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Early Mortality Rate in Patients Initiating Maintenance Hemodialysis in a Tertiary Care Hospital

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Abstract

Background and Aims: Mortality of end stage renal disease patients is 10 to 30 times higher than that of the general population. Timing of death related to dialysis vintage remains unclear. Mortality risk among hemodialysis patients may be highest soon after initiation of hemodialysis, the reason for which remains elusive. This study was carried out to determine the early mortality rate i.e. 90 day mortality in patients starting maintenance hemodialysis at a tertiary care facility in Pakistan.

Poor planning for dialysis initiation is known to be associated with hemodialysis catheter use, more infections and a higher mortality. This study additionally reports early mortality rate based on the type of vascular access used to initiate hemodialysis.

Method: This is a cross sectional study which included all consecutive patients who initiated maintenance hemodialysis at Bahria Town International Hospital Lahore over a three-month period. Each patient was followed up for a period of 90 days and the type of vascular access used to initiate hemodialysis was noted. Early mortality rate i.e. 90-day mortality rate from the day of initiation of dialysis was calculated. All collected data was analyzed using the SPSS software.

Results: A total of 485 participants were included in the study. The mean age was 44 years while 51% of the participants were male. The 90 day (early) mortality rate of patients initiating maintenance hemodialysis at our centre was found to be 45%. 88% of the patients initiated maintenance hemodialysis using a temporary hemodialysis catheter. 48% of the patients starting maintenance hemodialysis through a temporary dialysis catheter died within the 3 months of study period.

Conclusion: The 90-day (early) mortality rate is significantly high i.e. 45% in patients initiating maintenance hemodialysis. The use of temporary hemodialysis catheter to initiate maintenance hemodialysis is a major risk factor for early mortality when compared to AVF use.

Keywords: *Arterio-venous fistula, Hemodialysis, Mortality, Vascular access, temporary Hemodialysis catheter*

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Introduction

End-stage renal disease (ESRD) is a major problem health problem and its incidence is increasing rapidly across the globe. Apart from the significant cost incurred on the care of these patients, the mortality of ESRD patients is 10-30 times more than a healthy individual [1]. The treatment modalities available to these patients include hemodialysis, peritoneal dialysis, and kidney transplantation. In Pakistan, hemodialysis remains the most frequently used modality of renal replacement therapy followed by renal transplantation and peritoneal dialysis [2].

It is important to note that most major registries including the US Renal Data System (USRDS) and the European Renal Association – European Dialysis and Transplant Association (ERA-EDTA) Registry report a significantly higher rate of mortality in the first 90 days of dialysis initiation in the hemodialysis population i.e. 36 and 35% in comparison to the later dialysis vintage, respectively [3,4]. The cause of this remains unclear. However, the US cohort of the Dialysis Outcomes and Practice Patterns Study (DOPPS) was able to identify associated risk factors for this higher mortality in first 90 days period which include older age, catheter vascular access, low serum albumin levels (<3.5 g/dl), low serum phosphorus levels (<3.5 mg/dl) and poor pre-dialysis renal care [5].

Additionally, the choice of arterio-venous (AV) access for initiating maintenance hemodialysis has a major bearing on the mortality and morbidity of these patients. There is significant evidence to discourage the use of temporary hemodialysis catheter due to a higher rate infections, recirculation and mortality in comparison to AV fistula and AV graft [6]. Considering an AV fistula requires 6 weeks to mature, it is only through proper education and planning in the pre-dialysis clinic that one can endeavor to start patients on maintenance hemodialysis through a recommended AV access.

Very little or no data exists in Pakistan that looks at the early mortality rate in the maintenance dialysis population. This study was carried out to determine the early mortality rate i.e. 90 day mortality in patients starting maintenance hemodialysis at a tertiary care facility in Pakistan. Furthermore, we go onto report the early mortality rate based on the type of vascular access used to initiate hemodialysis.

Patients and Methods

This is a cross sectional study which included all consecutive patients who initiated maintenance hemodialysis at Bahria Town International Hospital Lahore over a 3-month period. Each patient was followed up for a period of 90 days and the type of vascular access used to initiate hemodialysis was noted.

Early mortality rate i.e. 90-day mortality rate from the day of initiation of dialysis was calculated. Early mortality data was also analyzed based on type of AV access used to initiate maintenance hemodialysis.

Inclusion criteria:

- All patients who initiated maintenance hemodialysis during the study period at Bahria Town International Hospital, Lahore were included in the study.

Exclusion criteria:

- Any patient who recovered their kidney function to a point that they did require maintenance hemodialysis after initiation of hemodialysis within the study period was excluded from the study.
- Any patient below the age of 14 (pediatric) was excluded from the study

All collected data was analyzed using the Statistical Package for Social Science (SPSS) software.
The research proposal was submitted, discussed and approved for possible publication by the hospital's Institutional Review Board & Ethical Committee (IRBEC).

Results

A total of 485 participants were included in the study that initiated their maintenance hemodialysis (MHD) at Bahria Town International Hospital, Lahore. The mean age of the participants included in the study was 44. 51% of the participants were with male while 49% were female. The 90-day i.e. early mortality of patients initiating maintenance hemodialysis at our centre was found to be 45%. From a total of 485 participants included; 267 patients were alive at the end of the 3 months study period while 218 patients had passed away (see figure 1).

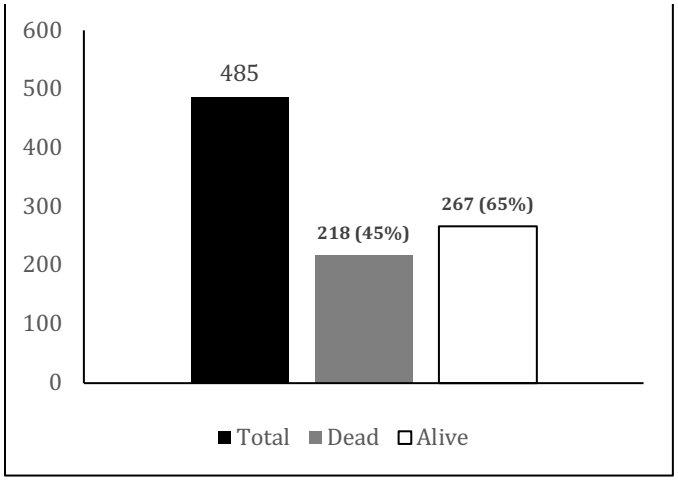

Figure 1: Mortality data of 485 maintenance hemodialysis patients after 3 months of dialysis initiation.

Out of a total participant number of 485, 88% i.e. 428 patients initiated maintenance hemodialysis through a temporary double lumen catheter. From these 428 patients 222 were alive while 206 participants had died within the 90 day study period. Hence, from amongst the patients starting MHD through a temporary hemodialysis catheter, 48% of the patients died within the 3 months study period. The overall early mortality of patients initiating MHD through a temporary hemodialysis catheter was calculated to be 42% (see Figure 2).

57 patients out of the 485 participants initiated maintenance hemodialysis through an AV Fistula. From these 57 patients 45 were alive while 12 participants had died within the 90 day study period. Hence, from amongst the patients starting MHD through an AV Fistula, 21% of the patients died within the 3 months study period. The overall early mortality of patients initiating MHD through an AV Fistula was calculated to be 2% (see Figure 3).
No patient was initiated on maintenance hemodialysis through a permanent hemodialysis catheter or an AV graft in the study period.

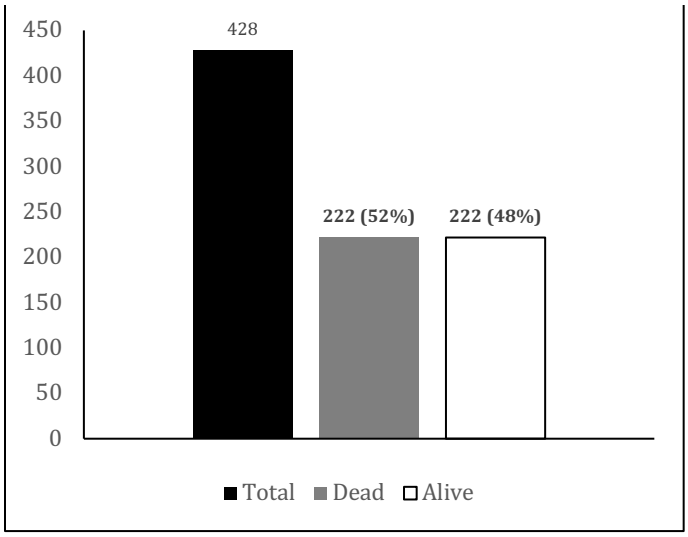

Figure 2 : Mortality data of 428 maintenance hemodialysis patients being dialyzed with temporary hemodialysis catheter after 3 months of dialysis initiation.

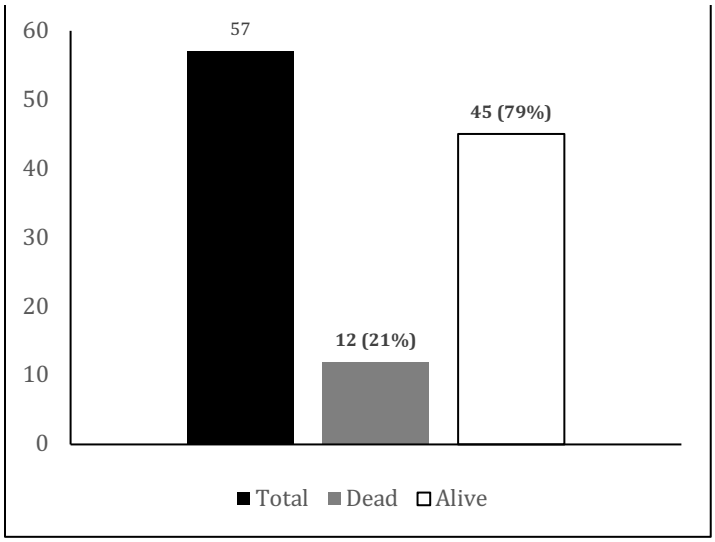

Figure 3: Mortality data of 57 maintenance hemodialysis patients being dialyzed with arteriovenous fistula after 3 months of dialysis initiation.

Discussion

Our study shows that the mortality rate is significantly high in patients initiating hemodialysis in first 90 days at our centre. Unfortunately due to the scarcity or absence of similar data locally or from South Asia, we have had to compare our findngs with the developed world i.e. USRDS, ERA-EDTA and the Canadian Renal Registry [7]. It is noteworthy that the findings of our study report the highest early mortality rate when compared to any of the registries mentioned above; which is a cause of concern. However, one has to realize that the 90 day mortality rate in patients being initiated on maintenance hemodialysis even in the developed world remains high with each of registries mentioned above reporting anywhere between 35 to 38% mortality rate in comparison to 45% reported by us.

A major observation that stands out in our study in comparison to international data is the enormous use of temporary hemodialysis catheter to initiate maintenance hemodialysis. This is contrary to all recommendations and good practice hemodialysis guidelines, which support a "Fistula First" policy for all patients starting maintenance hemodialysis [8]. The use of temporary hemodialysis in place of an AV fistula is associated with increased infections, morbidity and mortality [9]. The finding of 88% of participants in our study initiating maintenance hemodialysis through a temporary hemodialysis catheter could possibly be the reason of a comparatively higher 90 day mortality rate. The under-utilization of the recommended AV access i.e. AV fistula in our study should serve as a warning signal for all stake-holders involved in the pre-dialysis renal care in Pakistan. The reason for AV fistula under-utilization in our setting could be multi-factorial ranging from a lack of awareness, poor patient compliance to absence of surgical expertise and affordability issues.

Such a high 90-day mortality rate in patients starting maintenance hemodialysis in Pakistan would certainly serve as food for thought for our local nephrology colleagues who wrestle with the controversy as to whether there is any merit in early initiation of maintenance dialysis [10].

There are of course many limitations in our study; the first of which is inability to include any patient who was starting maintenance hemodialysis with an AV graft or permanent tunneled hemodialysis catheter. All the participants included in the study either started their maintenance hemodialysis sessions through a temporary hemodialysis catheter or an AV fistula. Secondly, we did not take into account any changes in the type vascular access used henceforth once the patient initiated their hemodialysis sessions within the study period.

Despite these limitations, we feel our study has reported significant findings, which should serve as wake-up call for the nephrology community, the healthcare system and the government at large to invest and ponder over why and where are we failing our dialysis patients.

Conclusion

The 90-day (early) mortality rate is significantly high i.e. 45% in patients initiating maintenance hemodialysis in our study. The use of temporary dialysis catheter to initiate maintenance hemodialysis is a major risk factor for early mortality when compared to AVF use.

Conflict of Interest: None declared

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