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Ultrasound guided axillary vein puncture for cardiac devices implantation, time to rethink the vascular access technique

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Fundamental: axillary vein puncture is the technique of choice for cardiac lead implantation, because of ease in obtaining vascular access with low need of surgical skills. Regardless of the evolution of cardiac devices technology, vascular access techniques still rely on traditional tools like contrast venography, poor anatomical references and blind puncture. Complications related to vascular access for lead implantation still represent a clinical problem, adding risk to the patient, increasing hospital costs and requiring longer hospitalization. Ultrasound guided techniques for vascular access are growing among intensive care providers all over the world in order to offer safety to vascular puncture with less complications.

Objective: to demonstrate the safety profile and results after 13 months of a implemented institutional protocol for performing 100% ultrasound-guided vascular puncture in cardiac devices implantations.

Methods: over a period of 13 months, 155 patients (mean 78 ± 14 years, 63% male) were submitted to cardiac devices implantations (106 dual-chamber pacemakers, 6 single-chamber pacemakers, 5 CRT-P’s, 1 dual-chamber pacemaker for His bundle pacing, 12 CRT-D’s, 13 dual-chamber ICD, 1 single-chamber ICD, 1 lead reimplantation and 10 upgrades for CRT-P). A total of 308 (100%) ultrasound-guided vascular punctures were performed. Techniques used for ultrasound-guided puncture were the transverse "out-of-plane" or the longitudinal "in-plane" approach, at the discretion of the physician experience. All providers used a point of care ultrasound device with a 12MHz linear transducer protected by a sterile cover Kit. All punctures were performed though the skin, before opening the wound, in order to increase image quality at the moment of the puncture.

Results: successful punctures were performed in 304 attempts (98.7% - 153 patients). In two patients (4 puncture attempts) there was no progression of guidewire due to complete obstruction at the level of left brachiocephalic vein. In these cases, right axillary vein implantation under ultrasound guidance was performed uneventfully. There were no pulmonary complications (pneumothorax or hemothorax) in this sample. There was one axillary artery accidental puncture (0.32%), during the learning curve. Local compression was effective with no further complications.

Conclusion: ultrasound-guided axillary vein puncture technique provides safety in vascular access for lead implantation, avoiding the use of contrast venography and pulmonary complications. Acquisition of the learning curve is fast, especially in centers with a large number of procedures.