



# Pre-operative VA ultrasound: From when and how to its predictive power

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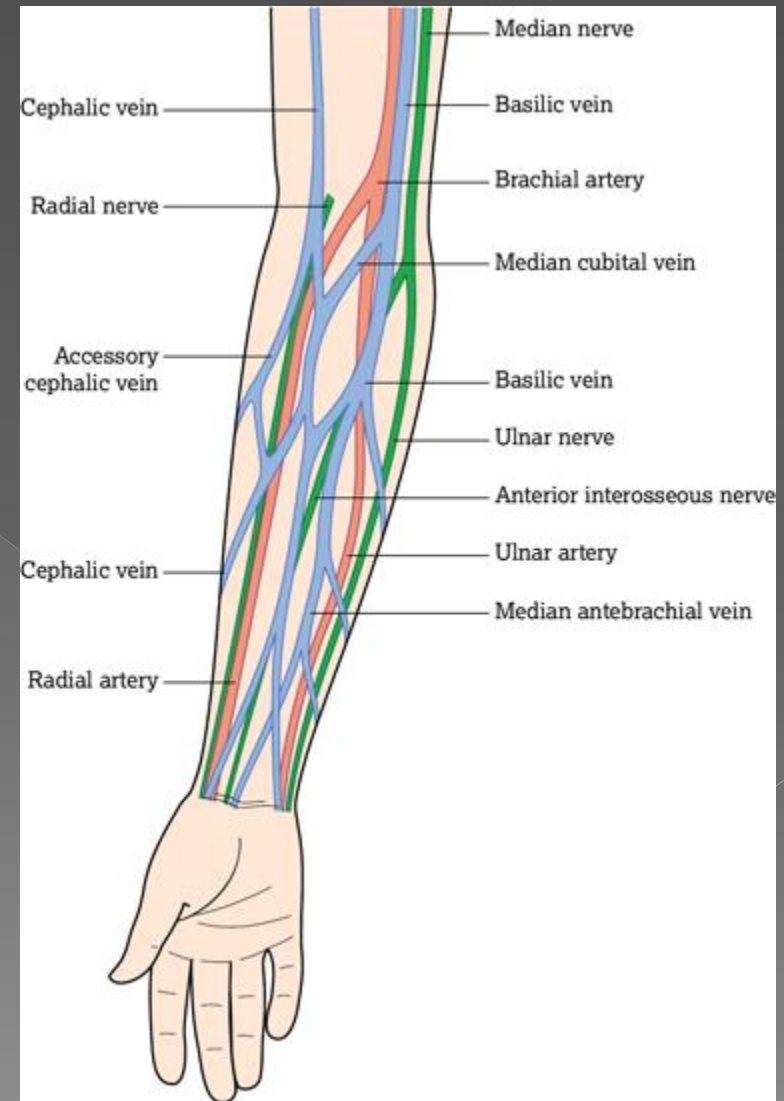
Do you believe pre-op US  
can improve AVF  
outcome?





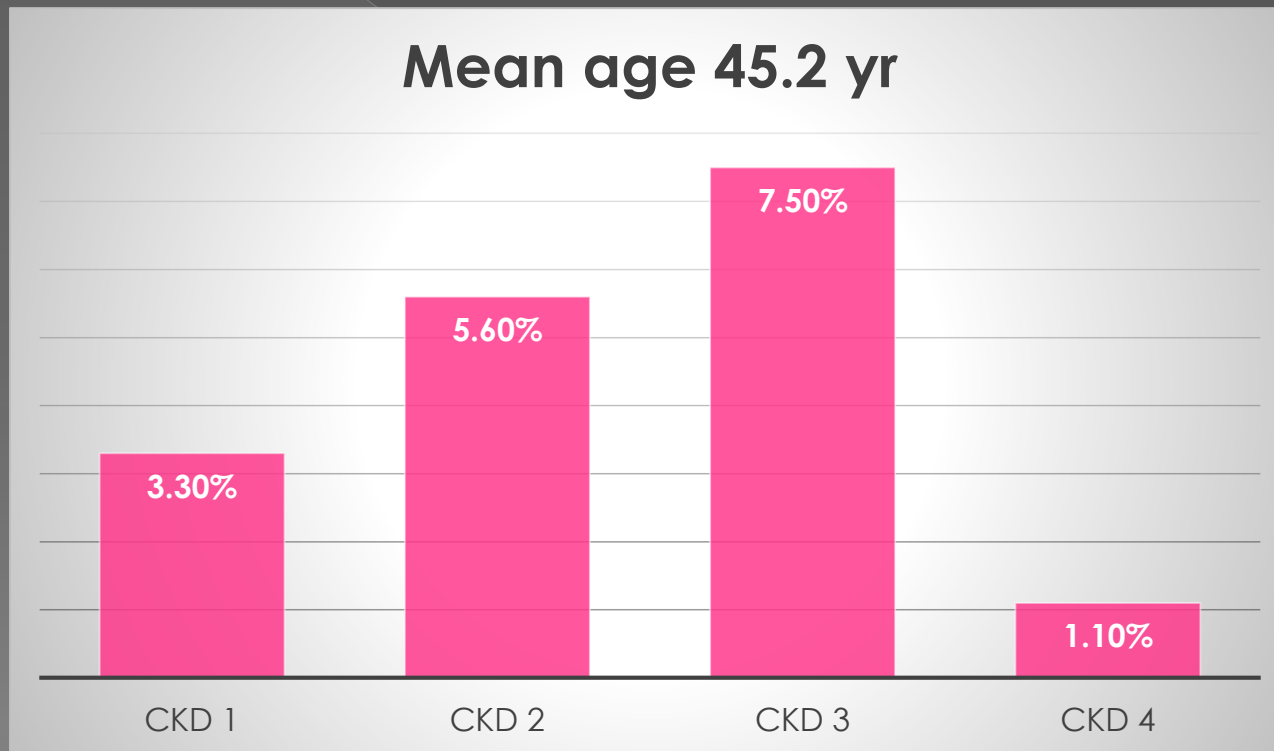
# Role of pre-op Ultrasound

- Evaluate veins / arteries
  - > Vein preservation planning
  - > AVF planning



# Thai CKD patients

○ Prevalence CKD = 17.5%



Ingsathit A, Thakkinstian A, Chaiprasert A, Sangthawan P, Gojaseni P, Kiattisunthorn K, Ongaiyooth L, Vanavanan S, Sirivongs D, Thirakhupt P, Mittal B. Prevalence and risk factors of chronic kidney disease in the Thai adult population: Thai SEEK study. *Nephrology dialysis transplantation*. 2009 Dec 27;25(5):1567-75.

## CKD staging by GFR

Stage	GFR (mL/min/1.73m <sup>2</sup> )
1	≥90
2	60-89
3	30-59
4	15-29
5	<15

# Venous preservation

- GFR < 60 ml/min/1.73 m<sup>2</sup> (stage 3,4,5)
  - > Consult multidisciplinary kidney team
    - CKD clinic
  - > Venous preservation
    - Routine
    - Planning by **ultrasound**



# Venous preservation

- Venipuncture in veins
  - > Of either arm
  - > On the dorsum of the hand





# When patient refer to Nephrologist

- ◉ GFR < 30 ml/min/1.73 m<sup>2</sup> (stage 4,5)
- ◉ Progression of CKD
- ◉ AKI or abrupt sustained fall in GFR
- ◉ Significant albuminuria

# When AVF plans

- ◉ GFR < 30 ml/min/1.73 m<sup>2</sup> (stage 4,5)
- ◉ Advice modes of RRT
- ◉ If Hemodialysis is choosed
  - > Consult Vascular surgeon for AVF planning
  - > Planning by **Ultrasound**

# When to create AVF

- ESVS guideline 2018
  - > Created 3-6 months before the expected start of HD
- CMU
  - > GFR < 15 ml/min/1.73 m<sup>2</sup> (stage 5)
  - > Waiting list ~ 2 months

# AVF planning Physical exam VS Ultrasound



# AVF planning

- Tourniquet in a warm room
  - > Tapping vein
- Pulse exam
  - > Allen's test



# AVF planning

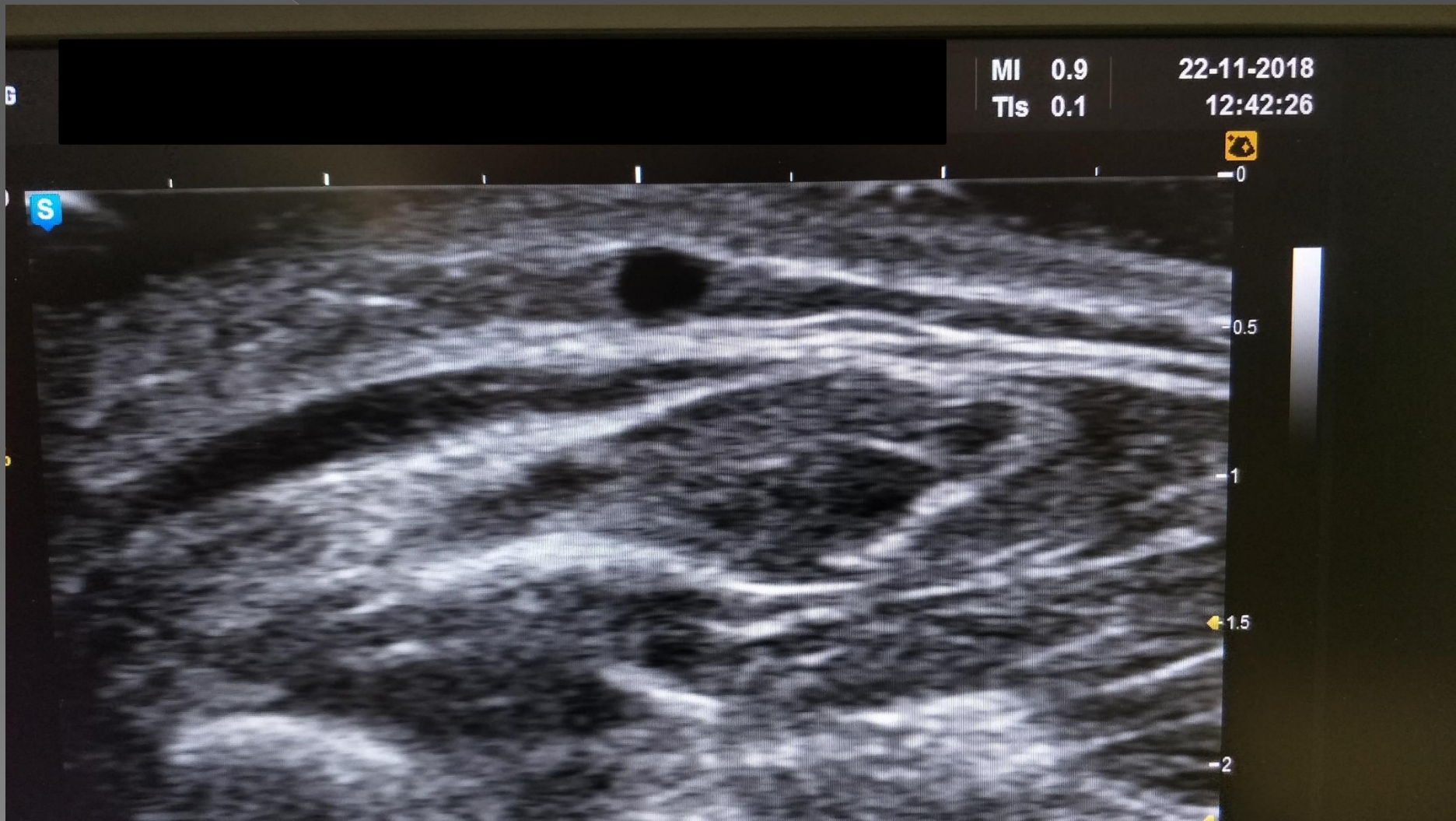
- ◉ Duplex ultrasound
  - > Veins
  - > Arteries



Schmidli J, Widmer MK, Basile C, de Donato G, Gallieni M, Gibbons CP, et al. Editor's Choice - Vascular Access: 2018 Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS). 2018;55(6):757-818.



# Duplex ultrasound

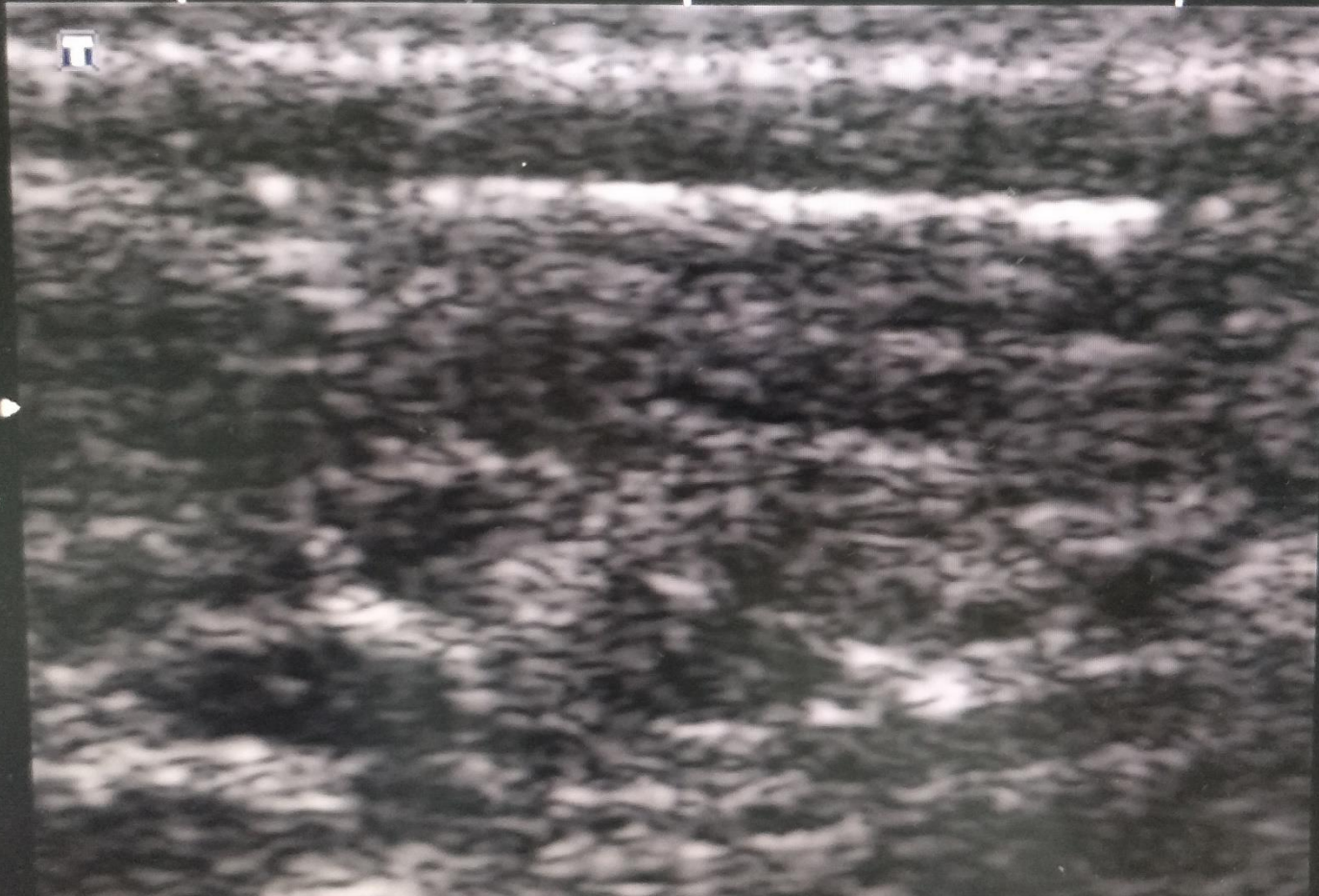


# Duplex ultrasound

MAHARAJ NAKORN CHIANGMAI

22/03/2018  
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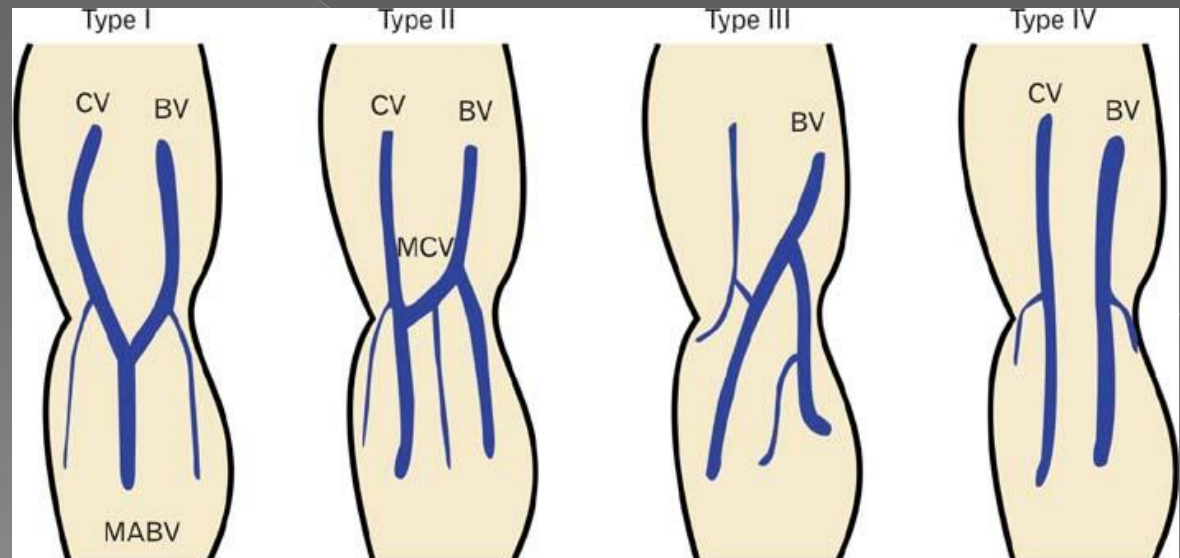
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6.0  
42fps  
DR65  
G86





# Duplex ultrasound

- Can detect
  - > Actual size and depth of vessels
  - > Chronic thrombotic or fibrous vein
  - > Calcified artery
  - > Variations



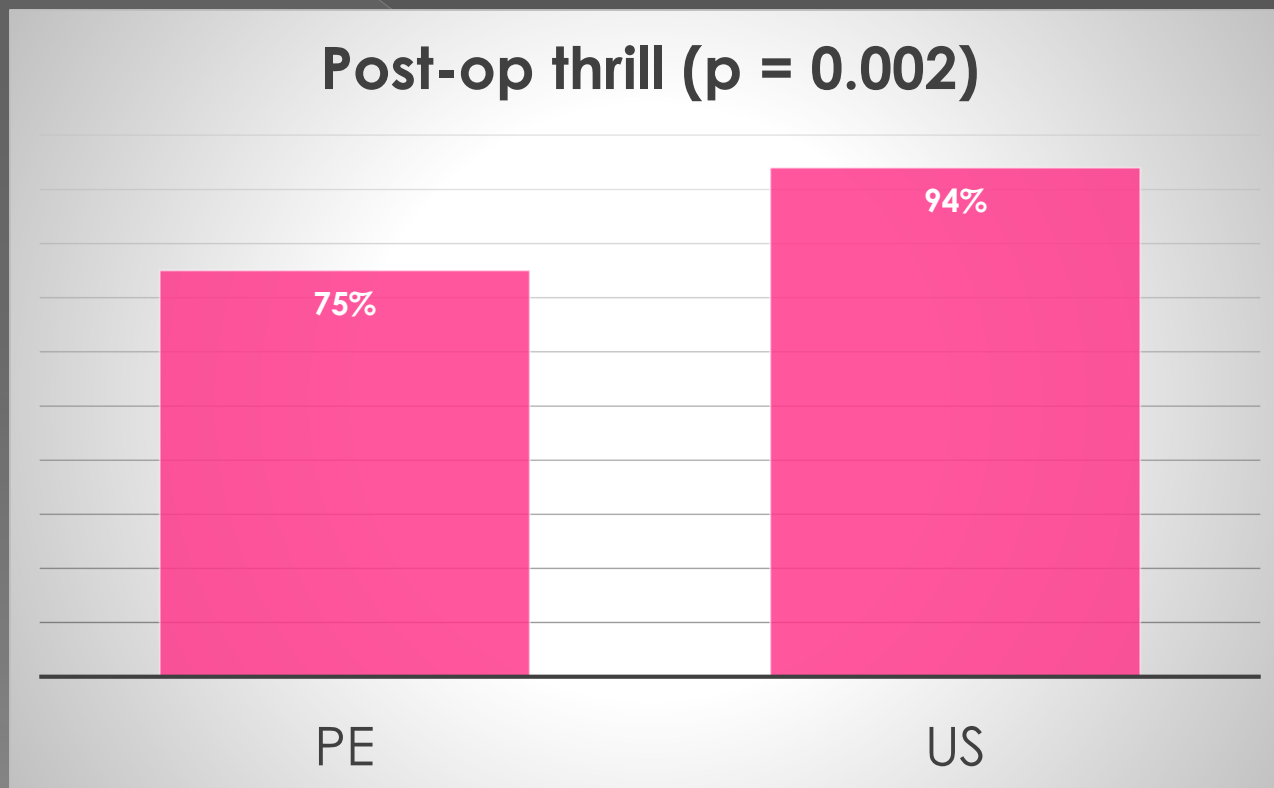
# Physical exam VS Ultrasound

- Immediate outcome - Thrill



# Physical exam VS Ultrasound

- RCT 124 patients



# Physical exam VS Ultrasound

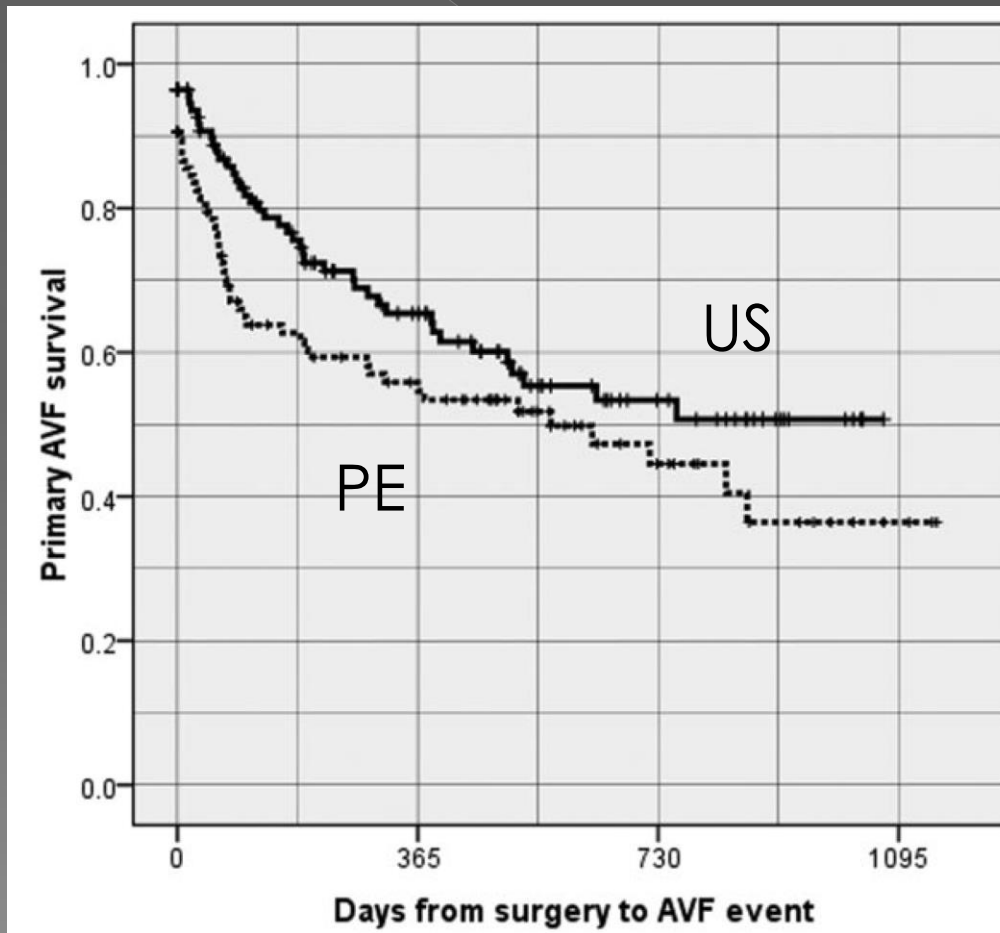
- Long-term outcome – AVF survival





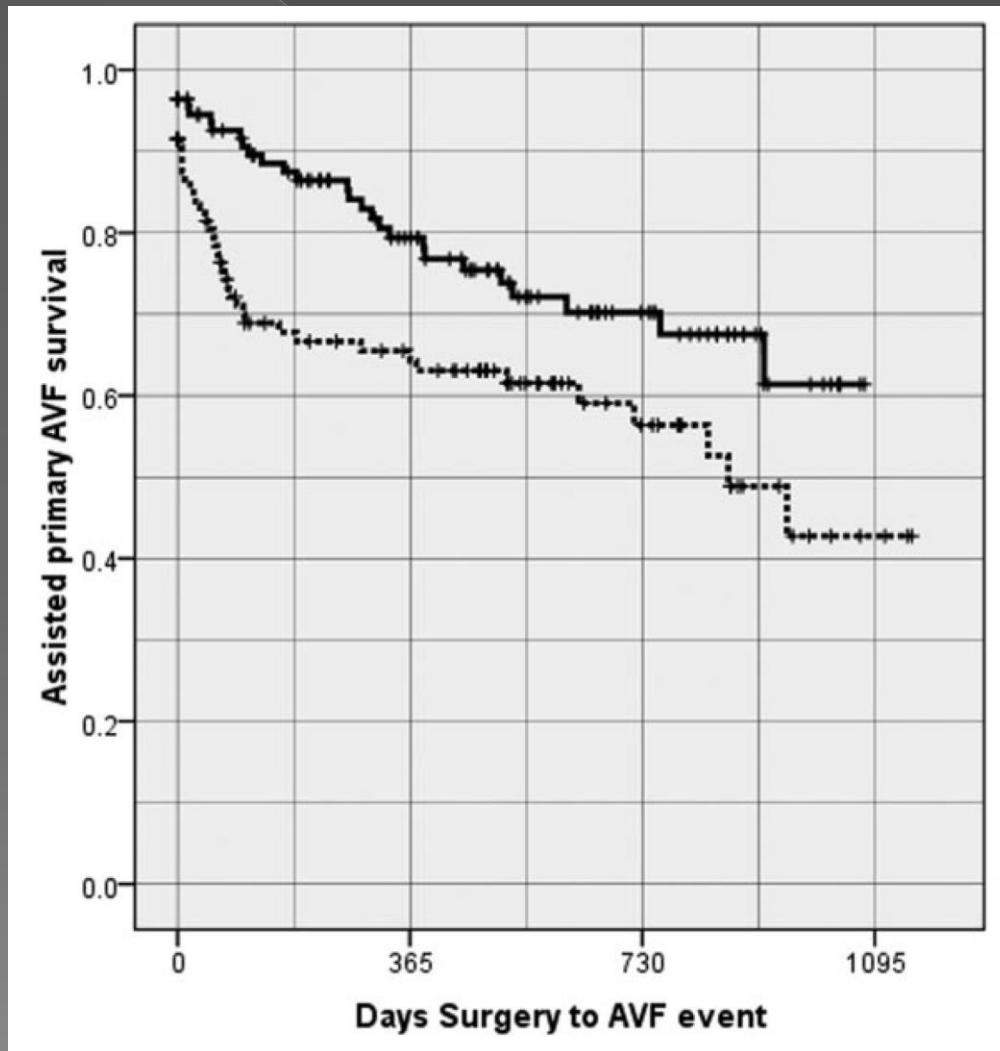
# Physical exam VS Ultrasound

○ RCT 218 patients



- 1 yr survival at 1 yr ( $p=0.081$ )
  - > US = 65%
  - > PE = 56%

# Physical exam VS Ultrasound



- Assisted 1yr survival at 1yr (p=0.012)
  - > US = 80%
  - > PE = 65%

# Conclusions

- Pre-operative ultrasound
  - > Necessary!!!
  - > CKD stage  $\geq 3$ 
    - Venous preservation planning
  - > CKD stage  $\geq 4$ 
    - AVF planning
  - > Increase numbers of post-op thrill
  - > Increase overall AVF survival