



CARDIAC CONTRACTILITY MODULATION AND VENTRICULAR MULTISITE PACING. CHALLENGES WE MEET IN PATIENTS WITH OPTIMIZER AND WIDE QRS COMPLEX

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Background:

Cardiac contractility modulation (CCM) is a device-based therapy for heart failure that improves symptoms in patients who didn't improve enough on optimal medical therapy (OMT). Most clinical studies examining CCM excluded patients with wide QRS. Patients who have implanted CCM sometimes develop indications for cardiac resynchronization therapy (CRT) therapy which poses a challenge from the device programming viewpoint. Bundle branch block or cardiac resynchronization therapy changes the activation pattern of interventricular septum contraction leading to inhibition of CCM.

In our experience patients who received Optimizer due to non-response to CRT or who developed indications for CRT after optimizer implantation show significant segmentation of ventricular signal on optimizer leads. Although there are some reports of CCM using in patients with implanted CRT, to date we lack information on how to manage this situation without losing benefits from CCM.

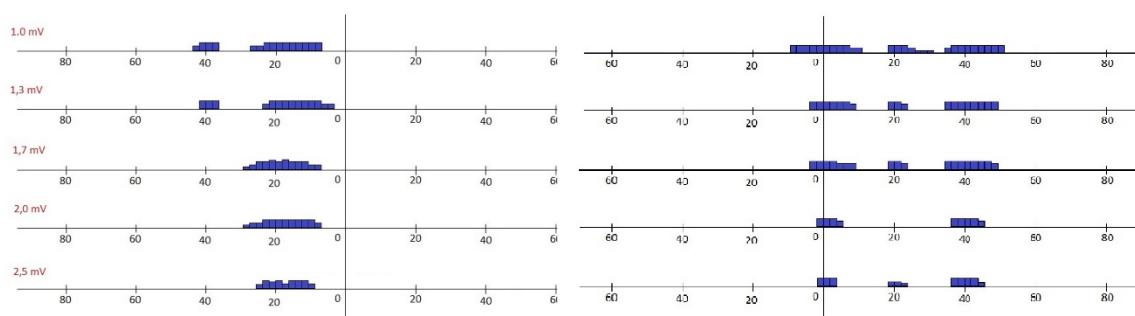
History:

In our practice, we encountered five patients with CRT and CCM devices who had this problem. Three patients with preexisting CRT had optimizer implantation due to heart failure symptoms despite OMT. The fourth had an optimizer implanted and then had developed a need for CRT (LBBB) and the fifth needed ventricular pacing due to AF and bradycardia

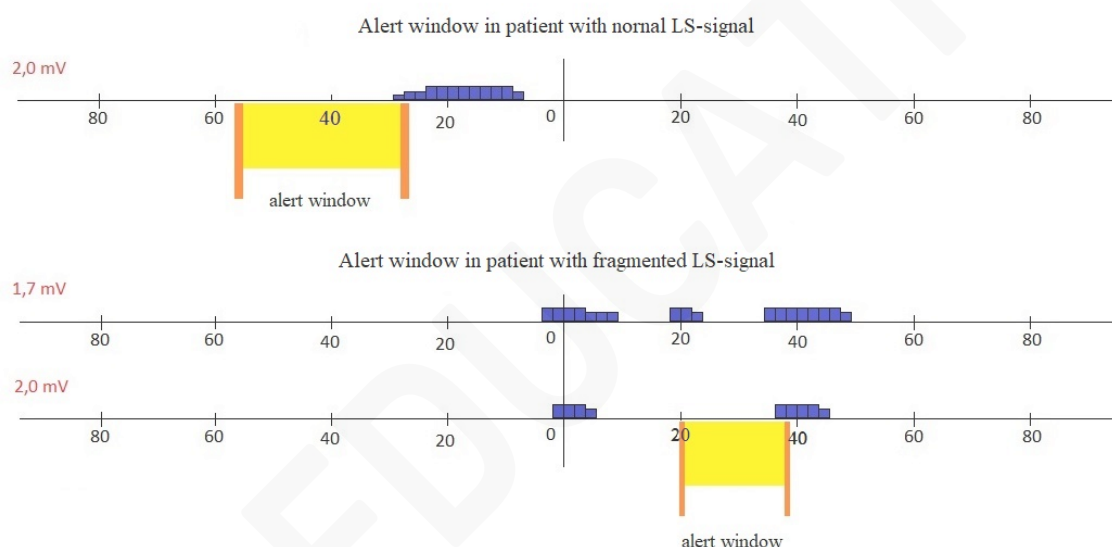
Operator found sensing amplitude with enough time between signal fragments and programmed alert window to ignore the first part of the signal and read only the last part.

Pic.1 shows optimizer programmer screen with signal morphology in patient with narrow QRS complex and in patient with intraventricular conduction abnormalities. In the first picture one may see a homogeneous signal in most sensing amplitudes. But in the second picture, we see fragmented potentials which is marked as "double potential" by the optimizer and inhibit therapy.

Pic.2 shows the position of the "alert window" that marks the time when the optimizer should detect normal ventricular activation registered on the second ventricular electrode (LS).



Picture 1: Ventricular signal as shown on programmer screen in patient with narrow QRS (A) and wide QRS (B) complex



Picture 2: Position of alert window in patients with normal and fragmented ventricular signal

As a result, two patients had >80% of successful CCM stimulation and other three > 90%, resulting in slight but stable improvement in six-minute walking distance.

This programming didn't result in any conflict, and patients didn't show any ventricular episodes that would require electrical therapy.

We believe this experience may be helpful for medical providers who encounter such a clinical situation.

Learning points:

- implanting CCM and CRT in one patient lead to typical problems in optimizer programming;



- programming of CCM in the presents of CRT requires additional correction of parameters to maximizes the percentage of effective stimulation
- CCM beneficial effects are not necessarily should be abandoned due to the necessity of CRT implantation

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