

## Case Report – Eccentric activation

I present you a 43y/o man with non-documented tachycardia crisis in October 2016. His electrophysiological study was performed yesterday and left us with a doubt. Basal ECG (Figure 1):

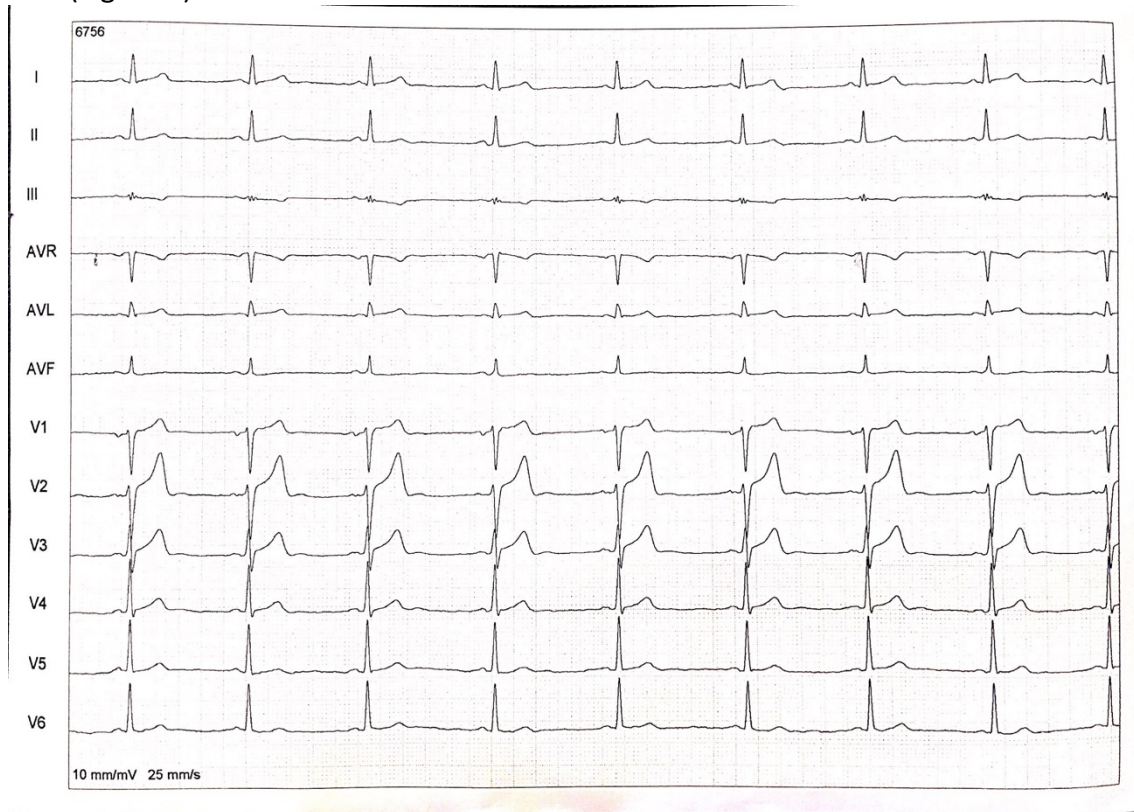


Figure 1: Basal ECG.

Eccentric activation seen during sinus rhythm (Figure 2). It is important to say that my and my colleagues asked several times to plug-off the Distal Coronary Sinus (Scd) and the proximal coronary sinus (Scp) just to be sure that we were seeing what we were seeing. We even changed the cable connector and still the same.

At some point of the electrophysiological study, we positioned a catheter in high right atrium and saw that the first atrium sign was there, proving that it was a sinus rhythm.

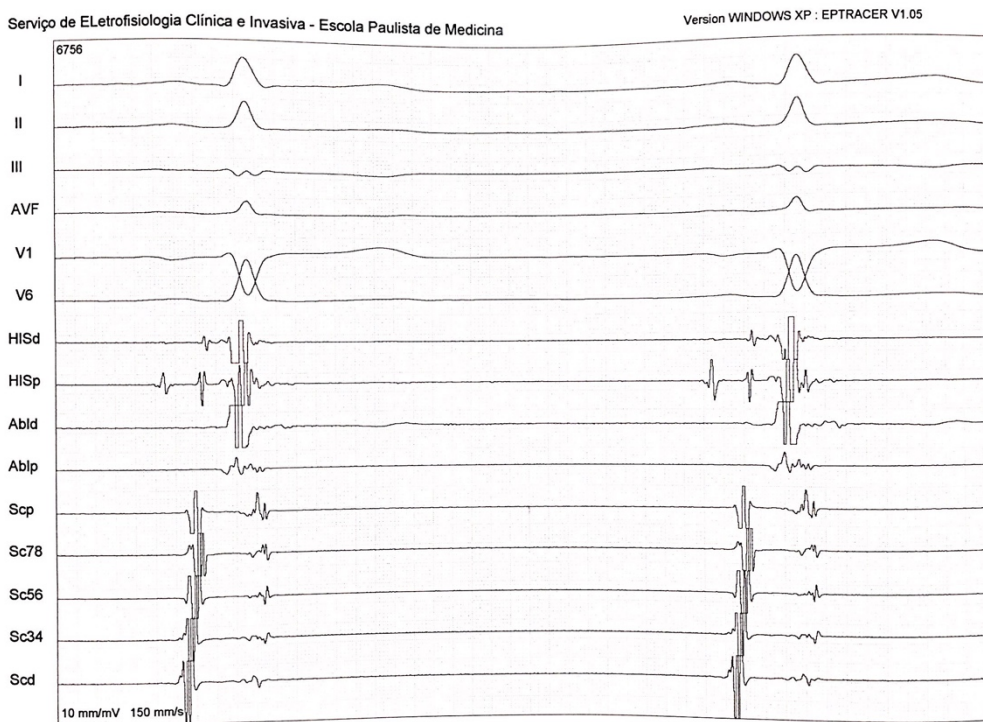


Figure 2: Eccentric atrial activation during sinus rhythm: the first atrium signal is recorded at proximal His, and then, the second atrium is the distal coronary sinus.

We performed a Decremental Atrial Stimulation and a Decremental Ventricular Stimulation and the strips are as follows (Figures 3 and 4):

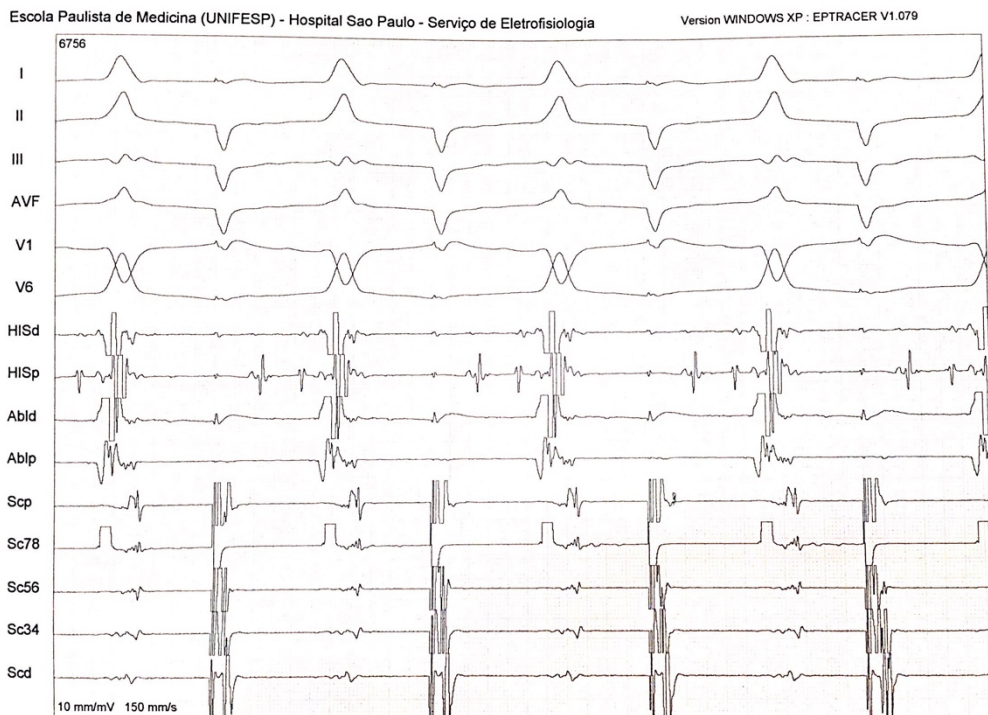


Figure 3. Decremental atrial stimulation (Sc78 - S1 350ms) with normal AV conduction.

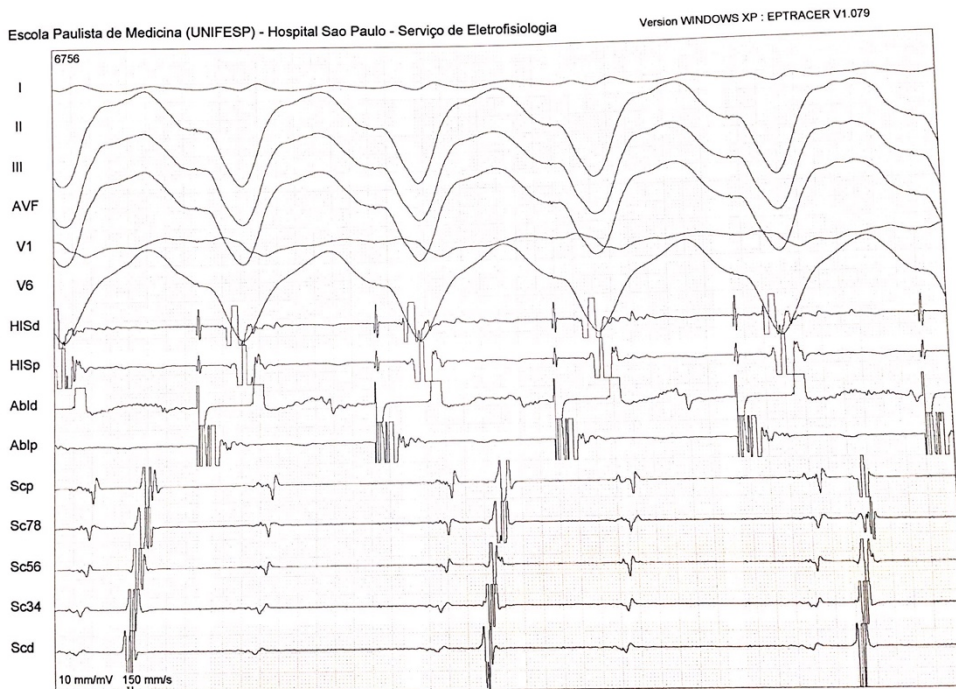


Figure 4. Decremental ventricular stimulation (AblD - right ventricle) with eccentric conduction 1:1 until 310ms (RWP 320ms). No arrhythmia induced.

The first programmed atrial stimulation was not successful in initiating a tachycardia. But, we repeated the process while infusing isoproterenol and the results are as it follows (Figures 5 and 6):

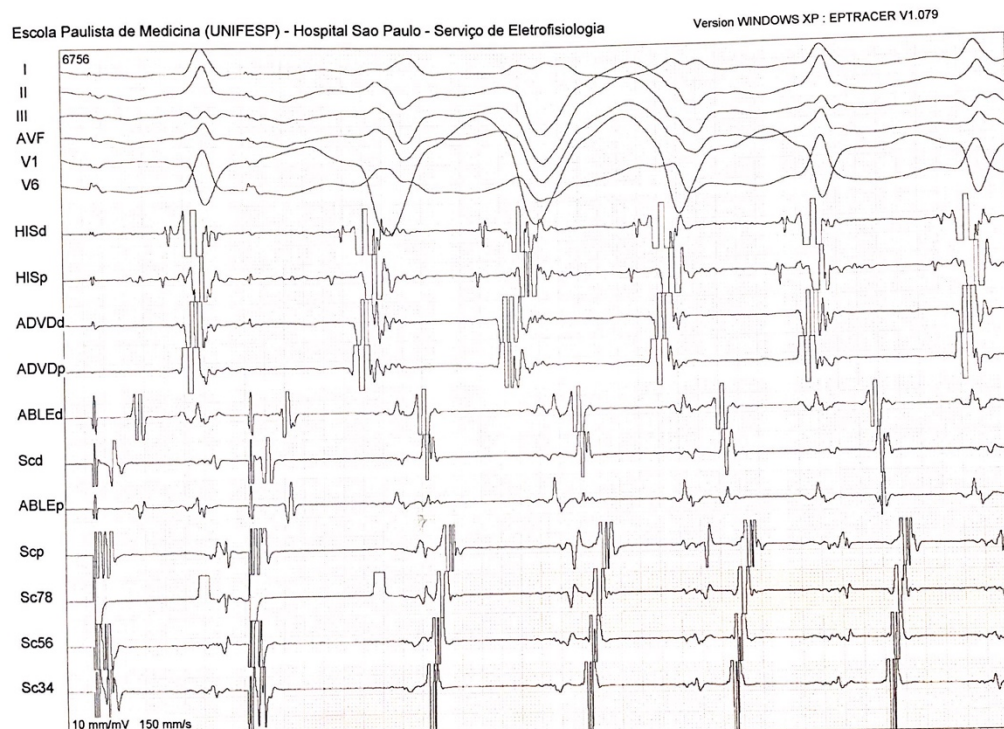


Figure 5. Programmed atrial stimulation (Sc 78 - S1 450ms, S2 260ms) initiating a tachycardia with Narrow QRS and eccentric activation

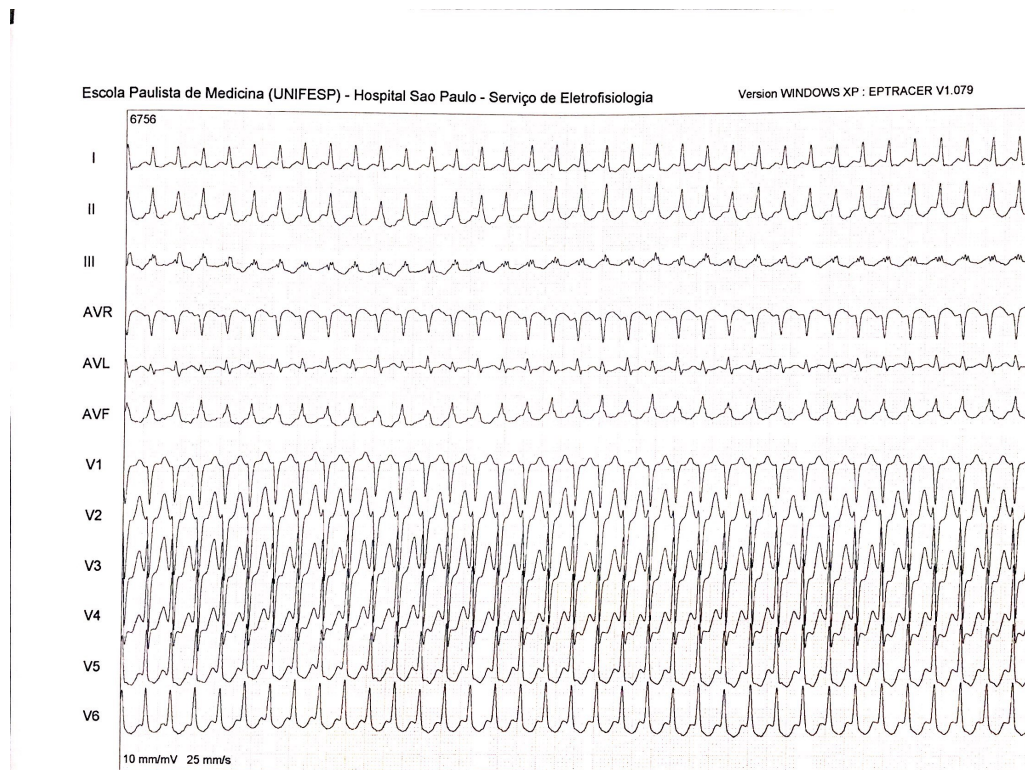


Figure 6. Narrow QRS tachycardia in 12 derivations.

Then, we started mapping left ventricle and found no fusion.

We went back to right ventricle and found fusion in para-hissian location pacing in right ventricle (Figure 7). For radiofrequency delivery, we stopped pacing and watched carefully for Hissian signal (Figure 8)

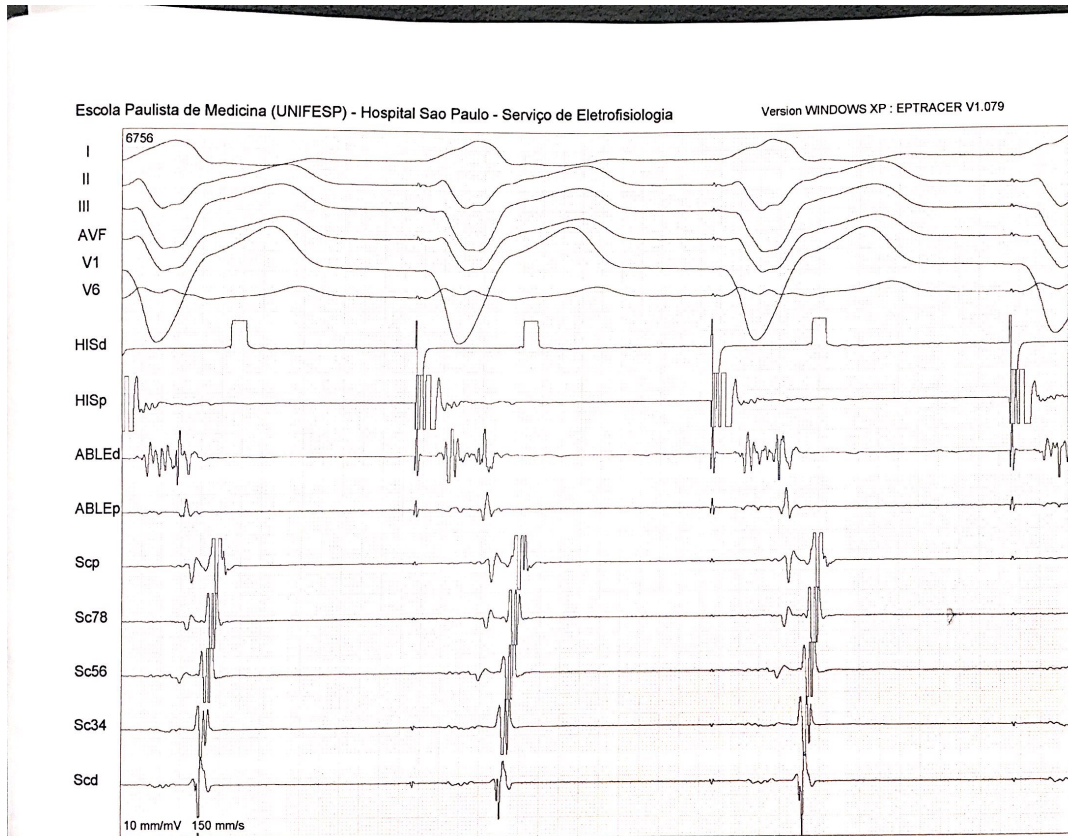


Figure 7. VA Fusion in para-hissian location when pacing right ventricle (ABLEd).

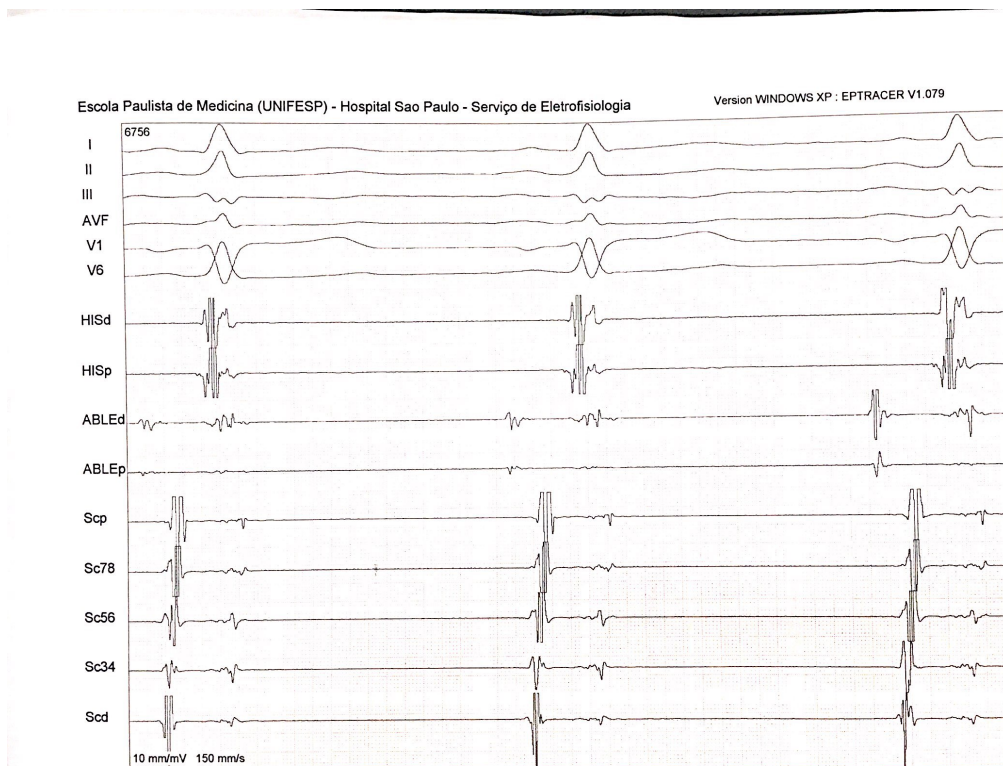


Figure 8. No Hisian signal at ABLEd in radiofrequency delivery.

There was stopping of VA conduction after radiofrequency (Figure 9) and no tachycardias were initiated with programmed stimulation with and without isoproterenol.

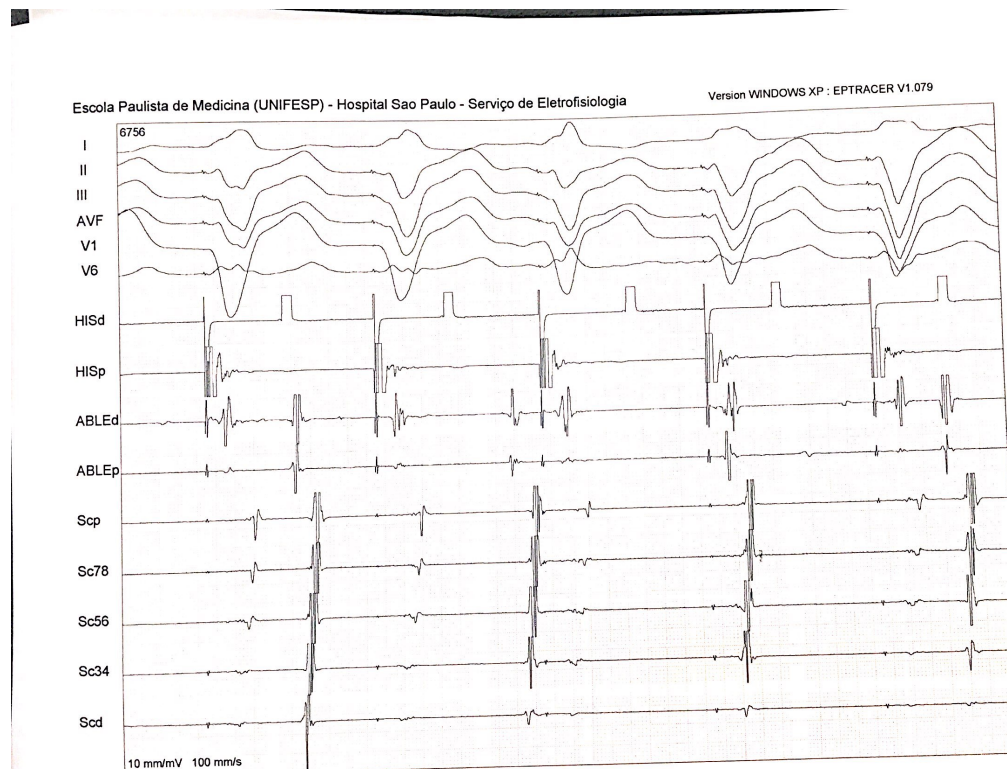


Figure 9. No VA conductance with ventricular stimulation.

Then, we finished the procedure with final ECG as it follows (Figure 10).

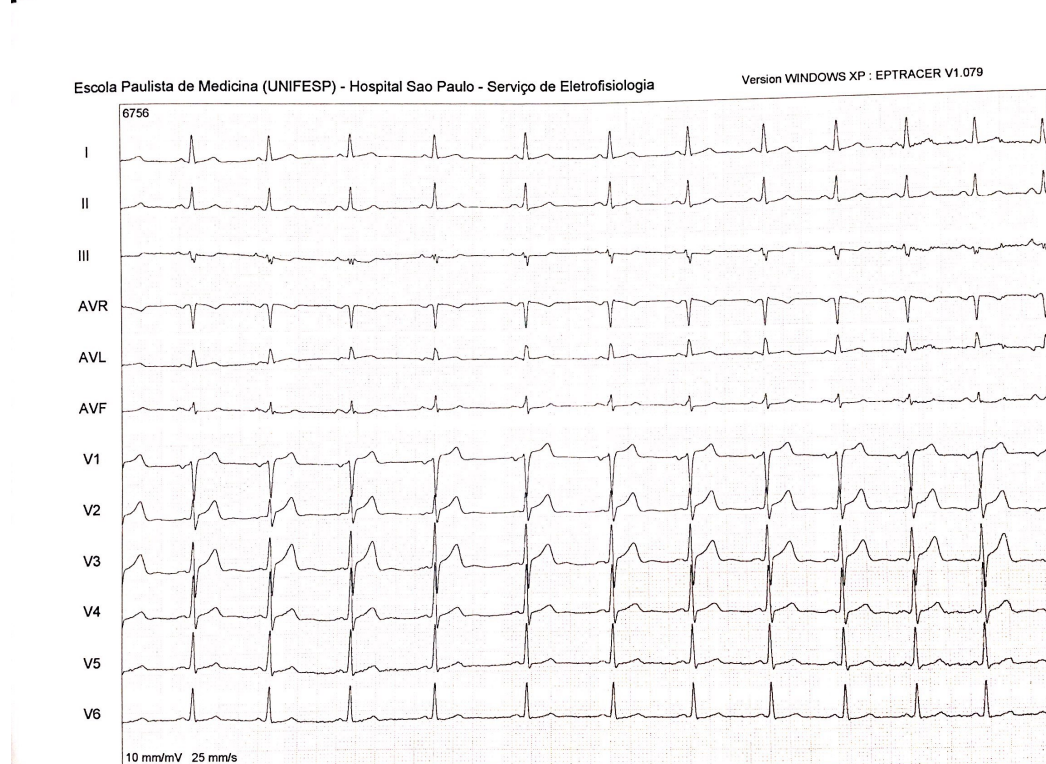


Figure 10. Final ECG

The main point of this procedure is the eccentric atrial activation during sinus rhythm. We were careful about the cables and the connections and the coronary sinus catheter was also well positioned. We can see in Figure 2 that the first atrium signal was in His catheter and then it “jumped” to distal coronary sinus (Scd) with eccentric activation. Our hypothesis is that there is a conduction block located inferior to His and proximal to proximal coronary sinus, in a way that the left atrium is depolarized exclusively through Bachmann cells.

This was also important for the electrophysiological study, because, despite eccentric atrial activation in tachycardia, the atrial activation in sinus rhythm was also eccentric, so the earliest fusion point was found in right atrium, not in left atrium (it was not a left accessory pathway, as one could think).

Finally, we think that, if our rational is correct, this could be of particular interest of professor Bayés and his studies with inter-atrial block, as this that I present to you is also a kind of inter-atrial block, but one “contrary” of those described by him: this block occurs inferiorly and not in Bachmann cells. So, this kind of block cannot be found in external 12 derivations ECG nor vectorcardiogram.

We would like to have electro-anatomic mapping to help us with the activation map, but due to financial problems, we did not have it for this exam.

Professors, me and my colleagues are interested in your opinions and to answer for some possible questions that may arise. I have to say that I am very glad and proud to be part of this amazing group. Thank you very much.

José Nunes de Alencar Neto.