



# Barriers to Implementation of Rope Ladder Technique in Cannulation

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# Introduction:

- ❑ Globally, most of the ESRD patients (80%) are on hemodialysis while the rest are on renal transplantation and peritoneal dialysis
  
- ❑ In Abu Dhabi;
  - ❑ 90% of ESRD patients are receiving hemodialysis as a renal replacement therapy
  
  - ❑ 80% of this population have Arterio Venous Fistula (AVF) as a vascular access

# Introduction:

- ❑ Cross-sectional survey of vascular access cannulation practices in 171 dialysis units
- ❑ Of the 10,807 patients enrolled in the original survey, access survival data were available for 7058 patients from nine countries
- ❑ Of these, 90.6% had an arteriovenous fistula and 9.4% arteriovenous graft
- ❑ **Access needling was by area technique for 65.8%**, rope-ladder for 28.2%, and buttonhole for 6%

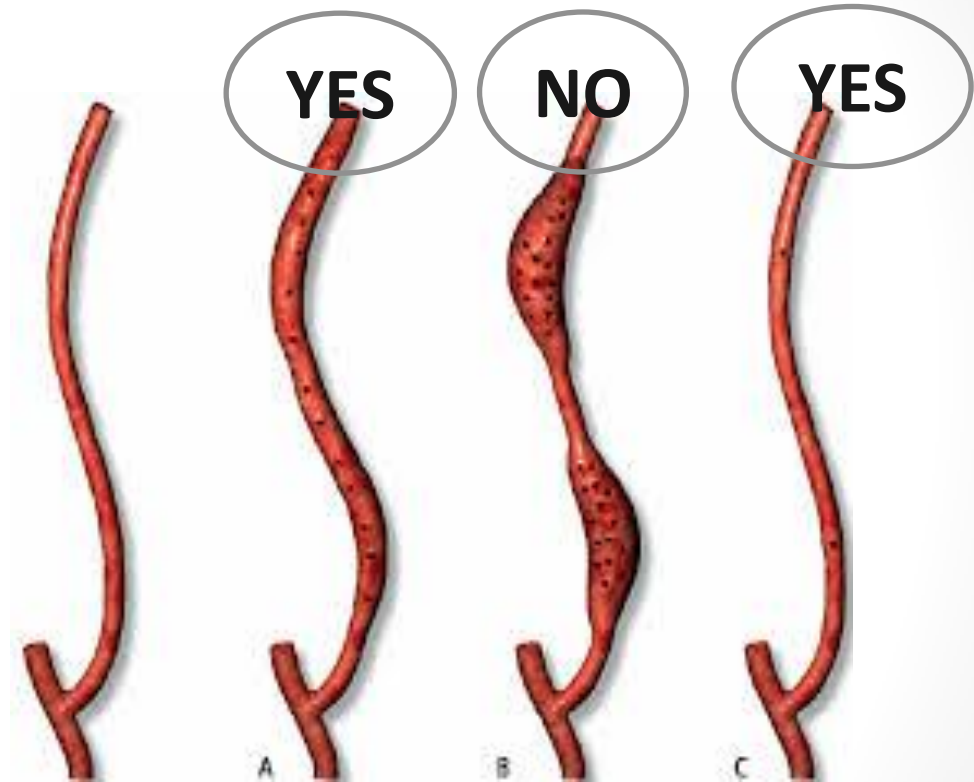
## **Cannulation technique influences arteriovenous fistula and graft survival**

Parisotto, M. T., Schoder, V. U., Miriunis, C., Grassmann, A. H., Scatizzi, L. P., Kaufmann, P., ... & Marcelli, D. (2014). Cannulation technique influences arteriovenous fistula and graft survival. *Kidney international*, 86(4), 790-797.

# Cannulation Methods:

There are three  
cannulation methods:

- A. Rope Ladder (RL)
- B. Area puncture (AP)
- C. Buttonhole (BH)



# Area Puncture:

- vessel wall damage
- stenosis formation
- prolong bleeding
- clotting of the fistula
- prevent an access from maturing
- altered body image





# Results of Area Puncture:

**Aneurysm**



**Ruptured AVF**



**Infection and long term damage**



# What the Literature Says:

- ❑ There was **no difference in cannulation pain** found among patients. BH is associated with increased risk of local and systemic infections as compared to RL (Wong, et al., 2014).
- ❑ **No reduction in pain with BH but the frequent episodes of bacteremia and exit site infections** compared with RL is critical thus use of BH needling in special circumstances requires careful deliberation (MacRae, Ahmed, Atkar, & Hemmelgarn, 2012).
- ❑ **BH cannulation caused more infections, formation of hematoma and pain** at the site than the RL group (Chow, Rayment, Miguel, & Gilbert, 2011).
- ❑ Patients dropped BH needling because of **BH cannulation failure, bleeding persistence at the needle site and bacteremia** (Kandil, Collier, Yewetu, Cross, & Davenport, 2014).

# This Study:

- Quantitative survey
- Specially devised self report questionnaire utilizing Likert's scale
- Convenience sampling of at least 10 participants



# The survey questionnaire:

Consists of 2 parts.

**Part 1:** Information about the participant

**Part 2:** identifying barriers to the implementation of rope ladder cannulation from nursing perspective.

**Part 1: Participant demographics:**

Number of years in Dialysis: \_\_\_\_\_ Number of years in SDS: \_\_\_\_\_

Location: \_\_\_\_\_ Gender: \_\_\_\_\_ Nationality: \_\_\_\_\_

**Part 2: Possible Barrier Categories:**

Please check as it apply

	Strongly Agree 1	Agree 2	Neither 3	Disagree 4	Strongly Disagree 5
In my opinion, Rope ladder (RL) cannulation not practiced due to;					
Nurses are not aware of rope ladder cannulation technique					
Nurses do not have experience on rope ladder cannulation technique					
The Cannulation guideline is not clear					
There is no clear protocol regarding Rope ladder cannulation					
Most nurses do not like to cannulate using the Rope ladder technique					
Nurses do not have enough education and training on Rope Ladder cannulation					
Nurses are not confident to cannulate using Rope Ladder					
There is no evidence to suggest that rope ladder cannulation is better than area puncture					
On a day to day basis Nurses do not have time to commit to find a new site					
In my opinion patients do not like rope ladder because:	Strongly Agree 1	Agree 2	Neither 3	Disagree 4	Strongly Disagree 5
They believe Rope ladder is more painful					
They believe Infiltration is more likely with rope ladder					
Developing new cannulation sites make patient very anxious					
Patients prefer area puncture to rope ladder					
Patient do not wish to change from area puncture to Rope ladder cannulation					
There is Lack of patient awareness on Rope ladder benefits					
Nurses do not monitor Rope ladder implementation					

# Data Analysis:

Table 1: Demographics of participant

Variable		Result
Gender	Female	6 (60%)
	Male	4 (40%)
Ethnicity	Arab	2 (20%)
	Asian	6 (20%)
	Western	2 (20%)
Years in dialysis	1-5	7 (70%)
	5 above	3 (30%)

## Three Themes:

1. Nursing knowledge
2. Nursing skills and experience
3. Patient related factors

Table 2. Participants' responses expressed as mean.

Question	SA	A	N	D	SD	Mean
	1	2	3	4	5	
1	0	0	1	7	2	4.1
2	2	1	0	4	3	3.5
3	2	3	0	3	2	3.0
4	4	5	0	1	0	1.8
5	0	0	2	4	4	4.2
6	0	3	4	2	1	3.1
7	3	3	2	2	0	2.3
8	0	5	2	3	0	2.8
9	1	6	1	2	0	2.4
10	2	3	3	2	0	2.6
11	1	6	2	1	0	2.3
12	0	4	3	3	0	2.9
13	3	5	0	1	1	2.2
14	3	3	4	0	0	2.1
15	3	3	3	1	0	2.2
16	5	4	0	1	0	1.7

SA = Strongly Agree A= Agree N = Neither D= Disagree SD= Strongly Disagree

# Results

## Theme 1: Nursing Knowledge

- Good awareness of the benefits of rope ladder cannulation (M= 4.1)
- Divided understanding on the clarity of the RL protocol (M=3.0)

# Results cont.

## Theme 2: Nursing skills and experience

- Lack of in-depth training on RL (M=1.8)
- Nurses choose to use area puncture because finding a new site on a day to day basis would require extra time (M= 2.4).
- Nurses inexperience on rope ladder cannulation technique (M= 2.8) influenced their confidence (M= 2.3).
- Failure to create a system to monitor RL application also contributes to poor implementation (M= 2.6).

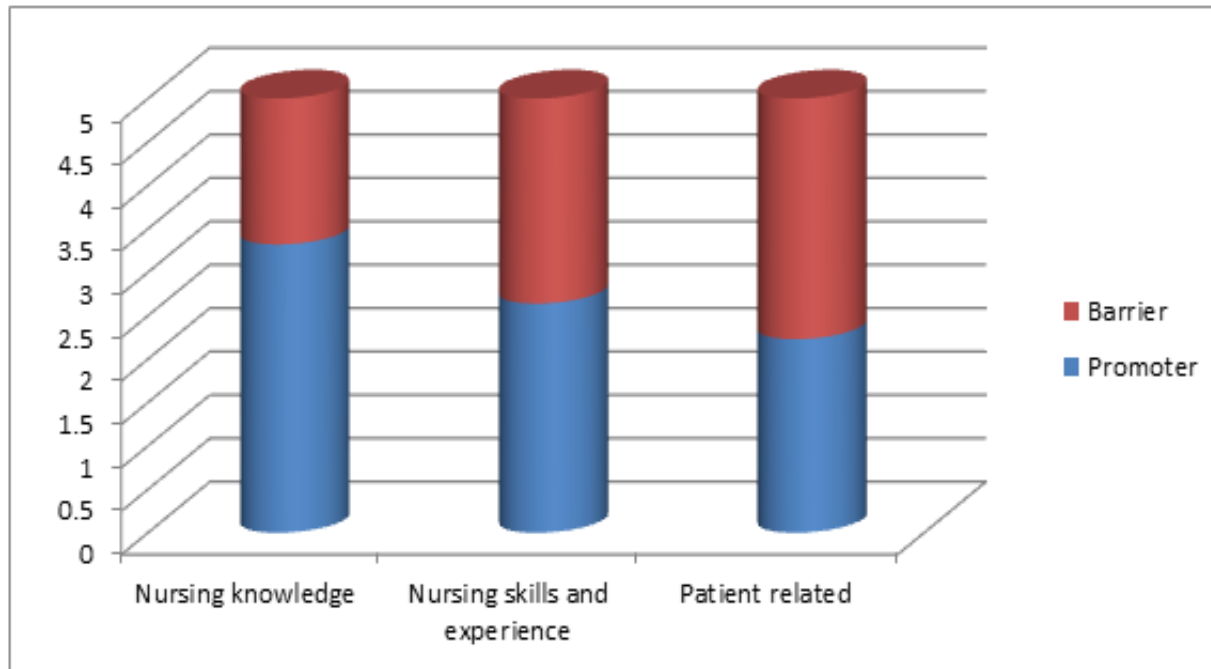
# Results cont.

## Theme 3: Patient related

- Reluctance to due to lack of awareness of RL benefits (M=1.7)
- Prefers area puncture than rope ladder (M= 2.1)
- Patients do not wish to change the current AP to RL (M= 2.2)
- New cannulation sites make patient very anxious (M= 2.2)
- RL is more painful (M= 2.3)
- More likely to have infiltration (M= 2.9)

# Result cont:

Table 3. Summary of barrier according to themes



# Limitations of the Study:

- Represented one group as the survey only covered the nursing population
- The number of potential validity problems associated with the use of self-report method
- It took extra time of to collate and analyze data
- Small sampling size



# Summary:

- ❑ Cannulation technique influences AVF patency and survival
- ❑ Evidenced based studies showed that rope ladder cannulation is mostly beneficial
- ❑ Renal nurses play an important role to be able to preserve and prevent possible angioaccess complications.
- ❑ Patient resistance and nursing inexperience are high barriers to implementing rope ladder cannulation.
- ❑ There is a resolution to the non-adherence to cannulation practice

# Recommendations:

- Implement a plan to change the culture of practice “old habits”
- Develop a structured cannulation training to improve skills
- Support advance nursing assessment of VA
- Introduce rope ladder to patients and family
- Establish a system of monitoring and timely surveillance
- Coordinate with regulating bodies to include vascular access education programs in dialysis specialty

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Thank you.

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