ARTERIOARTERIAL PROSTHETIC LOOP: AN ALTERNATIVE APPROACH FOR HEMODIALYSIS ACCESS

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بسم الله الرحمن الرحيم
وَٱلَّذِينَ مِنكُمۡ ءَامَنُواْ ٱلَّذِينَ ٱللَّهُ يَرۡفَعِ
بِمَا وَٱللَّهُ ۚ دَرَجَٰتٍ ٱلۡعِلۡمَ أُوتُواْ
١١ خَبِيرٞ تَعۡمَلُونَ
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ESRD	End-stage renal disease
AV	arteriovenous
DOPPS	Dialysis Outcomes and Practice Patterns Study
CKD	chronic kidney disease
KDOQI	Kidney Disease Outcomes Quality Initiative
DOQI	Dialysis Outcome Quality Initiative
CMS	Centers for Medicare and Medicaid Services
SCVIR	Society for Cardiovascular and Interventional Radiology
LT	Life table
KM	Kaplan-Meier
PTFE	polytetrafluoroethylene
HeRO	Hemodialysis Reliable Outflow
AAVS	American Association for Vascular Surgery
IVC	inferior vena cava
USRDS	United States Renal Data System
AAPL	arterioarterial prosthetic loop
O.D.	Once daily
NAVFs	Native arteriovenous fistulas
NKF- DOQI	National Kidney Foundation-Dialysis Outcomes Quality Initiative
CVC	Central venous catheter
ASAIO	American Society for Artificial Internal Organs

INTRODUCTION

Vascular access failure causes substantial morbidity in patients with end-stage renal disease who require long-term hemodialysis ***(Feldmann et al., 1996).*** As standard vascular access, an arterio venous (AV) fistula created with a superficial vein or a prosthetic AV access with a suitable deep vein are used ***(Zanow et al., 2005).***

However, in some patients, veins are exhausted owing to multiple previously failed AV vascular access attempts, or there is a central venous outflow track obstruction or stenosis due to multiple long-term indwelling central vein catheters or Trans venous pacemakers ***(Teruya et al., 2003).***

Although stenosis and occlusion of central veins can be treated surgically or by angioplasty to establish sufficient outflow ***(Kalra et al., 2003),*** the primary patency rates for 1 year are usually less than <50%, restenosis rates are very high, and long-term results are uncertain ***(Dammers et al., 2003).***

In addition, in a very few patients, the arterial status does not allow the construction of an AV graft, even if the graft is fed by a central artery, or there is cardiac insufficiency that is intolerable to the additional cardiac load of a high-flow AV graft and the risk of exacerbation of congestive heart failure. These patients represent a group with complex vascular access problems that preclude the creation of a conventional vascular access ***(Zanow et al., 2005)***.

Tunnelled central venous catheters do not represent an acceptable long-term alternative or even not applicable because of the unsuitability of large deep veins ***(Zanow et al., 2005)***.

An alternative procedure for permanent dialysis access is an arterioarterial loop access positioned either on the chest or thigh. However, experiences with interarterial approaches for dialysis are limited, and to our knowledge, few data have been published about this treatment option ***(Zanow et al., 2005) (Bünger et al., 2005).***

AIM OF THE WORK

In patients with central veins occlusion the creation of an arteriovenous access is not possible. Therefore arterioarterial access can be used in such patients to avoid peritoneal dialysis. This work aims at assessing the use of arterioarterial access regarding the short term patency, complications and efficacy of solving the problem of central vein occlusion.

CHAPTER (1)
Hemodialysis Access: General Considerations

End-stage renal disease (ESRD) is a huge public health problem with significant morbidity, mortality, and cost. The US national initiatives and guidelines have helped define the standard of care for vascular access and have emphasized the role of autogenous arteriovenous (AV) hemodialysis access. Although a mature autogenous access likely represents the optimal access choice, the real goal is a functional access with minimal associated complications. The construction and maintenance of hemodialysis access represent a significant component of many vascular practices. Despite their relatively minor magnitude, permanent access procedures are associated with significant perioperative morbidity and mortality, underscoring the patients' underlying comorbidities. Maintaining effective hemodialysis access is a lifelong challenge that requires a long-term plan and committed providers ***(Thomas S. Huber, 2014).***

EPIDEMIOLOGY OF END-STAGE RENAL DISEASE

ESRD, and the maintenance of hemodialysis access, is a tremendous public health problem that has reached almost epidemic proportions in the United States. In 2010, there were 594,374 prevalent and 116,946 incident cases of ESRD Notably, this represents more than tenfold increase from 1980, and it has been estimated that this trend will continue, with estimated prevalent and incident counts of 784,613 and 150,772, respectively by 2020(Fig. 1).The majority of patients with ESRD are on hemodialysis (hemodialysis 65%, transplantationi 30%, peritoneal dialysis 5%) ***(U.S. Renal Data System, 2012).***

Approximately 17,000 kidney transplants were performed in 2010, but the number of patients awaiting transplant has continued to increase and has outstripped the number of available organs.

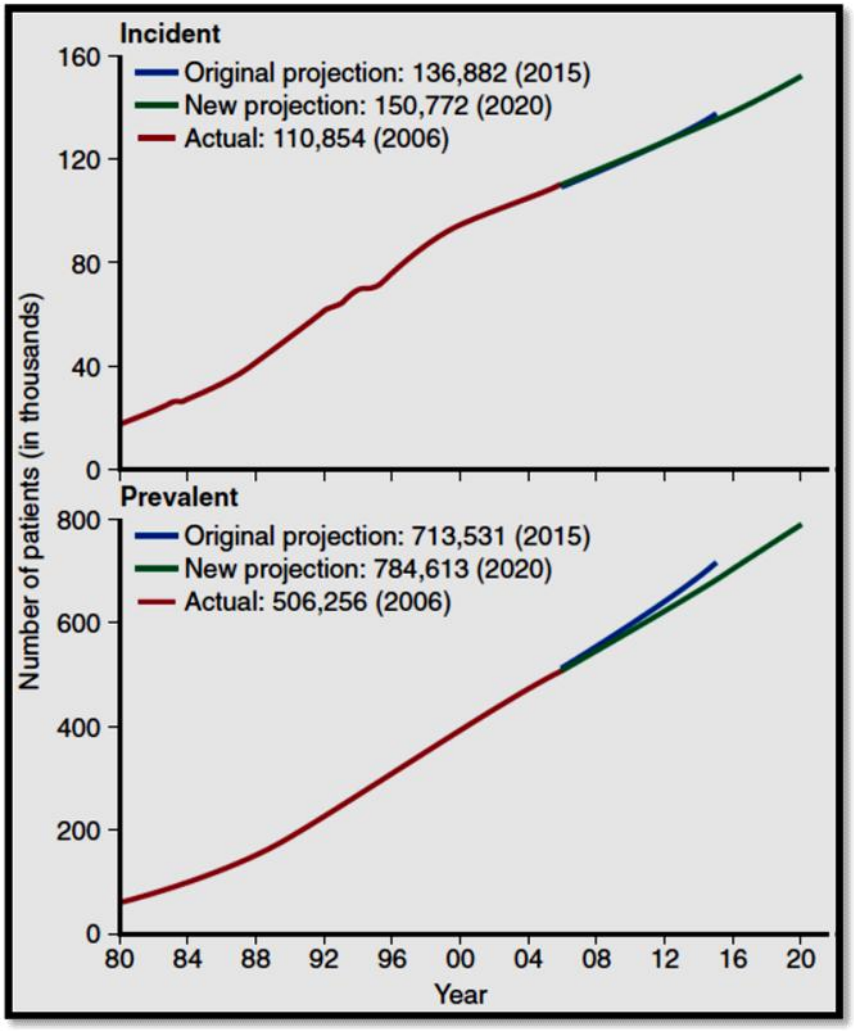

Figure 1 The projected incidence and prevalence for patients with ESRD for years 1980 to 2020 is shown. Note the continued growth of both patient cohorts. (From U.S. Renal Data System: *USRDS 2008 annual data report: atlas of end-stage renal disease in the United States,* vol 2, Bethesda, MD, 2008, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases ***(U.S. Renal Data System, 2008).***

Indeed, more than 87,000 patients in the United States were awaiting a kidney transplant in 2010, with the median time on the transplant list of 1.71 years. This gap between the supply and demand of kidney transplants is expected to continue to widen. The majority of patients initiated dialysis in 2010 (i.e., first dialysis