



Permanent Tesio's catheters for chronic hemodialysis: our experience at a regional hospital

R. Álvarez Navascués, L. Quiñones and J. Guerediaga

Nephrology Department. San Agustín Hospital. Avilés. Asturias.

SUMMARY

Introduction: Good vascular access remains the cornerstone of effective hemodialysis treatment. The Tesio catheters has been proposed to be a reliable source of vascular access for the dialysis patients.

Subjects and methods: We examined all Tesio catheters inserted over a 3-year period in our hospital. We obtained age, sex, dialysis duration, original nephropathy, vascular access history, complications, dialysis parameters, catheter function duration, confort level for patients and nurses, and death in all our cases.

Results: 33 catheters were inserted in 30 patients, 14 male and 16 female. Age $73,92 \pm 9,22$ years. Dialysis duration, $25,64 \pm 53,45$ months.

Diabetic nephropaty 26,66%, NAE 40%, others 33,33%.

First vascular access in 13 patients (43,33%), one previously fistula, 5 patients (16,66%), and more of one FAV, 12 patients (40%).

We observed two bleeding cases, eight parcial trombosis, one total trombosis (non-function), six tunneled infection and two systemic infection. Only 3 catheters were removal.

We obtained good dialysis parameters. Confort state for patients and nurses were satisfactory. Death 12 patients. Catheter function at the moment of study $16,76 \pm 12,99$ months.

Conclusions: We concluded that Tesio catheters can provide excellent long-term vascular access for hemodialysis patients, especially in the older people and with some previous failure fistulas, with low complication rates and acceptable dialysis parameters and tolerance.

However, the arteriovenous fistula remains the gold standard for long-term hemodialysis access.

Key words: **Permanent Tesio catheter. Comarcal Hospital.**

Correspondence: Dr. Rafael Álvarez Navascués
Servicio de Nefrología
Hospital San Agustín
Camino de los Heros, 4
33400 Avilés (Asturias)

CATÉTERES DE TESIO PERMANENTES PARA REALIZACIÓN DE HEMODIÁLISIS CRÓNICA: NUESTRA EXPERIENCIA EN UN HOSPITAL COMARCAL

RESUMEN

Introducción: La consecución y mantenimiento de un buen acceso vascular sigue siendo una de las piezas claves para la realización de un tratamiento dialítico adecuado. Los catéteres de Tesio están demostrando ser una opción válida de acceso vascular.

Objetivos y métodos: Hemos examinado todos los catéteres de Tesio colocados en nuestra Unidad a lo largo de tres años. Hemos analizado la edad, sexo, tiempo en diálisis, nefropatía de base, accesos vasculares previos, complicaciones, parámetros dialíticos, tiempo de funcionamiento en el momento del estudio, nivel de confort de pacientes y enfermeras y fallecimientos en todos estos pacientes.

Resultados: En este tiempo se han colocado 33 catéteres a 30 pacientes, 14 hombres y 16 mujeres. Edad media $73,92 \pm 9,22$ años. Tiempo en diálisis $25,64 \pm 53,45$ meses.

Nefropatía diabética 26,66 %, nefroangioesclerosis (NAE) 40%, otras causas 33,33%.

Primer acceso vascular en 13 pacientes (43,33%), una FAV previa en 5 (16,66%) y más de una FAV previa en 12 (40%).

Hemos tenido dos casos de sangrado, ocho de trombosis parcial, uno de obstrucción total (no funcionamiento), seis infecciones de tunel u orificio y dos infecciones sistémicas. Sólo en tres casos se precisó retirada del catéter.

Los parámetros de diálisis analizados han sido satisfactorios. El grado de confort de pacientes y personal de enfermería ha sido bueno. Han fallecido 12 pacientes. El tiempo medio de funcionamiento en el momento del análisis era de $16,76 \pm 12,99$ meses.

Conclusiones: Los catéteres de Tesio pueden constituir un buen acceso vascular permanente para la hemodiálisis, especialmente en pacientes mayores y con accesos vasculares previos fallidos. Presentan pocas complicaciones, buenos parámetros de diálisis y tolerancia.

En cualquier caso, la fístula arteriovenosa autóloga todavía constituye la opción más deseable.

Palabras clave: **Catéteres de tesio permanentes. Hospital comarcal.**

INTRODUCTION

The achievement and maintenance of a good vascular access for chronic hemodialysis performance still is one of the basic issues on which the health care staff responsibility working with renal patients.

Aside from the preference for an autologous arterial-venous fistula, the choice of particular vascular access type for hemodialysis will depend on the urgency to initiate treatment, its life expectancy, patient's age, vascular anatomy, the patient's preference, as well as performance and functioning of previous vascular accesses¹.

On the other hand, it is well known that we are facing a general and steady aging of our dialysis population, with the associated vascular issues².

There are basically three different types of vascular accesses for hemodialysis: the autologous arterial-venous fistula, reckoned as the most desirable in the general population and also with known drawbacks; vascular grafts, of different materials and sites; and catheters, either temporary (more used for hemodialysis in the acute patient) or the different modalities of funneled permanent catheters³.

In recent years, several catheter types have been tried in dialysis, with particularities, advantages and drawbacks with each type.

Since their introduction at the beginning of the last decade, Tesio's funneled catheters have become one of the most well-known and used variants in hemodialysis units.^{4,5,6}

OBJECTIVE

The aim of our analysis has been to assess the efficacy, comfort and complications of Tesio's catheters, as well as the patient's profile receiving one of these catheters in our Unit for the last several years.

MATERIAL AND METHODS

We have followed 30 consecutive chronic renal patients in whom 33 pairs of funneled jugular Tesio's catheters were inserted in our Unit from January 2000 to February 2003.

We have analyzed:

1. The profile of these patients: age, gender, baseline nephropathy, time on dialysis, and previous vascular accesses.
2. Immediate complications after insertion.
3. Further complications along time.
4. Efficacy: flows, dialysis dose (KtV), recirculation index and time from insertion to time on dialysis.
5. Mortality.
6. The degree of comfort of these patients and nursing staff caring for these patients. This parameter has been analyzed by direct questioning to patients and nursing staff.

Catheters were inserted in our Unit under local anesthesia, with a single or double puncture technique as needed, with the collaboration of the nephrologist and an expert dialysis nurse. Preferably, both catheters were inserted with through a single venous puncture. The access route always was jugular (right or left, as needed). X-ray control was done after insertion, and the use started 214 hours later. An antibiotic prophylaxis with a single dose of vancomicina 500 mg was done.

General asepsis precautions were taken in all patients with weekly topical application of ciprofloxacin (0.5 mL in each outlet opening).

Two mL of 5% sodium heparin in each branch was used of anticoagulation.

RESULTS

1. About our patients' profile:

Table I: Baseline nephropathy

	Diabetic Nph.	NAS	GN	Others
Num. of patients	8	12	4	6
%	26,66	40	13.33	20

NAS: nephroangiosclerosis. GN = glomerulonephritis.

Mean age of the patients was 73.92 \pm 9.22 years, 46.6% (14) were males and 53.3% (16) females.

Mean time from dialysis onset was 25.64 \pm 53.45 months.

Baseline nephropathies are shown in Table I:

Previous vascular access of these patients are shown in Table II:

Table II: Previous vascular accesses

	Num. of patients	%
First access	13	43.3
1 previous AVF	5	16.66
> 1 previous AVF	12	40

2. Immediate complications:

With regards to complications occurred during catheter insertion, we had two cases of abundant bleeding. In one of them, we delayed insertion for 24 hours, and in the other one, once the catheters were inserted, surgical hemostasia was indicated with a good clinical course and catheter functioning. In none of the cases, catheter replacement was required.

3. Late complications:

Late complications are shown in Table III:

Table III: Delayed complications

	Num. of patients	%
Partial thrombosis	8	26.6
Total thrombosis	1	3.3
Opening infection	6	20
Bacteriemia	2	6.66

Partial thrombosis cases were resolved with urokinase fibrinolytic therapy (50,000 U with a 20-30 min IV infusion in the affected branch). For opening infections a supplemental dose of topical ciprofloxacin was used and a prophylactic dose of vancomi-

cin 500 mg. Only in two cases of catheter-attributable bacteriemia and in one non-functioning case we were obliged to remove the catheters.

4. Efficacy:

Mean flows were 268 ± 40.32 mL/min. Kt/V was 1.2 ± 0.4 . Mean duration per dialysis session and dialyzers have been highly variable depending on each patient characteristics.

Analyzed recirculation indexes were $4.5 \pm 2.8\%$. Mean time from catheter insertion until analysis was 16.76 ± 12.99 months.

5. Mortality:

During this period, 12 (40%) patients died, similarly to other patients with the same age and other vascular access types.

None of them was included in the renal transplantation waiting list.

6. Degree of comfort:

When we asked our patients about the degree of comfort of catheters, the general feeling was good, particularly in those patients that had had previous arterial-venous fistulae and that avoided repeated vascular punctures.

Similarly, the feeling of the nurse staff attending our patients has been satisfactory.

DISCUSSION

As discussed above, the achievement and maintenance of a good vascular access represents one of the major concerns of any health care staff attending renal patients submitted to chronic hemodialysis. The approach to vascular access in these patients must be multidisciplinary and must basically include the patient and the hemodialysis nursing staff, since they are the ones that better know the difficulties, discomforts and functioning, and the nephrologist who is must warrant the achievement of good dialysis parameters with the less possible complications, as well as the vascular surgeon and many times the interventional radiologist⁷.

The profile of patients submitted to chronic hemodialysis in our units has substantially changed in the last decades, facing a generalized aging and an increase in life expectancy, with an increasing number of patients with several previous failed vascular accesses, and the presence of multiple associated comorbid conditions.

During this time, several types of catheters for hemodialysis have emerged, more recommended in acute patients in which renal replacement therapy is

presumed to be short lived, although they are being used more and more in chronic patients, to a great extent due to these patients characteristics⁸⁻¹⁰.

On the other hand, in many hospitals, as it is our case, there is a lack of vascular surgery, interventional radiology departments or endoscopic imaging. This represents a limitation and dependence level that may limit to a greater or lesser extent that our patients may benefit from the same opportunities than others that depend on reference hospitals.

In our Unit, we have analyzed Tesio's catheters inserted during a three-year period. In our case, we have chosen this type of catheters based on the literature and on reported series with acceptable results^{4,8}.

They have been inserted in patients that had previous failed vascular accesses, or in other patients with advanced age, multiple associated conditions with a short life expectancy (myeloma, metastatic cancer, etc.) or with apparent poor vascular beds.

As it can be observed from the outcomes, complications have been few (only in three patients catheter replacement was necessary) and easily overcome. In no case patient death was attributed to catheter-derived complications, in spite of the importance that a vascular access may have on renal patients morbidity and mortality¹¹⁻¹³.

On the other hand, and similarly to some published series,^{6,8,13-15} analyzed dialysis parameters (Kt/V, flows achieved, an recirculation indexes, have been satisfactory.

Similarly, and contrary to what may seem, patients showed a high comfort level, especially those with multiple previous vascular accesses that, in this way, avoided repeated venous punctures.

The high rate of deceased patients (40%) may be surprising. This is easily explained by the fact the patients were old and presented multiple associated conditions. One should consider the high percentage of nephroangiosclerosis (40%) and diabetic nephropathy (26.66%), or the fact that none of them was in the renal transplantation waiting list. As well, there were patients with associated tumoral disease that worsened their life expectancy. All are poor prognosis data when entering into renal replacement therapy programs¹⁶⁻¹⁹.

This high mortality rate would also explain that mean functioning time at the time of dialysis was only 16.76 months. The use of this type of catheters in elderly patients, with a short life expectancy at the time of starting on hemodialysis, may be a highly valid alternative from a clinical and financial point of view if we analyze the cost of performing arterial-venous fistulae for which, in our case, we must refer patients to other reference centers, and the cost

derived from the use of other temporary catheters, hospital admissions for catheter-related sepsis, or other related costs.

We have no experience with the use of these catheters in young patients that will presumably receive soon a renal transplantation. The analysis of series that use them as temporary catheters may encourage its future usage^{20,21}. In any case, the preference for an autologous arterial-venous fistula is still clear, if it is possible. Obviously, catheter use may have negative connotations in intermediate and long terms, even if these patients would be susceptible to transplantation.

We have not compare the clinical course of our patients with Tesio's catheters with that of other patients with different vascular accesses. This would require a high number of patients as well as a prospective analysis.

In any case, we do want to highlight the good result we are obtaining with this type of catheters, easily inserted at a regional hospital, without dependence on other departments, in a certain type of patients. It remains to be known the future implications with regards to vascular accesses for chronic hemodialysis.

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