

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

conference series.com

Oscar R. Reyes II, MSN, RN, CNN

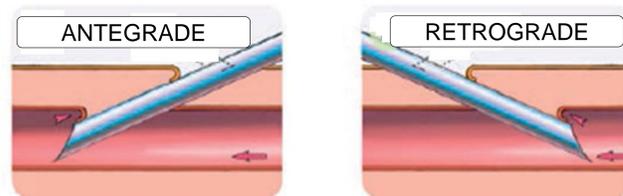
United Candelaria Doctors Hospital – Nephro Synergies Inc. Hemodialysis Center



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 reduction 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.

INTERVENTION GROUP					CONTROL GROUP				
RETROGRADE					ANTEGRADE				
Subject No.	URR		Kt/V		Subject No.	URR		Kt/V	
	Value	Verbal Description	Value	Verbal Description		Value	Verbal Description	Value	Verbal Description
1	71.03	NTO	1.37	NTO	1	73.20	NTO	1.68	NTO
2	68.46	NTO	1.47	NTO	2	76.98	NTO	1.95	O
3	67.74	NTO	1.38	NTO	3	78.34	NTO	1.93	O
4	70.75	NTO	1.56	NTO	4	75.18	NTO	1.71	NTO
5	69.17	NTO	1.49	NTO	5	75.03	NTO	1.70	NTO
6	69.32	NTO	1.57	NTO	6	70.73	NTO	1.43	NTO
7	68.84	NTO	1.32	NTO	7	71.55	NTO	1.56	NTO
8	69.04	NTO	1.46	NTO	8	79.66	NTO	1.80	O
9	69.47	NTO	1.39	NTO	9	71.88	NTO	1.54	NTO
10	69.67	NTO	1.53	NTO	10	73.98	NTO	1.74	NTO
TOTAL	69.35	NTO	1.45	NTO	TOTAL	74.65	NTO	1.70	NTO
SUMMARY	URR	Percentage	Verbal Description		SUMMARY	URR	Percentage	Verbal Description	
	80 to 100%	-	Optimal			80 to 100%	-	Optimal	
	65 to 79%	100% (10)	Near to optimal			65 to 79%	100% (10)	Near to optimal	
	Less than 65%	-	Inadequate			Less than 65%	-	Inadequate	
	Kt/V	Percentage	Verbal Description			Kt/V	Percentage	Verbal Description	
	1.80 to 2.30	-	Optimal			1.80 to 2.30	30% (3)	Optimal	
1.20 to 1.79	100% (10)	Near to optimal		1.20 to 1.79	70% (7)	Near to optimal			
Less than 1.20	-	Inadequate		Less than 1.20	-	Inadequate			
LEGEND	URR 80 to 100% - Optimal (O) dialysis 65 to 79% - Near to optimal (NTO) dialysis Less than 65% - Inadequate (I) dialysis				LEGEND	Kt/V 1.80 to 2.30 - Optimal (O) dialysis 1.20 to 1.79 - Near to optimal (NTO) dialysis Less than 1.20 - Inadequate (I) dialysis			

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

- Cicek, S., Haydanli, L., Kinay, B., Unal, E., Karadakovan, A., & Parisotto, M.T. (2010, September). *Influence of needle orientation in arteriovenous fistula on dialysis adequacy*. Poster presentation at the EDTNA/ERCA 39th International Conference, Dublin, Ireland.
- Dias, T.S., Neto, M.M., & da Costa, J.A. C. (2008). Arteriovenous fistula puncture: An essential factor for hemodialysis efficiency. *Renal Failure*, 30 (9), 870-876. doi: 10.1080/08860220802353876
- Marita, M., Preda, M., Miriunis, C. & Parisotto, M.T. (2014, September). *Influence of antegrade vs. retrograde arterial needle placement on dialysis efficiency*. Poster presentation at the EDTNA/ERCA 43rd International Conference, Riga, Latvia.
- National Kidney Foundation – Kidney Disease Outcome Quality Initiative [NKF-KDOQI]. (2006). K/DOQI clinical practice guidelines and clinical practice recommendations for 2006 updates: Hemodialysis adequacy, peritoneal dialysis adequacy and vascular access. *American Journal of Kidney Disease*, 48, S31.
- Parisotto, M.T. & Pancirova, J. (2014). *Vascular access cannulation and care* (1st ed.). Spain: Imprenta Tomas Hermanos.