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Omitting Fascial Resuturing: A New Adjunct in Basilic Vein Transposition

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ABSTRACT

Objective: To investigate the results of omitting fascial resuturing on medial aspect of arm after lateralisation of basilic vein by Fascial sling technique in patients of CKD stage 5.

Study Design: Quasi experimental study.

Place and Duration of Study: Department of Vascular Surgery, Combined Military Hospital, Rawalpindi Pakistan, from Oct 2023 to Sep 2024.

Methodology: Patients were divided into 2 groups. In Group-A, deep fascia was stitched, while in Group-B, deep fascia was not stitched. Patients aged 20 to 70 years with CKD stage 5 requiring Hemodialysis were included in study while patients having DM were excluded from study in order to standardize the quality of AVF Vein. Data was analyzed by SPSS version 26.

Results: Our study population included 88 patients. 52(59.1%) patients were males and 36(40.9%) were females. Mean age of participants was 53.80±7.83 years. In 44(50%) patients, fascia on medial aspect of arm was not sutured while in 44(50%) patients, fascia was resutured. Mean distance of transposed vein from previous location, in patients whom fascia suturing was omitted, was 5.71±0.11 cm while in patients in whom fascia was resutured, it was 5.01±0.13 cm.

Dialysis staff was comfortable regarding ease of access in Group-A and patients were satisfied in terms of comfortable position of arm while undergoing hemodialysis.

Conclusion: Study concludes that Omission of Fascial resuturing is a very useful adjunct in better lateralisation of AVF Vein. This technique should be adapted in all patients undergoing BVT in whom all superficial veins of arm are exhausted/thrombosed.

Keywords: BVT (Basilic Vein Transposition), Deep Fascia, Lateralisation, Resuturing.

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INTRODUCTION

End-stage renal disease is a major health care issue effecting numbers of patients worldwide. There is alarming increase in number of patients requiring Hemodialysis. Nearly 4 million people in the world are living on Hemodialysis or some other kidney replacement therapy like peritoneal dialysis. Hemodialysis (HD) accounts for approximately 69% of all kidney replacement treatment and 89% of all dialysis.[1] The Society of Vascular surgery assembled a multi-specialty panel to develop practice guidelines in arteriovenous access placement and maintenance with the aim of maximally increasing the percentage and function of autogenous arteriovenous Fistulas that are created.[2] Over time, various novel approaches have been developed for creation of AV Fistulas.[3] KDOQI Dialysis access guidelines are widely practiced world-wide.[4] The type of Hemodialysis access does not affect survival in patients with CKD.[5]

The Fistulas which are being done in patients requiring hemodialysis are primarily Forearm Fistulas. They include Radio-cephalic Fistulas, Basalo-radial Fistulas and Forearm Loop AV Fistulas, when all these options exhaust, Brachiocephalic Fistulas are done. When all other options are not available, we shift to Brachio-basilic AV Fistulas. These Fistulas do well as the Basilic vein is deep and remains free of intra-venous punctures and not usually get thrombosed. Procedure is called Basilic vein transposition as well. If basilic vein is small, procedure is done in 2 stages. In first stage, basilic vein is anastomosed to brachial artery and allowed to mature for 4 to 6 weeks, then in second stage, basilic vein is transposed to a more superficial location on lateral aspect of arm. Here, Transposition of basilic vein refers to superficialisation, elevation and lateralisation on arm. If basilic vein is 6mm or greater in diameter, it can be single stage procedure.

At the same institute, Nauman et al. earlier devised an innovation of Fascial slings for lateralisation of AVF Vein in Basilic vein transposition.[6] This technique yielded good results in achieving better lateralisation of AVF Vein. The institute has done a second modification of this

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procedure in which deep fascia is not stitched from where basilic vein is taken out for transposition. This study aimed to explore the results of omitting fascial resuturing on medial aspect of arm after lateralisation of basilic vein by Fascial sling technique in patients of CKD stage 5.

METHODOLOGY

This Quasi Experimental study was conducted in Department of Vascular Surgery CMH Rawalpindi, Pakistan from October 2023 to September 2024. Ethical approval of study was taken from Hospital IERB (vide IERB No. 583 dated 28 Mar 2024). The sample size was 88. As this is a new technique, we included all patients who fulfilled inclusion criteria in subject study.

Inclusion Criteria: Patients having chronic kidney disease stage 5 who required hemodialysis were included in study. Age limit for enrolment was set from 20 years to 70 years.

Exclusion Criteria: Patients below 20 years and above 70 years of age were excluded from study. Patients who were terminally ill were also excluded from study.

Patients who came in vascular surgery OPD with previous failed AV Fistulae were evaluated with ultrasound doppler for suitability of basilic vein for transposition. Patients with patent basilic vein, patent axillary vein and patent central veins were found suitable for the procedure. Patients were sent for Laboratory investigations. Complete blood counts, Coagulation profile, Hepatitis B, Hepatitis C, Renal Function Tests, Serum Electrolytes were done. Laboratory investigations were evaluated and any medical optimization if required before surgery was done. Patients finally up for surgery were assigned the group and dated for surgery.



Figure-1: Deep Fascia is shown (Vein Lateralized by Fascial Slings Technique)

Patients were randomly divided into 2 groups by lottery method. Group-A included patients in whom deep fascia was not sutured (Group-A) while Group-B included patients in whom fascia was sutured (control group). Figure-4 shows division of patients in 2 groups. A total of 110 patients were considered. 22 patients were excluded from study based on exclusion criteria. Data collection Performa was designed. It contained demographic data like Age and Gender plus Allocated group i.e. Fascia suturing Omission (Group-A) vs Fascial Suturing (Group-B).



Figure-2: Deep Fascia resutured on medial side

Patients were advised to take a bath on morning of surgery. Once patient on operation table, Ultrasound doppler was again performed to recheck Basilic vein, central veins and brachial artery. Incision was marked with help of ultrasound guidance. Intended incision was right over the course of basilic vein which later on served as a marker of previous location of vein. All cases were done in infraclavicular block and Local anesthesia. A Single dose of intravenous antibiotic was given 30 minutes before start of procedure. Site of surgery was shaved with trimmer. Pyodine solution was applied on site of surgery and patient was draped. Patients were continuously monitored by anesthesia team during surgery. Incision was given on marking already done. Subcutaneous tissue was incised, and vein was reached. All the branches of vein were tied from elbow area to Axilla. When vein ready to be transposed, space was developed on lateral part of arm for placement of vein and hinge it in place with fascial slings. Figure-1 shows use of fascial slings. Patients who fell in control group, suturing of deep fascia of medial side of arm was done. Figure-2 shows deep

fascia which has been resutured. Fascia resuturing was omitted to prevent the vein from falling back on medial part in experimental group. Figure-3 shows Deep fascia which has not been sutured.



Figure-3: Omission of Fascial Resuturing

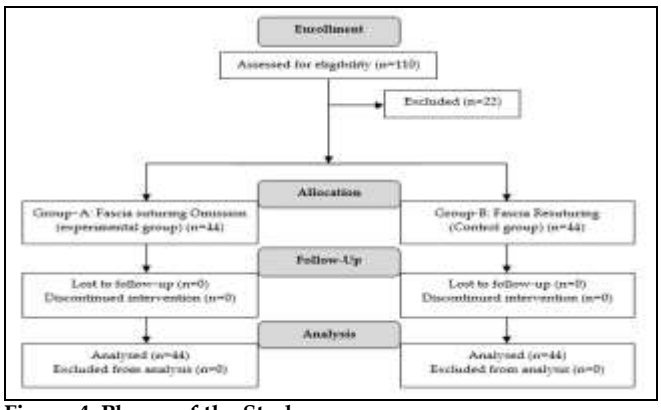


Figure-4: Phases of the Study

Hemostasis was secured; drain was placed and wound sutured. Dressing applied. Patient was advised arm exercises and were sent to ward. Patients were discharged on next day and called for follow up after 1 week. Later follow ups were advised subsequently.

The outcome variable was distance of transposed vein from its original location. The distance was measured by vernier calipers. The patients were called for follow up after 2 weeks, then 6 weeks and then 3 months. All measurements of distance of transposed vein from its previous location were done after 6 weeks. Previous location was incision site which was initially marked with ultrasound guidance at the time of surgery and was taken as reference point for measurement.

Patients in Group-A, underwent transposition of basilic vein with omission of deep fascia resuturing, while patients in Group-B underwent basilic vein transposition with fascial resuturing. However, Fascial slings were made in both groups to remove any bias.

Data was analyzed using Statistical Package For Social Sciences (version 26). Qualitative variables like gender and fascia suturing omission and resuturing of fascia were measured by frequency and percentages while Quantitative variables like age and distance of vein from previous location were measured by Mean and standard deviation. Independent samples t test was applied.The p value ≤ 0.05 was considered as significant.

RESULTS

A total of 110 patients were considered, out of them, 22 was excluded from study based on exclusion criteria. The study included 88 patients.. Table-I shows demographic variables. 52(59.1%) patients were males and 36(40.9%) were females. Mean age of participants was 53.80±7.83 years. In 44(50%) patients, fascia on medial aspect of arm was not sutured while in 44(50%) patients, fascia was resutured.

Table-I: Demographic Variables of Study Population (n=88)

Study Parameter(s)	Values
Age (Mean±SD)	53.80±7.83 Years
Gender	
Male	52(59.1%)
Female	36(40.9%)
Groups	
Group-A	44(50.0%)
Group-B	44(50.0%)

Table-II shows mean distance of transposed vein from previous location. In patients in whom fascia suturing was omitted, it was 5.71±0.11 cm while in patients in whom fascia was resutured, it was 5.01±0.13 cm. Dialysis staff was comfortable regarding ease of access in Group-A and patients were satisfied in terms of comfortable position of arm while hemodialysis.

Table-II: Distance of Transposed vein (cm) from previous Location (n=88)

Parameter	Study Groups		*p*-value
	Group-A (n=44)	Group-B (n=44)	
Distance of vein from previous location (cm)	5.71±0.11	5.01±0.13	<0.001

DISCUSSION

The distance of Transposed basilic vein from previous scar was 5.71±0.11 cm in case fascia on

medial side was not resutured. While it revealed a distance of 5.00±0.13 cm in case fascia on previous location was resutured. The reason of this more lateralisation achieved with omitting fascial resuturing may be since stretch applied on transposed vein by fascial suturing was mitigated by omission of fascial resuturing. No local or international data is available on omission of fascial resuturing and its effect on lateralisation of basilic vein. Hence, it is an innovation which this study is offering in the field of vascular surgery.

BVT is done in many ways in different centers. Many centers are doing two stage BVT. Some centers prefer single stage BVT.[7] Some centers prefer taking down the anastomosis and tunnel the vein in a lateral location and then re-anastomose with brachial artery.[8] Some centers advocate BVT with single long incision and some of them are doing it with interrupted incisions.[9] In few centers, Videoscopic dissection is done as well.[10] In CMH Rawalpindi, we are doing it with Fascial sling technique.

A study done by Li *et al.*,[11] compared Elevation transposition with tunnel transposition and they found that elevation transposition might be a more reliable method than tunnel transposition for superficializing of a basilic venous fistula. In our set-up, elevation of transposition of basilic vein with fascial slings technique is also being done. A meta-analysis done by Koudounas *et al.*,[12] compared basilic vein tunnel transposition vs basilic vein elevation transposition and study revealed similar long term results with two techniques.

A study done by Baliga *et al.*,[13] concluded that single stage BVT is safe, efficient and cost effective option for patients in developing countries. Single stage BVT in not performed routinely, rather it is done in cases where basilic vein is 6 mm or greater in diameter. Another study conducted by Kakkos *et al.*,[14] concluded that two stage BVT Fistula through 2 skip incisions is superior to single stage procedure.

Korkut *et al.*, reported surgical experience of superficializing of basilic vein of 350 cases.[15] They concluded that superficializing basilic vein technique is a logical alternative method of basilic vein transposition. Superficializing requires less extensive skin incision and surgical dissection. Long term patency was good. Bourqelot *et al.*,[16] described transposition, elevation, and technique of needling. They concluded that tunnel transposition and lipectomy are efficient techniques to allow easy needling of deeply situated upper arm basilic vein and cephalic vein in obese patients respectively. Kakkos *et al.*,[17] described techniques of surgical and endovascular revision of brachiobasilic vein fistula. They concluded that endovascular revision is the treatment of choice for most cases of BVF dysfunction or thrombosis with redo surgery reserved for failures of end-vascular techniques or other specific indications. Bronder *et al.*,[18] reported experience of 295 cases of fistula elevation. They concluded that AV Fistulas that might otherwise have been abandoned due to excessive depth and tortuosity can be successfully salvaged by an adjunctive fistula elevation procedure and achieve satisfactory long-term patency.

Basilic vein is known to fall under the scar on medial location which makes its puncture for dialysis very difficult. Nursing staff spends more energy and effort, but puncture remains a problem area. Repeated punctures get patients annoyed oftentimes. This is logical as abduction of arm for cannulation of vein on medial location makes patients tired. So, here comes the value of better lateralisation of basilic vein which can overcome these issues, and it can make dialysis for patients easy as well as for nursing staff. Complication rate with better lateralisation of AVF vein is low as well.

LIMITATION OF STUDY

Small sample size was the limitation of our study. In future, further research is warranted with larger sample sizes to replicate the findings of this research.

CONCLUSION

Our study concludes that Omission of Fascial resuturing is a very useful adjunct in better lateralisation of AVF vein in addition to Fascial slings. This technique should be adapted in all patients undergoing BVT in which all forearm and superficial arm veins are exhausted/ thrombosed.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

MS & NI: Data acquisition, data analysis, critical review, approval of the final version to be published.

ABS & MI: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

AH & AA: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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