2011, 6386 patients in 1049 US hospitals were treated by SM. Low SM volume was associated with worse outcomes, including higher mortality, longer length of stay, and higher costs. Peri-operative mortality was 15.6% for patients in centers in the lowest tertile of procedural volume, compared with 9.6% for the second tertile and 3.8% for the highest tertile [8]. However, mortality rates from their high-volume tertile, are still nearly 10-fold higher than what is seen at HCM Centers of Excellence. In their study, no details are available comparing the results of Centers of Excellence within higher volume centers [8].

In the 2014 Esc guidelines recommendations on septal reduction therapy in HCM it is advised that septal reduction therapies be performed by experienced operators, working as part of a multidisciplinary team expert in the management of HCM. (Level of evidence IC) [9]. It is recommended for surgeons to perform at least 10 myectomies per operator/year, a goal that can be achieved in only a minority of centers across the world. In addition, sequential AV pacing, with optimal AV interval to reduce the LV outflow tract gradient may be considered in selected patients with resting or provokable LVOT  $\geq 50$  mmHg, sinus rhythm and drug-refractory symptoms, who have contraindications for septal alcohol ablation or septal myectomy (Level of evidence IIB) [9].

What about pacing in obstructive HCM? Pacemaker therapy is considered less complex and invasive than myectomy and alcohol septal ablation (ASA). However, this therapy to reduce the LVOT gradient is also best adopted in centers specialized in treating HCM patients, since careful implantation and individual optimization (like the optimal ventricular stimulation site, ventricular capture and left AV synchrony) is crucial to achieve the best results. More importantly, the scientific evidence is still relatively weak. Short term results of pacing are inconsistent, nevertheless long-term studies report beneficial effects of pacing with a progressive reduction of obstruction during follow up, improvement in NYHA class and decrease of MV insufficiency in some studies [10].

More scientific data are needed to explore the role of pacemaker therapy. Two upcoming trials attempt to fill part of the gap in our

DOI of original article: <https://doi.org/10.1016/j.ijcard.2020.08.066>.

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Please cite this article as: M.J.M. Kofflard, , International Journal of Cardiology, <https://doi.org/10.1016/j.ijcard.2020.10.005>

knowledge [10]. The 'Pacing Therapy for Hypertrophic Obstructive Cardiomyopathy'-HOcm PACE study is a French prospective, multi-center trial which aims to demonstrate that individually optimized DDD pacing with a dual-chamber ICD is non-inferior to ASA. The « Triple Chamber Pacing in Hypertrophic Obstructive Cardiomyopathy Patients » -TRICHAMPION study is a prospective multi-centre trial which aims to evaluate the benefit of CRT in severely symptomatic HOcm patients, all implanted with a Cardiac Resynchronization Therapy-Pacing (CRT-P) device. The comparison will be optimized CRT pacing including the possibility of AV node ablation in case of fusion (active group) vs. back-up AAI pacing (control group).

At the end of their manuscript the authors raise a very important question: How should small nations best organize the care of HOcm patients? In my opinion patients with HOcm should be treated in high volume centers with special expertise to deal with the specific problems in these complex patients. As shown in this paper the complication rate is too high to perform SM in low volume centers. I agree with the authors that for a country like Sweden it is mandatory to centralize septal reduction procedures in a single national center. Regional centers may choose to treat HOcm patients with pacemaker therapy in a shared decision-making process, in which the fully informed patient is able to choose between the different available procedures in that specific country [7].

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