Mobilization and superficialization of basilic vein for brachio basilic fistula

Salim A. Dahduli, *FRCSEd, FRCSI,* ***Nabeel M. Qattan,*** *FRCSEd, FRCSI,* ***Rashid A. Al-Kuhaymi,*** *MD, FRCSEd,* ***Mohammed A. Al-Jabreen,*** *MD,* ***Abdullah A. Al-Khader,*** *MD, FRCP.*

ABSTRACT

Objective: The aim of this study was to report the Armed Forces Hospital, Riyadh, Kingdom of Saudi Arabia experience in 20 patients who underwent brachio basilic fistula. The use of basilic vein for creation of vascular access for hemodialysis has become popular as it has superiority over polytetrafluoroethlene grafts, as it is a native vessel with less complications.

Methods: From March 2001 to June 2001, 20 patients were selected to have brachio basilic arteriovenous fistula with superficialization, age range between 25-85 years (mean age 55 years). Eight were diabetic and 9 were hypertensive. All patients started the dialysis 6 weeks after the operation. We are planning to extend our study up to 2 years.

Results: Four patients were excluded. Three out of 4 were found to have stenotic short vein and had brachio-axillary Gortex graft and the 4th patient had mobilization of forearm basilic vein looped up and anastomosed to the brachial artery below the elbow. Two out of the remaining 16 fistulas failed, one within 2 weeks and the other after 8 weeks. The remaining 14 are functioning well 6 months after the operation. This is an 85% success rate so far, which is comparable to other studies.

Conclusion: Brachio basilic fistula with superficialization is an acceptable access for dialysis with a good success rate and fewer complications compared to brachio axillary Gortex graft.

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The national kidney foundation has identified the use of arteriovenous (AV) grafts and the interventions required to maintain their patency as 2 major causes of increased expenditure in the management of hemodialysis access and have issued an appeal for the increased use of native AV fistulae.[1] Native vessels have always been a better option for vascular access for dialysing chronic renal failure patients for their longer survival and less complications compared to synthetic grafts. In patients who had a previous failed vascular access in the forearm and whose arm is not suitable for a brachiocephalic fistula (due to poorly visualized or impalpable cephalic vein), we chose to mobilize and superficialize the basilic vein and create an AV fistula to the brachial artery.

We present our experience in 20 patients carried out over a 4-month period. The provisional results of our study support other studies in confirming the superiority of brachio basilic fistula with superficialization over synthetic grafts in the arm.

Methods. We performed 20 brachio basilic fistulas with superficialization (BBFWS) for 20 patients over a period of 4-months, from March 2001 to June 2001. There were 12 males and 8 females, ages ranged from 25-85 years, mean age being 55-

From the Department of Surgery (Dahduli, Qattan, Al-Kuhaymi, Al-Jabreen) and the Department of Nephrology (Al-Khader), Armed Forces Hospital, Riyadh, *Kingdom of Saudi Arabia*.

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Address correspondence and reprint request to: Dr. Salim Dahduli, Consultant and Head Division of Vascular Surgery, Department of Surgery, Armed Forces Hospital, PO Box 7897, Riyadh 11159, *Kingdom of Saudi Arabia*. Tel. +966 (1) 4777714 Ext. 5667. Fax. +966 (1) 4760853. E-mail: sdahduli@yahoo.co.uk

years. All the patients who had previous failed forearm access with their arm cephalic vein either being used before or not suitable for arm brachiocephalic fistula (due to obesity or the vein could not be detected by clinical examination or found to be thrombosed on ultrasound [US] examination), were chosen for BBFWS. Eight of our patients were diabetic and 9 were hypertensive. All patients had pre-operative US or, if they had a failed declotting attempt for forearm brachio basilic graft, underwent venogram. The operations were carried out by 2 consultants and performed through hokey racket incision extending from near the axilla, over the medial aspect of the arm and curved laterally over the cubital fossa. One patient was found to have a good basilic vein in the forearm hence, it was mobilized, tunneled and looped under the skin of the forearm to be anastomosed to the brachial artery. We tried to dissect and mobilize 20 cm of basilic vein. To avoid kinking of the vein at the veinoarterial anastomosis, the skin flap was placed back in its normal position. At this stage, the vein was tunneled under the skin of the arm using 6 mm tunnelar. Care was taken to avoid the twist of the vein through the tunnel. The best way to undo a twist is to pass a Fogarty Catheter size 3 up in the vein and pull it down. The vein is then anastomosed end to side to the brachial artery just above the elbow. The skin was closed with staples without drain or closing of the deep fascia.

Results. Out of 20 patients, we were unable to use the vein of 3 patients. In one of the patients, the vein found to be short due to stenotic lower segment therefore, we performed brachio basilic Gortex graft. In another patient, the basilic vein could not be found and we realized that US was misleading; this patient had brachioaxillary Gortex graft. The 3rd patient was found to have stenotic basilic vein and was a hypotensive cardiac patient with poor ejection fraction, one had basilic vein in the forearm mobilized and looped up to the brachial artery just below the elbow. All 16 fistulas had primary function except one who required de-clotting the following day. This gives a 95% primary patency rate. Four patients developed mild steal, namely, the hand became colder than the other but there was no pain and O_2 saturation was equal in both hands as detected by pulse oxymeter. One patient, who was on an anticoagulant for cardiac reasons, developed a post-operative hematoma that required evacuation, and the wound had to be left open. None of the patients developed wound infections; however, most of the patients developed swollen arms and forearms post-operatively which was resolved by conservative management. Fifteen of the fistulas were successfully used for dialysis 6 weeks from the date of operation **(Table 1)**. One clotted 2 weeks postoperatively in a terminally ill patient who died later and one failed 10 weeks postoperatively after having been used a few times. The remaining 14 fistulas are satisfactorily functioning after 6 months of follow-up and we are planning to continue to follow-up these patients for up to 2 years. Four patients were excluded, 3 had brachio-axillary graft and one had brachio basilic loop in the forearm.

Discussion. Cephalic vein at the wrist has always been the best option to create an AV fistula for dialysing chronic renal failure patients.The next option is cephalic vein at the cubital fossa. This is considered to be a better option for diabetic elderly and female patients.[2] Loop polytetrafluoroethlene (PTFE) graft in the forearm, has proved to be a good option and serves its purpose for acceptable periods despite the clear superiority of native fistulas. However, PTFE has many problems such as infections, aneurysms and clotting associated with stenosis, and intimal hyperplasia. An excellent options that is available most of the time is the basilic vein if its diameter is at least 4-5 mm[3] either in the arm or in the forearm. The problem here lies in the anatomical position of the basilic vein being too deep and being posteromedial in the forearm; thus, making its cannulation difficult. This can be overcome by mobilizing and superficializing it in order to have easy access. Brachio basilic fistulas with superficialization were first described by Dagher et al[4] and since then it has a progressive popularity. One of the advantages of this operation is that, it includes one anastomosis and avoids venous anastomosis, which could be a source of intimal hyperplasia and stenosis that occurs in the graft. When a BBFWS fails we are still able to place an ipsilateral PTFE

Table 1 - Armed Forces Hospital, Riyadh, KSA results.

Access Type	n of procedures	Age	Diabetic	Hypertension	n of excluded patients	n of failed fistulas	6 months follow-up n (%)
BBF	20	25-80 (Av 55)	8	9	4	2	14 (87.5)

n - number, BBF - brachio basilic fistula, Av - average, KSA - Kingdom of Saudi Arabia

arterio venous fistula in 89% of patients[5] but not on the other way.[6] Some authors described closing the fascia deep to the vein,[3,5] without tunneling, we found this more suitable in fatty arms. We believe that tunneling and positioning the basilic vein in front of the biceps is more convenient to the patient especially in the elderly with stiff shoulders, and to dialysis staff. This was originally described by Dagher et al and Matsuura et al[4,7] but using long forceps instead of tunnelar. Using the tunnelar is easier on the vein and it gives better room for the vein to distend with arterial pulsations. However, care should be taken to avoid twisting the vein. It is our practice if we are in doubt that the tunneled vein is twisted, we pass a size 3 Fogarthy catheter through the vein and pull it down gently. This will undo the twist if it is there. Humpries et al[3] described the operation without using the tunnelar and only closing the deep fascia under the vein. The fistula is not used before 6 weeks.[7] All the patients developed postoperative upper limb edema. Unless there is an associated subclavian vein stenosis, this is usually self-limiting and resolves spontaneously with conservative management.[8] By doing BBFWS, the worry regarding infection is reduced compared to using PTFE graft. One of our patients developed postoperative hematoma, which required evacuation leaving the wound to heal by secondary intention with good outcome. The BBFWS has been trouble free so far in our experience and this coincides with Dagher et al[4] and other experience.[2-3] Brachio basilic fistula with superficialization is a good option for vascular access before proceeding for brachioaxillary graft. It has many advantages, it is well tolerated and it provides acceptable access to dialysis nurses, however, it requires skill to perform, especially in fatty arms.

References

1. Ascher E, Hingoran A, Gunduz Y, Yorkovich Y, Ward M, Mirandanda J et al. The value and limitations of the arm cephalic and basilic vein for arteriovenous access. *Ann Vasc Surg* 2001; 15: 89-97.
2. Miller PE, Tolwani A, Luscy CP, Deierhoi MH, Bailey R, Redden et al. Predictors of adequacy of arteriovenous fistulas in hemodialysis patients. *Kidney Int Suppl* 1999; 56: 275-280.
3. Humphries AL, Colborn GL, Wynn JJ. Elevated basilic vein arteriovenous fistula. *Am J Surg* 1999; 177: 489-491.
4. Dagher F, Gelber R, Ramos E, Sadler J. The use of basilic vein and brachial artery as an A-V fistula for long term hemodialysis. *J Surg Res* 1976; 20: 373-376.
5. Salgado OJ, Terán NA, Garcia R, Carlos H, Herrera J, Bernardo RI. Subcutaneous transposition of arterialized upper arm veins for hemodialysis angioaccess: Optimal alternative to grafts. *Vasc Surg* 1998; 32: 81-85.
6. Butterworth PC, Doughman TM, Wheatley TJ, Nicholson ML. Arteriovenous fistula using transposed basilic vein. *Br J Surg* 1998; 4: 653-654.
7. Matsuura JH, Rosenthal D, Clark M, Shuler FW, Kirby L, Shotwell M et al. Tranposed basilic vein versus polytetrafluorethylene for brachial-axillary arteriovenous fistulas. *Am J Surg* 1998; 176: 219-221.
8. Pretre R, Delay D, Bonada I, Murith N. Approach to upper limb edema secondary to subclavian vein occlusion situated distal to an arteriovenous fistula. *Ann Chir* 1998; 52: 331-337.