

Endovascular treatment of dysfunctional arteriovenous fistulas and grafts: results from a single centre

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■ ABSTRACT

Percutaneous angioplasty of dysfunctional arteriovenous fistulas (AVF) and grafts has become standard vascular access stenosis treatment. Several studies have shown the safety and efficacy of this technique and it has similar primary and secondary patency rates to surgical intervention. The aim of this study was to evaluate long-term results of endovascular treatment of vascular access related stenosis in our centre. A retrospective assessment was performed on patients referred to our centre for percutaneous angioplasty due to failing AVF and grafts. During the study period 116 AVF and grafts underwent angioplasty. Average follow up time was 726 days. Primary patency was considered to begin on the day of the first procedure and to end on the day of access failure, reintervention or end of follow up. Secondary patency included all further percutaneous procedures and ended on the day of access failure, surgical intervention or end of follow up. The initial success rate averaged 88%. The rate of significant complications was 2.3%. Primary patency rates were 33% for AVF and 31% for grafts at one year, and 22% for AVF and 17% for grafts at two years. At one year secondary patency was 82% for AVF and 94% for grafts. At two years secondary patency was 78% both for AVF and grafts. Thirty six percent of vascular accesses had more than one intervention. Percutaneous angioplasty is a safe and beneficial treatment for vascular access related

stenosis. Patency rates were similar to other reports in the literature, showing that endovascular intervention maintains long-term patency, but requires repeated procedures in a significant number of cases.

Key-Words:

Angioplasty; haemodialysis; interventional nephrology; vascular access stenosis.

■ INTRODUCTION

Haemodialysis vascular access dysfunction is a major cause of morbidity and mortality in haemodialysis patients. Hospital admissions due to vascular access related problems account for up to 23% of total hospital admissions in haemodialysis patients¹. Percutaneous angioplasty of dysfunctional arteriovenous fistulas (AVF) and prosthetic grafts has become, in many centres, the standard of care for vascular access stenosis treatment^{2,3}. Several studies have shown the safety and efficacy of this technique^{3,4} and some studies relate early stenosis detection and treatment to an increase in vascular access survival and decrease in access related morbidity⁵⁻⁷.

Access primary and secondary patency rates found using percutaneous angioplasty differ from study to study⁸⁻¹¹, but are not inferior to results of surgical

intervention¹¹⁻¹³. In our centre nephrologists have performed vascular access percutaneous intervention since 2003, with an increasing number of procedures each year. In the last year 200 arteriovenous accesses underwent angiographic procedures in our centre.

■ SUBJECTS AND METHODS

In order to evaluate long-term results of endovascular treatment of vascular access related stenosis in our centre a retrospective assessment was performed on patients referred for percutaneous angioplasty due to failing AVF and grafts.

In our centre the vast majority of procedures were related to dysfunctional accesses, with only a small number of cases of thrombosed vascular accesses.

Clinical and angiographic assessments of the vascular access were performed, with angiographic evaluation made by direct puncture of the vascular access (or of the brachial artery when the referral was due to reduced blood flow or inadequate AVF maturation), with isosmolar contrast medium administration and visualisation of the vasculature. Stenoses considered to be clinically significant (superior to a 50% reduction of luminal diameter compared to adjacent nonstenosed segment, opacified collateral vessels and limb oedema in central venous stenosis) were submitted to angioplasty with adequate size high-pressure balloon inflation for 60 seconds. When necessary, in lesions resistant to dilatation, this procedure was repeated. Adequate results were considered as anatomical (less than 30% of residual stenosis) and clinical improvement after the procedure. All interventions were performed as out-patient procedures.

Accesses that underwent angioplasty January 2006 – November 2007 were studied. The patient age average was 65.1±13.2 years. 55% of the patients were male and 24% were diabetics. Primary patency was considered to begin on the day of the first procedure and to end on the day of access failure, reintervention or end of follow up. Of the accesses included in this study, the time of the first procedure was from June 1, 2004 to November 30, 2007. Secondary patency included all further percutaneous procedures and ended on the day of

access failure, surgical intervention or end of follow up (February 29, 2008). Death or renal transplant with a patent vascular access were also considered to be the end of follow up. Follow up data was collected from hospital clinical files that contain all vascular access related procedures and from information gathered from the patients' haemodialysis centres.

Access patency rates were calculated using Kaplan-Meier survival analysis, with differences between groups determined by log rank analysis.

■ RESULTS

During the study period 116 AVF and grafts underwent endovascular angioplasty, 60% were grafts (n=69) and 40% were AVF (n=49). Of the AVF only 8 were forearm AVF. Average follow up time was 726 days (minimum 90 days, maximum 1362 days). The initial success rate averaged 88%. 36% of vascular accesses had more than one intervention. Stenoses were more frequently found at the venous anastomosis of grafts (37%), peripheral veins (25%), central veins (12%), within the graft (5%), at the arteriovenous anastomosis (2%) and multiple lesions were found in 19% of the interventions.

Primary patency rates were 33% for AVF and 31% for grafts at one year and 22% for AVF and 17% for grafts at two years. One year secondary patency was 82% for AVF and 94% for grafts. At two years secondary patency was 78% both for AVF and grafts. There was no significant difference in primary patency (p=0.059) or secondary patency (p=0.50) rates between AVF and grafts. The rate of significant complications was 2.3%, all venous lacerations controlled locally with low-pressure balloon inflation.

■ DISCUSSION

Primary patency rates found in the literature range from 29-40% at one year and 13-25% at two years for dysfunctional grafts, and range from 33-51% at one year and 24-38% at two years for dysfunctional upper arm AVF (the vast majority of AVF

included in our study). Secondary patency rates found in other studies range from 60-86% at one year and 50-78% at two years for dysfunctional grafts, and 80-84% at one year and 68-80% at two years for AVF. Results found in our centre are similar to these other study results. In a significant number of cases (36%) repeated interventions were required to maintain patency of the vascular access. Location of the lesions was similar to other study results. There were no serious complications and a relatively small number of minor procedure related complications. In relation to other reports our results show that secondary patency of vascular accesses is possible using this technique. Our results show that percutaneous angioplasty is a safe and beneficial treatment for vascular access related stenosis, but requires repeated procedures in a significant number of cases to maintain vascular accesses secondary patency.

Conflict of interest statement. None declared.

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