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ECG Technology for Central Catheter Placement

Clinical Reference

The Intracavitary ECG Method For Positioning The Tip Of Central Venous Catheters: Results Of An Italian Multicenter Study.

Source: *Journal of Vascular Access.* 13(3):357-65, 2012 Jul-Sep. [Evaluation Studies. Journal Article. Multicenter Study]
Authors: Pittiruti, Mauro; Bertollo, Daniele; Briglia, Ermanno; Buononato, Massimo; Capozzoli, Giuseppe; De Simone, Luigi; La Greca, Antonio; Pelagatti, Cecilia; Sette, Piersandro.
Institution: Pittiruti,Mauro. Department of Surgery, Policlinico Universitario 'A.Gemelli', Roma, Italy

The aim of this multicenter study was to assess the feasibility, safety, and accuracy of the intracavitary ECG method for real-time positioning of the tip of different types of central venous catheters. A total of 1,444 catheter insertions in adult patients were studied, including ports, PICCs, tunneled CVCs and non-tunneled CVCs. Catheters were placed into the lower one-third of the superior vena cava, at the cavo atrial junction or in the upper part of the atrium. The final position was verified by a post procedural chest X-ray. This study confirmed the intracavitary ECG method for real time verification of tip position is accurate, safe and feasible in adult patients, and applicable to any type of short term or long term central venous access device.

Endovascular Electrocardiography To Guide Placement Of Totally Implantable Central Venous Catheters In Oncologic Patients.

Source: *Journal of Vascular Access.* 12(4):348-53, 2011 Oct-Dec. [Comparative Study. Evaluation Studies.
Authors: Pelagatti C; Villa G; Casini A; Chelazzi C; De Gaudio AR. Department of Critical Care, Section of Anesthesiology and Intensive Care, University of Florence, Florence, Italy.

Appropriate tip position of totally implantable central venous catheters is essential in order to prevent catheter-related complications, in particular thrombosis. This study shows evidence that endovascular electrocardiography is an economic and safe method to guide placement of catheters into the central veins. Using the endovascular electrocardiography method in the placement of implantable central venous catheters demonstrated a lower incidence of catheter-related thrombosis, especially when inserted from the left side.

Effectiveness Of Electrocardiographic Guidance In CVAD Tip Placement.

Source: *British Journal of Nursing.* 24(14): S4, S6, S8-12, 2015 Jul 23 - Aug 12. [Journal Article. Review]
Authors: Walker G; Chan RJ; Alexandrou E; Webster J; Rickard C.
Institution: Walker, Graham. Foundation Year Doctor, The University of Aberdeen, Scotland. Alexandrou,Evan. Senior Research Fellow. Webster, Joan. Nursing Director for Research, Royal Brisbane and Women's Hospital, Australia

International standard practice for the correct confirmation of the central venous access device is the chest X-ray. The intracavitary electrocardiogram-based insertion method is radiation-free, and allows real-time placement verification, providing immediate treatment and reduced requirement for post-procedural repositioning. It was found in these five studies involving 729 participants ECG guided insertion was more accurate than surface anatomy guided insertion. This technique may remove the requirement for post procedural chest X-ray.

Evaluation Of An Electrocardiograph-Based PICC Tip Verification System.

Source: *British Journal of Nursing.* 22(14): S24-8, 2013 Jul 25-Aug 7. [Evaluation Studies. Journal Article].
Authors: Oliver, Gemma; Jones, Matt. Institution: East Kent Hospitals University NHS Foundation Trust, Kent

Performing a confirmatory chest X-ray after insertion of a peripherally inserted central catheter (PICC) is recognized as the gold standard for checking tip placement. A technological advancement has been developed that utilizes changes in a patient's electrocardiograph (ECG) recorded from the tip of the PICC as a more reliable method. This evaluation discusses how a vascular access team in a large NHS Trust safely and successfully incorporated the use of ECG technology for verification of PICC tip placement into their practice.

The Electrocardiographic Method For Positioning The Tip Of Central Venous Catheters.

Source: *Journal of Vascular Access.* 12(4):280-91, 2011 Oct-Dec. [Journal Article. Review]
Authors: Pittiruti M; La Greca A; Scoppettuolo G. Department of Surgery, Catholic University, Rome, Italy

Proper tip position of a central venous access device is very important and should be verified before starting infusion. The electrocardiography (ECG) method has many advantages such as avoidance of risks, delays and costs of repositioning. The ECG method is as accurate as fluoroscopy, but simpler, more readily available, less expensive, safer, and more cost-effective. The EKG method may remove the need for chest X-ray for tip confirmation

Intravenous Electrocardiography Helps Inexperienced Operators To Place Totally Implantable Venous Access Device more accurately.

Source: *Journal of Surgical Oncology.* 105(8):848-51, 2012 Jun 15. [Clinical Trial. Journal Article]
Authors: Wang YC; Huang CH; Lin FS; Lin WY; Fan SZ; Lin CP; Sun WZ. Department of Anesthesiology, National Taiwan University Hospital, Yun-Lin Branch, Yun-Lin, Taiwan.

Proper tip position is a major factor of totally implantable venous access device (TIVAD) outcomes. This study was to analyze the potential utilization of intravenous electrocardiography (IV-ECG) to help inexperienced operators for TIVAD placement. Two methods were used, landmark measurements versus IVECG to determine catheter tip location and catheter length. Catheter tip position was confirmed by post-operative supine chest X-ray. It was determined IV-ECG is a safe and convenient method to help inexperienced operators placing TIVAD.

Intracavitary ECG Is An Effective Method For Correct Positioning The Tip Of Tunneled Groshong® Catheters.

Source: *Journal of Vascular Access.* 13(3):393-6, 2012 Jul-Sep. [Journal Article]
Authors: Capozzoli G; Accinelli G; Fabbro L; Pedrazzoli R; Auricchio F.
Institution: Anesthesia and Intensive Care Unit, Bolzano Central Hospital, Italy.

Intracavitary electrocardiography (ECG) is a well-known and studied method for correct positioning of the tip of central venous catheters (CVC). This is determined by a significant increase in the P-wave, as registered by the intra-cavitary electrode. In 150 patients the tip was positioned by means of intracavitary ECG. Intracavitary ECG was always able to detect the increase in the P-wave. The need for chest X-ray or fluoroscopy may be virtually eliminated by using the ECG technique.

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