

Evaluation of dialysis access care by means of process quality indicators

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ABSTRACT: Improvement of dialysis access management depends on technical skill but also on effective choice, construction, monitoring and revision of the access. Surgical procedure is only one step of a complex course, beginning with the referral of patients to nephrologists.

Using two process quality indicators, we describe the evolution of access management at our centre, where access surgery and access-related activities are performed by nephrologist. The first process indicator is based on the prevalence of temporary access at first dialysis (TA1st) in end stage renal disease ESRD patients, the second one measures the prevalence of permanent central venous catheters (%CVC) in dialysis population.

TA1st increased to 27.1% in 1999, more than twofold compared to the previous year. There was also an increase in %CVC from 20.6 to 26.3%. Native access remained the most utilised, well above 70% of dialysis patients.

Our process monitoring suggests a rapid worsening of late referral, as indicated by the increasing use of temporary catheters at the beginning of chronic dialysis. Increasing surgical activity and diagnostic procedures were only partly effective in containing the rise in CVC.

Venous sparing, early referral, Continuous Quality Improvement and a multiprofessional access-team co-ordinated by a nephrologist could be the key-elements in facing the never-ending-story of dialysis vascular access.

KEY WORDS: Vascular access, Catheters, Quality, Indicators, Late referral, Management

INTRODUCTION

Presently the dialysis vascular access scenario is rapidly changing. Late referral is now recognised as one of the main hindrances to timely planning of arterio-venous fistula, still the unsurpassed standard in this field. Central venous catheters (CVC) play a cumbersome role, solving problems but growing in number well above any recommendable standard (1).

A survey on vascular access management in Italy revealed that nephrologists provide access care in most dialysis centres (DC) and confirmed late referral and CVC utilisation as new hallmarks of this activity (2).

We were therefore prompted to critically analyse the performance of our group as regards vascular access, evaluating quality indicators and comparing our organisational model with other possible ways of management.

The aim of this paper is to find some issues of development, in one of the most important dialysis-related sectors, which can heavily affect human and economic treatment costs.

MATERIALS AND METHODS

Our DC is one of the largest in Italy and is located in an area of 630.000 inhabitants: it cares for an av-

erage of 490 regular dialysis patients, treated both in a hospital-based facility (175 patients) and 11 satellite DC (260 patients). Peritoneal dialysis is used for 53 (11%) chronic renal failure patients. Since the start of our dialysis program in 1976, vascular access management was done by the nephrology team, devoted to the complete range of procedures, including Ramirez shunts, native AV fistulas at wrist as well as elbow and prosthetic grafts. From the early nineties, CVC were introduced and increasingly used as permanent access, whereas external shunts were abandoned.

Referral to vascular surgeon is usually reserved to emergency or very complex cases (less than 2% of all procedures). A program of interventional radiology was started only recently and is still under development.

The number of nephrologists devoted to access surgery (initially the whole team) was progressively reduced on the basis of both personal choice and professional fitting in with the whole process (planning, monitoring and surgical management). Four years ago a Continuous Quality Improvement program was implemented and both outcome and process indicators are in use.

As outcome quality indicator, we customised to the dialysis setting the so-called Minimum Success Rate (MSR), i.e. the target percentage of functioning internal access at the end of the procedure, set to 90% and applicable to the team or to the single surgeon. During the last four years this index of outcome was achieved (MSR 91-95%).

As process quality indicators, we started using during the last two years the prevalence of temporary access (mainly catheters) at the first dialysis of chronic patients (TAIst) and the prevalence of per-

manent catheters in dialysis population (%CVC). TAIst was further defined as raw (including all temporary access) and net; the latter intended as cleared from factors of late referral independent from the DC, such as superimposed acute renal failure on chronic renal failure (last calculated GFR above 15 ml/min), patients referred from outside our district, planned PD and documented absence of native vessels (intentional avoidance of constructing an access).

TABLE I - TEMPORARY CATHETERS AT FIRST DIALYSIS TAIst OF CHRONIC DIALYSIS PATIENTS

TAI st	Raw %	n	Net %	n
1998	27.4	34/124	11.3	14/124
1999	44.7	51/114	27.1	31/114
Difference 98-99	+17.3		+15.8	

see text for explanation of the terms Raw and Net

TABLE II - PREVALENCE OF CVC AND GRAFTS IN CHRONIC DIALYSIS PATIENTS (Hospital-based)

year	CVC	prostheses	Native AVF
1998	20.6	0.6	78.8
1999	26.3	2.4	71.3
Difference 98-99	+5.7%	+1.8%	-7.5%

TABLE III - PREVALENCE OF NON-NATIVE ACCESS IN DIFFERENT COUNTRIES

Country/City	Year (ref.)	%CVC	%prostheses	TAI st
U.S.A.	1996 (1)	12.9		18.9
Italy	1997 (2)	<10		
Catalan Registry (Spain)	1999 (3)	5.6	8.5	48
Languedoc-R (France)	1999 (*)	18		
Modena (Italy)	1999 (**)	26.3	2.4	27.1

(*) B. Canaud - Personal communication

(**) Present paper

RESULTS

The activity increased from 250 procedures in 1998 to 350 procedures in 1999 (27% increase). Fistulograms doubled during the same period. Table I shows results of TAIst monitoring, before (raw) and after (net) elimination of unforeseeable causes of late referral. There is a sharp increase in the use of TA, confirmed by the high prevalence of CVC shown in Table II.

DISCUSSION

The rationale was to measure the late-referral with TAIst, whereas %CVC, together with the prevalence of grafts, was to represent the worst part of the “access-yard”. The combined analysis of these two indices allows us to describe and monitor the magnitude and the spontaneous evolution of vascular access related activity.

If we accept TAIst prevalence as a measure of late referral, then, according to our results, this problem is worsening: although in our DC the surgical activity increased, just like diagnostic investigations and monitoring, the %CVC and grafts also rose with a detrimental effect on native AV-fistula prevalence.

We believe that %CVC is increasing all over the world; this means a decrease in native fistulas with related growth in complications and costs. The problem seems to involve all countries, though to a different extent (Tab. III).

In conclusion, patency rates and actuarial survival are well accepted means for assessing surgical performance in the field of dialysis vascular access. Unfortunately, these methods only demonstrate that surgical skill is the major determinant of access outcome (4, 5). Since access outcome is only one of the elements of the whole process of dialysis access management, we propose the use of TAIst and %CVC as process quality indicators, suitable for summarising all the steps in planning, creating, monitoring and revising vascular access.

Indeed, it is very unlikely that we shall overcome in the near future some of the key-problems related to vascular access, such as outflow stenoses, thrombogenicity of prosthetic materials, catheter-related infections and atherosclerosis of native vessels.

If we cannot improve the Brescia-golden standard, then we must improve the managing system by means of a few, but well-known and perhaps tedious fundamental issues.

1) Patients and nurses should be instructed to spare venous burden in the arm, starting when early renal failure is present (serum creatinine around 2 mg%);

2) Home practitioners should refer renal failure patients to nephrologist early and on a regular basis (and nephrologist should provide easy access to the outpatient clinic);

3) Continuous Quality Improvement criteria should be applied to the field of vascular access, by using customised quality indicators, as suggested by Sands and Miranda (6);

4) The nephrologist should move from a self-sufficient activity (or, on the contrary, from complete commitment to the surgeon), to a more complex managing model. This model, already being developed (7), should be multiprofessional and integrated: vascular surgeon, interventional radiologist and renal nurse are part of this system, where the nephrologist acts as co-ordinator.

So far little attention has been paid to these simple principles, but it's time to take into account the fact that the dialysis population is progressively ageing, this worsening the condition of the vascular burden. To manage the future of vascular access is more demanding than simply handling sutures and vessels, but it could be more rewarding.

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