American Journal of Medicine and Medical Sciences 2025, 15(4): 1085-1089
DOI: 10.5923/j.ajmms.20251504.47

Assessment of Quality of Life in Patients with High and Low Risk of Vascular Access Thrombosis

E. A. Khatamov, M. A. Sabirov, N. N. Sultonov*

Republican Specialized Scientific and Practical Medical Center of Nephrology and Kidney Transplantation, Tashkent, Uzbekistan

Abstract The patients were examined according to the proposed protocol using a scale developed earlier at the RSSPMTCNKT. The average score calculated according to the proposed scale for these patients was 6.11±2.44 points. Thus, a group of patients with a high risk of VA thrombosis was identified, defined as a score of 8 or more, which amounted to 38 patients - 20.32%. This category of patients was identified and marked as the first study group with a high risk of VA. The remaining patients, with a score below 8 - 149 patients (79.68%) made up the second study group and were marked as a group with a low risk of VA thrombosis. The results of the KDQOL SF V1.3 survey show that the consequences of kidney failure on the daily life of older patients are associated with the lowest quality of life scores. The following results were established when assessing the quality of life of the patients studied using scales designed for dialysis patients. The average indicators among patients of both groups were comparable with each other, some of the low indicators were: the consequences of the burden of disease associated with hemodialysis in the group with a low risk of thrombosis of VA was -38.3±18.2, and in the group with a high risk of thrombosis of VA - 36.7±19.6; the labor status in the group with a low risk of thrombosis of VA was -39.4±21.2, and in the group with a high risk of thrombosis of the VA -37.8±20.1; as well as sleep disorders in the group with a low risk of thrombosis of the VA and in the group with a high risk of thrombosis of the VA 53.3±15.2 and 51.4±14.5, respectively. At the same time, one of the indicators with a high score was in the group with a low risk of thrombosis of the VA and in the group with a high risk of thrombosis of the VA were respectively: support of dialysis staff 87.3±12.4 and 88.4±11.6 and satisfaction with medical care-78.2±14.9 and 77.8±14.2, which indicatesquality of social interaction. There were no significant differences between the two patient groups in terms of duration of hemodialysis, although patient surveys indicated a desire for more energy to participate in activities and less time on dialysis.

Keywords Hemodialysis, Diabetes mellitus, Chronic kidney disease, Vascular access, Arteriovenous fistula

1. Introduction

In the modern world, due to progress in medical science and technology, as well as changes in lifestyle and the epidemic situation, the number of patients requiring hemodialysis for the development of chronic kidney disease (CKD) is increasing. On average, up to 0.15% of the population needs hemodialysis [5]. Hemodialysis can improve the survival and quality of life of patients with CKD [1,2,6]. Hemodialysis can be performed using a catheter, arteriovenous shunt and arteriovenous fistula. Vascular access (VA) failure in 85% of cases is associated with thrombosis. According to the literature, vascular access thrombosis develops from 0.5 to 80% per year [5,8]. Vascular access thrombosis is associated with interruption of the hemodialysis program, increased cardiovascular risk, increased hospitalization and mortality rates, the need for temporary catheter placement and associated bacteremia, as well as a significant increase in financial costs for treatment [4,9] associated with the establishment of new access, hemodialysis through temporary access, treatment of complications associated with impaired vascular access function and interruption of the hemodialysis program [3,7]. An epidemiological study of VA failure shows that the frequency of this complication worsens the quality of life of patients several times [10].

Purpose of the study: assess the quality of life of patients undergoing programmed hemodialysis depending on the risk of developing vascular access thrombosis.

2. Material and Research Methods

The study included patients receiving program hemodialysis at the Tashkent City Center for Nephrology and Kidney Transplantation. All patients underwent hemodialysis using a VA in the form of an arteriovenous fistula (AVF) formed in the surgical department of that center. The time from the operation to the start of hemodialysis (the fistula "maturation" period) ranged from 3 to 6 months. Patients were assessed

* Corresponding author:
dr_nodir86@mail.ru (N. N. Sultonov)
Received: Jan. 17, 2025; Accepted: Feb. 13, 2025; Published: Apr. 16, 2025
Published online at http://journal.sapub.org/ajmms

depending on the risk of VA thrombosis. This division of patients into groups was carried out using the risk scale for the development of vascular access thrombosis (Table 1), developed in our center.

A total of 187 patients with newly started hemodialysis were examined, as a result 2 prognostic groups were formed: with a high risk of vascular access thrombosis (38 patients – 20.32%) and a low risk of access thrombosis (149 patients – 79.28%). The clinical characteristics of the patients are presented in Table 2.

In the specified groups, a comparative study of the clinical characteristics of patients (age, diagnosis, duration of hemodialysis, body mass index (BMI), hemoglobin concentration and use of erythropoiesis-stimulating agents (ESA), etc.), mineral status (concentration of parathyroid hormone and phosphorus in the blood), hemodynamic features (BP during dialysis and during the day, echocardiography, duplex scanning of the vessels of the contralateral limb, endothelium-dependent vasodilation test (EDVD) and rheological features (auto rosette formation) were conducted. In addition, a special assessment of the quality of life (QOL) was carried out based on the Russified Kidney Disease Quality of Life Short Form (KDQOL-SFTM) questionnaire, including sections specific to dialysis therapy.

Table 1. Scale for identifying patients with CKD 5D at high risk of thrombosis of the VA

High risk of thrombosis of the VA is defined as a score of 8 or higher		
№.	Sign	Score
1.	Age 35 years and above	1
2.	BMI 24 kg/m^2 and above	1
3.	Radial artery of the arm 4.15 relative units and higher	1
4.	EDVD 3% or less	1
5.	IPS 20 mm.Hg and more	1
6.	Decrease in blood pressure during HD below 100 mm Hg (SBP) or 60 mm Hg (DBP)	1
7.	Hemoglobin concentration in the blood is 90 g/l and below	1
8.	Use of high doses of EPS	1
9.	LVEF 54.5% or more	1
10.	LV EDR 57.5 mm or more	1
11.	LP 43 mm and more	1
12.	RV 34 mm and more	1
13.	Systolic pressure in the PA is 35 mm Hg or more	1
14.	The proportion of auto rosettes and signs of lysis is 32% or more	1
15.	Phosphorus concentration 2.1 mmol/l and more	1

Table 2. Clinical characteristics of patients included in the second stage of the study

Indicator	**Low risk thrombosis of VA (n=149)**	**High risk thrombosis of VA (n=38)**
Age in years	38.85±13.95	42.18±11.22
Etiology of CKD:		
Diabetes mellitus, hypertension, polycystic kidney disease, metabolic nephropathy (gout, amyloidosis	71	27
Chronic pyelonephritis	22	3
CGN, lupus nephritis, systemic vasculitis	56	8
Therapy:		
Calcium channel blockers	138	33
Beta blockers	82	21
Alpha-adrenergic blockers	43	11
Diuretics	16	4
Nitrates	21	8
Iron supplements	121	31
EPS	97	23
Vitamin D3 + calcium	136	31
Bisphosphonates	63	16
Phosphate binders	72	17

Note: * - reliability of difference between groups. One sign – $p<0.05$, two signs – $p<0.01$, three signs – $p<0.001$.
- number of patients indicated.

The KDQOL-SFTM questionnaire (version 1.3) used consists of 36 SF-36 questions (general questions for measuring QOL regardless of the type of disease), 43 questions reflecting the specifics of dialysis therapy, and one question allowing to assess the state of health in general. Four additional scales are aimed at assessing satisfaction with social support, support from dialysis personnel, patient satisfaction with the quality of medical care and self-assessment of health in general. The obtained scores for each scale of the KDQOL-SFTM questionnaire are converted into standard ones, so that the assessment of each sphere of life is made in points from 0 to 100: the higher the score, the better the QOL.

All obtained data were entered into summary tables Excel. After the groups were formed, all parameters were described as the arithmetic mean and its standard deviation. The reliability of intergroup differences was determined using the Student criterion. The comparison of the frequency of occurrence of features between groups was carried out using the chi-square table criterion and checking its reliability according to the tables depending on the number of degrees of freedom.

3. Research Results and Discussion

The patients were examined according to the proposed protocol using a scale developed on the basis of a retrospective study. The average score calculated according to the proposed scale in these patients was 6.11±2.44 points. Thus, a group of patients with a high risk of VA thrombosis was identified, defined as a score of 8 or more, which amounted to 38 patients - 20.32%. This category of patients was identified and marked as the first study group with a high risk of VA. The remaining patients, with a score below 8 - 149 patients (79.68%) made up the second study group and were marked as a group with a low risk of VA thrombosis. The average age of patients was 42.64 ± 3.58 years. Also in the high-risk group there were 25 men (65.79%), and 13 women (34.21%), while in the low-risk group there were 94 men (63.09%) and 55 women (36.91%).

The results of the KDQOL SF V1.3 survey show that the consequences of renal failure for the daily life of elderly patients are associated with the lowest quality of life scores. It should be noted that the scores were comparable and did not differ statistically significantly between the study groups and depending on the data in the control group. Assessment of the quality of life in the studied patients using scales intended for dialysis patients, the following results were established (Table 3). The average indicators among patients of both groups were comparable with each other, some of the low indicators were: the consequences of the burden of disease associated with hemodialysis in the group with a low risk of thrombosis of VA was -38.3±18.2, and in the group with a high risk of thrombosis of VA - 36.7±19.6; the labor status in the group with a low risk of thrombosis of VA was -39.4±21.2, and in the group with a high risk of thrombosis of the VA -37.8±20.1; as well as sleep disorders in the group with a low risk of thrombosis of the DM and in the group with a high risk of thrombosis of the VA 53.3±15.2 and 51.4±14.5, respectively. At the same time, one of the indicators with a high score was in the group with a low risk of thrombosis of the VA and in the group with a high risk of thrombosis of the VA were respectively: support of dialysis staff 87.3±12.4 and 88.4±11.6 and satisfaction with medical care-78.2±14.9 and 77.8±14.2, which indicatesquality of social interaction.

There were no significant differences between the two patient groups in terms of duration of hemodialysis, although patient surveys indicated a desire for more energy to participate in activities and less time on dialysis.

Analyzing the indicators of the general scales of health-related QOL, fairly high scores were found on the scales of the psychosocial component of QOL: mental health, the influence of emotional state on daily activities, social functioning (Table 4), but all results were not significant compared to the control group.

Table 3. Assessment of quality of life in the studied patients using the KDQOL-SF 1.3 questionnaire scale (scales intended for dialysis patients)

Indicator	Low risk thrombosis of VA (n=149)	High risk thrombosis of VA (n=38)
Symptoms/Problems	70±12.5	69.2±10.5
Impact of kidney disease on daily activities	64.3±15.2	66.2±16.3
Time of kidney disease	38.3±18.2	36.7±19.6
Employment status	39.4±21.2	37.8±20.1
Cognitive functions	72.9±12.5	74.7±11.6
Quality of social interaction	74.4±15.6	75.2±16.1
Sexual function	69.1±21.5	62.3±17.4
Dream	53.3±15.2	51.4±14.5
Social support	69.8±21.3	69.1±21.1
Support for dialysis staff	87.3±12.4	88.4±11.6
Satisfaction with medical care	78.2±14.9	77.8±14.2

Note: *- differences are significant compared to the indicators in the groups (*- $p<0.05$, **- $p<0.01$, ***- $p<0.001$).

Table 4. Assessment of quality of life in the studied patients according to the KDQOL-SF 1.3 questionnaire scale (General scales of health-related quality of life (SF-36))

Indicator	Control group (n=20)	Low risk thrombosis of VA (n=149)	High risk thrombosis of VA (n=38)
Physical functioning	79.1±20.2	60.9±21.8	56.4±21.2
Impact of physical condition on daily activities	65.5±22.4	33.2±21.3	32.8±21.1
Pain intensity and impact of pain on daily activities	67.7±15.2	55.8±24.8	60.4±22.0
General health	73.6±12.9	36.9±15.3	36.2±14.3
General activity, energy	72.5±13.6	49.5±14.7	46.8±15.4
Social functioning	68.2±18.1	62.6±22.1	62.8±22.4
The influence of emotional state on everyday activities	62.8±16.7	53.5±25.3	64.5±23.7
Mental health	66.7±11.6	61.3±18.0	60.8±18.1

It should be noted that the mental health indicator obtained in this study among patients (both low-risk and high-risk groups) were comparable with the results in the healthy control group. According to the literature, some studies in neighboring countries provide results that even exceed the normative data [10,11]. Perhaps this is due to the patients' satisfaction with their condition and acceptance of the disease, their emotional state, psychological mood and ability to adapt to the disease. In addition, these results are also confirmed by data from researchers in the USA, Canada and European countries [1,3]; of all the general scales of health-related QOL (SF-36), the smallest difference between patients on HD and healthy individuals is registered on the mental health scale.

Therefore, the data on the quality of life assessment of patients undergoing hemodialysis among groups with low and high risk of vascular access thrombosis show comparable results. The indicators differ significantly from the data among the control group and require correction. However, these indicators do not affect the risk of developing vascular access thrombosis in patients undergoing PH.

4. Conclusions

During the study, using a scale developed earlier to identify a high-risk group for vascular access thrombosis among patients undergoing PH, it was found that patients who received 8 points or more had a high risk of vascular access thrombosis of 93.55% with a relative risk level 27.13 times higher, i.e. patients with a score of more than 8 points should be included in the high-risk group for vascular access thrombosis for preventive measures and they are characterized by a deterioration in quality of life.

REFERENCES

[1] Ayumi Ishiwatari, Shungo Yamamoto, Shingo Fukuma, Takeshi Hasegawa, Sachiko Wakai, Masaomi Nangaku; Changes in Quality of Life in Older Hemodialysis Patients: A Cohort Study on Dialysis Outcomes and Practice Patterns. Am J Nephrol 19 August 2020; 51(8): 650–658. https://doi.org/10.1159/000509309.

[2] Domenick Sridharan N., Fish L., Yu L., Weisbord S., Jhamb M., Makaroun M.S., Yuo Th.J The associations of hemodialysis access type and access satisfaction with health-related quality of life. Vasc Surg. 2018 Jan; 67(1): 229-235. doi: 10.1016/ j.jvs.2017.05.131. Epub 2017 Aug 16. PMID: 28822665.

[3] Khrulev A.E., Kudryavtseva E.S., Egorova P.A., Rodionova A.D., Sorokoumova S.N., Suvorova O.V. Quality of life of patients on programmed hemodialysis. General Reanimatology. 2019; 15(2): 4-12. https://doi.org/10.15360/1813-9779-2019 -2-4-12.

[4] Kosa S.D., Bhola C., Lok CE.J. Vasc Access. Measuring patient satisfaction with vascular access: vascular access questionnaire development and reliability testing. 2015 May-Jun; 16(3): 200-5. doi: 10.5301/jva.5000339. Epub 2015 Jan 27. PMID: 25634153.

[5] Li M.T., Wu M., Xie Q.L., Zhang L.P., Lu W., Pan M.J., Yan X.W., Zhang L., Zhang L., Wang Y.J. The association between vascular access satisfaction and quality of life and depression in maintained hemodialysis patients. Vasc Access. 2024 Mar; 25(2): 439-447. doi: 10.1177/11297298221113283. Epub 2022 Aug 1. PMID: 35915558.

[6] Quencer K.B., Friedman T. Declotting the Thrombosed Access. Tech Vasc Interv Radiol 2017; 20: 38-47.

[7] Vasilyeva I.A., Smirnov A.V. Assessment of the quality of life of patients on hemodialysis using the KDQOL-SFTM questionnaire. Nephrology. 2018; 22(5): 58-63. https://doi. org/10.24884/1561-6274-2018-22-5-58-63 Saran R, Robinson B, Abbott KC, et al. US Renal Data System 2016 Annual Data Report: Epidemiology of Kidney Disease in the United States. Am J Kidney Dis 2017; 69: A7-8. 10.1053/j.ajkd.2016.12.004.

[8] Vincent Wu, Sanjeeva P. Kalva, Jie Cui. Thrombectomy approach for access maintenance in the end stage renal disease population: a narrative review. Submitted Aug 20, 2021. Accepted for publication Dec 15, 2021. Published online Dec 28, 2021. doi: 10.21037/cdt-21-523.

[9] Wu M., Li M.T., Zhang L.P., Wei D., Han Y.C., Gao M.J. The impact of vascular access satisfaction on health-related quality of life in patients receiving maintenance hemodialysis: A 2-year follow-up study. Vasc Access. 2024 Sep; 25(5): 1467-1473. doi: 10.1177/11297298231163224. Epub 2023

Mar 27. PMID: 36971399.

[10] Yeo W.S., Ng Q.X. Disruptive technological advances in vascular access for dialysis: an overview. Pediatr Nephrol. 2018 Dec; 33(12): 2221-2226. doi: 10.1007/s00467-017-3853-7. Epub 2017 Nov 29. PMID: 29188361 Review.

[11] Yonata A., Islamy N., Taruna A., Pura L. Factors Affecting Quality of Life in Hemodialysis Patients. Int J Gen Med. 2022 Sep 12; 15: 7173-7178. doi: 10.2147/IJGM.S375994. PMID: 36118180; PMCID: PMC9480587.