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Conference Paper in Trauma Monthly · March 2015

DOI: 10.5812/traumamon.28507

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Evaluation of success rate and complications of internal jugular vein catheterization with and without ultrasonography guidance: a randomized clinical trial

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Introduction: Central vein catheterization (CVC) is an important procedure for emergency departments (ED). Despite the existence of ultrasonography (US) devices in every ED, CVC was accomplished by anatomical landmarks in many EDs in Iran.

Objective: This study was designed for the evaluation of US-guided CVCs, anatomical landmark CVCs, and the promotion of US-guided CVC in Iran.

Methods and Materials: In this randomized clinical trial, patient candidates for internal jugular vein catheterization referred to Baqiyatallah Hospital ED and were randomized to US-guided CVC and anatomical landmarks guided CVC. Central vein access time, attempt times, access rate, and complications for each group were evaluated. Collected data were compared between two groups.

Results: Among 100 patients, the mean age was 50.6 years and the mean BMI was 21.87 kg/m². Fifty-six patients were male and 44 patients were female. There were no significant differences in demographic data between the groups ($P > 0.05$). Mean access time was 37.12 seconds in the US group and 63.42 seconds in the landmark group. The access rate of the first attempt was 88% in the US group and 50% in the landmark group. The second attempt access rate was 12% in the US group and 42% in the landmark group. A total of 8% of the landmark group need more than 2 attempts. The mean attempt times were significantly more in the landmark group (1.12 vs. 1.58 times). The access rate of CVC was 100% in the US group and 88% in the landmark group. Total complications (hematoma, carotid puncture, hemothorax, and pneumothorax) were more frequent in the landmark group when compared to the US group ($P < 0.05$).

Conclusion: Although ultrasonography can reduce side effects and related costs on a health care system and increase the success rate, but we should not forget teaching of traditional methods.

