



DISTAL RADIOCEPHALIC OR BRACHIOCEPHALIC FISTULA-WHICH ONE IS BETTER? A COMPARATIVE STUDY

Surgery

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ABSTRACT

Arteriovenous fistula is an integral part of renal replacement therapy (chronic hemodialysis) for end stage renal disease. Various methods of creation of arteriovenous fistula are in vogue, each having their own pros and cons. In this retrospective comparative study, outcome and complication of two most common sites of AVF creation - distal radiocephalic fistula and brachiocephalic fistula are compared.

KEYWORDS

Distal radiocephalic Fistula, Brachiocephalic fistula, Hemodialysis

INTRODUCTION

Brescia-Kimino Arteriovenous fistula(AVF) ¹ still remains the best choice for long term renal replacement therapy over arteriovenous graft (AVG) or central venous hemodialysis catheter (CVC) for patients undergoing renal replacement therapy (RRT) ². Among various AVFs, distal radiocephalic(DRCF) fistula or snuff box fistula followed by brachiocephalic (BCF) fistula are preferred over proximal radiocephalic fistula(PRCF) and brachiocephalic fistula(BBF) ^{2,3,4}. AVFs are preferred over AVG and CVC for RRT as they are economic and have longer patency rate ^{2,3}.

Aim of this study is to compare outcome and complication of DRCF and BCF.

MATERIAL AND METHOD

This retrospective comparative study is conducted in CTVS department of RGKar MCH. Patients who underwent AVF creation between January 2017 to July 2019 by a single surgeon (author himself) were included in the study. OT register, OPD register, patient documents from nephrology department were obtained and data collected.

Total 130 patients were operated for AVF during the study period. Patients who expired due to comorbidities and could not be followed up for 6 months post-AVF creation and who underwent second operation by surgeon (author) due to fistula failure during the study period were not included in the study. With these exclusion criteria, 101 patients could be enrolled for study. Patients were divided in two groups, who received distal radiocephalic fistula (DRCF, n=53) and who received brachiocephalic fistula (BCF, n=48). Demographic pattern, operative outcome and complication were analysed. Primary fistula failure of AVF is defined as no palpable thrill and/or thrombosis or inability to start HD through AVF within 3 months of creation⁵. Late fistula failure is defined as inability to continue hemodialysis through AVF beyond 3 months after using fistula⁶.

Data was analysed with Microsoft excel 2013. Continuous variables are expressed as Mean \pm standard deviation and compared using the independent samples t-test (2 tailed). Categorical variables are measured as frequency and percentage of the total group and compared using Pearson's χ^2 test or Fischer exact test. P-values \leq 0.05 are considered significant.

RESULTS

Table 1 shows demographic pattern and preexisting disease of the pattern of the study population. Except 2 patients in distal radiocephalic group, all patients were hypertensive.

Table 1

N=101	Distal Radiocephalic (n=53)	Brachiocephalic (n=48)	P value
age	51.8 \pm 12.5 (28-76)	49.2 \pm 12.5 (27-72)	.294949
sex			
male	28	23	.6921
female	25	25	
DM	31	29	1
HTN	51	48	.4962.
IHD	11	7	.4483

Table 2 shows that BCF matured earlier than DRCF which is statistically significant. Also operating time were significantly higher

in DRCF group. Dialysis associated steal syndrome(DASS) was significantly higher in BCF group. Patients who have previously failed AVF, were operated for BCF. Primary fistula failure or late fistula failure were not significantly different in two groups. 6 months Fistula patency rate were similar in both groups after 6 months. All pseudoaneurysm cases, patients were reoperated and fistula was closed. In DRCF group, 4 patients developed debilitating hand edema (venous hypertension) for which fistula had to be closed whereas in BCF group, 1 patient developed hand edema(venous hypertension) which was managed with hand elevation alone and HD through fistula continued. 5 patients in BCF group developed DASS for which fistula had to be closed.

Table 2

N=101	Distal Radiocephalic (n=53)	Brachiocephalic (n=48)	P value
Maturity (days)	41.40 \pm 4.31	30.5 \pm 2.32	<.00001 (significant)
Pseudoaneurysm	1	5	.0994
Hand edema	4	1	.3655
Operation time (minutes)	48.68 \pm 4.59	35.98 \pm 3.97	<.00001 (significant)
hematoma	2	1	1
Dialysis associated Steal syndrome (DASS)	0	5	.0216 (significant)
Previous failed AVF	0	7	.0043 (significant)
Primary fistula failure	7	1	0.0622
Late fistula failure	2	0	.4962
Patency @ 6 months	40	37	1

DISCUSSION

Studies have shown that BCF has higher and earlier maturation rate over DRCF ^{7,8}. AVF maturity is assessed by "rule of sixes," that is- 1) blood flow of \geq 600 ml/min through AVF, 2) arterialized vein diameter \geq 6 mm, 3) depth \leq 6 mm from skin.⁹

Pseudoaneurysm or aneurysm is a known complication following AVF creation¹⁰. It is classified in 4 groups¹¹. Wherever possible, salvaging the fistula should be tried by 1) observation in small stable aneurysm, 2) excision, mobilization of the ends and reconstruction of the AVF by direct end-to-end anastomosis by "trap door" technique, 3) interposition graft or aneurysmorrhaphy 4) Endovascular techniques 5) thrombin injection 6) ultrasound compression ^{10,11}. However - pseudoaneurysm with imminent rupture or leaking aneurysm needs ligation lest it may burst with devastating consequences.^{10,12}

Venous hypertension manifested by edema is a devastating complication of AVF. Management strategy is aimed at preservation of AVF patency with decreasing edema which includes elevation of arm, Transluminal angioplasty in the form of balloon dilatation and endovascular stent, angiographic embolization of the AVF or surgical closure.¹³

DASS is more common in brachiocephalic AVF than radiocephalic

AVF and is graded in 4 grades according to severity^{14,15}.main risk factors for DASS are 1)Brachiocephalic AVF, 2)DM, 3)Ischaemic Heart disease and/or Peripheral vascular disease 4)female, 5)prior history of DASS. Various management modalities exist to manage DASS arising out of brachiocephalic AVF starting from distal revascularization-interval ligation (DRIL) procedure, proximal arteriovenous anastomosis (PAVA), revision using distal inflow (RUDI), Minimally invasive limited ligation endoluminal-assisted revision (MILLER) or Banding and in extreme cases ligation . For DASS arising out of distal radiocephalic AVF -distal radial artery ligation (DRAL) may suffice^{14,15}.

CONCLUSION

In this present study , It is seen that operation time and fistula maturation time is significantly higher in Distal radiocephalic AVF than Brachiocephalic AVF, DASS is more common with Brachiocephalic AVF than with Distal radiocephalic AVF and earlier failed AVF patients are more susceptible to undergo a Brachiocephalic AVF creation. However , 6 months patency rate are similar in both types of AVF.

Limitation Of The Study

This study was retrospective in nature and sample size was small . Also proper randomization could not be done. Hence prospective Randomized control trial is necessary to come to a definitive conclusion.

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Nil

Conflict Of Interest

None declared

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