

PICC insertion with the use of IC- ECG navigation compared with chest X-ray to confirm PICC tip location

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Background:

The use of IC-ECG to position PICCs gained more attention. The aim of this study was to support and provide more evidence for the feasibility, accuracy and safety of IC-ECG tip location in comparison with chest X-ray in order to eliminate unnecessary waiting time for patient's iv treatment.

The study was performed by nurses PICC team and is the first on this topic in Czech Republic.

Methods:

This is a single-center prospective, non-randomized clinical study. We analyzed 453 adult patients. Data were collected over 3 years at University Hospital Ostrava from June 2020 to January 2023. The primary outcome was measurement of time elapsed between IC-ECG and chest X-ray confirmation. The secondary outcome was the success rate of IC-ECG in confirming that the tip is CAJ.

Results:

The minimum time elapsed between IC-ECG and chest X-ray confirmation by physician was 1 minute (physician was present) and the maximum time was 400 minutes, with a median waiting time of 80 minutes. It means that 75% of patients had to wait for the approval to use PICC more than 45 minutes from the IC-ECG navigation.

The IC-ECG success rate was 84.7% (n = 384) of the sample. During the study time, out of 69 unsuccessful IC-ECG navigations, 35 patients had atrial fibrillation. We did not include them as seen in the study by Gao et al. (2018).

Table 1: Descriptive statistics of time elapsed between IC-ECG, chest X-ray and chest X-ray confirmation

Time (min)	Minimum	Lower quartile	Median	Upper quartile	Maximum
IC-ECG vs Chest X-ray	1	18	32	68	374
Chest X-ray vs Chest X-ray confirmation	0	16	34	61	269
IC-ECG vs Chest X-ray confirmation	1	45	80	130	400

Conclusion:

The IC-ECG confirmation method can be used by nursing teams safely and effectively. It proved to be a reliable method of confirming the position of the tip of the catheter by nurses and allows the use of a PICC immediately post insertion without a delay in patient's treatment.

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