

The Use Of Plastic Cannulas In Patients Undergoing In-centre Nocturnal Haemodialysis

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Introduction/Background

Metal needles traditionally used for Arteriovenous Fistula (AVF) cannulation in haemodialysis treatments may increase the risk of vessel injury in nocturnal haemodialysis patients. Plastic cannulas have been found to be suitable for patients with new or challenging AVF access, as well as for patients on extended dialysis. A survey at NKF in early 2022 revealed that 16% of patients undergoing in-centre nocturnal haemodialysis (INHD) were worried about needle infiltration during sleep, negatively impacting their quality of sleep and treatment experience.

Goal/Objective

This project aims to enhance patient safety and improve treatment outcomes for patients undergoing INHD by transitioning from metal needles to plastic cannulas for AVF cannulation.

Implementation Plan

A cohort of 27 patients with AVF undergoing INHD in two community dialysis centres were monitored over a six-month period in 2022/2023. Competent, well-trained nurses performed the cannulations using Argyle plastic cannulas from Medtronic (Argyle™). The observations were included:

- Numeric pain rating scale.
- Successful cannulation rates.
- Vascular access patency evaluation through transonic blood flow measurement.
- Venous pressure comparison between metal needles and plastic cannulas.
- Complication rates and treatment efficacy
- Feedback from both patients and nurses.

Benefits/Results

The introduction of plastic cannulas resulted in

- Patient-reported pain, with 88.9% of patients experiencing no to mild pain.
- Cannulation success rates improved from 93.2% at baseline to 98.3% and 98.8% at the third and sixth months respectively.
- No significant differences in vascular access patency were observed between the two cannulation methods.
- An unexpected increase in venous pressure was noted with the use of 16 G plastic cannulas.
- No vascular access complications were reported, and treatment efficacy was not compromised.
- Patient feedback indicated a substantial decrease in fear of injury during sleep, with 85.2% reporting no fear of accidental arm movement. Furthermore, 93.2% of patients expressed confidence in the safety of plastic cannulas.

Table 1: Transonic blood flow measurement (n=27)

	Metal Needle n=27 Mean±	Plastic cannula (1 st month) n=27 Mean±	Plastic cannula (3 rd month) n=27 Mean±
Blood flow (ml/min) (Mean) (Qb from 220-270)	1580±904	1542±663	1644±703
Recirculation	0%	0%	0%
Mean absolute change*	Reference	-40	64

*P>0.05

Table 2: Success cannulation rate and complications

	1 st month n=27		3 rd month n=27		6 th month n=27	
	patient	cannulation	patient	cannulation	patient	cannulation
Successful Cannulation	20 (74%)	327 (93.2%)	25 (92.6%)	345 (98.3%)	26 (92.3%)	349 (98.8%)
Repeated attempt (Missed first-cannulation)	7 (26%)	24 (6.8%)	2 (7.4%)	6 (1.7%)	1 (0.8%)	2 (0.2%)
Infiltration during cannulation	0		0		0	
Infiltration during treatment	0		0		0	
Dislodgement	0		0		0	
Hematoma (or bruises)	0		0		0	
Stenosis required intervention	0		0		0	
Prolonged bleeding after removal of cannula	0		0		0	

Figure 1: Process Implementation

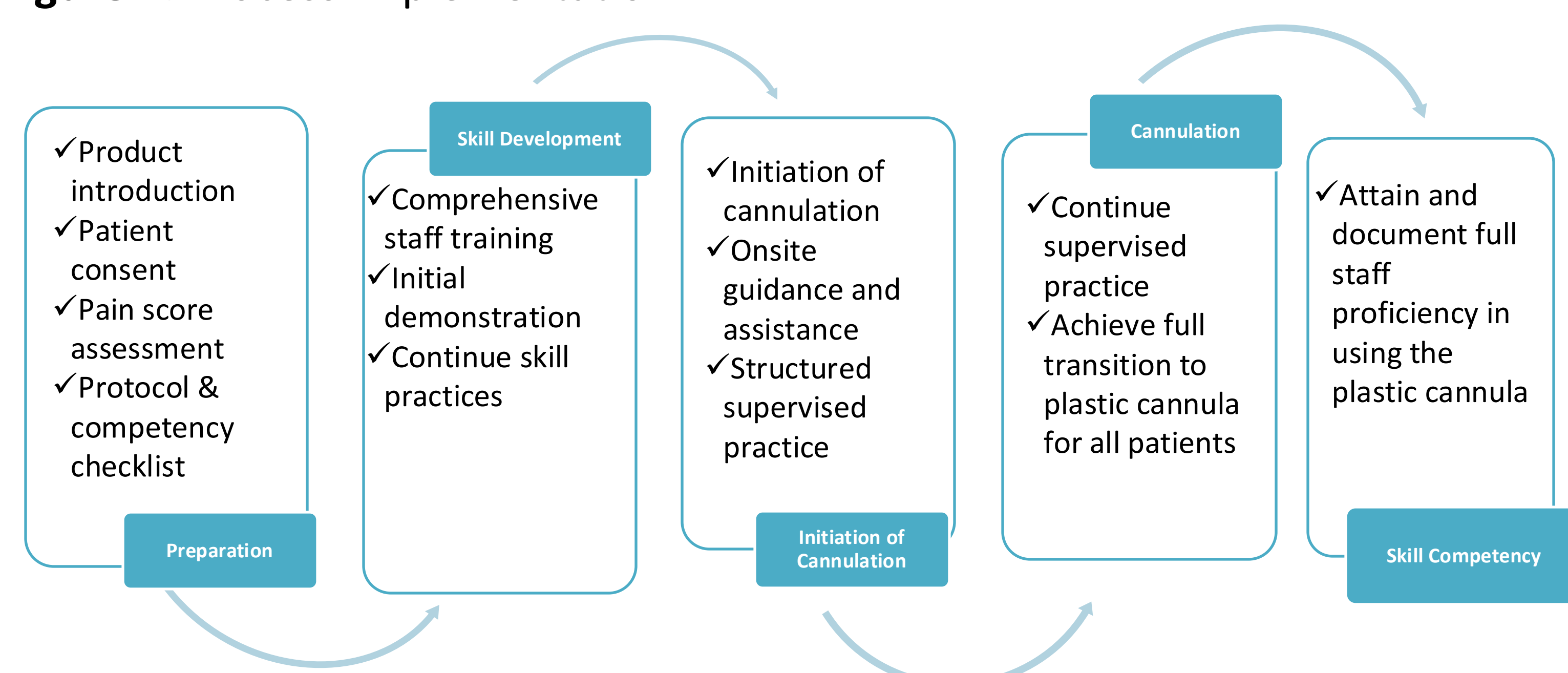


Figure 2: Staff training and onset guidance



Sustainability & Reflections

The substitution of metal needles with plastic cannulas in AVF cannulation for INHD patients has proven to be a favourable change. This pilot supports the notion that patient-centred innovations can improve the haemodialysis experience.

Our group has made a significant contribution to the nursing profession by piloting the use of plastic cannulas for arteriovenous (AV) access in In-centre Nocturnal Haemodialysis (INHD), a first in the community dialysis setting. This innovation directly addresses concerns related to patient safety, pain, and treatment interruptions caused by traditional metal needles.

This initiative has not only advanced the standard of haemodialysis care but also set a benchmark for sustainable, patient-centred innovation in nursing. Its scalability and positive reception have positioned it as a model for improving the quality of life and health of haemodialysis patients across wider communities.