Slow maturation of arterio-venous fistula in seven uremic patients: use of Ash Split Cath® as temporary, prolonged vascular access

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ABSTRACT: The temporary vascular access is the essential condition required to perfrom hemodialysis in uremic patients in the absence of a permanent and utilizable vascular access. The cannulation of a central vein with a dual lumen catheter may be useful when a few weeks are required for the maturation of AVF. Longer times for AVF maturation (such as in diabetic patients and in aged patients) impose the use of a tunnelled catheter such as Tesio Catheter or Hickman Catheter which lead to minor complications and more efficient dialysis treatment. The Ash Split Cath®, a recently introduced chronic hemodialysis catheter, provides dialysis via a transcutaneous portion containing a 14 French cylindrical shaped catheter with D-shaped lumens and a dacron cuff.

Due to the slow maturing of AVF, in our Department the Ash Split Cath has been used in 7 uremic patients (3 males and 4 females) who required hemodialysis.

The cannulation of the internal jugular vein was performed by an ultrasound assisted technique and the correct catheter position was verified by standard chest X-rays.

The average blood flowrates were 250 ml/min, and the mean KT/V calculated in all patients one month after the beginning of the dialytic therapy was 1.09 ± 0.02. In six patients the catheter was utilized for at least 4 months, in one patient for 8 months. The devices were easily removed when the patient's AVF was functional and usable.

We found that the use of the Ash Split Cath as a temporary, prolonged vascular access in uremic patients was optimal allowing for flexibility in organizing the dialysis treatment schedule and in yielding a good performance in the initial dialysis therapy. Moreover, this device allows, in these patients, a satisfactory dialysis efficiency.

KEY WORDS: *Ash split cath, Vascular access*

INTRODUCTION

Vascular access is essential for hemodialysis and is frequently prepared before the onset of end-stage renal failure to ensure its proper functioning and usability at the start of the hemodialysis treatment. In addition, temporary vascular access is essential to perform hemodialysis in uremic patients in the absence of a permanent and usable vascular access. When end-stage renal failure requires immediate hemodialysis most nephrologists usually perform the cannulation of a central vein (mainly internal jugular vein) with a dual lumen catheter (1-2). This device allows the dialysis management of the uremic patient but it has several side effects and low dialytic efficiency.

The main objective of this study was to assess whether in uremic patients with slow arterio-venous fistula (AVF) maturation, the use of a tunnelled dialysis catheter allows efficient, initial dialysis treatment, with minimal side effects.

METHODS AND RESULTS

Because of the slow AVF maturation process, in our nephrology and dialysis department we used the Ash Split Cath® in 7 uremic patients (3 males and 4 females) requiring hemodialysis, namely: three diabetic patients (respectively 74, 44 and 46 years old), three patients over 75 years old and one 51-year-old with polycystic disease. Both clinical setting and pa-

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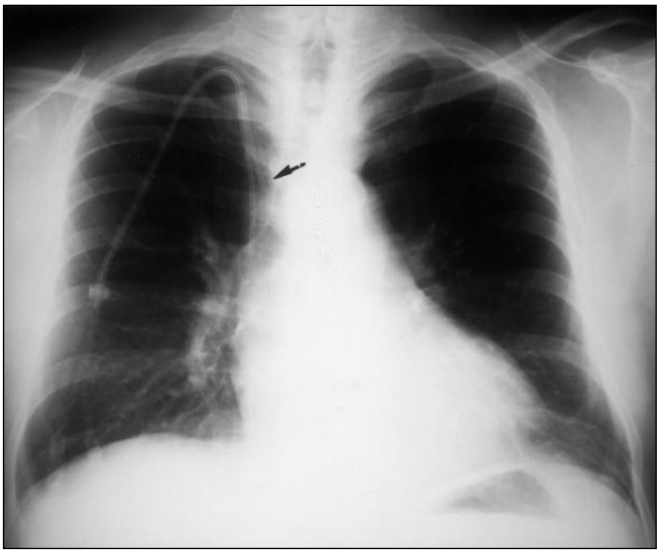

Fig. 1 - ***The standard chest X ray shows the correct position of the Ash Split Cath. In the jugular vein the Split Cath splits into two separate D-shaped limbs (arrow).***

tient age justified the slow AVF maturation.
Informed consent was obtained from all patients.
The Split Cath provides dialysis via a transcutaneous portion containing a 14-French cylindrical – shaped catheter with D-shaped lumens and a dacron cuff.
The cannulation of the internal jugular vein was performed by an ultrasound assisted technique (3-4) and the correct catheter position was verified by standard chest X rays (Fig. 1).
At the entrance to the jugular vein the Split Cath splits into two separate D-shaped limbs which merge into multiholed cylindrical tips in the vena cava. All patients have been dialyzed three times a week with 4-hour sessions.
Average blood flowrates were 250 ml/min, and the hydraulic resistance was the same as that described by Mankus and Ash (5). The mean KT/V calculated for all patients one month after the beginning of the dialysis therapy was 1.09 ± 0,02.
No bleeding or infection or flow complications occurred. Catheter patency during the interdialysis interval was assured by filling each lumen with heparinized solution.
In six patients the catheter was utilized for at least 4 months, in one patients for 8 months. The devices were easily removed when patient AVFs were functional and usable. Presently five patients are regularly dialyzed by using native AVF and one patient has been transplanted. One patient died of cardiovascular accident.
In two patients, considered for kidney transplantation, a cavography was performed five months after catheter withdrawal: no vessel damage was observed and, in particular, the state of the jugular vein was found to be normal. In other patients, regularly dialyzed by native AVF the contrast medium examination has not been performed because until today there is no evidence of blood flow changes.

DISCUSSION

Temporary vascular access plays an essential role in the management of a patient requiring hemodialysis (2). The conditions for emergency vascular access mainly include acute renal failure and end-stage renal failure requiring immediate hemodialysis.
It is possible that in some uremic patients the slow AVF maturation does not allow its early utilization and, therefore, a temporary vascular access may be required.
The cannulation of a central vein with a dual lumen catheter may be useful when a few weeks are required for AVF maturation; the advantage of this catheter is that it can be immediately used but it may result in complications like local or systemic infections, thrombosis and low blood flux with poor dialysis efficiency. Longer AVF maturation times (diabetic patients and old patients) impose the use of a tunnelled catheter (Tesio Catheter®, Hickman Catheter®, Ash Split Cath®) which results in minor complications and more efficient dialysis treatment. The Ash Split Cath® is a recently introduced chronic hemodialysis catheter.
In our expreience the use of the Ash Split Cath as a temporary, prolonged, vascular access in uremic patients gave excellent results, if allowed flexibility in organizing the dialysis treatment schedule and performing well in the initial dialysis therapy. Morevoer, in these patients, the dialysis efficiency of this device was satisfactory.
In conclusion, we recommend the use of the Split Cath because it is simple to insert and remove, while providing adequate dialysis treatment, and it is particularly indicated for uremic patients with slow AVF maturation. Although we believe that the advantages of the Split Cath are greater than those of the traditional dual lumen catheters, further experience is needed to confirm our observations.

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