

Dialysis access pattern in incident haemodialysis patients at B & B Hospital, Kathmandu, Nepal

DV Karkee, MB Adhikari and JL Baidya

Department of Surgery, B & B Hospital, Gwarko, Lalitpur, Nepal

Corresponding author: Dr DV Karkee, B&B Hospital, PO Box 2481, Lalitpur, Nepal. e-mail; dvkarkee@gmail.com

ABSTRACT

The clinical practice guideline for vascular access in haemodialysis recommends the use of arteriovenous fistula (AVF) over a central venous catheter. AVF needs to be created sufficiently in advance of anticipated haemodialysis. However, many incident haemodialysis patients are still being dialyzed with central venous catheter at the time of first haemodialysis. This paper aims at presenting the pattern of dialysis vascular access in incident haemodialysis patients at our institution from July 2002 to July 2008 in a cohort of patients who were referred to us for creation of native AVF. A total of 100 patients (56 male and 44 female) with the mean age of 54 years were studied. Only 11.0% of patients were found to have AVF created in advance and the rest (89.0%) were dialyzed via central venous catheter. Of the 11 patients with AVF; 5 fistulas were created 3 months prior to the dialysis, 3 fistulas between 1 and 3 months prior and 3 less than a month of anticipated dialysis. Interestingly, 35.0% of total patients were seen by nephrologists only a month prior to the dialysis. Hence, an early referral of the chronic renal failure patients to the nephrologists and vascular access surgeons may overcome this problem.

Keywords: Arteriovenous fistula, dialysis vascular access, chronic renal failure, incident haemodialysis.

INTRODUCTION

The native arteriovenous fistula (AVF) for haemodialysis has been described as the Achilles heel but also the Cinderella of haemodialysis.¹ AVF has been the vascular access of choice for haemodialysis because of lower cost, morbidity and mortality.²⁻⁶ Despite this, nearly two thirds of incident dialysis patients, even in the developed countries use a venous catheter to start with their haemodialysis and fewer than 15.0% begin dialysis with an AVF.⁷ This paper aims at presenting the pattern of dialysis vascular access in incident haemodialysis patients in our institution.

MATERIALS AND METHODS

This is a prospective observational study carried out at B&B Hospital from July 2002 to July 2008 in a cohort of patients. This cohort consisted of chronic renal failure patients referred to us by nephrologists for creation of native AVF prior to or during the dialysis. AVF created elsewhere or stopped functioning and required a new creation were excluded. Data were collected at the time of evaluation for AVF creation.

RESULTS

During these 6 years a total of 100 incident patients (56 males and 44 females) with the mean age of 54 years (range from 18 to 80) had AVF created in our institution. Of them only 11% had fistula created prior to the anticipated haemodialysis and 89.0% started dialysis via

central venous catheter. Of the 11 patients; 5 fistulas were created 3 months prior to the anticipated dialysis, 3 were created in between 1 and 3 months and further 3 fistulas in less than a month of dialysis. All patients who were dialyzed via central venous catheter consented to AVF creation.

DISCUSSION

As compared to central venous catheter, use of AVF in haemodialysis is associated with higher blood flow rate and lower rate of infection, thrombosis, septicemia, central venous stenosis and mortality.^{5,6} Brescia-Cimino AVF has been unanimously considered the gold standard vascular access of choice for haemodialysis.⁸ Clinical practice guideline for vascular access of the National Kidney Foundation's Dialysis Outcome Quality Initiative (NKF-DOQI) recommends planning the vascular access sufficiently in advance.⁸ Whenever appropriate, an AVF must be created 1 to 4 months prior to the scheduled start of dialysis if the creatinine clearance is less than or equal to 25 ml/min and/or the serum creatinine is over 4 mg/dl.⁸

Of the total 100 incident dialysis patients at our hospital only 11 patients started their haemodialysis via AVF and rest (89.0%) were dialyzed via central venous catheter. According to a DOPPS II Canadian study; 26.0% of Canadian, 18.0% of US and 50.0% of European incident haemodialysis patients start dialysis via an AVF.⁹

Catheters accounted for 70.0% of all vascular access use by Canadian incident patients as compared to 46.0% in Europe and 66.0% in USA.⁹ Similarly, 60.0% of patients in an Italian study,¹⁰ 24.0% of patients in New Zealand study¹¹ and 28.0% of patients in an Australian study¹² started their dialysis with a central venous catheter. Late referral to a nephrologist and a longer time taken by a nephrologist to arrange for creation and maturation of an AVF have been described for such a high rate of catheter use.⁹ This may be true in our patients, more than that; our patients were poorly educated about the morbidity, mortality and overall cost of the dialysis central venous catheter. Once they were subjected to haemodialysis via such catheters, patients had experienced the morbidities and cost of the catheters and consented without hesitation for AVF creation.

Haemodialysis performed via a catheter is also associated with an increased risk of mortality. Polkinghorne et al reported two to three fold increase in the risk of death in the first 6 months in patients receiving haemodialysis via a catheter when compared to the AVF.⁵ In a dialysis morbidity and mortality study, Dhingra *et al* reported an increased mortality risk of 54.0% among diabetic and 70.0% among nondiabetic patients who were using a catheter as compared to those who were using an AVF.¹³ In a nation wide Choice for Healthy Outcomes in Caring for End stage renal disease (CHOICE) study, Astor *et al* reported 47.0% higher risk of death in incident haemodialysis patients who were using a catheter as compared to AVF.⁶

It is difficult to pinpoint exactly, the mechanism responsible for higher death associated with dialysis venous catheters. However, several potential mechanisms have been proposed. Since the catheters provide a lower blood flow rate, it is possible to have a lower dose of dialysis achieved.¹⁴ Catheters are associated with an increased rate of access related complications which subsequently may miss or shorten the dialysis sessions.¹⁵ Mortality may be directly related to the catheter associated infection and sepsis.¹⁶ Infection related risk of death is found 41.0% higher in patients using a venous catheter as compared to those using an AVF.⁶

Despite these data, the use of central venous dialysis catheter is being increased worldwide.¹⁷ Chronic renal failure patients should be referred early to the nephrologists, who should settle the issue of vascular access in time. Referral to the nephrologists alone may not be sufficient, as reported in a Canadian study⁹ where 85.0% of haemodialysis patients despite being seen by a nephrologist more than a month and 79.0% patients more than 4 months prior to the start of dialysis; 70.0%

patients had started dialysis using a venous catheter because of delayed arrangement of creation and maturation of AVF. Hence, a nephrologist should also refer a patient to a vascular access surgeon in time.⁸ Since most of the fistulas are created by surgeons, early referral to them is important because of limited number of vascular access surgeons available, a longer waiting list for surgery and a longer time of AVF maturation. In fact, >80.0% of medical directors in Europe would like to use AVF within 2 months of its creation and 75 to 87.0% of medical directors in the United States and Canada would like to use after 2 months of its creation.⁹ That is why a fistula should be created sufficiently in advance so that it will have time to mature and function adequately at the time of dialysis. Medical personals should also be educated to protect the non dominant upper extremity veins for the future use of AVF creation. Cannulation of veins and insertion of venous access devices have potential to injure the veins and thereby incite phlebitis, sclerosis, stenosis or thrombosis.¹⁸ The creation of a high quality AVF is difficult or impossible in the presence of prior venous injury.¹⁸

This study clearly demonstrated the fact of fewer number of incident dialysis patients being dialyzed via AVF. Limitation to this study is the single institutional nature which may not reflect the true incidence of access pattern in incident haemodialysis patients all over the country. However, this will incite an interest to other nephrologists and vascular access surgeons to present and publish their studies in the future.

There is a proven benefit of AVF over central venous catheter in haemodialysis. However, only a fewer number of patients in this study had started haemodialysis via an AVF. Majority of the fistulas were created while patient being dialyzed. An early referral of the chronic renal failure patients to the nephrologists and vascular access surgeons may overcome this problem.

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