

Ulnobasilic Arteriovenous Fistulae for Hemodialysis

An ulnobasilic arteriovenous (AV) fistula was constructed in 29 patients; in one patient it was constructed twice. These were patients in whom the classic AV fistula (radiocephalic) had either failed or was not possible due to poor vein quality. Of the 3 ulnobasilic AV fistulae constructed, there was primary non-functioning in 2 patients and the fistula was not used in 3 patients who soon underwent transplantation. In the remaining 24 patients, the ulnobasilic AV fistula has been successfully used for periods of between 4 weeks and 140 weeks. In all but 1 patient, the blood flow was adequate. Another patient developed irreversible edema of the hand following the fistula surgery. In 1 of the patients with a primary non-functioning fistula, a second ulnobasilic AV fistula was constructed in the other hand and is functioning well.

The creation of an arteriovenous (AV) fistula in the forearm provides an easy access for hemodialysis—via simple venipuncture—in patients who are on maintenance hemodialysis.¹ Traditionally, an AV fistula is created by the anastomosis of the radial artery and one of the forearm veins. However, by the time that some patients reach our nephrology unit, the cephalic vein has been repeatedly punctured during blood sampling and intravenous fluid administration and, hence, the construction of a classic AV fistula is not possible.

The other sites described for the construction of an AV fistula are:

- the distal brachial artery to a branch of the antecubital vein,
- the middle brachial artery to the cephalic vein,
- the middle brachial artery to the basilic vein,
- the ulnar artery to the basilic vein.²

Here we report on 30 cases in which an ulnobasilic AV fistula was used as an access for hemodialysis. Slight difficulty in cannulation was experienced during the first few weeks

following construction of the ulnobasilic AV fistula due to its position (Figure 1).

MATERIAL AND METHODS

Over a 29-month period between October 1993 and March 1997, a total 30 ulnobasilic AV fistulae were constructed between the ulnar artery and basilic vein in the distal half of the forearm in 29 chronic renal failure patients (of whom 12 were diabetic).

In 10 of the cases, the classic radiocephalic AV fistula had failed in one hand; in 4 cases it had failed in both hands, and in the remaining 16 cases the procedure was not possible due to thrombosis of the cephalic veins.

Ulnobasilic AV fistula construction consisting of an anastomosis of the proximal end of the basilic vein to the side of the ulnar artery—was performed under local anesthesia. The surgical procedure is slightly more delicate than that for a classic fistula, since both the ulnar artery and basilic vein require greater mobilization.

Patients were dialyzed 2-3 times a week for 4 hours per dialysis. On an average, the fistula was first used 6 weeks after construction. The vessels were cannulated using

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Table I. Characteristics of the study patients and results of the ulnobasilic AV fistula construction.

No. of patients.....	29
male.....	20
female.....	9
Diabetes mellitus.....	12
Primary non-functioning AVF.....	2
Total period of use (wk).....	4-140
Total dialyses.....	6-379
Complications.....	1 (edema)
No. of patients on dialysis*.....	9

*as of January, 1998

either 15-G or 16-G Teflon needles. The average blood flow rate was 250-300 ml/min.

RESULTS

Tables I and II summarize our data. A total of 30 AV fistulae were constructed in 20 male and 9 female patients. Their ages ranged from 14-85 years. (The 85-year-old patient had been on dialysis for 5 years. Over a 4-year period, radiocephalic fistulae constructed in both of this patient's hands had failed. A proximal brachiocephalic fistula was closed due to severe limb edema.)

These chronic renal failure patients—all of whom were either on maintenance hemodialysis or awaiting a kidney transplant—were dialyzed for a period of 4-140 weeks



Figure 1. The somewhat unusual position of the ulnobasilic arteriovenous fistula makes cannulation a bit difficult.

following construction of their ulnobasilic AV fistula. The total number of dialyses through the ulnobasilic AV fistulae ranged from 6 to 379.

Out of the total of 29 patients, 2 experienced primary non-function of their fistula, while in 3 cases the fistula was not used at all because the patients underwent immediate transplantation. In 1 patient with a primary non-functioning fistula, a second ulnobasilic AV fistula was created in the other hand and was successfully used for dialysis. Poor blood flow was noted in only 1 patient, and 1 patient had irreversible limb edema following fistula construction.

Twelve of the study patients later underwent successful transplantation. Three of the 29 patients expired—1 due to a high-grade fever of unknown cause, and 2 others due to chest infection and septicemia, respectively. One patient was successfully dialyzed for 14 weeks and then switched over to continuous ambulatory peritoneal dialysis. Nine of the patients were still on dialysis at the time of this writing.

DISCUSSION

The failure of a classic AV fistula is not a contraindication for the creation of an ulnobasilic AV fistula, since the palmar arch maintains a good blood supply. Nonetheless, reports on ulnobasilic AV fistulae are scarce.

Hanson et al. in 1967 published a report of 5 ulnobasilic fistulae constructed in 4 patients with successful dialysis in 3 of them.³ Lindstedt in 1968 mentioned the possibility of an anastomosis between the ulnar artery and basilic vein when the cephalic vein is thrombosed.⁴

Kinnaert et al. in 1971 reported on 16 ulnobasilic fistulae constructed in 11 patients.⁵ In that study, 3 immediate thromboses occurred in the same patient. Six late thromboses were observed in other patients: 2 after kidney transplantation and 4 after hemodialysis was initiated. Seven out of the 10 patients in whom the fistula was used were dialyzed adequately for periods ranging from 5 weeks to 15 months, and no adverse effect owing to the fistula was noted. The type of anastomosis used in these patients was side to side in all but 2 of the patients. The fistulae were constructed under general anesthesia.

Here we have successfully dialyzed 25 patients using ulnobasilic AV fistulae over a period of 4-140 weeks without any complications. In these patients, a traditional radiocephalic fistula had failed or was not possible. Considering the low incidence of complications, an ulnobasilic AV fistula should be considered before proceeding with a graft insertion.

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Table II. Details of ulnobasilic AV fistula construction in the 29* study patients.

Case	Age (yr)	Sex	Period of Use (wk)	No. of Dialyses	Remarks
1	52	f	16	48	DM, renal Tx
2	56	m	12	36	renal Tx
3	58	m	0	0	DM, non-functioning
4	38	f	13	39	renal Tx
5	65	m	120	265	DM, functioning
6	52	m	0	0	DM, not used
7	60	m	96	272	DM, functioning
8	56	m	15	42	renal Tx
9	46	f	12	32	expired
10	42	m	14	40	DM, renal Tx
11	62	m	16	48	DM, expired
12	72	f	16	38	CAPD
13	28	m	16	46	expired
14	42	m	26	67	renal Tx
15	40	m	17	50	renal Tx
16	55	m	12	25	DM, renal Tx
17	68	m	56	152	DM, functioning
18	72	f	110	326	functioning
19	40	m	5	12	functioning, renal Tx
20	55	f	4	8	DM, inadequate flow
21	28	f	13	45	renal Tx
22	52	m	0	0	DM, not used
23	14	m	156	379	functioning
24	62	f	152	318	functioning
25	50	f	0	0	not used
26*	45	f	0	0	non-functioning
27	45	f	10	29	2nd fistula, renal Tx
28	70	m	92	192	DM, functioning
29	85	m	72	206	functioning
30	52	f	60	162	functioning

*1 patient received a second fistula after the first failed; DM = diabetes mellitus

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