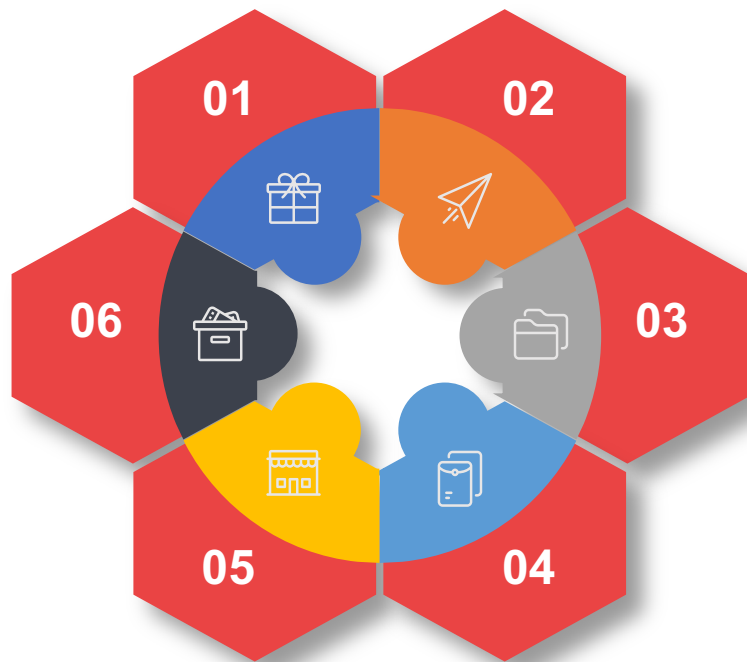




# PREOPERATIVE AND POSTOPERATIVE ECHOGRAPHIC VASCULAR CHARACTERISTICS IN ARTERIOVENOUS FISTULAR PATIENTS

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# CONTENTS



- **01** INTRODUCTION
- **02** OBJECTIVES
- **03** OVERVIEW
- **04** METHODS
- **05** RESULTS AND DISCUSSION
- **06** CONCLUSIONS

# INTRODUCTION

- AVF: “Life buoy for ESRD”
- Preoperative mapping echo:  
Increases success rate
- Early postoperative echo:  
AVF maturation prognosis,  
complications.



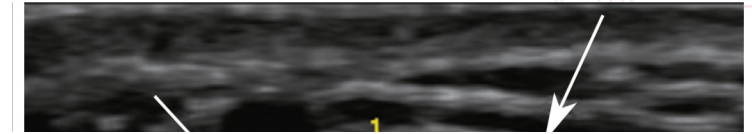


# OVERVIEW

## Preoperative Mapping

- Radial diameter  $\geq 2$  mm  
(acceptable if  $> 1.6$  mm)
- Venous diameter  $\geq 2.5$  mm

**To achieve favorable results**



**FIGURE 16-2** Proper position of arm on instrument stand for imaging of the vessels for hemodialysis planning.





# OVERVIEW

## Hemodynamics

AVF flow increases most strongly in the first 24 hours after surgery (# 50% flow at 4-6 weeks)  $\Rightarrow$  continues to increase in the next 2-3 weeks  $\Rightarrow$  increases slowly after  $\Rightarrow$  Early postop echo helps predict AVF prognosis

## Maturation criteria

Venous diameter  $\geq$  **4-5 mm** and AVF flow  $\geq$  **400-500 ml/min**

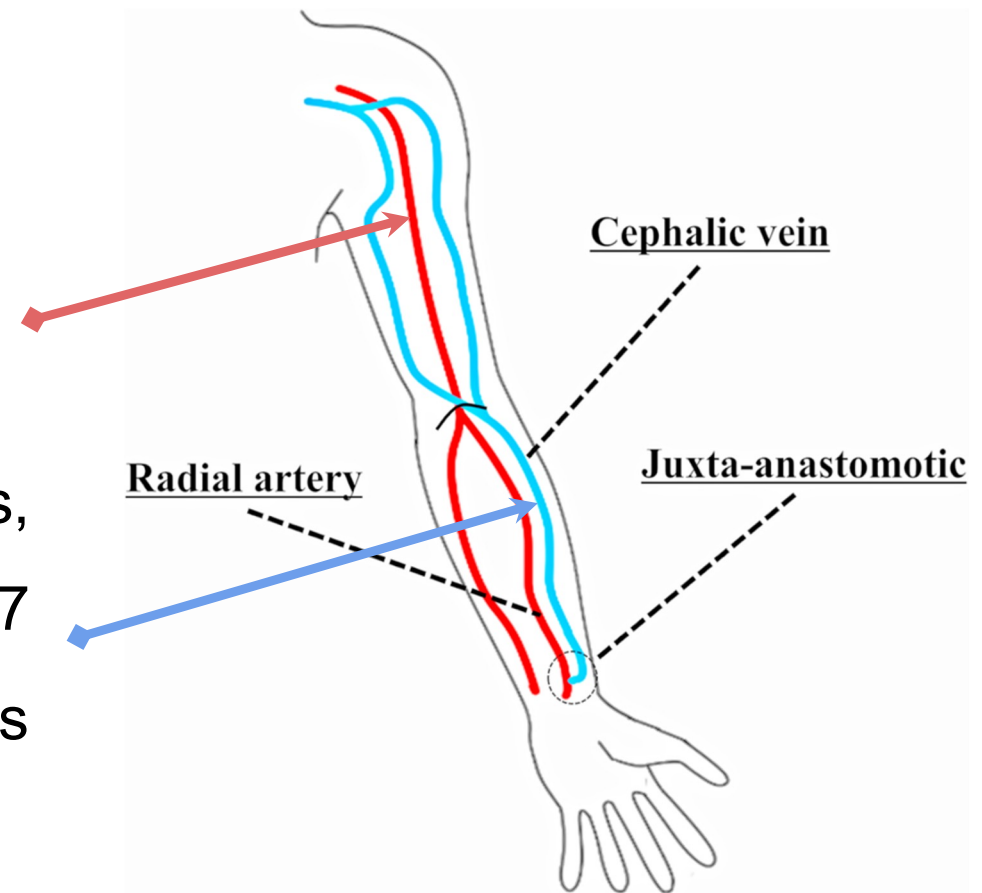


# OVERVIEW

## Postop echo for flow assessment

Measurement:

- Brachial artery
- Vein: 5 – 10 cm from anastomosis, straight, no aneurysm formation,  $d \leq 7$  mm, no significant accessory branches





# METHODS

**Research design:** Prospective, case series description

**Sample selection criteria:** All patients who undergo surgery to create a new arteriovenous fistula (AVF) at Dong Nai General Hospital from 04/2022-04/2023

**Exclusion criteria:**

1. Patients who cannot be contacted.
2. Deceased patients.
3. Patients who already have an AVF on the same side but it is dysfunctional.

**Sampling method:** Convenience sampling







# RESULTS - DISCUSSION



## RESULTS - DISCUSSION

### Population characteristics of the study

Features	Our study (N = 80, Dong Nai, 2023)	Robbin (N = 143, USA, 2016)	N.B.Tuyền (N = 75, Cho Ray, 2015)
Age, year	61 (48 – 65)	52,2 (33,0 – 67,4)	62 (51 – 72)
Gender, male(%)	50,0	86,0	25,3
Pre-op renal function(%)	72,5	63,6	
Hypertension(%)	96,25		
Diabetes(%)	51,25	51,0	52,0
Radiocephalic AVF (%)	81,25	23,75	



Michelle L. Robbin. Arteriovenous Fistula Development in the First 6 Weeks after Creation. Radiology. May 2016; 279(2): 620–629

ATSS 2023 Bích Tuyền. Ứng dụng siêu âm mapping mạch máu trước mổ tạo dò động tĩnh mạch để chạy thận nhân tạo. Tạp chí Y học TP.HCM. 2015; 19(4)

## RESULTS - DISCUSSION

### Preoperative vascular characteristics

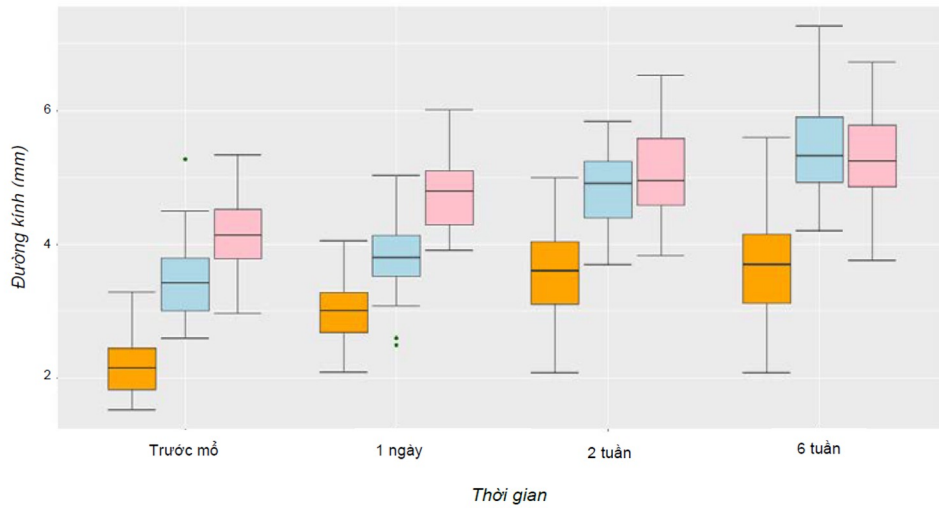
AVF location	Vessels	Features	Our study (2023)	Robbin (2016)
Radiocephalic AVF (n = 65)	Radial artery	Diameter, mm	<b>2,12</b> (1,83 – 2,5)	2,3 (1,8–3,0)
		D ≥ 2 mm (%)	<b>61,54</b>	
		D > 1,6 mm (%)	<b>95,38</b>	
	Cephalic vein	Diameter, mm	<b>3,38</b> (2,9 – 3,80)	
		D ≥ 2,5 mm (%)	<b>95,38</b>	
Brachial AVF (n = 15)	Brachial artery	Diameter, mm	<b>3,67</b> (3,45 – 3,99)	4,2 (3,1 – 5,4)
	Cephalic or Basilic vein	Diameter	<b>4,0</b> (3,64 – 4,05)	
		D ≥ 2,5 mm (%)	<b>100</b>	



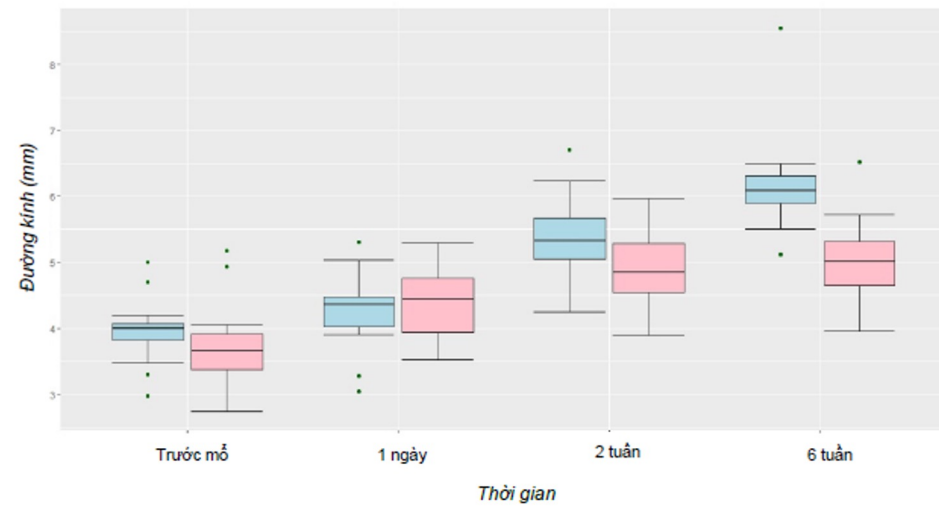
## RESULTS - DISCUSSION

**Surgical outcomes: 81.25% had no complications.**

Loại AVF	Thời điểm	Biến cố (%)	Xử trí
AVF cẳng tay (n = 65)	Sau mổ 1 ngày	1 huyết khối hẹp TM dẫn lưu (1,54)	PT lấy huyết khối
	Sau mổ 2 tuần	3 phân nhánh phụ (4,62)	PT thắt nhánh
	Sau mổ 6 tuần	7 hẹp TM dẫn lưu (10,77)	5 can thiệp nong đoạn hẹp 1 PT tạo lại miệng nối mới 1 không đồng ý can thiệp
		3 không trưởng thành (4,62)	PT tạo AVF mới
	<b>Tổng</b>	<b>14 (21,5)</b>	
AVF cánh tay (n = 15)	Sau mổ 1 ngày	0 (0)	
	Sau mổ 2 tuần	0 (0)	
	Sau mổ 6 tuần	1 huyết khối tắc TM dẫn lưu (6,67)	PT tạo AVF mới
	<b>Tổng</b>	<b>1 (6,67)</b>	



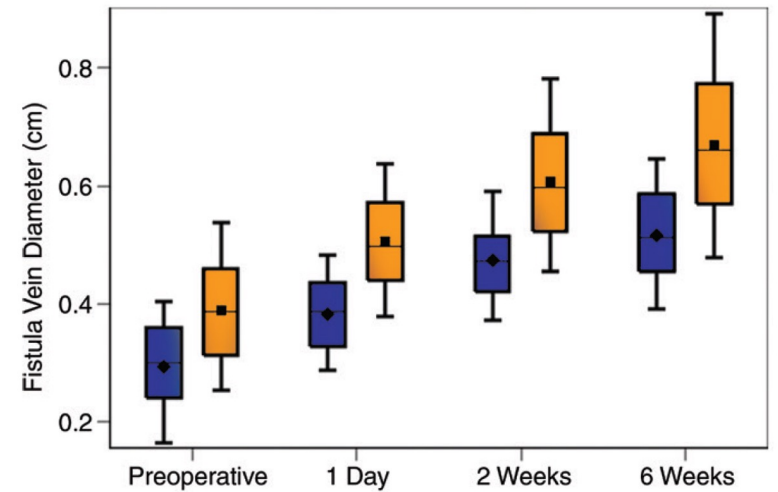
**Radiocephalic AVF (n=51)**



**Brachial AVF (n=14)**

## RESULTS - DISCUSSION

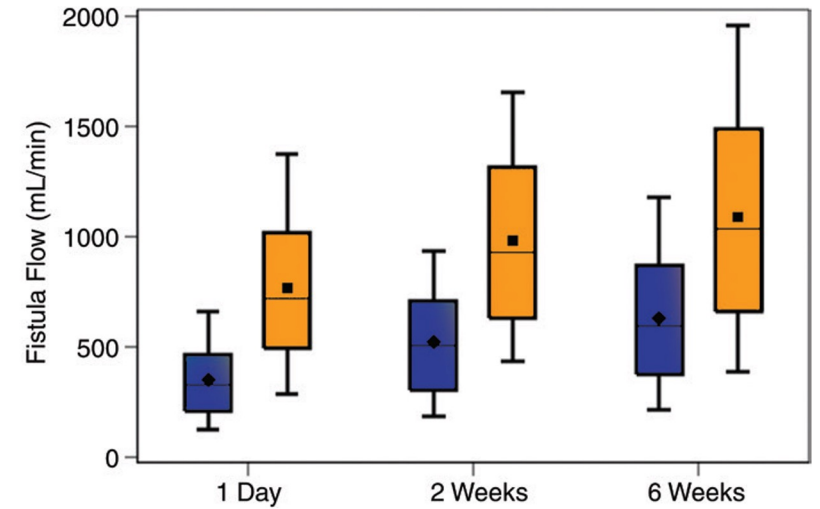
### Change in diameter



**Robbin**

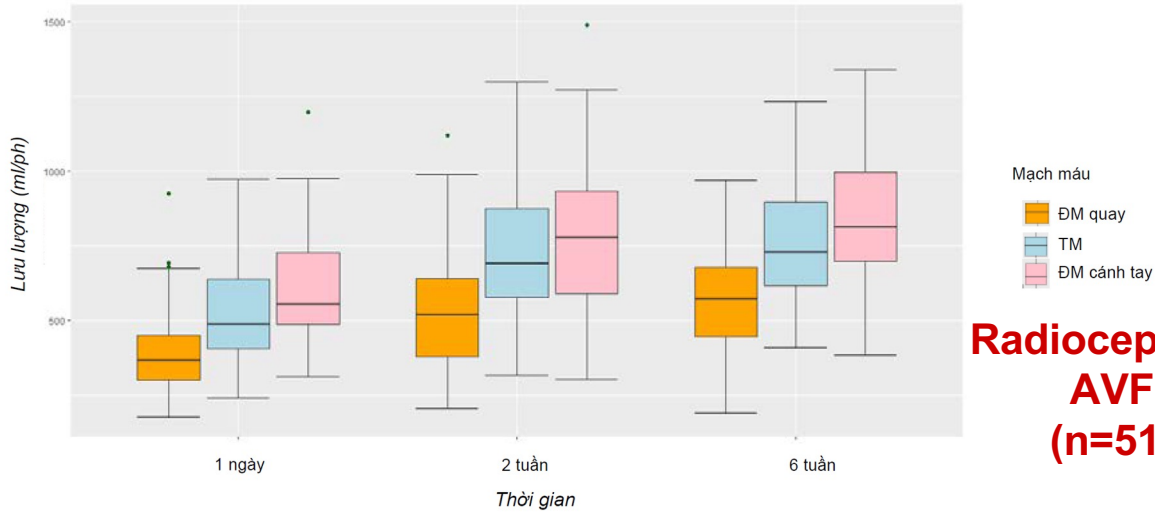
# RESULTS - DISCUSSION

## Change in volume flow

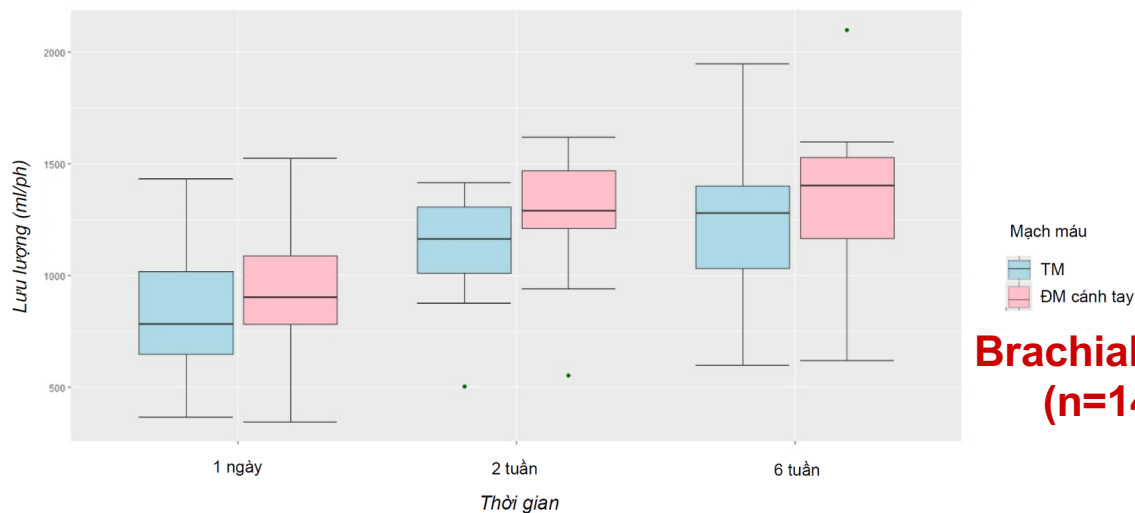


**Robbin**

Michelle L. Robbin. Arteriovenous Fistula Development in the First 6 Weeks after Creation. Radiology. May 2016; 279(2): 620–629



**Radiocephalic AVF (n=51)**



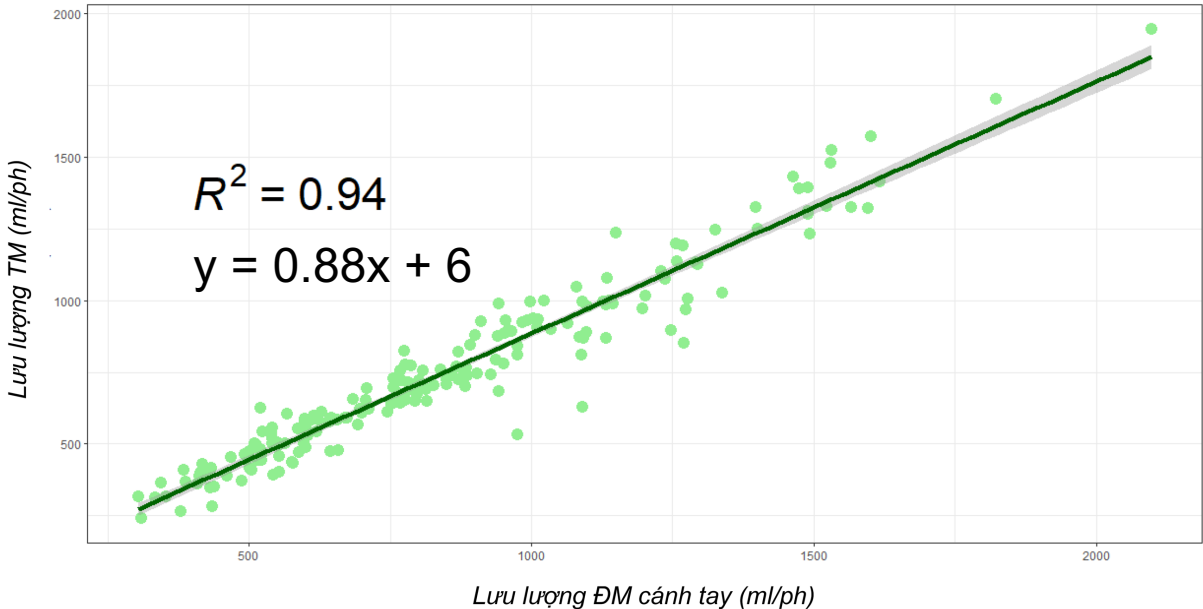
**Brachial AVF (n=14)**



**Our study**

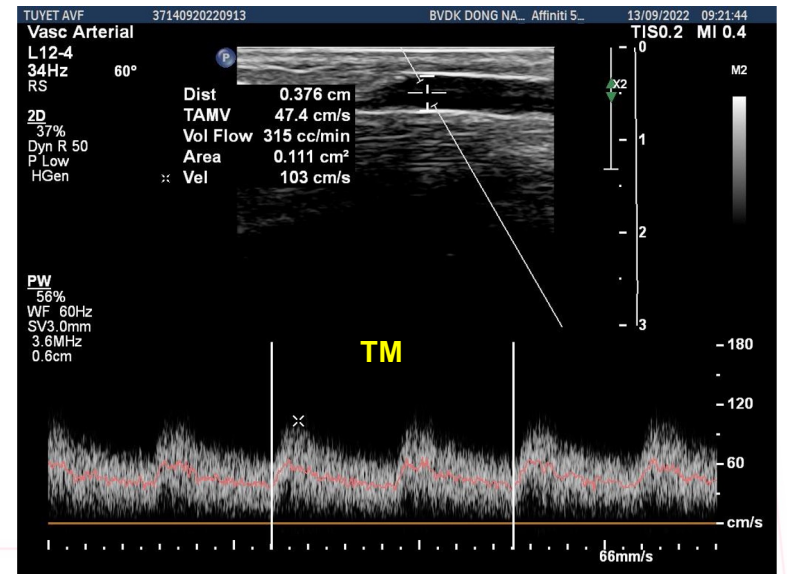
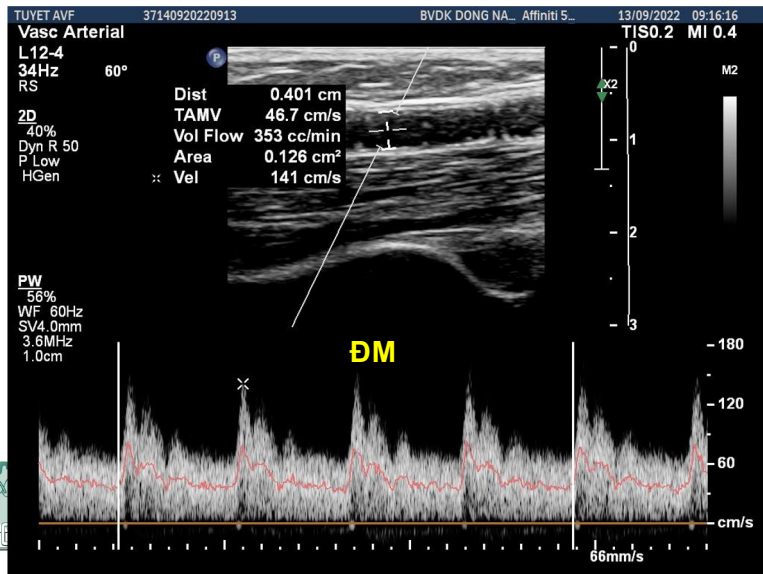
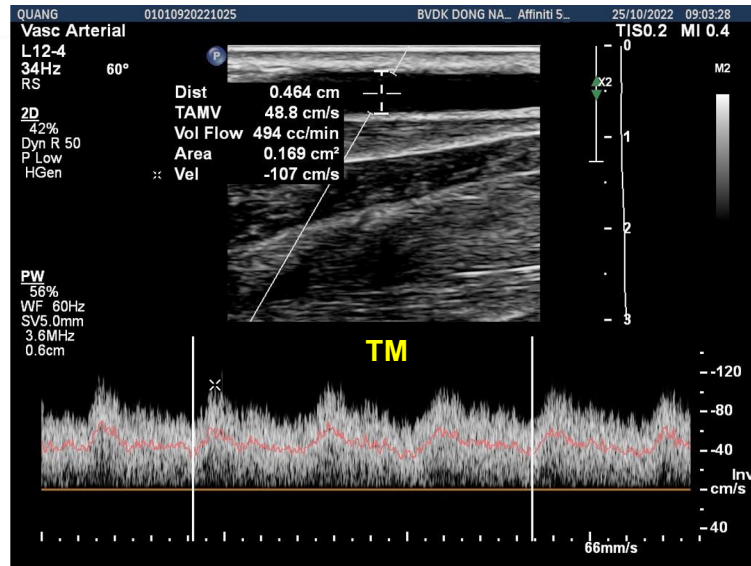
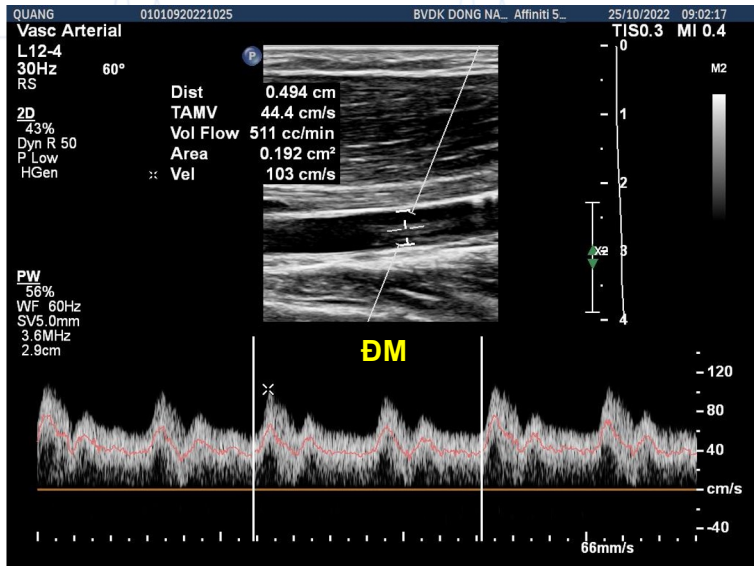
# RESULTS - DISCUSSION

## Change in Volume flow



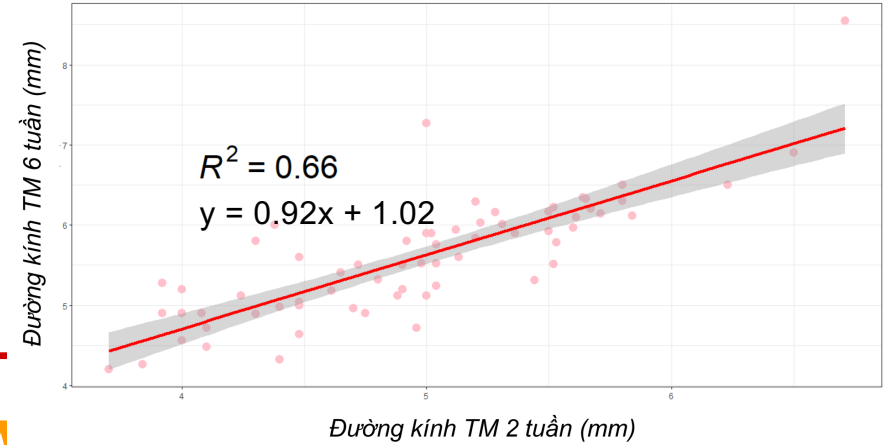
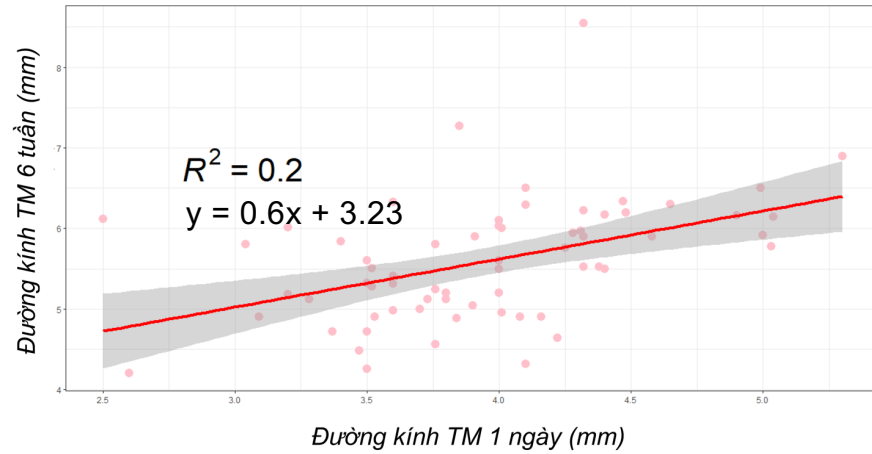
*Correlation between venous outflow and arterial flow in the arm.*



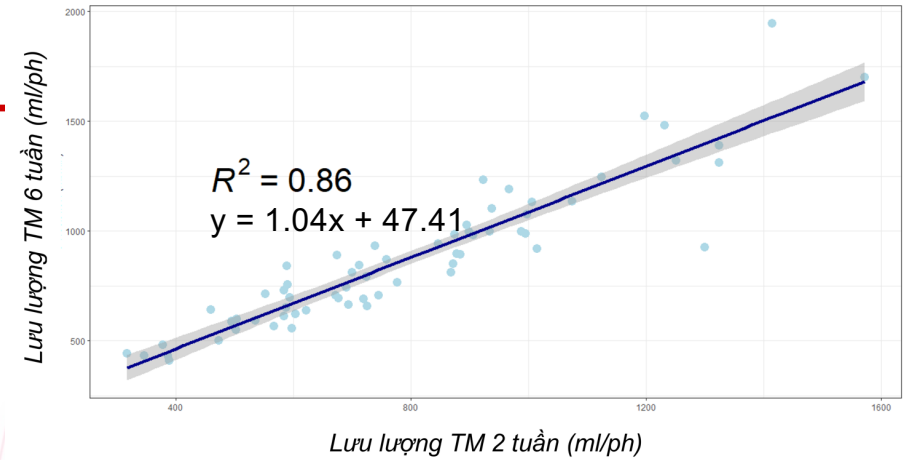
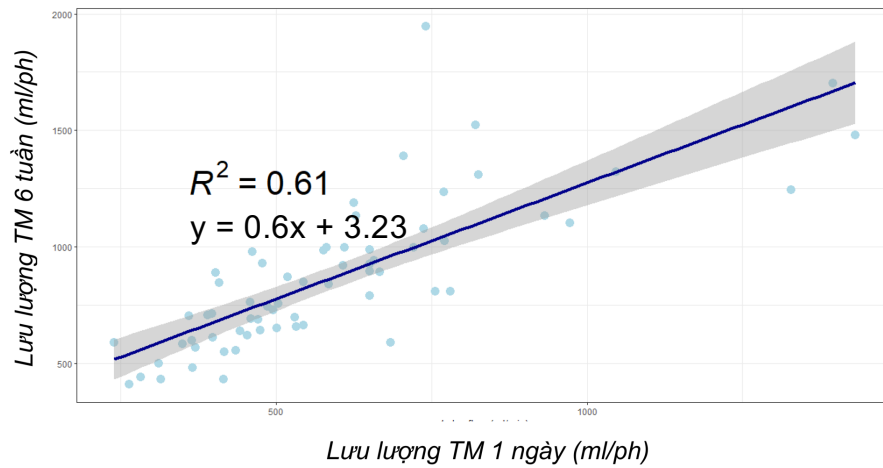




# Correlation analysis



for





# CONCLUSIONS - RECOMMENDATIONS

- Preoperative Doppler mapping: highly necessary
- Two weeks post-surgery ultrasound: a predictor of AVF maturation
- Measuring AVF flow in the arm artery: easily performed, minimizes errors
- Patients with diabetes: careful consideration needed when selecting the preoperative blood vessel.





THANKS FOR YOUR ATTENTION

