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Cannulation technique influences arteriovenous fistula and graft survival

Introduction & Aim of the Study: There is a close link between the availability of a well-functioning vascular access and patient survival on haemodialysis. Every effort should be made to maintain the functionality of the vascular access for long-term use. Practices of access cannulation vary from clinic to clinic, mainly for historical reasons. The aim of this study is to investigate the impact of cannulation technique on the survival of the arteriovenous fistula (AVF) and grafts (AVG).

Methods: In April 2009, a cross sectional survey was conducted in 171 dialysis units located in Europe, Middle East and Africa to collect details on vascular access cannulation practices. On the basis of this survey, a cohort of patients was selected for follow-up, inclusion being dependent on the availability of corresponding access survival/intervention data in the clinical database. Access survival was analyzed using the Cox regression model (adjusted for within country effects) defining as events the need for first surgical access survival intervention. Patients were censored for transplantation, death, loss of follow-up, or end of the study period (March 31, 2012). Results were adjusted for age, gender and diabetes mellitus.

Results: Out of the 10,807 patients enrolled for the original survey, access survival data was available for 7,058 (65%) of patients, those residing in Portugal, UK, Italy, Turkey, Romania, Slovenia, Poland and Spain. Mean age was 63.5±15.0 years; 38.5% were female; 27.1% were diabetic; 90.6% had a native fistula and 9.4% had a graft. Access location was distal for 51.2% of patients. During the follow-up, 51.1% were treated with antiaggregants and 2.8% with anti-coagulants. Prevalent needle sizes were 15G and 16G for 63.7% and 32.2% of the patients, respectively (14G: 2.7%, 17G: 1.4%). Cannulation technique was area for 65.8% and rope-ladder for 28.2%, and the direction of puncture was antegrade for 57.3%. Median blood flow was 350-400 mL/min.

Conclusions: The study revealed that area cannulation technique, despite being the most commonly used, was inferior to both rope-ladder and buttonhole for the maintenance of vascular access functionality. With regard to the effect of needle and bevel direction, the combination of antegrade position of arterial needle with bevel up or down was significantly associated with better access survival than retrograde positioning with bevel down. There was an increased risk of access failure for graft versus fistula, proximal vs. distal location, right arm vs. left arm, and the presence of a venous pressure greater than 150 mmHg. The higher HR associated with a venous pressure greater than 150 mmHg should open a discussion on currently accepted limits.

Biography

Maria Teresa Parisotto obtained the Nursing Diploma in 1974 and the Nursing Management Diploma in 1976, at the Nursing School Ospedale San Carlo, Milan, Italy. At the beginning of her career she worked as Nurse Manager in a Dialysis Unit, Ospedale San Paolo, Milan, Italy. In 1980 she left the hospital and started to work as Application Specialist first, Marketing Director Peritoneal Dialysis afterwards in Fresenius Medical Care, Italy. In 1999 she moved to Fresenius Medical Care headquarters (Bad Homburg, Germany) as Director Peritoneal Dialysis for Europe, Middle East and Africa. From 2006 till 2016, she worked in Fresenius Medical Care Deutschland GmbH–NephroCare Coordination, Bad Homburg, Germany as Director of Nursing Care Management for Europe, Middle East and Africa. Currently she is working at the Fresenius Medical Care Deutschland GmbH–Care Value Management, as Chief Nurse Advisor. Her main areas of interest and experience are Vascular Access Cannulation and Care, Hygiene and Infection Control, Dialysis processes analysis, Safety in Dialysis. Her publications focused on peritoneal dialysis, haemodialysis safety and quality, and vascular access cannulation and care. She participated in scientific projects with EDTNA/ERCA as co-author for the development of “*Environmental Guidelines for Dialysis – A Practical Guide to Reduce the Environmental Burden of Dialysis*”, Co-Editor for “*Development of Vascular Access Cannulation and Care – A Nursing Best Practice Guide for Arteriovenous Fistula*” and Editor of the “*Vascular Access Cannulation and Care – A Nursing Best Practice Guide for Arteriovenous Graft*”.

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