

Comparative Evaluation of Ultrasound Guided Internal Jugular Vein Cannulation Using Measured Guided Needle and Conventional Size Needle for Success and Complication of Cannulation

Authors : Devendra Gupta, Vikash Arya, Prabhat K. Singh

Abstract : Background: Ultrasound guidance could be beneficial in placing central venous catheters by improving the success rate, reducing the number of needle passes, and decreasing complications. Central venous cannulation set has a single puncture needle of a fixed length of 6.4 cm. However, the average distance of midpoint of IJV to the skin is around 1 cm to 2 cm. The long length needle has tendency to go in depth more than required and this is very common during learning period of any individual. Therefore, we devised a long needle with a guard which can be adjusted according to the required length. Methods: After approval from the institute ethics committee and patient's written informed consent, a prospective, randomized, single-blinded controlled study was conducted. Adult patient aged of both sexes with ASA grade 1-2 undergoing surgery requiring internal jugular venous (IJV) access was included. After intubation, the head was rotated to the contralateral side at 30 degree head rotation on the position of the right IJV. The transducer probe a 6.5 to 13-MHz linear transducer (Sonosite, USA) had been placed at the apex of triangle with minimal pressure to avoid IJV compression. The distance from skin to midpoint of the right IJV and skin to anterior wall of Common Carotid Artery (CCA) had been done using B-mode duplex sonography with a 6.5 to 13-MHz linear transducer. Depending upon the results of randomization 420 patients had been divided into two groups of equal numbers (n=210). Group 1. USG guided right sided IJV cannulation was done with conventional (6.4 cm) needle; and Group 2. USG guided right sided IJV cannulation was done with conventional (6.4 cm) needle with guard fixed to a required length (length between skin and midpoint of IJV) by an experienced anesthesiologist. Independent observer has noted the number of attempts and occurrence of complications (CCA puncture, pneumothorax or adjacent tissue damage). Results: Demographic data were similar in both the group. The groups were comparable when considered for relationship of IJV to CCA. There was no significant difference between groups as regard to distance of midpoint of IJV to the skin ($p < 0.05$). IJV cannulation was successfully done in single attempts in 180 (85.7%), in two attempts in 27 (12.9%) and three attempts in 3 (1.4%) in group I, whereas in single attempt in 207 (98.6%) and second attempts in 3 (1.4%) in group II ($p < 0.000$). Incidence of carotid artery puncture was significantly more in group I (7.1%) compared to group II (0%) ($p < 0.000$). Incidence of adjacent tissue puncture was significantly more in group I (8.6%) compared to group II (0%) ($p < 0.000$). Conclusion: Therefore IJV catheterization using guard over the needle at predefined length with the help of real-time ultrasound results in better success rates and lower immediate complications.

Keywords : ultrasound guided, internal jugular vein cannulation, measured guided needle, common carotid artery puncture

Conference Title : ICSR2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020