Original Article

Arterio Venous Fistula Formation in End Stage Kidney Diseases

Experience of End-to-Side and Side-to-Side Techniques of Arterio Venous Fistula Formation in End Stage Kidney Diseases

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ABSTRACT

Objective: To determine the success rates of end-to-side and side-to-side techniques of Arterio Venous fistula formation for end stage kidney diseases.

Study Design: Descriptive study

Place and Duration of Study: This study was conducted at the Department of Urology, PUMHS, Nawabshah from March 2014 to February 2016.

Materials and Methods: Cases of end stage kidney diseases were selected from outdoor and referred cases from other health facilities on inclusion and exclusion criteria. All cases were randomly divided in two equal size groups A and B. In group A end to side technique was used and in group B side to side technique was used for arterio venous fistula (AVF) formation for hemodialysis in patients with end stage kidney diseases. All AVF was made surgically under local anesthesia at non dominant upper limb near the wrist. Success of each technique was established by determining the postoperative patency of AVF in terms of palpable thrill and flow of blood with the help of Doppler ultrasound. Data was analyzed and success rate of each technique was calculated and any difference in the results of both techniques was noted.

Results: Mean age of the patients was 44 years, SD± 7 and a range of 19 to75 years. Male to female ratio was 5:3. In group A out of 45 cases of end to side fistula, 38 cases were found patent showing a success rate of 84%. In group B out of 45 case of side to side fistula, 36 cases were found patent showing a success rate of 80%.

Conclusion: The success rates of end to side and side to side technique of AVF are 84% and 80% respectively, reflecting no great difference between the results of these two techniques of arterio venus fistula formation for end stage kidney diseases.

Key Words: Arteriovenous Fistula, End to side Anastomosis, Side to Side Anastomosis

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INTRODUCTION

In the developed part of the world, chronic kidney diseases are the 9th leading cause of death[1]. Chronic kidney diseases (CKD) encompass all degrees of long standing renal diseases whereas end stage kidney disease stands at extreme of its terminal end. In order to sustain life, end stage kidney disease requires renal replacement therapy in the form of either renal transplantation or dialysis. In 1854 Graham introduced dialysis across a semi-permeable membrane[2]. Hass performed the first hemodialysis in human for renal failure[3]. Due to high cost, lack of suitable donors, shortage of well equipped health care facilities with proper teams and lack of social awareness, hemodialysis still remains a very effective tool of management for the patients of end stage kidney diseases. At present hemodialysis and peritoneal dialysis are the two popular methods with their own indications. The economic burden of dialysis program has been increasing worldwide[4]. The purpose of dialysis treatment is to maintain human body homeostasis by removing waste material and maintaining hydration status at optimum. A certain flow of blood is required in a vein that contains arterialized blood through an established arterio venous fistulae and connected with a hemodialysis unit. Patients of end stage kidney diseases undergo dialysis usually in an indoor, outdoor and less frequently at home setup[5, 6]. For hemodialysis a connecting channel is always needed between the dialysis unit and the patient's vascular flow. Various types of connecting routes can be established but few of them are more common including arterio-venous fistulae (AVF), synthetic graft and intravenous catheter. Among these three routes, arterio-venous fistulae AVF are most common, although all these require a minor surgical expertise[7]. Well evaluated vascular status and good collaterals are the key factors in selecting the site for surgically creating an AVF[8]. Snuf box is the most frequently

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selected chosen site for AVF[9]. Anti cubital fossa is another recommended site for establishing an AVF[10]. Preferably AVF are made in the non dominant upper limb by either end to side or side to side techniques between the radial artery and the cephalic vein near the wrist. Both these techniques can differ in their success rates in terms of patency and blood flow, therefore this study was conducted to determine the success rates of these two techniques of end to side or side to side Arterio-venous fistulae formation and in patients of end stage kidney diseases.

MATERIALS AND METHODS

This study was conducted from March 2014 to February 2016 at departments of urology and general surgery, Peoples University of Medical and health sciences Hospital Nawabshah. Cases of end stage kidney diseases were selected from outdoor and referred cases from other health facilities. Only those cases were selected who were the candidates for long term hemodialysis treatment and willing for surgically made arterio venous fistulae formation. All cases were underwent detailed history and clinical examination including specifically Allen test. Patients were excluded from the study on the basis of having positive Allen test, coagulopathy, malignant hypertension, severe cardiac diseases and past failure of AV fistula formation. All cases were randomly divided into two equal groups A and B. In group A all patient were underwent end to side AV fistula formation while in group B all cases underwent side to side AV fistula formation. Local anesthesia was used in all cases and informed consent was taken. In both groups AV fistulae were formed between radial artery and cephalic vein near the wrist. Post operative patency and success was checked by palpating thrill and measuring the blood flow by Doppler study in the early post operative period and then subsequently by frequent long term follow ups at least for 6 months. In the two groups AV fistulae were considered patent or successful only when both palpable thrill and a flow of blood more than 300 ml per minute were found post operatively and persist for long term at least up to six month follow up.

RESULTS

This 24 month study included 90 cases of end stage kidney diseases. Mean age of the patients was 44 years, SD± 7 and a range of 19 to75 years. Male to female ratio was 5:3. All cases were divided randomly in two equal groups A & B , each comprising 45 cases. In group A end to side arterio venous anastomosis was made and in group B side to side arterio venous anastomosis was made. Patency of the fistulas anastomosis was established by palpating the thrill, auscultating the machinery murmur and determining the blood flow. In group A out of 45 cases of end to side fistula, 38 cases were found patent showing a success rate of 84%. In group B out of 45 case of side to side fistula, 36 cases were found patent showing a success rate of 80%.

DISCUSSION

Our study included 90 cases of end stage kidney diseases requiring long term hemodialysis. Mean age of the cases was 44 years, that is very similar to many national and international studies[11,12]. In the recent modern era of advancements and technologies hemodialysis still remains a very effective tool of management for the patients of end stage kidney diseases in spite of tremendous amount of progresses in the field of kidney transplantation. This is mainly due to high cost, lack of suitable donors, shortage of well equipped health care facilities with proper teams and lack of social awareness. For long term hemodialysis in the cases end stage kidney diseases a competent, durable and well functioning vascular access is always needed. Although due to the better patency and fewer complications, arterio venous fistulous access is considered superior to other two techniques of synthetic graft and double lumen tunneled cuffed catheter but still there is a need of search for even best results[13, 14]. Present study shows success rates of 84% in end to side group of AVF and a success rate of 80% in side to side group of arterio venous fistulous anastomosis that is very much comparable to various studies[15-18]. Works of Murphy and Zeebregts show patency rate of less than 80%[19.20]. The slightly higher rate of patency in our study could reflect the relatively smaller sample size but there is no great differences in the success rate between these two techniques end to side and side to side arterio vascular fistulous anastomosis made for hemodialysis in end stage kidney diseases.

CONCLUSION

The success rates of end to side and side to side technique of AVF are 84% and 80% respectively, reflecting there is no any great difference between the results of these two techniques of arterio venous fistula formation for end stage kidney diseases.

Author's Contribution:

Concept & Design of Study:	Muhammad Ali Suhail
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