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Aterio-Venous Fistulas for Hemodialysis in Kosova During COVID-19 Pandemic: Short-Term Outcomes

BRIEF CLINICAL REPORT

ARTERIO-VEINUS FISTULAS FOR HEMODIALYSIS IN KOSOVA DURING COVID-19 PANDEMIC: SHORT-TERM OUTCOMES

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ABSTRACT

Background: Despite the invention of numerous vascular access techniques, mainly endovascular, native arteriovenous fistula remains the main vascular access for patients with chronic kidney failure.

Objective: We aimed to review and present the status of vascular access for the practice of hemodialysis (HD) in Kosova during the first six months of the COVID-19 pandemic.

Materials and Methods: This is a prospective study that was carried out at the Department of Vascular Surgery of the University Clinical Center of Kosova. All patients who underwent the surgical creation of the arteriovenous fistula between March 2020 to August 2020 were enrolled in this study. Gender, age, time of creation of the fistula, type of fistula, and surgical complications were all subject to the study during a follow up period of three to six months.

Results: All AVF fistula created were native. Out of 123 patients that underwent AVF creation during this study period, 88 (59.46%) of them were male. The average age of the patients was 48.17 years. Only two of the patients had an AV fistula prior to the initiation of hemodialysis (1.35%). The majority of the AVF were radiocephalic (48.78%) and brachiocephalic (31.70%), followed by brachiobasilic (BB) two stage AVF (13.01%) and proximal radiocephalic AVF (5.69%). Radiocephalic (RC) AVF were the preferred type of AVF in all decades, although they did not represent the majority of performed AVF except during the second (66.67% of all AVF) and fourth decade of life (64.71%). Brachiocephalic (BC) AVF are increasing with age and reach their peak during the eighth decade of life (75%). A greater number of RC, BC, and BB AVF were created in males and more proximal RC AVF in females. During a short time follow-up (three to six months) after the procedure, there were 12 AVF that were thrombosed (9.75%), 9 RC (15% of all RC AVF) and 3 BC AVF (7.69%). Two RC AVF failed to mature (3.33% of all RC AVF). All patients were COVID negative during the time of operation. Twelve (9.76%) of them were COVID-19 positive before the creation of the AVF. Two of patients that recovered from COVID-19 had their RC AVF thrombosed.

Conclusion: Native AVF is the preferred access for dialysis in our patients. The ongoing COVID-19 pandemic has made no difference in the established practice of AVF formation in our study. Nonetheless, there is a need for long-term follow up.

Key words: Hemodialysis, Arteriovenous Fistula, COVID-19, Chronic Kidney Failure, Kosova.

Background

Despite the invention of numerous techniques, mainly endovascular, native arteriovenous fistula (AVF) remains the main vascular access for patients with chronic kidney failure. Due to their prolonged patency, durability, and low risk of infection, AVF is indeed the recommended gold standard vascular access modality for hemodialysis. Unfortunately, this is not an ideal procedure and is associated with both significant failure and a complications rate. Additionally, it is not an option for patients with an unsuitable vascular anatomy and those with high output cardiac failure as native AVF may seriously deteriorate their condition. Many studies have analyzed this particular issue; however, the impact of the current COVID-19 pandemic on the success rate has only been a matter of investigation in few.¹⁻⁵

Objective

We aimed to review our experience with native AVF for hemodialysis (HD) in Kosovo during the first six months of the COVID-19 pandemic. We intend to use our data to contribute in the worldwide discussion on the advantages and disadvantages of native AVF in general and in light of the current COVID-19 pandemic.

Materials and Methods:

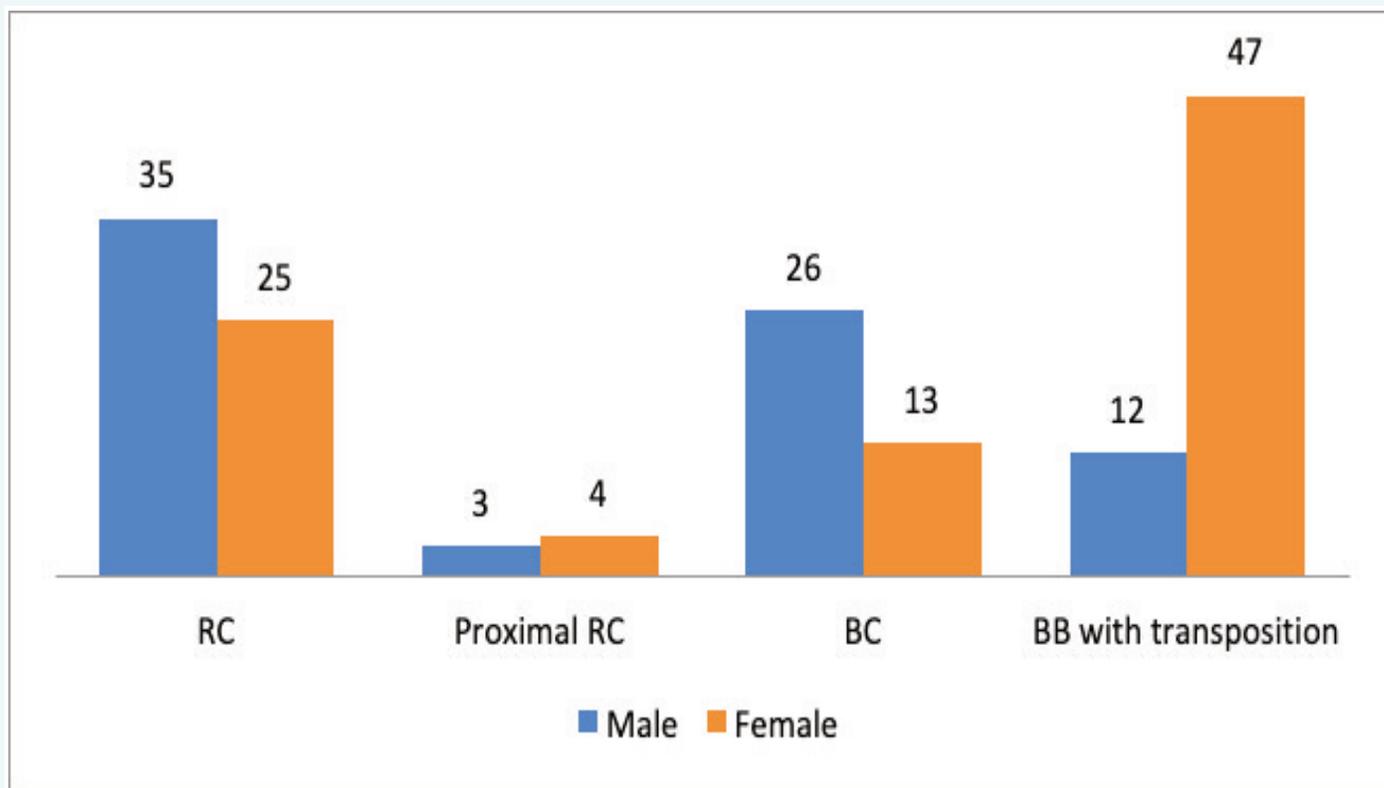
This is a prospective study that was carried out at the Department of Vascular Surgery of the University Clinical Center of Kosovo. All patients who underwent the surgical creation of the arteriovenous fistula between March 2020 to August 2020 were enrolled in this study. Demographic characteristics (gender, age), time of creation of the fistula, type of fistula, and surgical complications (thrombosis, bleeding, failure to mature) were all subject to the study.

All patients were either negative for IgM antibodies or positive for IgG antibodies against Coronavirus at the time of the creation of AVF. The patient follow up period was three to six months after the surgery.

Results

Demographics

One hundred twenty-three patients (123) underwent AVF creation at the study period. Eighty-eight (59.46%) of them were men. The average age of the patients was 48.17 years, with the youngest patient being 9 and oldest being 82 (Table 1, Graph 1).



Graph 1. Type of fistula and gender of the patients. RC – Radiocephalic, BC – Brachiocephalic, BB – Brachio basilic

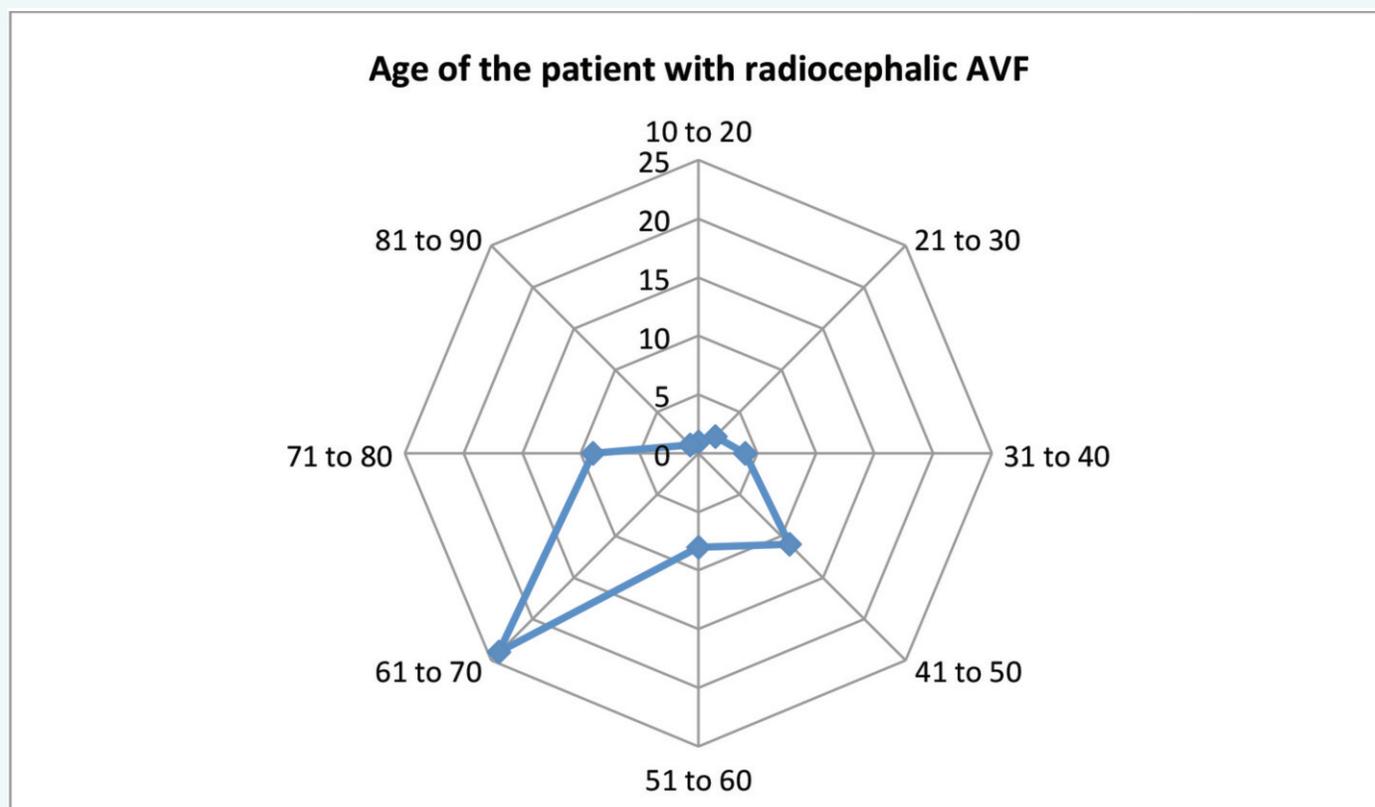


Type of fistula

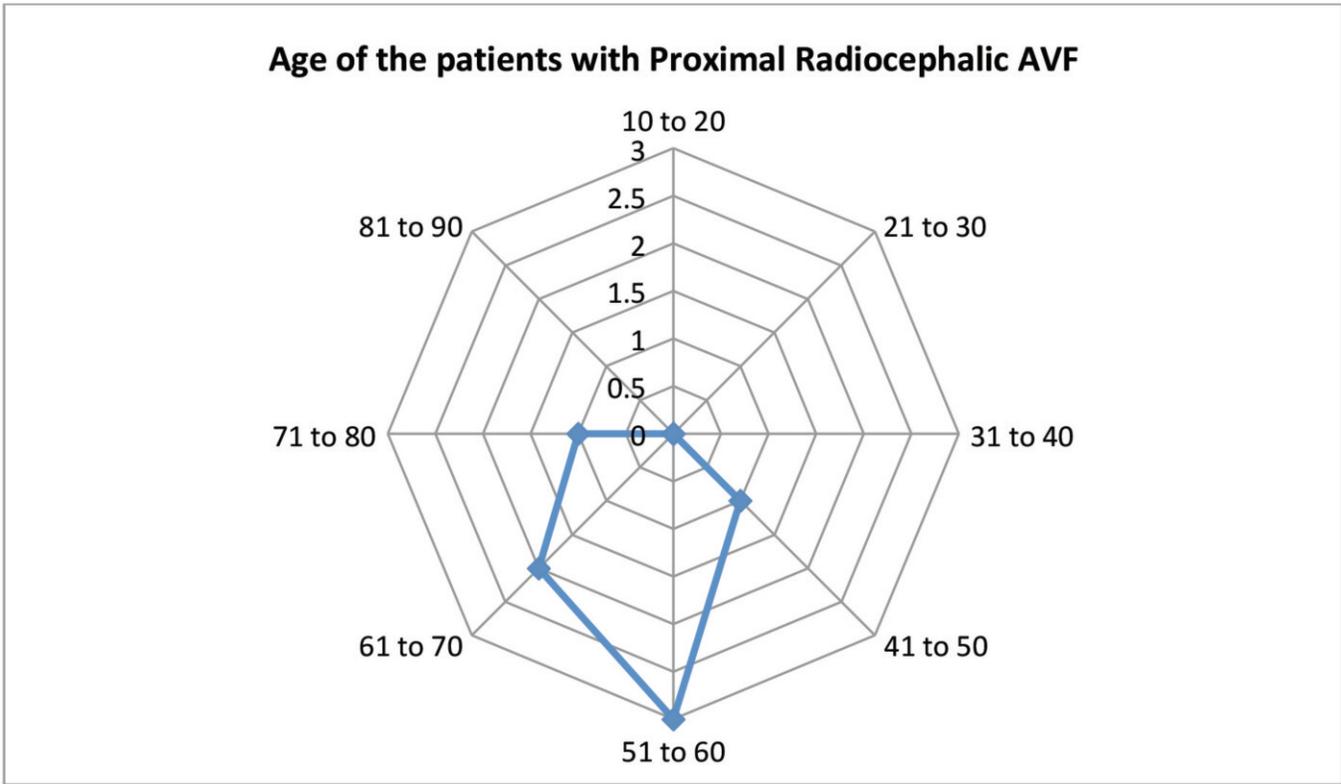
All of the created AVF fistulas were native. Only two of the patients had their AV fistula prior to the initiation of hemodialysis (1.35%). The majority of the native AV fistulas were radiocephalic (48.78%) and brachiocephalic (31.70%), followed by brachio basilic (BB) two stage AVF (13.01%) and proximal radiocephalic AVF (5.69%). Radiocephalic (RC) AVF were the preferred type of AVF throughout all decades, although they did not represent the majority of performed AVF except during the second (66.67% of all AVF) and fourth decade of life (64.71%). Brachiocephalic (BC) AVF are increasing with age and reach their peak in the eighth decade of life (75%). There was a proportionally larger number of RC, BC, and BB AVF among men and more proximal RC AVF in women (Graphs 2-5).

TYPE OF AVF	AGE OF PATIENTS (YRS)								TOTAL
	10-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	
Radiocephalic	1	2	4	11	8	24	9	1	60
Proximal radiocephalic	0	0	0	1	3	2	1	0	7
Brachiocephalic	1	1	3	3	8	15	5	3	39
Brachio basilic with transposition	0	0	2	2	2	8	2	1	17
TOTAL	2	3	9	17	21	49	17	5	123

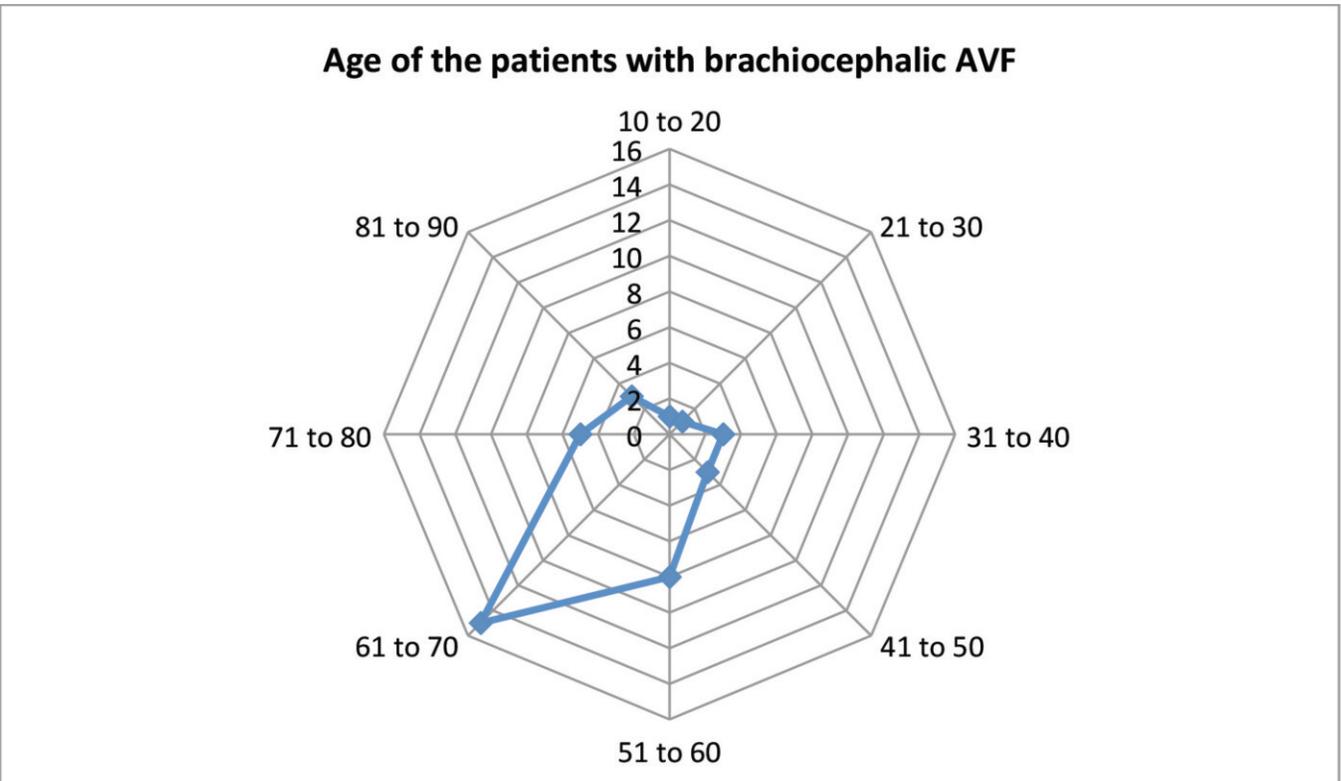
Table 1. Age of the patients and type of fistula



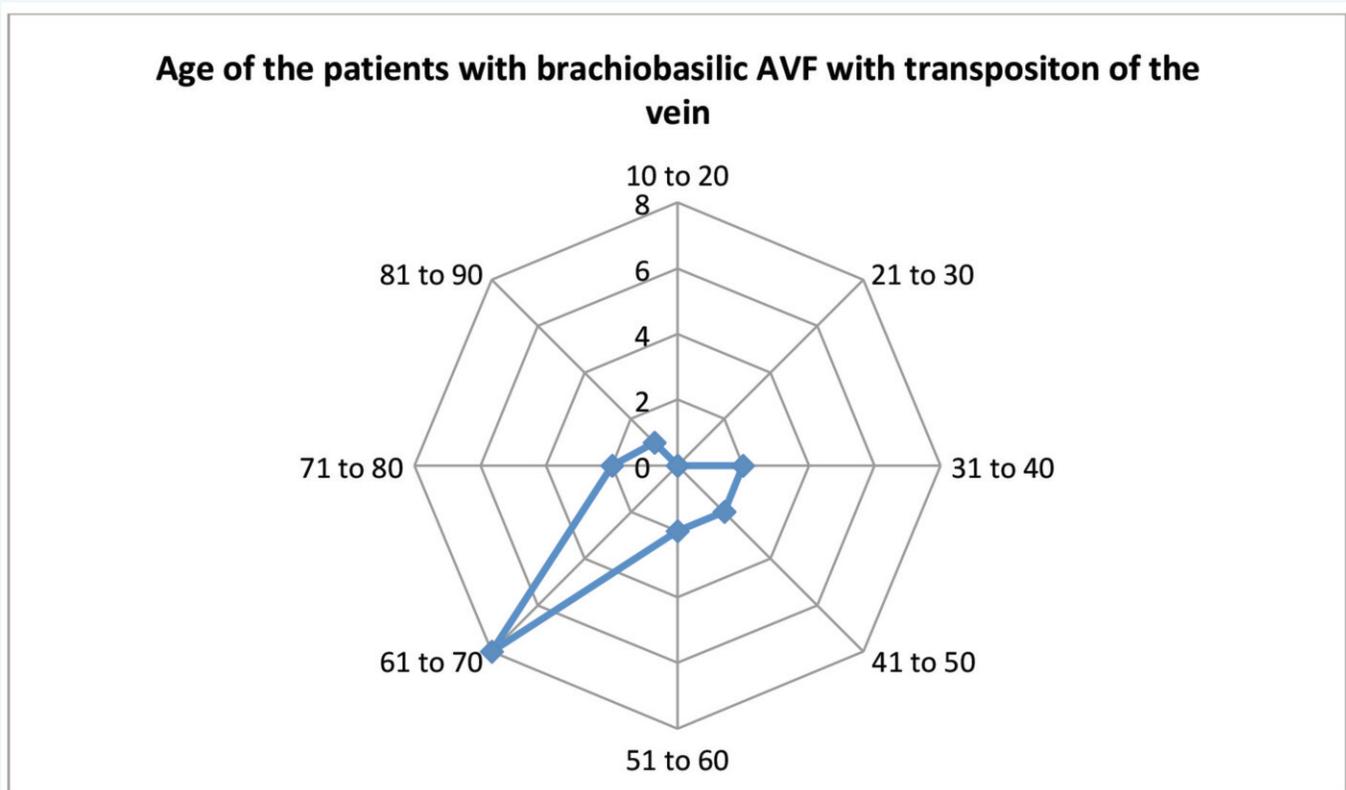
Graph 2. Age of the patients (yrs) with radiocephalic AVF



Graph 3. Age of the patients (yrs) with proximal radiocephalic AVF



Graph 4. Age of the patients (yrs) with brachiocephalic AVF



Graph 5. Age of the patients (yrs) with brachio basilic AVF with transposition of the basilic vein.

Follow-up and complications

Throughout the follow up period, which occurred after three to six months, there were 12 AVF (9.75% of all created AVF), 9 radiocephalic AVF (75% of all thromboses or 15% of all radiocephalic AVF), and 3 brachiocephalic AVF (7.69%) that thrombosed. Two AVF's (1.63% of all AVF's), both of which were radiocephalic AVF (3.33% of all radiocephalic AVF), failed to mature.

All patients were COVID-19 negative during the time of operation. Twelve (9.76%) of them experienced pneumonia due to COVID-19 before the procedure and recovered. Two of patients that recovered from COVID-19 had their RC AVF thrombosed.

Discussion

Due to their prolonged patency, improved durability, and low risk of infection, it has been widely confirmed that the best and safest modality of dialysis initiation is the creation of a vascular access by performing an arteriovenous fistula (AVF) between an artery and a vein of the arm.⁶ Unfortunately, this is not an ideal procedure. Over 60% of the patients in need for renal replacement therapy suffer a failure or a dysfunction arteriovenous

fistulas.⁷⁻¹¹ In addition, 9–16% of the dialyzed patients suffer malfunctioning of arteriovenous fistula and complications after its maturation, which causes inadequate dialysis, bleeding, steal syndrome and ischemic circulation of the distal arm, hemodynamic effects of high flow volume, and cardiac overload.¹²⁻¹⁵

The variation in failure and complication rates between countries, and even centers within a country, are notable.^{16,17} In our experience, thrombosis was the most frequent complication and it occurred in 9.57% of our patients. The majority of thrombosis that occurred had a radiocephalic AVF (75% of all thromboses and 15% of all radiocephalic AVF). Failure to mature occurred in 1.63% of all created AVFs and were the second most common complication. All of failed AVFs were radiocephalic (3.33% of all radiocephalic AVFs).

In contrast to many studies performed on the topic, the impact of the current COVID-19 pandemic on the success rate of AVFs has been a matter of investigation only in few.¹⁻⁵ Despite the fact that guidelines and recommendations have been utilized, there is still a growing need for more research on this topic.

In light thrombosis that occurs in COVID-19 patients, we have decided not to offer this service to COVID-19

positive patients, regardless of whether or not they are symptomatic. All patients in need of hemodialysis that were affected by COVID-19 are now receiving it through central venous catheters. We did, however, perform AVF in patients that had already recovered from COVID-19; there were 12 such patients (9.75% of all patients included in our study). Out of these 12 patients, only 2 (1.62%) developed a thrombosis of their AVF. These numbers do not signify a high prevalence when compared to the thromboses that occurred in non-post-COVID-19 patients, however, the study lacks power to draw any conclusion and further studies are needed.

Conclusion

Native AVF is the preferred access for dialysis in our patients. The ongoing COVID-19 pandemic has made little to no difference in the established practice of AVF formation in our department. Furthermore, we have noticed no distinguishable difference regarding the complication rate between non-COVID-19 and post-COVID-19 patients. Nonetheless, a longer follow up is required to determine if there will be an eventual impact on the fate of performed AV fistulas.

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Authors' contributions

All authors were major contributors to the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

The data are available under consideration of the corresponding author upon reasonable request.

Ethics approval and consent to participate

This study was approved by the Ethical Committee of the University Clinical Center of Kosova.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

REFERENCES

1. Franco RP, Costa CBS, Sousa CS, et al. Hemodialysis Vascular access maintenance in the Covid-19 pandemic: Positioning paper from the Interventional Nephrology Committee of the Brazilian Society of Nephrology. *J Bras Nefrol.* 2020 Aug 26; 42(2 suppl 1): 41-43. PMID: 32877498
2. Khalid U, Ilham MA, Szabo L, et al. Arterio-venous fistula surgery can be safely delivered in the COVID-19 pandemic era. *J Vasc Access.* 2020 Dec 27:1129729820983166. [Epub ahead of print]. PMID: 33356795
3. Kirksey L, Droz NM, Vacharajani T, et al. COVID era “essential surgery” dialysis access management considerations. *J Vasc Surg.* 2020 Dec;72(6):1845-1849. [Epub 2020 Aug 14]. PMID: 32798572
4. Goicoechea M, Sánchez Cámara LA, Macías N, et al. COVID-19: clinical course and outcomes of 36 hemodialysis patients in Spain. *Kidney Int.* 2020;98(1):27-34. PMID: 32437770
5. Sia CSM, Cheong SHL, Ngoh CLY, et al. Critical Coronavirus Disease 2019 in a Hemodialysis Patient: A Proposed Clinical Management Strategy. *Case Rep Nephrol Dial.* 2020;10(2):86-94. PMID: 32884935
6. Bylsma LC, Gage SM, Reichert H, et al. Arteriovenous fistulae for haemodialysis: a systematic review and meta-analysis of efficacy and safety outcomes. *Eur J Vasc Endovasc Surg.* 2017; 54(4):513-522. PMID: 28843984
7. Lok CE. Fistula first initiative: advantages and pitfalls. *Clin J Am Soc Nephrol.* 2007;2(5):1043–1053. PMID: 17702726
8. Howard, A.D., Howard, R.S., Goldstein, S.L. and Meyer, K.B., 2013. Fistula First Breakthrough Initiative (FFBI): lessons about arteriovenous fistula prevalence goals. *American journal of kidney diseases*, 61(3), pp.523-525.

9. Checheri I.A., Tu L.A., David, C., Peride, I., Niculae, A., Geavlete, B.F., Pricop, C.T.L.I.N. and Ion, D.A., 2015. An overview of permanent vascular access in hemodialyzed patients. *Rom J Morphol Embryol*, 56(1), pp.27-31.
10. Allon M, Robbin ML. Increasing arteriovenous fistulas in hemodialysis patients: problems solutions. *Kidney Int.* 2002;62(4):1109-1124. PMID: 12234281
11. Dember LM, Beck GJ, Allon M, et al. Effect of clopidogrel on early failure of arteriovenous fistulas for hemodialysis: a randomized controlled trial. *JAMA.* 2008;299(18):2164e71. PMID: 18477783
12. Dorobanțu LF, Țiru O, Bulescu C, et al. Complications of autogenous arteriovenous fistulas. In: Suzuki H, ed. *Hemodialysis.* Croatia: InTech; 2013: 621– 634.
13. Van Tricht I, De Wachter D, Tordoir J, et al. Hemodynamics and complications encountered with arteriovenous fistulas and grafts as vascular access for hemodialysis: a review. *Ann Biomed Eng.* 2005; 33(9):1142–1157. PMID: 16175669
14. Schild AF, Perez E, Gillaspie E, Seaver C, Livingstone J, Thibonnier A. Arteriovenous fistulae vs arteriovenous grafts: a retrospective review of 1,700 consecutive vascular access cases. *J Vasc Access.* 2008; 9(4):231–235. PMID: 19085891
15. Huber TS, Carter JW, Carter RL, et al. Patency of autogenous and polytetrafluoroethylene upper extremity arteriovenous hemodialysis accesses: a systematic review. *J Vasc Surg.* 2003; 38(5):1005–1011. PMID: 14603208
16. Huijbregts HJ, Bots ML, Moll FL, et al. Hospital specific aspects predominantly determine primary failure of hemodialysis arteriovenous fistulas. *J Vasc Surg.* 2007; 45(5):962–967. PMID: 17466788
17. Schinstock CA, Albright RC, Williams AW, et al. Outcomes of arteriovenous fistula creation after the Fistula First Initiative. *Clin J Am Soc Nephrol.* 2011; 6(8):1996–2002. PMID: 21737851