

Case Report

A case of reversible upper brachial plexopathy following CRT-P implantation

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ABSTRACT

Brachial plexus injury is a challenging field of hand and upper extremity surgery. Presently available microsurgical techniques and functional gains are rewarding in upper plexus injuries. Cardiac electronic devices implantation rate is the required to manage long-term complications. Cardiac resynchronization therapy (CRT) implantation is a commoner procedure done for severe ischaemic and non ischaemic cardiomyopathy. A 65-year-old male patient underwent CRT device implantation via utilizing his left subclavian vein with a classical incision over the delto pectoral groove, with right ventricular lead on the inter ventricular septum and left ventricular lead into the posterolateral branch of coronary sinus with RA threshold, impedance and amplitude (P) of 1V and 690ohm and 7.8mv respectively. CRT with adjacent nerve structure is carefully selected for vein puncture to minimize the risk of Brachial plexus injury, i.e. pacing lead induces nerve injury. Peripheral nerve injuries are sparsely reported due to procedural as well as indwelling trans venous pacing leads and isolated posterior cord involvement is a rarer presentation hence is reported.

Keywords: Brachial plexopathy, Cardiac resynchronization therapy, Peripheral nerve injuries

INTRODUCTION

Cardiac resynchronization therapy (CRT) is an accepted and effective treatment for patients with heart failure, left bundle branch block (LBBB) or a wide QRS complex.¹ Several studies have represented improvements in myocardial performance, exercise tolerance, and in quality-of-life by cardiac resynchronization with Biventricular pacing.^{2,3} CRT has been also an effective treatment in a patient with drug-refractory advanced congestive heart failure, severe left ventricular (LV) systolic dysfunction and intraventricular conduction delay.³

At the time of cardiac device implantation procedure, the appropriate vein puncture site selection is very important

to reduce the risk of vascular and lead-related complications. Nerve injuries that arise during device implantation procedures.³ At the time of CRT implantation, pectoral nerves and intercostals nerve block were reported.

These peripheral nerve blockage inspired by the transverses abdominal plane block and brachial plexus block with infraclavicular approach.⁴ The brachial plexopathy simulates the C5 and C6 root lesion.⁵ Postoperative brachial plexus injury is manifested by a variety of upper extremity neuropathies, following by cardiac surgery.⁶ The randomized, controlled trial evidence base for CRT is only limited to de novo patient and excluded who are previously implanted devices.⁷

Authors present a case of acute brachial plexopathy due to trans venous lead placement.

CASE REPORT

65-year-old male hailing from North Kerala presented with progressive worsening dyspnoea from functional class II to functional class III (FC II -FC III) for two years. Electrocardiogram revealed complete LBBB with QRS width of 140msec.

Patient was subjected to transthoracic echocardiography, which revealed global left ventricular (LV) hypokinesia with severe LV dysfunction with 30% of Ejection Fraction. He was subjected to coronary angiogram which revealed normal coronaries.

Patient was implanted with CRT- pacemaker (Boston Scientific-PG- Valitude X 4 CRT-P SN 723298, Leads- Ingevity MRI (RV)-SN 788423 and leads-ACUITY X4 Spiral S(LV)-SN801096 and Ingevity MRI(RA)-856220) utilizing his left subclavian vein with a classical incision over the delto pectoral groove, with right ventricular lead on the inter ventricular septum and left ventricular lead into the posterolateral branch of coronary sinus with RA threshold, impedance and amplitude (P) of 1V and 690ohm and 7.8mv respectively. The same parameters for RV and LV were 1V, 720ohm, 14.0mv and 1V, 980ohm and 28mv respectively (Table 1).

Table 1: NCS demonstrating decreased velocities and latencies.

	Latency (ms)	Amplitude (mV)
Rt. Radial (Thumb)	3.7	8
Lt. Radial (Thumb)	2.8	7
Rt. Radial (Snuff box)	2.2	5
Lt. Radial (Snuff box)	Not elicitable	
Rt. Radial (Middle finger)	3.2	3
Lt. Radial (Middle finger)	Not elicitable	
Rt. Median (Thumb)	3.3	12
Lt. Median (Thumb)	2.6	9
Rt. Median (Index)	3.5	8
Lt. Median (Index)	3.6	7
Rt. Median (Middle finger)	3.4	9
Lt. Median (Middle finger)	3.8	5

Postoperative day 2, patient witnessed inability to abducting his left arm and forearm associated with neuropathic pain. After cervical spine aetiology was ruled out, on subjecting the patient to nerve conduction study, authors demonstrated decreased latencies and amplitudes in left radial nerve with normal motor and median nerve sensory conduction (Figure 1). The patient recovered with oral steroids and follow up after one month witnessed significant improvement in end-systolic fraction, ejection fraction and functional class.

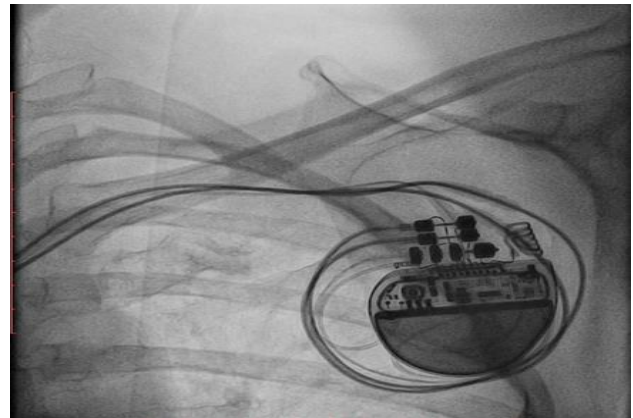


Figure 1: CRT device in situ.

DISCUSSION

CRT can improve cardiac dysfunction symptoms. In CRT, the pacemaker is used to overcome abnormal dysfunction of cardiac which was reported in several studies. There was also growing evidence of a negative effect of pacing-induced ventricular dyssynchrony and patient suspected with bradyarrhythmia and heart failure might benefit from cardiac resynchronization.²

During the cardiac device implantation procedure, selection of the appropriate vein puncture site is important to reduce the risk of vascular and lead-related complications.⁸ Nerve injuries that arise during subclavian puncture and lead placement are about 0.6%.^{7,9} Unfortunately, if inappropriately insertion of CRT devices leads to brachial plexus injury. Although CRT induced, nerve injury is not frequent case or complication seen in clinical practice. So, CRT with adjacent nerve structure is carefully selected for vein puncture to minimize the risk of Brachial plexus injury, i.e. pacing lead induce nerve injury.

Here, authors report acute brachial plexopathy due to trans venous lead placement. Present case was an exception for the fact that there was selective involvement of posterior cord of brachial plexus (radial nerve). Posterior cord injury due to lead placement is less reported in the literature.^{10,11} Although uncommon, yet it proves to be a preventable complication and should be kept in the mind of operators during trans venous procedures.

CONCLUSION

Brachial Plexopathy with selective involvement of posterior cord of brachial plexus is rare and often preventable complication of trans venous access.

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