EFFECTS OF ARTERIAL NEEDLE PLACEMENT ON DIALYSIS ADEQUACY OF END-STAGE RENAL DISEASE PATIENTS UNDERGOING MAINTENANCE HEMODIALYSIS

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Introduction
Ensuring the adequacy of hemodialysis is important as it minimizes disease complications and hospitalization, improves the quality of life and the survival of the patient.

According to National Kidney Foundation – Kidney Disease Outcomes Quality Initiative (NKF-KDOQI) (2006), the arterial needle placement in arteriovenous fistula (AVF) can either be antegrade (in the direction of blood flow or pointing towards the heart) or retrograde (against the direction of blood flow) while venous needle placement should always be in the same direction as the blood flow.

NKF-KDOQI guidelines recommend that the minimum adequate dose of hemodialysis should be a single-pool Kt/V of 1.20 with a urea recirculation ratio (URR) of 65% per dialysis session (NKF-KDOQI, 2006). In addition, an access recirculation percentage is an essential measure for the quality of hemodialysis, which should be less than 10%. The measurement of access recirculation percentage in hemodialysis patients is an important concern as it appears as an important cause of inadequate hemodialysis.

Objective
To determine the difference between the adequacy of hemodialysis being delivered through an antegrade arterial needle placement from a retrograde arterial needle placement.

Methods
A randomized controlled trial design was used in the study. A total of 20 non-diabetic, non-cardiac patients on maintenance hemodialysis for more than 6 months were randomized either to the intervention group (patients’ AVF were cannulated in a retrograde manner) or the control group (patients’ AVF were cannulated in an antegrade manner). Urea reduction ratio (URR) and Kt/V as well as access recirculation percentage were used to determine dialysis adequacy. Pre-dialysis, in the first 30 minutes of dialysis initiation and post-dialysis blood samples for blood urea nitrogen determination were obtained in each patient in 6 succeeding hemodialysis considering dialyzer reuse up to fifth reuse.

Results
The findings of the study revealed that the mean URR and Kt/V of subjects cannulated in retrograde manner and antegrade manner were 69.35% and 1.45, and 74.65% and 1.70, respectively. The mean access recirculation percentage of the subjects was 4.65% in the intervention group and 3.02% in the control group. There was a significant difference on URR (t-value: 5.35) and Kt/V (t-value: 4.25) of the subjects using retrograde and antegrade arterial needle placement in 6 succeeding hemodialysis sessions. There was no significant difference on access recirculation of the subjects using retrograde and antegrade arterial needle placement in 6 succeeding hemodialysis with computed t-value of 1.81.

Conclusions
Antegrade arterial needle placement provides more adequate hemodialysis than retrograde arterial needle placement in terms of URR and Kt/V values among non-diabetic, non-cardiac patients undergoing maintenance hemodialysis in 6 succeeding hemodialysis sessions. The directions of the arterial needle either retrograde and antegrade did not have significant effects on access recirculation.

References