Original Article

Assessing the Comfort Level of Dialysis Patients with Supraclavicular Tunnel Location of Tunneled Dialysis Catheter: A Tertiary Care Center Experience in Karachi, Pakistan

Danial Khalid Siddiqui, Misbah Tahir, Muhammad Ali, Raisa Altaf, Khalid Mustafa and Khubab Khalid Siddiqui

ABSTRACT

Objective: To evaluate patients' comfort level receiving tunnel catheters in a supraclavicular location at a tertiary care hospital.

Study Design: Descriptive cross-sectional study

Place and Duration of Study: This study was conducted at the Interventional Radiology, Liaquat National Hospital, Karachi, Pakistan June 2022- November 2022.

Materials and Methods: Participants in the study had to be at least 18 years old, of any gender, and have completed at least four successful hemodialysis sessions. Patients were interviewed to evaluate their comfort level using a self-structured questionnaire.

Results: 105 patients were studied. Median age was 60 (IQR= 52 – 70) years. Discomfort was observed for the dressing of the catheter (n=10, 9.5%), feeling pain on getting up (n=9, 8.6%), and feeling pain when getting dress-up (n=9, 8.6%). Some patients reported discomfort when bathing and showering (n=8, 7.6%), uncomfortable sleep (n=6, 5.7%), unhappiness with their appearance (n=5, 4.8%), hindering of catheter location in enjoying spare time (n=3, 2.9%) and feeling of isolation due to catheter location (n=2, 1.9%). Few of patients were dissatisfied with the location of the catheter (n=2, 1.9%).

Conclusion: This study analyzed that the supraclavicular site for tunnel positioning is acceptable and not compromising patients' daily routine activities and social interactions.

Key Words: Tunneled dialysis catheter, Hemodialysis, Comfort, Supraclavicular site

Citation of article: Siddiqui DK, Tahir M, Ali M, Altaf R, Mustafa K, Siddiqui KK. Assessing the Comfort Level of Dialysis Patients with Supraclavicular Tunnel Location of Tunneled Dialysis Catheter: A Tertiary Care Center Experience in Karachi, Pakistan. Med Forum 2023;34(1):64-68.

INTRODUCTION

CKD, or chronic kidney disease, is a terrible condition[1]. Most patients who develop ESKD require hemodialysis (HD), which is administered either through an arteriovenous fistula (AVF) or a central venous catheter (CVC)[2]. If they mature and work dependably to administer appropriate dialysis, fistulas are associated with the lowest morbidity and mortality of all forms of vascular access.

Department of Interventional Radiology, Liaquat National Hospital, Karachi.

Correspondence: Danial Khalid Siddiqui, Assistant Professor of Interventional Radiology, Liaquat National Hospital, Karachi.
Contact No: 0321-8949285
Email: daniyal106@gmail.com

Received: December, 2022
Accepted: December, 2022
Printed: January, 2023

However, due to the urgent requirement for dialysis, many patients need immediate vascular access to deliver hemodialysis, with catheters being the preferred option until either a fistula or a graft can be produced[3]. Providers have started to shift away from a fistula-first strategy in every patient and toward offering more patient-centered suggestions, while still acknowledging that AVF offers the greatest outcomes in the HD population as a whole[4]. It is plausible to assume, for instance, that in some circumstances, a poorly working AVF that necessitates multiple hospitalizations and missed dialysis treatments may be less beneficial than a functional AVG or TDC[5].

Patients' preferences are important to guarantee that the services provided to patients are of the highest caliber and live up to their expectations. The choice of vascular access by the patient may be significantly influenced by their satisfaction with their vascular access[6]. In the majority of nations, patients are started on dialysis without being asked for their authorization or for how accepting and satisfied they are with the procedure.

However, feedback from patients is useful in gathering information about how well medical practitioners can accommodate their values and expectations[7].

Even though an arteriovenous fistula is the finest access currently available, many patients still use a tunneled hemodialysis catheter for their dialysis treatment to avoid the discomfort of cannulating an arteriovenous access[8]. The tunnel can be made in a supraclavicular location or infraclavicular location in the chest. It depends on the choice of the patient and the operator's preference. Supraclavicular tunnel location has the advantage of better angulation and avoidance of kinking. It also avoids repeated exposure of the chest for dialysis and dressing.

The choice of vascular access is significantly influenced by patient preference. To the best of our knowledge, this method of inserting a tunnel into the supraclavicular region has never been used elsewhere in the world. Due to cultural challenges, particularly those that affect women such as skin exposure issues, we adjusted the method and made the supraclavicular placement. Therefore, this study was planned to evaluate patients' comfort level receiving tunnel catheters in a supraclavicular location at a tertiary care hospital.

MATERIALS AND METHODS

This descriptive cross-sectional study was performed at Interventional Radiology Department, Liaquat National Hospital, Karachi, Pakistan, in June-November, 2022. After taking approval from the hospital ethics committee (App # 0773-2022 LNH-ERC), the study was started. With their signed informed consent, patients were enrolled. Participants in the study were at least 18 years old, of any gender, and completed at least four successful hemodialysis sessions using a supraclavicular tunneled catheter. Patients with acute kidney injury, kidney transplant candidates, and mentally challenged individuals were excluded from this study.

A sample size of 105 patients was estimated using an Open-Epi calculator by taking 22.6% discomfort prevalence[9] among patients receiving TDC, 95% confidence interval, and 5% of margin of error. The sampling technique was non-probability consecutive.

All TDCs were inserted by interventional radiologists with at least one year of experience, using real-time ultrasound and fluoroscopic guidance in an angiography suite under proper aseptic technique and local anesthesia. Pre-procedure 1.2 grams of Co-Amoxicillin was given intravenously (I/V). The appropriate vein was selected for TDCs insertion. The patency of the vein was confirmed using doppler ultrasound (DUS). We placed 14.5 French (Covidien palindrome, Medcomp, and Bard) catheters with lengths of 19 cm for the right internal jugular, and 23 cm for the left internal jugular. The vein was punctured and access was secured using the seldinger technique. The clavicle was palpated and approximately 2-3 cm above the clavicle Inj. Xylocaine 10% was injected using a 20 gauge L.P. needle for local anesthesia within the subcutaneous tissues. A 7-10 cm long subcutaneous tunnel was made in the supra-clavicular region for bilateral jugular veins. The length of the tunnel depends upon the physique of the patient. So that the tip of the catheter is in the right atrium. Fluoroscopy was used to confirm the tip of the catheter. The catheter was flushed with heparinized saline and stitches were applied routinely and were removed three weeks, post-procedure. 5000IU/ml heparin and 20mg/ml gentamycin, 1ml of each of them, were mixed with 5ml normal saline. 7ml solution was made and 3.5ml solution was injected into each port of TDC as a catheter lock solution. Patients were advised to dialyze from TDC 24 hours after the procedure to reduce the risk of hemorrhage. In urgent cases, such as hyperkalemia and uremic symptoms, dialysis was immediately done after TDC placement.

The patient's perspective on comfort level was assessed using a self-structured questionnaire. The questionnaire had a total of 14 items with two components. The first component evaluated comfort related to daily routine activities with a total of 8 questions. The second component assessed social activities by investigating a total of 5 questions. The last question assessed overall comfort level. All of the questions had a response of a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). Pilot testing was done for the questionnaire by enrolling 20 patients and Cronbach's alpha was computed for measuring its reliability, which was 0.8.

The gathered data was put up in SPSS version 21 to perform data analysis. Categorical variables were summarized as frequency and percentage. Numerical variables were expressed as mean ± standard deviation.

RESULTS

A total of 105 patients were studied with a median age of 60 (IQR= 52 – 70) years and the majority were males (n=68, 64.8%). Patients had comorbid hypertension (n=80, 76.2%), diabetes (n=54, 51.4%), and ischemic heart disease (n=32, 30.5%). Median catheter days were 84 (IQR= 30-170) days.

A higher discomfort was observed for the dressing of the catheter (n=10, 9.5%) followed by feeling pain on getting up (n=9, 8.6%), and feeling pain when getting dress-up (n=9, 8.6%). None of the patients felt discomfort regarding moving of catheter with their movement. Lower discomfort was observed related to the position of the catheter (n=2, 1.9%), feeling of pain when patients moved inside the bed (n=3, 2.9%), and hindering of daily activities (n=5, 4.8%). A minor proportion of patients were dissatisfied with the location of the catheter (n=2, 1.9%) (Table 1).

Table No.1: Response distribution of patients regarding comfort during daily routine activities

Survey items	Strongly agree	Agree	Disagree	Strongly disagree
When I get up, I get pain in the place where my catheter is	3(2.9)	6(5.7)	74(70.5)	22(21)
When I move inside the bed, I get pain in the place where my catheter is.	0(0)	3(2.9)	78(74.3)	24(22.9)
I get pain in the place where my catheter is when I get dressed	0(0)	9(8.6)	72(68.6)	24(22.9)
I do not have pain, but its position disturbs me	5(4.8)	5(4.8)	70(66.7)	25(23.8)
I am afraid of my catheter moving out when I move	0(0)	0(0)	105(100)	0(0)
Does it hinder your daily routine activity?	9(8.6)	9(8.6)	74(70.5)	13(12.4)
Is applying catheter dressing comfortable?	10(9.5)	85(81)	4(3.8)	6(5.7)
I am satisfied with the location of my catheter	11(10.5)	90(85.7)	2(1.9)	2(1.9)

Table No.2: Response distribution of patients regarding comfort related to social activities

Survey items	Strongly agree	Agree	Disagree	Strongly disagree
I was bothered by the appearance of my vascular access	0(0)	5(4.8)	80(76.2)	20(19)
Location interfered with my sleep	15(14.3)	6(5.7)	65(61.9)	19(18.1)
The location caused me problems with bathing or showering	6(5.7)	8(7.6)	80(76.2)	11(10.5)
The location of the catheter does not hinder me to enjoy my spare time	10(9.5)	92(87.6)	3(2.9)	0(0)
I feel isolated from people due to the catheter location	0(0)	2(1.9)	90(85.7)	13(12.4)

Some of the patients reported discomfort related to bathing and showering (n=8, 7.6%), uncomfortable sleep (n=6, 5.7%), unhappiness with their appearance (n=5, 4.8%), hindering of catheter location in enjoying spare time (n=3, 2.9%) and feeling isolated from people due to catheter location (n=2, 1.9%) (Table 2).

DISCUSSION

Due to the urgent necessity for hemodialysis, a large number of hemodialysis patients require immediate vascular access. Catheters are the preferred option until a fistula or graft can be formed[3]. On some occasions, TDC placement is a patient's desire. In clinical settings where medical science has not yet reached to solutions, patient preferences play a role in directing decision-making[10,11].

The junction of the superior vena cava and right atrium is the ideal tip position for catheters inserted through the internal jugular vein or subclavian vein, and catheters of around 19 cm in length are suitable[12]. Tunneling, which entails guiding the catheter through subcutaneous tissues from the exit site to the location on the neck where the guide wire was placed into the jugular vein, is a crucial component of this technique[13]. In usual practice, the exit site of the catheter is at the anterior chest wall below the clavicle. However, in our practice, we have seen that patients feel uncomfortable when they expose their skin for dialysis or dressing. Thus, an alternate approach for the tunnel location was chosen. The method of making the tunnel and selecting the length of the tunnel is technically the same except the exit site is present in the supraclavicular location rather than the infraclavicular location at the chest wall. This supraclavicular location was more readily accepted by females as another approach to making the tunnel medial to the breast which makes them uncomfortable while uncovering during dialysis. This location also has the advantage as it is completely covered under the shirt/clothing. That's why we evaluated the comfort level of the patients in which TDC is placed in the supraclavicular location.

One important patient-reported outcome for dialysis patients is life involvement, which necessitates physical activity and physical function. However, the aware patient may experience significant discomfort as a result of the catheter implantation. Actual or potential tissue injury can result in pain, an unpleasant sensory and emotional experience. Assuring the patient's comfort is crucial for boosting compliance, making the treatment easier, and reducing the risk of catheter malpositioning or insertion failure[14,15].

The Kidney Disease Outcomes Quality Initiative (K/DOQI) published guidelines for dialysis patients that advised dialysis personnel to assess patients' physical function and motivate them to engage in physical exercise[16]. In this study, among all survey items, a higher proportion of discomfort was seen regarding catheter dressing (9.5%), followed by a feeling of pain on getting up (8.6%) and a feeling of pain when getting dress-up (n=9, 8.6%). A Canadian study analyzed

patients' perspectives on complications linked to vascular access. It was analyzed that physical complications were higher for grafts and fistulas than for catheters. However, disruption of daily routine was higher for catheters[3]. Nadurak et al[17] investigated pain and anxiety with two different techniques of catheter insertion. Patients receiving catheters through standard procedure experienced lower levels of pain (median=2) than patients who received catheters through conscious sedation (median=3). A recently published study from Pittsburgh compared health-related quality of life among three types of vascular access including AVF, AVG, and TDC. A vascular access questionnaire was used for measuring patient satisfaction with a lower score denoting higher satisfaction. A median satisfaction for TDC (median=6.5) was lower than AVF (median=4.5) however it was higher than AVG (median=7)[18].

It's common for patients and their social network to view the start of dialysis treatment as a major hardship because the dialysis therapy equipment is challenging to integrate into their social activities[19]. In this study, discomfort in social activities was observed for bathing and showering (n=8, 7.6%), uncomfortable sleep (n=6, 5.7%), unhappiness with their appearance (n=5, 4.8%), hindering of catheter location in enjoying spare time (n=3, 2.9%) and feeling isolated from people due to catheter location (n=2, 1.9%). Sridharan et al[18] also reported higher discomfort related to bathing and showering among all items of the social domain with a median score of 6 followed. The second highest discomfort was on the appearance of vascular access (median=1.5) and access interference with sleep (median=1.5) whereas discomfort was lowest on interference with daily activities (median=1).[20]

This study examines patients' experiences related to a novel tunnel placement at the supraclavicular site. However, this method is only used in our institute, and no comparison to the conventional method was done. A randomized control study with a larger sample size might be conducted in the future for more convincing evidence.

CONCLUSION

This study analyzed that the supraclavicular site for tunnel positioning is acceptable and not compromising patients' daily routine activities and social interactions.

Author's Contribution:

Concept & Design of Study:	Danial Khalid Siddiqui
Drafting:	Misbah Tahir, Muhammad Ali
Data Analysis:	Raisa Altaf, Khalid Mustafa, Khubab Khalid Siddiqui
Revisiting Critically:	Danial Khalid Siddiqui, Misbah Tahir
Final Approval of version:	Danial Khalid Siddiqui

Conflict of Interest: The study has no conflict of interest to declare by any author.

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