Abstract:

The use of real-time ultrasound (US) is advantageous in the insertion of central venous catheters (CVCs) in adults, especially in whom difficulties are anticipated for various reasons. The aim of the present study was to compare two different real-time 2-dimensional US-guided techniques for internal jugular vein (IJV) cannulation. In this prospective study, 90 critical care and hemodialysis patients were assigned for insertion of CVCs using either the real-time US-guided (SAX OOP approach or LAX IP approach) or landmark technique (control group). Failed catheter placement, risk of complications from placement, failure on first attempt at placement, number of attempts until successful catheterization, time to successful catheterization, incidence of central line-associated bloodstream infection (CLA-BSI) and demographics of each patient were recorded. There were no significant differences in patient’s demographic characteristics, side of cannulation (right or left) or presence of risk factors for difficult venous cannulation between the three groups of patients. Cannulation of the IJV was achieved in all patients by using US (SAX OOP and LAX IP approaches) and in 27 of the patients (90%) by using the landmark technique (P = 0.045). Average access time (skin to vein) and number of attempts were comparable between the SAX OOP and the LAX IP approaches while significantly reduced in both US groups of patients compared with the landmark group (P <0.001). In the landmark group, puncture of the carotid artery occurred in
16.7% of the patients, hematoma in 23.3% of the patients, pneumothorax in 3.3% of the patients and CLA-BSI in 20% of the patients, which were all significantly increased compared with the US group (P <0.05). The findings of this study suggest that the SAX OOP and LAX IP approaches were comparable for cannulation of IJV in critical care and hemodialysis patients. Furthermore, both US-guided techniques were superior to the landmark technique for insertion of CVCs.