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TREATMENT OF CENTRAL AND PERIPHERAL VENOUS STENOSIS WITH BALLOON ANGIOPLASTY (PERCUTANEOUS TRANSLUMINAL ANGIOPLASTY) IN HEMODIALYSIS PATIENTS.

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ABSTRACT… Objective: To evaluate the treatment success rate of percutaneous transluminal angioplasty (balloon angioplasty) for peripheral and central venous stenosis in hemodialysis patients. **Study Design:** Retrospective/observational study. **Place and Duration of Study:** Department of Cardiology, Shaikh Zayed Hospital Lahore from 1st January 2018 to 30th June 2018. **Methods:** Thirteen patients of both genders presenting during from two years of hemodialysis failure and ipsilateral arm and neck swelling followed by peripheral and central venous stenosis were included in this study. Patients ages were ranging from 25 to 70 years. Patient's detailed history including hemodialysis treatment, age, sex, socio-economic status was examined after taking informed consent from the patients. Percutaneous transluminal angioplasty (PTA) was performed at all the patients. Procedural success rate was examined. **Results:** There were 9 (69.23%) patients were men and rest (13.77%) were women. 5 (38.46%) patients were ages between 25 to 45 years, 6 (46.15%) patients had an ages 46 to 65 years and 2 (15.38%) patients were ages greater than 65 years. 10 (76.92%) had rural residency. 40 % patients had income >30000 PKR. Location and severity of lesions was examined as brachiocephalic vein, subclavian vein, Axillary vein, basilica, cephalic and median cubtal vein in 1,3,2,3,3 and 1 patients respectively. We determine priority patency rate in central lesion PTA was 82.7%, 62% and 38% at 3, 6 and 12 months and priority patency rate in peripheral lesions PTA was 87%, 79.5% and 67.8% at 3, 6 and 12 months. **Conclusion:** It is concluded that percutaneous transluminal angioplasty (balloon angioplasty) procedure for treatment of central and peripheral venous stenosis in hemodialysis patients was safe and effective with no procedural complications.

Key words: Balloon Angioplasty, Central Venous, Percutaneous Transluminal Angioplasty, Peripheral Venous, Hemodialysis.

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INTRODUCTION

Central venous stenosis (CVS) and peripheral venous stenosis is major complication in hemodialysis patients. In initial clinical examination of these patients demonstrate with ipsilateral pain, arm, face and neck swelling and chest pain. Central venous stenosis disorder is caused by dialysis shunt dysfunction, dilated collateral veins.[1] Moreover, dialysis shunt thrombosis, and lengthen hemodialysis duration may caused by shunt dysfunction.[2,3] Abnormality of arterivenous fistulae (AVF) and grafts appear frequently in hemodialysis patients and it may lead to increase the rate of morbidity in the hemodialysis patients.[4] There are several etiologies of symptomatic lesion, and mostly caused by long period CV catheterization and ipsilateralarteriovenous fistulae. The results of stenosis in patients has been resulted 50%.5

Worldwide, the standard treatment for central venous stenosis is angioplasty with conventional balloon and primary patency rate is noted as 53 and 37% approximately at 6 and twelve months.[6] According to the National kidney foundation (NKF) stenting is demonstrated in case of elastic central vein stenosis within a three months period.[7] Balloon angioplasty provides a better results to reduce the rate of restenosis in

central venous disease.[8-9] Surgical procedures need general anesthesia and has a high rate of surgical complications in end stage renal disease (ESRD). Patency rates have not been better than with endovascular methods and extensive reconstructions might not be reasonable in a group of patients with several comorbidities.[10-11]

The purpose of this study was to evaluate the outcomes of percutaneous transluminal angioplasty treatment for central or peripheral venous stenosis in hemodialysis patients. Moreover, at our centre, central or peripheral venography and percutaneous transluminal angioplasty are performed commonly for the treatment and diagnoses of central and peripheral venous stenosis in hemodialysis patients.

MATERIALS AND METHODS

This retrospective/observational study was carried out at Department of Cardiology, Shaikh Zayed Hospital Lahore from 1st January 2018 to 30th June 2018. Thirteen patients of both genders presenting during from two years of hemodialysis failure and ipsilateral arm and neck swelling followed by peripheral and central venous stenosis were included in this study. Patients ages were ranging from 25 to 70 years. Patients detailed history including hemodialysis treatment, age, sex, socio-economic status was examined after taking informed consent from the patients.

Percutaneous transluminal angioplasty was performed at all the patients. Procedural success rate was examined. Hig-pressure balloon catheterization were used with diameter of 10 to 14mm. Follow-up duration was rangin from 3 to 12 months after treatment. Patency rate was illustrated as the interval from the time of intervention until thrombosis. Patients having history of previous PTA treatment for same lesion, PTA combined with stenting and previous history of throbectomy and life expectancy less than six months were excluded from this study. All the statistical data was analyzed by computer statistical software SPSS 17.0.

RESULTS

There were 9 (69.23%) patients were men and 4 (30.76%) were women. Five (38.46%) patients were ages between 25 to 45 years, 6 (46.15%) patients had an ages 46 to 65 years and 2 (15.38%) patients were ages greater than 65 years. 10 (76.92%) had rural residency. 40 % patients had income >30000 PKR.

Location and severity of lesions was examined as brachiocephalic vein in 1 (7.69%) patient, subclavian vein in 3 (23.07%) patients, Axillary vein in 2 (15.38%) patients, basilica in 3 (23.07%) patients, cephalic in 3 (23.07%) patients and median cubtal vein in 1 (7.69%) patient. We determine priority patency rate in central lesion PTA was 82.7%, 62% and 38% at 3, 6 and 12 months and assisted priority patency rate was 91%, 72.5% and 63.5%. Priority patency rate in peripheral lesions PTA was 87%, 79.5% and 67.8% and assisted priority patency rates was 94%, 86.6% and 77% at 3, 6 and 12 months.

In all patients no major complication was observed after successful treatment of central venous stenosis. No death was happen during follow-up duration. All the patients were discharge on same day after clinical examination and strong follow-up was taken from all the patients.

Gender	No.	%
Male	9	69.23
Female	4	30.76

Table-I. Gender-wise distribution of patients

Variable	No.	%
Age (years)		
25-45	5	38.46
46-65	6	46.15
>65	2	15.38
Residence		
Rural	10	76.92
Urban	3	23.08
Income (PKR)		
<30000	6	46.15
>30000	7	53.85

Table-II. Age-wise distribution and socio-economic status of patients

Variable	No.	%
Central Venous Lesions		
Brachiocephalic vein	1	7.69
Subclavian vein	3	23.07
Axilliary vein	2	15.38
Peripheral Venous		
Bacillica vein	3	23.07
Cephalic vein	3	23.07
Median cubital vein	1	1.69

Table-III. Clinical examination of patients/location of lesions

Severity of Stenosis	Mean±SD	% Range
Central Venous Lesions		
Brachiocephalic vein	8.2±1.1	74-91
Subclavian vein	8.5±6.0	75-94
Axilliary vein	8.9±6.0	86-96
Peripheral Venous		
Bascillica vein	8.5±8.0	81-99
Cephalic vein	8.7±9	74-100
Median cubital vein	8.6±6	79-01

Table-IV. Severity of stenosis in patients

Patency Rates	3 months	6 months	12 months
Central Venous Lesions PTA			
Priority PR	82.70%	62%	38%
Assist PPR	91%	72.50%	63.50%
Peripheral Veins Lesions PTA			
Priority PR	87%	79.50%	67.80%
Assist PPR	94%	86.60%	77%

Table-V. Patency rates of central and peripheral lesions

DISCUSSION

Central and peripheral venous stenosis disorder in hemodialysis patients is commonly found in these patients. It is commonly caused by long term catheterization and intervention of hemodialysis and previous PTA failure. The symptoms mainly observed arm, neck and face swelling, ipsilateral and chest pain.[12] The main objective of our study was to provide better treatment and to relief pain of the patients and this objective was similar to study conducted by Bhatiai et al.[13]

In the present study, out of all 13 patients, 9 (69.23%) patients were men and rest (13.77%) was women, a similar results was reported by a study conducted in Turkish hospital in which number of male population was high as compared to females.[14] We observed 5 (38.46%) patients were ages between 25 to 45 years, 6 (46.15%) patients had an ages 46 to 65 years and 2 (15.38%) patients were ages greater than 65 years. Patients having middle ages has a great chance to fall in this malignant disorder it may be due to the lack of awareness and lack of technical assistance in our hospitals. 10 (76.92%) had rural residency. 40 % patients had income >30000 PKR. In Pakistan most of the population had income <30000 and it is the most important factor may lead to hemodialysis.

Percutanous transluminal angioplasty PTA is the most common performing procedure in treatment of central and peripheral venous stenosis in hemodialysis patients. This technique is less invasive with normal anesthesia and inexpensive and has better outcomes as compare to surgical treatment.[15] In our study we performed percutaneous transluminal angioplasty in all included 13 patients and diagnoses of lesions and severity of stenosis was noted with this safe and effective technique. We observed primary patency rate in central venous lesion at 3 months was 82.70% and 62% at 6 months and 38 at 12 months. The average follow-up duration was 12.5 months and assisted priority patency rate was 91%, 72.5% and 63.5% at 3, 6 and 12 months respectively. Priority patency rate in peripheral lesions PTA was 87%, 79.5% and 67.8% and assisted priority patency rates was 94%, 86.6% and 77% at 3, 6 and 12 months. We observed that the primary patency rate in peripheral venous lesion was better than the central venous lesion. Due to high frequency of elastic recoil the recurrence rate for central venous was higher than the peripheral venous stenosis. These results shows significantly similarity to the study conducted by Scott et al[16] in which recurrence rate of central venous lesions was high.

Some other studies regarding treatment of central venous stenosis shows the primary patency rates of 27% and 9% at 1 and 2 years and assisted patency rates was 71% and 39%. The average follow-up was 16 moths.[17-18] Our results as compared to these results showed better patency rates in central venous lesions PTA. Our study show similarity to the study conducted by

Scott et al and Mehmat et al in which treatment of central venous and peripheral venous stenosis with percutaneous transluminal angioplasty (balloon angioplasty) without stenting reported better results. Stent placement carries many of disadvantages included potential collateral vein obstruction and shortening and migration of the stent, these complication can cause the major morbidity and mortality in hemodialysis patients.[19-21]

In our study the use of percutaneous transluminal angioplasty procedure for treatment of central and peripheral venous stenosis resulted as safe and less invasive procedure with no major complications. Moreover, this study was not sufficient because of small number of patients and limited resources. We have to do more work to reduce the morbidity and mortality rate.

CONCLUSION

Central venous stenosis is the most common disorder in hemodialysis patients and PTA is the commonly performed procedure for treatment of central and peripheral venous stenosis. In this study, we conclude that percutaneous transluminal angioplasty (balloon angioplasty) procedure for treatment of central and peripheral venous stenosis in hemodialysis patients was safe and effective with no procedural complications.

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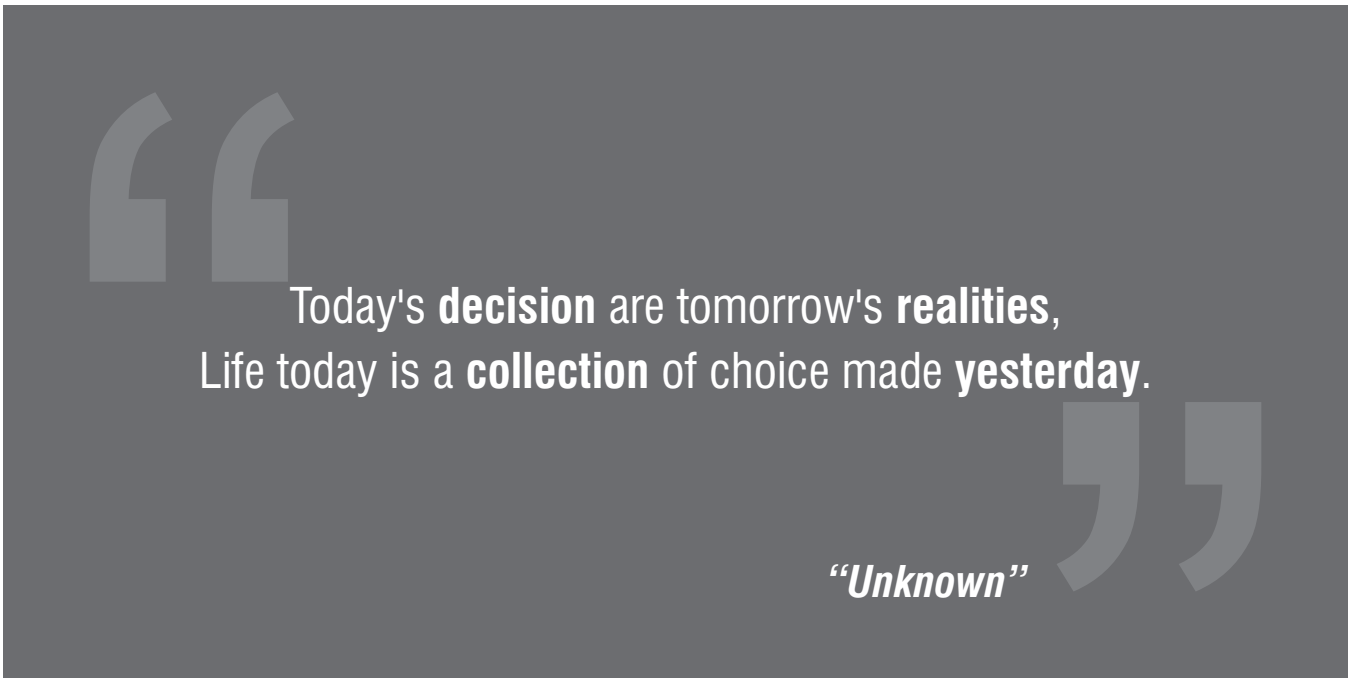

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