

Diagnostic accuracy of the Catheter Injection and Aspiration (CINAS) classification for assessing the function of totally implantable venous access devices

G. A. Goossens^{1,2} · Y. De Waele³ · M. Jérôme¹ · S. Fieuws⁴ · C. Janssens¹ · M. Stas⁵ · P. Moons^{2,6,7}

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Abstract

Purpose Intravenous catheters are used for the administration of intravenous therapy and for blood sampling. These devices are considered as well-functioning if both the injection and aspiration are easy. Malfunction is frequently observed and usually vaguely described as occlusion. We developed the CINAS, the Catheter Injection and Aspiration scheme. The CINAS is a catheter function classification tool, which classifies both the injection and the aspiration ability in a uniform way. Each CINAS class consists of a combination of an injection (IN) and an aspiration (AS) code: e.g. INIAS1 is the CINAS class for a well-functioning catheter. In this series, we aimed to determine the accuracy of the CINAS class reported by nurses, after minimal training, versus a trained researcher, acting as a reference standard.

Methods Catheter function was assessed during a standard blood sampling procedure through a totally implantable venous access device in a convenience sample of 150 oncology patients. One nurse researcher and 111 oncology nurses both scored the catheter function according to the CINAS classification scheme, independently. Concordance between the scores was calculated.

Results For the 140 catheters scored as well-functioning (INIAS1 score) by the researcher, 139 or 99.3 % (95 % confidence interval (CI) 96.1–99.9 %) were scored correctly by the nurse participants. Nine out of ten or 90 % (95 % CI 55.5–98.3 %) of malfunctioning catheters (researcher scores different from INIAS1) were also identified as malfunctioning by the nurse participants and received exactly the same CINAS score in eight cases (80 %, 95 % CI 44.4–97.5 %). The overall accuracy of the CINAS scored by the nurse participants versus the researcher is (139+9)/150 or 98.7 % (95 % CI 95.3–99.8 %).

Conclusions Nurse participants were able to classify the catheter function of totally implantable venous access devices with the CINAS accurately after a brief explanation about the classification options.

✉ G. A. Goossens
Godelieve.Goossens@uzleuven.be

- ¹ Nursing Centre of Excellence, University Hospitals Leuven, Herestraat 49, Leuven, Belgium
- ² KU Leuven Department of Public Health and Primary Care, KU Leuven, Kapucijnenvoer 35, Box 7001, 3000 Leuven, Belgium
- ³ Department of Orthopaedic Surgery, Antwerp University Hospital, Wilrijkstraat 10, 2650 Edegem, Belgium
- ⁴ Interuniversity Centre for Biostatistics and Statistical Bioinformatics, KU Leuven and Universiteit Hasselt, Kapucijnenvoer 35/2, 3000 Leuven, Belgium
- ⁵ Department of Surgical Oncology, University Hospitals Leuven, Herestraat 49, Leuven, Belgium
- ⁶ The Heart Centre, Copenhagen University Hospital, Blegdamsvej 9, 2100 Copenhagen, Denmark
- ⁷ The Institute of Health and Care Sciences, University of Gothenburg, Gothenburg, Sweden

Keywords Vascular access devices · Equipment failure · Malfunction · Classification tool · CINAS

Introduction

Intravenous catheters provide access to the bloodstream for drug and fluid administration and for blood aspiration. Different intravenous catheter types are available for short- or long-term use. These catheters are considered as well-functioning if the user is able to inject and to aspirate blood easily. Verification of both abilities is required to confirm that the catheter tip is properly located in the vein, at insertion and during catheter