Introduction: Background: Persistent left superior vena cava (PLSVC) is an uncommon congenital abnormality of coronary sinus venous which always makes device implantation difficult, especially in cardiac resynchronization therapy (CRT) candidates who needed the placement of left ventricular (LV) lead. Objectives: We aimed to report four cases of PLSVC undergoing successful permanent left bundle branch (LBB) pacing.

Methods: Two patients with heart failure and complete LBB block, and another two patients with atrioventricular block and normal cardiac function were included. Prior to implantation, echocardiography did not show any clues of PLSVC in one patient, so the lead placement was performed from the left-side approach. For the other three patients without a connecting innominate vein, the implantation was from the right-side axillary vein. LBB pacing was achieved by penetrating the interventricular septum into the LV sub-endocardium with the pacing lead (model 3830, Medtronic Inc.). Reconfiguration of the sheath (C315 HIS, Medtronic Inc.) was needed in one patient from the left-side approach.

Result: All patients showed Qr morphology in paced ECG with narrow QRS durations (123.8 ± 4.8ms) and short LV activation time (77.5 ± 9.6ms). LBB potential was recorded in 3 patients. Pacing threshold and sensing amplitude were 0.6 ± 0.1V/0.5ms and 10.9 ± 3.2mV respectively at implantation and remained stable during follow-up. Two patients with heart failure had increased LV ejection fraction and improved cardiac function status at 3-month follow-up.

Conclusion: Permanent LBB pacing is feasible and effective in patients with PLSVC. LBB pacing could be a first-line choice in CRT candidates since LV lead placement in these patients is challenging.