Journal of
Cardiology & Cardiovascular Therapy
ISSN 2474-7580

Juniper Publishers
key to the Researchers

Case Report
Volume 1 Issue 3 – September 2016

J Cardiol & Cardiovasc Ther

Balloon Angioplasty of Chronic Total Occlusion of the Coronary Sinus due to Lead Maturation Process

***Omnia Kamel**

Ain Shams University, Egypt

Submission: August 28, 2016; **Published:** September 08, 2016

***Corresponding author:** Omnia Kamel, Ain Shams University, 30 Alemary Street, Alsayeda Zinab, Cairo, Egypt.

Abstract

Massive rise of the pacing threshold during lead maturation period (up to 6 months post-implant) has declined after the introduction of steroid eluting electrodes but not totally disappeared [1], many trials discussed the management of this problem including systemic steroid therapy during the early stage but repositioning of the lead implantation of new lead remains the solution of the exit block. We describe a case of loss of capture of coronary sinus (CS) lead 3 months post-implant due to exit block which is thought to be due to lead maturation process resulted in extensive fibrosis inside the CS which was successfully managed by balloon angioplasty, followed by successful placement of new CS lead .

Case Report

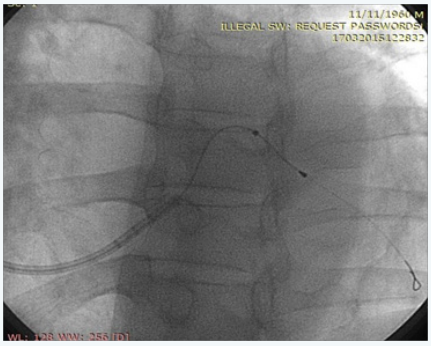

Figure 1: CS injection during the first implantation.

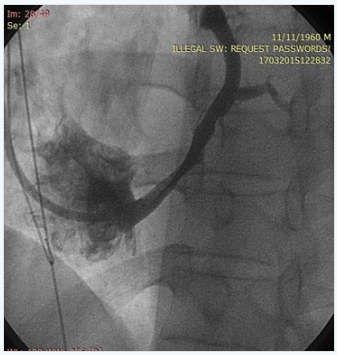

Figure 2: Implantations of CS lead at the first time.

50 year old male patient with DCM (EF 28%) with past history of CRT-P implantation 3 months ago with no difficulty during implantation (Figures 1 & 2) with marked improvement of the functional status, 3 months after implantation he had loss of capture of CS lead after progressive increase in the pacing threshold with normal impedance and normal function of the atrial and RV leads and fluoroscopic imaging showed that there is no macro dislodgment of CS lead.

During injection of the coronary sinus, there was total occlusion at mid segment (Figure 3), after multiple attempts, a hydrophilic PT^2 Moderate support hydrophilic Guide wire, 0.014 in (Boston Scientific, USA) was crossed through the site of total occlusion using Maverick PTCA Balloon (Boston Scientific, USA) measuring 1.5x12mm for support (Figure 4) then the balloon was inflated multiple times up to 15 ATM resulting in faint ante grade flow (Figure 5) but a 4F Bipolar lead (St. Jude medical) failed to be advanced through CS (Figure 6) so a larger Balloon Sapphire (Orbus Neich) measuring 3x28 mm was inflated multiple times across the CS up to 14 ATM then another Sapphire NC measuring 3.5x15 mm was inflated multiple times across the CS up to 18 ATM (Figures 7 & 8) then inflated at the ostium of the anterolateral tributary and was used as an anchor for better engagement of the sheath deeply in CS for more support (Figure 9) and the lead was advanced into an anterolateral tributary (Figures 10 & 11), it was tested with pacing threshold 0.75v @0.5msec and ECG post implantation confirmed biventricular pacing (Figure 12) 3months follow up showed no change in pacing threshold with more than 99% biventricular pacing

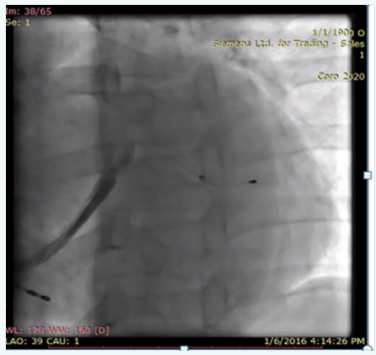

Figure 3: Injection of CS at the second procedure showing no ante grade flow

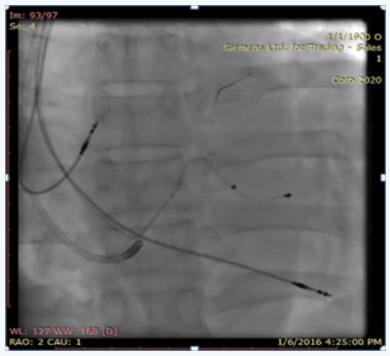

Figure 4: Crossing the wire using Balloon for support.

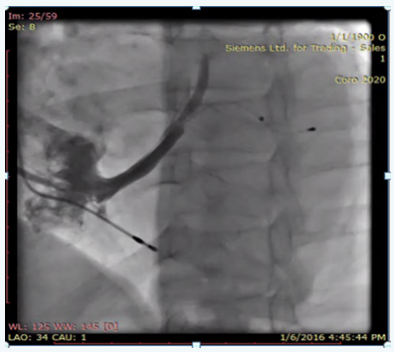

Figure 5: Faint ante grade flow after inflation of the Balloon.

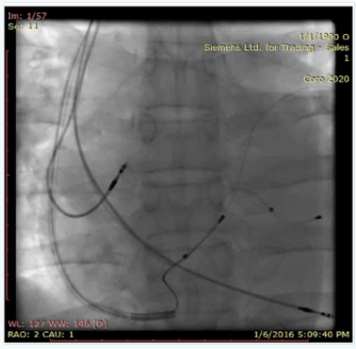

Figure 6: Trial to advance the lead through CS.

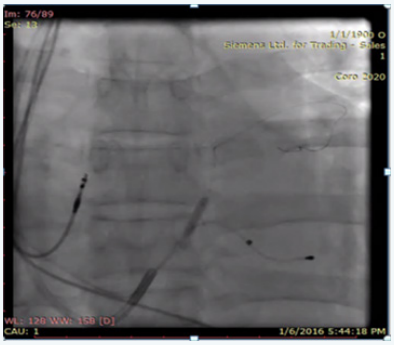

Figure 7: Inflation of (3.5X15mm) Balloon across CS.

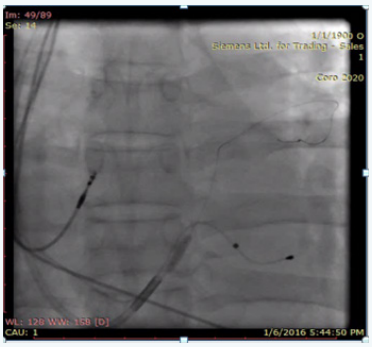

Figure 8: Inflation of (3.5X15mm) Balloon across CS.

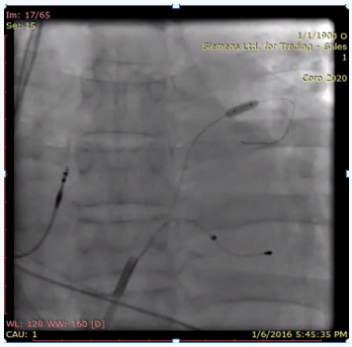

Figure 9: Using the inflated Balloon as an Anchor to advance the sheath for support.

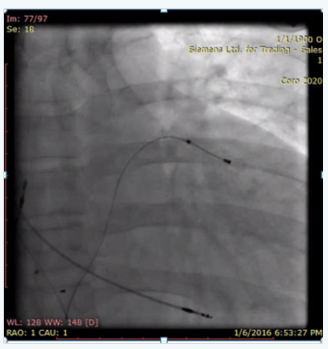

Figure 10: Implantation of CS lead at anterolateral tributary.

How to cite this article: Omnia K. Balloon Angioplasty of Chronic Total Occlusion of the Coronary Sinus due to Lead Maturation Process. J Cardiol & Cardiovasc Ther. 2016; 1(3): 555563. DOI: 10.19080/JOCCT.2016.01.555563

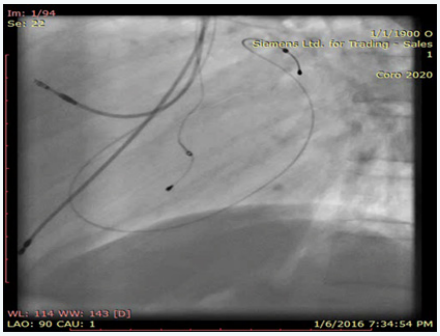

Figure 11: LAO view of CS lead.

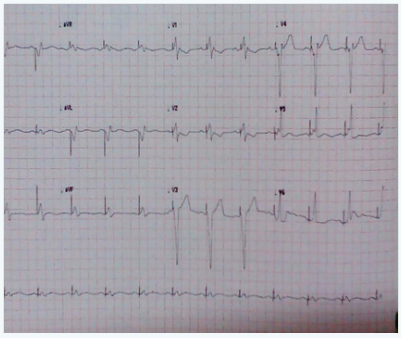

Figure 12: ECG post implantation.

Discussion

According to our knowledge, it is the first case of CS angioplasty because of extensive fibrosis and the first case of coronary sinus lead induced fibrosis which is thought to be lead maturation process. The timing of loss of capture of pacing lead can give vulnerable data about the cause. As in our case, if the loss of capture occurred weeks to months after implantation it is most probably due to lead maturation process [2]. Lead maturation process is an inflammatory reaction following the lead tip contact with endocardium [3,4] resulting in local swelling displacing the tip from endocardium causing rise in pacing threshold, this process occur between 2 to 6 weeks after implantation after this period is considered to be chronic phase of lead maturation and if resulted in loss of capture it is called exit block [5,6] although this process was described mainly in endocardial leads but is the only explanation we have for the extensive fibrosis in our case. Recently The incidence of this problem is markedly decreased after the steroid elluing electrodes [7] but still a significant rise in threshold due to this process may occur even after the innovation in lead design [8]. Acute threshold rise in threshold responds to systemic steroids in about 50% of cases [9] but exit block doesn't and require lead repositioning or new lead implantation.

References

1. Mond H, Strokes K, Helland J, Grigg L, Kertes P, et al. (1988) The porous titanium steroid-eluting electrode: a double-blind study assessing the stimulation threshold effects of steroid. Pacing Clin Electrophysiol 11(2): 214-219.
2. Majid Haghjoo (2011) Pacing System Malfunction: Evaluation and Troubleshooting, Modern Pacemakers -Present and Future.
3. Furman S, Hurzeler P, Mehra R (1977) cardiac pacing and pacemakers IV. The threshold of cardiac stimulation. Am Heart J 94(1): 115-124.
4. Furman S, Pannizzo F, Campo I (1979) Comparison of active and passive adhering leads for endocardial pacing. Pacing Clin Electrophysiol 2(4): 417-427.
5. Davies J & Sowton E (1966) Electrical threshold of the human heart. Br Heart J 28(2): 231-239.
6. Shepard R, Kim J, Colvin E, Slabaugh J, Epstein A, et al. (1991) Pacing threshold spikes months and years after implant. Pacing Clin Electrophysiol 14(11): 1835-1841.
7. Kein H, Steinberger J, Knack W (1990) Stimulation characteristics of a steroid-eluting electrode compared with three conventional electrodes. Pacing Clin Electrophysiol 13(2): 134-137.
8. Ellenbogen KA, Wood MA, Gilligan DM, Zmijewski M, Mans D (1999) Steroid eluting high impedance pacing leads decrease short- and long-term current drain: results from a multicenter clinical trial. CapZure Z investigators. Pacing Clin Electrophysiol 22(1): 39-48.
9. Levine P (2005) Evaluation and management of pacing system malfunctions, In: Ellenbogen K & Wood M (4th Edn.), Cardiac pacing and ICDs. Blackwell publishing, Massachusetts, USA, pp.329.

How to cite this article: Omnia K. Balloon Angioplasty of Chronic Total Occlusion of the Coronary Sinus due to Lead Maturation Process. J Cardiol & Cardiovasc Ther. 2016; 1(3): 555563. DOI: 10.19080/JOCCT.2016.01.555563