Commentary

Interventional Cardiology

Left bundle branch area pacing: The dawn of new era in pacing

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Description

It is well known that in a substantial portion of patients that require Ventricular pacing (Vp), there is a risk of developing pacing induced cardiomyopathy, caused by the Left Ventricular (LV) dyssynchrony which is directly linked to the paced LBBB morphology. This downside can be overcome by Conduction System Pacing (CSP) which consists of His Bundle Pacing (HBP) and Left Bundle Branch Area Pacing (LBBAP). Initial attempts were focused on the his bundle pacing but due to high rate of increased lead ventricular threshold and lead dislodgement this method has been abandoned by most of the operators [1]. It seems that the last years LBBAP has prevailed over HBP.

LBBAP has been applied in patients with a bradycardia indication and normal ejection fraction requiring high rate of Vp and it has been shown that Left Ventricular Ejection Fraction (LVEF) is being preserved compared to conventional pacing. Moreover, myocardial work-a resynchronization index-is higher in LBBAP. This is driven mainly by the lower waisted work observed in LBBAP which is known as an important factor leading to LV remodeling [2]. Moreover, it has been demonstrated by meta-analysis of observational studies and large registries that this technique does not compromise safety [3].

However, the major step would be if LBBAP is proved to be a game changer in patients requiring Cardiac Resynchronization Treatment (CRT). Currently, LBBAP has the strongest indication as a bail out strategy in cases that an epicardial LV lead in a Coronary Sinus (CS) branch cannot be placed. Apart from anatomical restrictions which hinder intra procedural LV lead placement, phrenic nerve capture and LV lead dislodgement are known weaknesses of the classic CRT which no more exist in LBBAP.

More importantly, electrical resynchronization is more prominent with LBBAP than in CRT. Many observational studies have shown that this translates to higher rate of Echo responders and super responders and to less heart failure hospitalizations. However, so far current data failed to show statistical significant difference in harder outcomes, such as all-cause mortality [4].

As in every procedure, it is very important to select the patients that will benefit the most. Currently, resynchronization treatment is suggested in patients with EF<35% and QRS>130 msec with different levels of recommendations depending on QRS morphology (LBBB vs. non LBBB).

The main aim of LBBAP is to shorten the QRS interval. This is done mainly in patients with LBBB where the primary goal is the LBBB correction. Therefore, it is crucial to define which patients have LBBB-induced cardiomyopathy as these have the higher chance to improve their LVEF. This is quite difficult to be found as it has to be evident from the clinical history that LBBB onset precedes EF decline. As a result

of this, LBBB associated cardiomyopathy is another term used instead. LBBB correction will be present after LBBAP if the site of block is proximal to the site of pacing. There is no 100% sensitive marker to predict this. Even when the patient has LBBB that meets the Strauss criteria-described also as "complete", "typical" or "advanced" LBBB there is no absolute correlation with a proximal site of block. It is known that even a block that is located distally leaving intact the Purkinje activation-can mimic a complete LBBB pattern in 30% of cases [5]. It remains to be found if identification of a typical LBBB contraction by strain echocardfiography can add in predicting better long term outcomes in LBBAP as it applies for CRT [6].

A lot of randomized studies are in progress that will shed more light on the real benefit of LBBAP The results of these studies could change our mindset and LBBAP might become in the future the first line approach whereas CRT might be under graded as a bailout option when LBBAP fails.

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