

# Clinical experience of hemodialysis with percutaneous arteriovenous fistulae

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**No potential conflict of interest**

# Introduction

- Arterio-venous fistula (AVF) : best vascular access for hemodialysis.
- AVF creation is recommended 6 months before initiation (KDOQI 2006).
- Complications: stenosis, aneurysm, high blood flow, ischemia, steal syndrome.
- In the last 50 years, no changes have occurred in the way AVFs are created.
- **Recently, Ellipsys devices** have enabled the creation of percutaneous arterio-venous fistula (pAVF): anastomosis between the proximal radial artery, and the deep communicating vein in the proximal forearm.

# Introduction

- Anatomic criteria for the p AVF creation :
  - **Pre-operative ultrasound examination**
    - Distance between DCV and PRA  $< 1.5$  mm.
    - DCV and PRA diameter  $\geq 2$  mm.
- Average duration of the procedure : 15 min.
- No scars.
- High patient satisfaction.

Before



Today



# Objectives

## To evaluate :

- Puncture and the use of pAVF / Differences from surgical AVF.
- Quality of dialysis.
- Related complications.
- Need for re-interventions.

# Methods

**From May 2017 to January 2019 :**

46 patients p AVF: 45 technical successes

Average age : 67 years old (26-82)

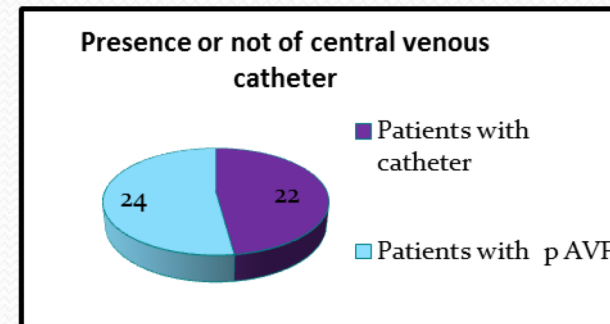
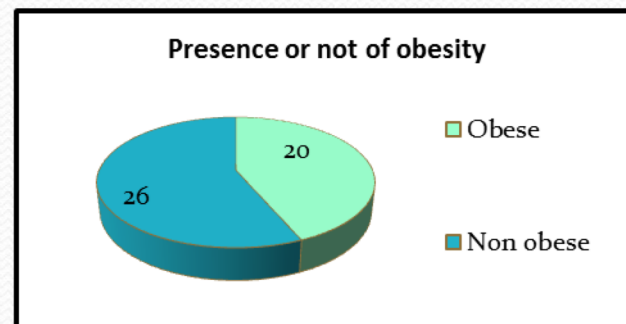
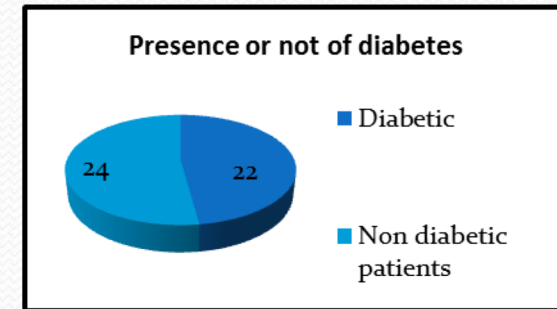
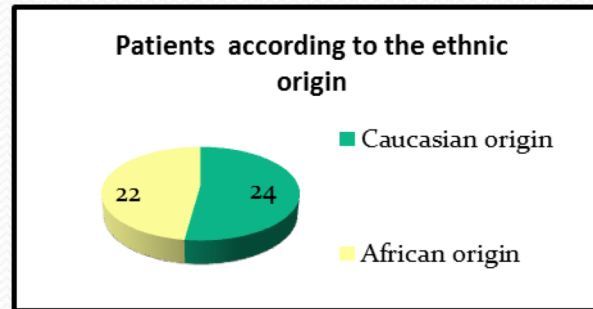
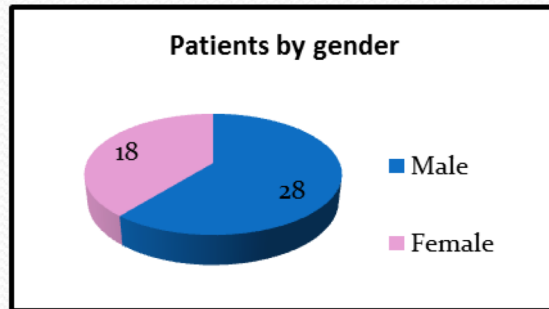
Average Follow-up : 390 days (30-640)

- 4 patients had not yet started dialysis

- 3 patients died during the follow-up period

*(from causes unrelated to the procedure).*

- 1 distal p AVF



# Methods

## **Before p AVF creation**

- Clinical and vascular ultrasound exam by vascular surgeon for patient eligibility.

## **During follow-up of p AVF**

- Clinical check-up (nephrologist).
- Skin marking to guide the puncture (vascular surgeon).
- Plavix : 1 dose/day (for 1 month).

## **During the use of p AVF**

- Monitoring of dialysis parameters.
- Doppler follow-up: **brachial artery** :1, 3, 6 months, 1year and 18 months later.



# Results

I- p AVF creation enabled different ways of **cannulation** :

**1- 2 needles in the cephalic vein**  
(26 patients)



# Results

**2- 2 needles in both the cephalic and the median basilic vein**  
(15 patients)



**Cannulation areas marked on the forearm to guide the puncture**

# Results

## 3- Early cannulation (< 2 weeks)

(12 patients)



# Results

## 4- Button-hole

(10 patients)

*pAVF after 6 months*



*pAVF after 21 months*



# Results



**pAVF Button-hole formation**



**p AVF puncture on day 21**

# Results

## 5- Ultrasound guidance

(12 patients)

- Skin marking



# Results

## 6-Ultrasound guidance of p AVF cannulation





**Compression of median basilic vein to increase blood flow in cephalic vein**



# Results

(2 patients)



**p AVF after surgical fistula failure**

# Results

**II- Percutaneous angioplasty (3 to 4 weeks after procedure : 7 patients).**

**III- Banding of the basilic vein (1 patient).**

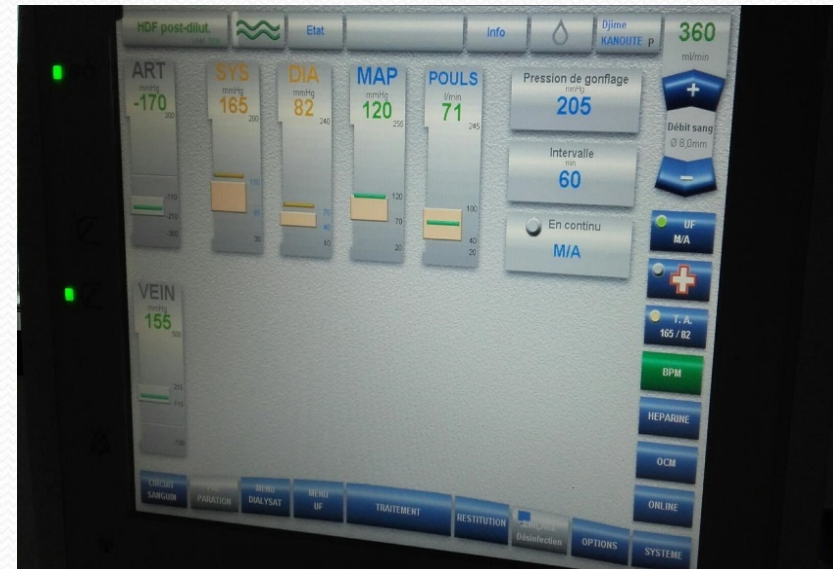
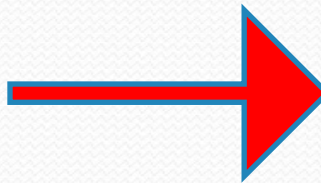
**IV- Valvulotomy (1 patient).**

**V- Superficialization: ( 3 patients)**

# Results

## IV- Hemodynamic parameters of hemodialysis :

- Average pump Blood flow : 330 ml/min
- Kt/v : 1.6 - Recirculation <10%
- **16** patients were treated by HDF (re-infusion volume>20l)



**Excellent parameters of hemodialysis session**

# Results

## Average flow of pAVF :

3 months : 670ml/min, 6 months : 690ml/min, 1 year : 860 ml/min, 18 months : 880ml /min

## Complications :

- **No** aneurysm, **no** high blood flow, **no** stenosis



**Moderate AVF flow and lower venous pressure, decreased risk of congestive heart failure and aneurysm formation.**

## Recommandations - Conclusions

- The first cannulation of p AVF must be **guided** by the nephrologist.
- Early cannulation: can prevent the use of a catheter.
- Excellent dialysis hemodynamic parameters.
- No scar, no stenosis
- Less complications such as aneurysm, high blood flow.
  
- **Innovative technique, high patient satisfaction**
  
- **Importance of the multidisciplinary collaboration: nephrologist, vascular surgeon, dopplerist.**

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L'équipe IDE

## **Hôpital Privé de Thiais**

L'équipe IDE





Thank you for your attention