

Nautilus : a new compact E.C.G based guidance system dedicated to real- time correct positioning of the tip of central venous catheters

Șerban Bubenek, Ion Miclea

“Carol Davila” University of Medicine Bucharest. 1-st Cardiovascular Anaesthesia and Intensive Care Dept. of
“C. C. Iliescu” Emergency Institute for Cardiovascular Diseases Bucharest – Romania

e-mail : bubenek@alsys.ro

Abstract

Background : Endo-cavitary electrocardiography (EC- ECG) is a well recognized method for controlled placement of central venous catheters (CVC).

The aim of this study was to assess the accuracy, feasibility and safety of a new and compact EC- E.C.G based guidance system (Nautilus®, S.C.Romedex International-Romania) dedicated to real- time correct positioning of the tip of CVCs.

Method : After obtaining institutional ethics committee approval and written informed consent, 30 consecutive adult patients who had malignant diseases and were scheduled for CVCs placement procedures (implantable ports) were included in this study.

Patients with P-wave abnormalities, arrhythmias, or pace-makers were excluded.

The Nautilus® system is a new device, build “al in one “(custom laptop with integrated ECG data acquisition module and its own software) which displays simultaneously both the surface ECG and the EC- ECG and allows freezing of the screen as well as printing and recording the data. Under local anaesthesia and using ultrasound guidance, thirty subclavian vein catheterizations were performed (26 left side and 4 right side).

Then, using the Nautilus system together with its dedicated saline (24 patients) or electric (6 patients) adapters, the CVCs were gradually advanced into the venous system during real time display of EC- ECG (lead II) and surface ECG (lead III), chasing the P wave changes on the EC-ECG, until a typical giant P wave (as high as the QRS) appeared. Because of the large consensus on the fact that the tip of a long-term CVC dedicated to chemotherapy should be positioned preferably inside the lower third of the superior vena cava or in the neighborhood of the cava-right atrium junction (CAJ), we left the tip of the CVCs at the supposed CAJ level, as shown on EC-E.C.G : the tallest positive P wave. At the end of the procedure, the tip position was verified by a chest x-ray and the equivalence between the EC-ECG method and radiology has been reviewed by a radiologist.

Results : The EC-ECG method was able to show typical giant P waves in all 30 patients. We found also that the CAJ position as determined on the EC-ECG was confirmed by the control chest x-ray in 100 % of cases. No adverse events or complications were noted.

Conclusions: In our study, the EC-ECG method provided by the Nautilus® system was easy to use, safe, feasible and accurate for real-time correct positioning -at the CAJ level- of the tip of subclavian vein introduced implantable ports.

Keywords : : endo-cavitary electrocardiography, real-time correct positioning of the tip of central venous catheters, new compact guidance system