

MICROSURGERY AND PREEMPTIVE HAEMOSTASIS FOR DISTAL RADIO-CEPHALIC ARTERIO-VEIN FISTULA IN ADULT.

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INTRODUCTION

Distal radio-cephalic AV fistula (RCAVF) is considered the best vascular access for chronic haemodialysis because of the better survival and lower rate of complication compared with other AV fistulas, graft and catheters. Guidelines of American Society of Nephrology (NFK K-DOQI) and European Society of Vascular Access, particularly stressed the superiority of vascular access with native vessels, between them indicating the RCAVF as the gold standard (1).

The major inconvenient with RCAVF is the high rate of primary failure (fistula not usable for dialysis because of early thrombosis or lack of maturation).

In fact, according with the most recent meta-analysis, RCAVF - created with the standard technique - showed a primary failure rate up to 50% (2), with a pooled estimated primary failure rate of 15,3% (3).

In recent years several studies has been published focusing on criteria for predicting successful distal RCAVF creation. Apart from diabetes, obesity, vascular disease and age (all of them being general risk factor for vascular access surgery), the diameter of vessels (radial artery < 1,6 mm - cephalic vein < 2 mm) appeared to represent the major limitation for distal RCAVF creation with standard technique (4).

Other studies suggest the use of the proximal radial artery for latero-lateral anastomosis at the mid forearm with a retrograde perfusions of the cephalic vein (5-6). This solution intend to find a radial artery more proximally, thus with a diameter sufficient for an AV anastomosis.

However distal ischemia is a risk with this latero-lateral anastomosis, but there are not yet data published on this subject.

Better results are obtained for distal RCAVF creation, with the use of microsurgery and pre-emptive haemostasis with a primary failure rate of 5 to 10% in a paediatric population (7-8).

Microsurgery allow to work with extreme precision even on small and difficult vessel, thus favouring the respect of these structure anatomy and so far of their function.

Pre-emptive haemostasis ameliorate the operative field visualization. Vascular clamp are unnecessary, thus reducing further traumatism of the vascular wall; radial artery would not be dissected (9).

The use of pre-emptive haemostasis with an inflatable tourniquet necessitate of regional anaesthesia with a brachial plexus block. This technique has the further advantage to induce vasodilatation; moreover post-operative analgesia last, depending on the anaesthetic used, up to 6 hours.

AIM OF THE STUDY

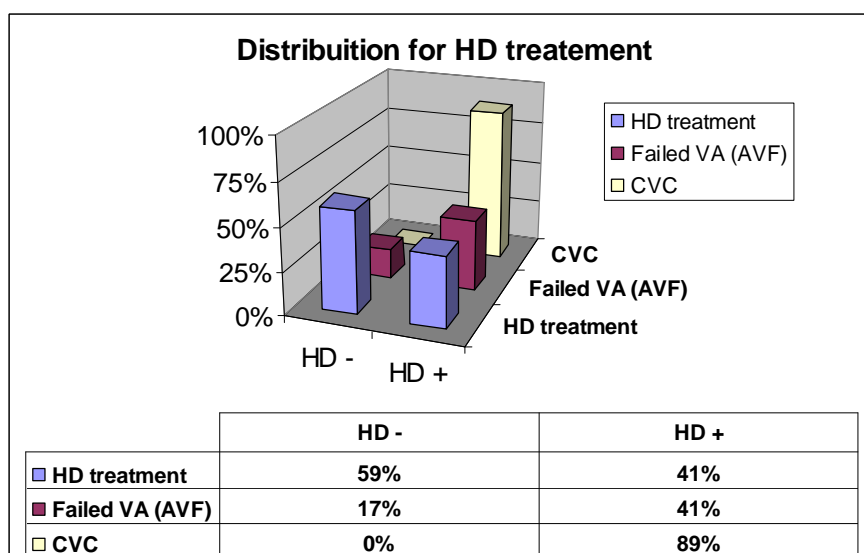
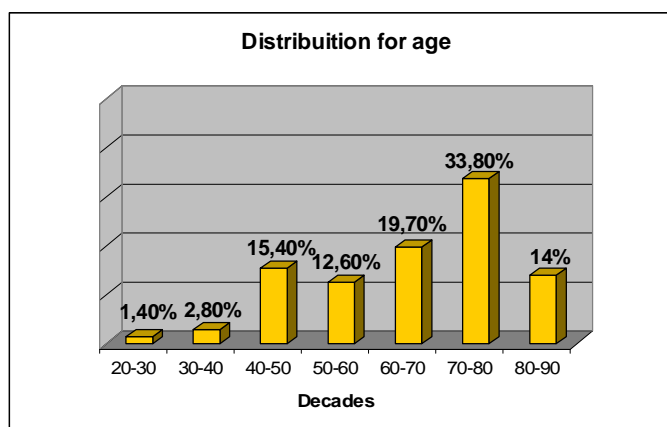
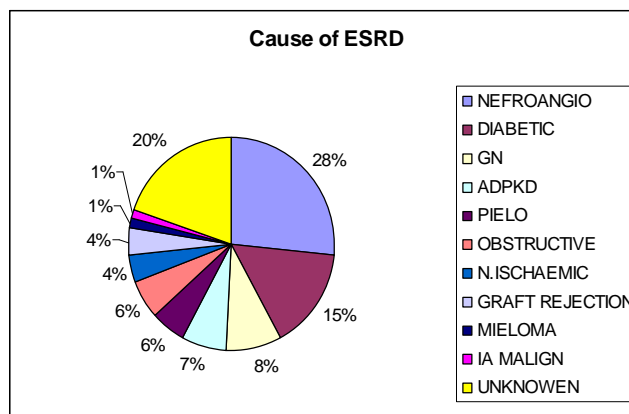
Evaluate the results, in term of proportion of RCAVF created on incident patient, early failure and patency, of microsurgery and preventive haemostasis for distal RCAVF in adults ESRD patient.

MATERIALS AND METHOD.

We use microsurgery (associated with preventive haemostasis which is used since 2000) starting on November 2004. During the first 25 month (Nov 2004 - Nov 2006) 71 patients where referred to our centre for a vascular access creation.

Patients data are exposed in the tables below.

Incident patients	71
Age (median, DS)	66 +/- 14,45%
M/F	43/28
Age > 65y	45%
HT	67%
Diabetes	21%
Obesity (BMI >30)	11%
Vasculopathy	33%
Vascular calcification	35%



The only criteria for a distal RCAVF creation was the existence (on a clinical and a systematically performed US preoperative examination) of a permeable radial artery and cephalic vein, independently from their diameter (\varnothing ranging from 1 to 3 mm).

Operative procedure

All operations were made by the same surgeon (nephrologists trained on vascular access surgery, working since 2000).

With the use of magnification glasses (2,3x) the cephalic vein and radial artery are exposed through a longitudinal incision, half way between them, at the wrist.

The vein is freed by wide dissection, handled only by the adventitia; collateral branches are ligated with polypropylene (6/7-0) or microsurgical clips.

Just the anterior wall of the artery is exposed without any dissection of its trunk.

With the use of an operative microscope (up to 12x), an end-to-side vein-to-artery anastomosis is performed with four running 8-0 polypropylene sutures.

Arteriotomy length is 10-15 mm; if haemostasis is uncompleted (vascular loop, or haemostatic clamps), can easily be placed after minimal dissection.

When the anastomosis is completed, the tourniquet is released. Additional sutures are added in case of leak. Patency is confirmed by palpation.

Follow up

Patients were followed at 1, 7 and 28 days after operation, and at 1 year. Maturation was defined as functional patency with appropriate dialysis.

Statistical analysis

Data analysis was performed by using SPSS 13 for Windows. Unvaried analysis was used to determine the proportion of early failure after one month of treatment, and late failure after one year of follow up, as well as the distribution of all demographic data and proportion of comorbidity factors usually considered risk factors for successful RCAVF construction.

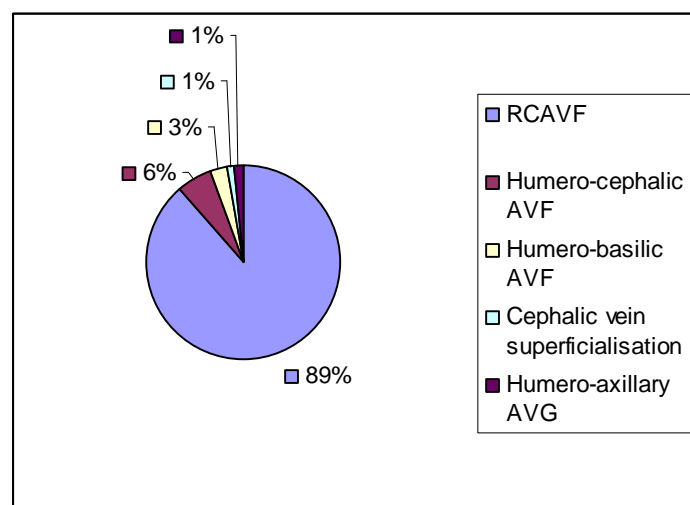
Results are expressed according with the "Recommended Standards for report dealing with Arteriovenous Haemodialysis Access" from the Committee on reporting standards for arteriovenous access of the Society for Vascular Surgery and the American Association for Vascular Access (10)

RESULTS

In 63 patients it was possible to create a distal RCAVF; that means a proportion of 88,7% on the incident population.

In the remaining group of patients the distribution of other procedures was:

- 4 humero-cephalic AVF
- 2 humero-basilic AVF
- 1 superficialisation of cephalic vein (in pts with humero-cephalic AVF non useable for dialysis because of obesity)
- 1 humero-axillary PTFE direct bypass.



Primary failure rate in RCAVF group was 7,9% (5/63pts).

The cause of early failure were:

- thrombosis <24h after surgery in 0 pts
- thrombosis >1week after surgery in 1 pts
- lack of maturation (patent but unfunctional AVF) due to iuxta-anastomotic vein stenosis in 3 pts and to mid vein stenosis in 1pts.

Treatment of primary failure was: surgical revision (proximalisation at the forearm) of the anastomosis in 4 pts – loss of the vascular access with new AV fistula (distal ulno-basilic AVF) construction in 1 pts.

35 patient who would have completed a 1 year follow, 4 of them died and 2 were lost.

Primary patency at 1 year of the 29 patients followed was 70,3%.

Primary assisted patency at 1 year was 93,1% (27/29). The intervention needed to maintain patency were: 3 surgical and 1 radiological (PTA) revision.

There were no complication caused to brachial plexus block and preemptive haemostasis.

CONCLUSION

In recent years RCAVF has been the subject of a number of studies on the emerging problem of “early failure”: fistula not usable for dialysis because of early thrombosis or lack of maturation.

Several factors has been indicated as the cause of the high rate of primary failure of RCAVF: the increase of median age of patients starting dialysis and that of comorbidity (diabetes, obesity and vascular disease), and the poor vessel quality at the forearm.

Our single centre observational study show that microsurgery, along with preemptive haemostasis, allow the construction, with a low early failure rate of distal RCAVF in a good proportion of an aged and difficult (high prevalence of comorbidity factor) population.

Further studies are needed to validate this results.

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