Author’s response to reviews

Title: Transvenous dual-chamber pacemaker implantation in patients with persistent left superior vena cava

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Dear editor:

We are truly grateful to you for all critical comments. Based on these comments and suggestions, we have made careful modifications to the original manuscript.

1. Francesco Vitali, M.D (Reviewer 1): On 9 patients you can't conclude that PPI through PLSVC is technically feasible, safe, and effective.

Thanks, it was a small retrospective observational study, and a definite conclusion could not be drawn by limited datas. So we revised the conclusion. PPI through PLSVC may be technically feasible, safe, and effective.

2. Luca Donazzan (Reviewer 2): There are some typing errors to be corrected (for example in line 53).

Thanks, it was a typing error and it had been corrected.

3. You should focus the paper on that. You should write the paper with an educational perspective. You don't need a control group, mostly because the sample size is unbalanced and it does not allow an effective statistical comparison of the two groups. Moreover, it is a retrospective analysis with all its inherent limitations.
Thanks. In the revised manuscript, we focused on the methods and efficacy of patients with PLSVC who underwent permanent pacemaker implantation with double active fixation leads. Meanwhile, the control group was deleted.

4. I have the following comments: PLSVC is mostly associated with other cardiovascular abnormalities; did you search for them in your patients? Please report about that.

In our department, we only found the patients with PLSVC were combined with other arrhythmias such as atrial fibrillation and atrioventricular nodal reentrant tachycardia. These patients did not complain other symptoms and discomfort, so we did not further search other cardiovascular abnormalities. Furthermore, no other cardiovascular abnormalities could be found in the routine examination including Chest X-ray and transthoracic echocardiography. In our center, Chest CT scans, cardiac magnetic resonance imaging and cardiac catheterization were not performed routinely in these patients.

5. Interestingly, you report a 100% success in pacemaker implantation via the PLSVC. None of the patients underwent late complications or device failure. Your success rate is very high and in contrast with the available literature. It would be useful if you could better describe your implantation technique adding pictures of implantation steps, stylet curves, etc.

In our study, no late complications were observed during the follow-up. The implantation procedure section described each step of the ventricular lead implantation in detail, we also provided a series pictures about these steps (Figure 1). It was a pity that no more pictures of the stylet curves and other videos of the ventricular lead implantation process were preserved during the procedure.

5. Please compare your technique with that reported in the available literature.

Thanks, the implantation technique and stylet curves was described and compared in the discussion section. Various techniques such as the use of standard, special shaped and right ventricular septal stylets facilitating ventricular lead implantation have been reported in previous studies. In these previous case reports, the ventricular leads were fixed only in the RVA even using a right ventricular septal stylet. In our study, the pacing leads were advanced into the right atrium with the original soft straight stylet first. Then a “C” shaped stylet was used to introduce the ventricular lead across the tricuspid annulus and place at the RVOT.

6. You recommend the implantation via the PLSVC instead of performing a contralateral right-sided implantation. In my centre we use to perform contralateral right-sided implantation, mostly the day after the first left-sided attempt. According to literature data, the complication rate of left-sided implantation over short and long time is quite high. Could you comment on that? Why do you recommend right-sided implantation?
During a mean follow-up of 4 years, no device malfunction or lead dislodgement were observed. According to the previous case reports, the complication rate of left-sided implantation was quite low, the pacing thresholds were stable. Only Polewczyk, A reported that increasing defibrillation threshold was detected in 1 patient in 2014. So we recommend that double active fixation leads may be standard for patients with PLSVC.

In our study, all PPI was performed in the left subclavian region irrespective of the PLSVC. This was an operator preference. We gained confidence from the success of the first case. Actually, we were used to operating on the right subclavian region. At the same time, the absence of right superior vena cava (RSVC) also exists in some patients. Moreover, the vast majority of Chinese patients are right-handed. Switching to the right subclavian region may add a new incision and increase the inconvenience for the patients particularly in right-handed patients.

In other center of China, surgeons chose to perform contralateral right-sided implantation after confirming a PLSVC by venography in the same day. Another procedure was performed in the day after the first left-sided attempt would increases the hospitalization expenses, unpleasant experience of patients and incidence of infection.

7. You don't report about possible complications of implanting an active fixation lead in the right ventricular apex or inferior free wall as well as the implantation in the lateral atrial wall. Please comment on that.

In our study, the ventricular lead was placed in the RVOT septum 7 patients. In the remaining 2 patients, the ventricular leads were fixed in the RV apical region and the inferior free wall of sub-tricuspid annulus respectively. During a mean follow-up of 4 years, no periprocedural and late complications such as lead fracture, lead dislodgement, pericardial tamponade, or chest pain were observed in all 9 patients. Therefore, the incidence of complications may be not correlated with the location of ventricular lead implantation.