An alternative for transseptal puncture in patients without femoral accesses: the superior route

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Introduction: Complex congenital heart disease (CHD) patients represent a great challenge when catheter ablation procedures are required. Successful surgical corrections of complex substrates have brought to the growth of this unique population who requires unusual procedural techniques.

Methods: We report a small series of consecutive procedures in which transseptal puncture (TSP) was performed via the jugular vein approach by a single operator in a tertiary centre from 2017 to 2019, using a radiofrequency (RF) needle.

Result: Six catheter ablation procedures for atrial fibrillation (AF) (4, 67%) and left-sided atrial tachycardia (AT) (2, 33%) were performed in 3 patients (mean age 45±14 years, 1 male, mean weight 70±17 kg). Two patients had an interrupted inferior vena cava with azygos continuation. One patient had bilaterally blocked femoral venous access due to previous multiple surgeries, surgically repaired coronary sinus/ASD and a mechanical mitral valve which excluded a retrograde approach. Therefore, we opted for a superior vena cava approach via jugular and subclavian vein access. Using the right jugular vein (5) and left jugular vein (1) we performed a single TSP using a combination of fluoroscopy, ultrasound and 3D electroanatomical mapping guidance with 3D depiction of the needle tip. To avoid the sliding of the needle off the fossa ovalis due to the deviate angle between the TSP needle and the septum, the needle was reshaped with an angle between 120-150°. In addition, we decided to use a RF needle (in combination with a SL1 sheath and epicardial steerable sheath) to lessen the necessary mechanical force to perforate the interatrial septum. All procedures were performed under general anaesthesia and using a 3D roadmap merge from either CT or CMR scan. In four cases, remote magnetic navigation was subsequently used. In one case, due to the impossibility to advance the sheath through a very calcified septum, a balloon dilatation was required. Left atrium access was gained in all cases, no complications occurred. Four procedures (66%) were acutely completely successful. Overall procedural time was 387±79 min, with a median fluoroscopy time of 16 [8-26] min and median fluoroscopy exposure of 1442 [348-3007] µGy*m2.

Conclusion: Although technically challenging also for an expert operator, successful TSP can be safely performed via the superior jugular route and can be greatly facilitated by the use of a RF needle.