

CONTROVERSES ET ACTUALITES EN CHIRURGIE VASCULAIRE

CONTROVERSIES & UPDATES IN **VASCULAR SURGERY**



JANUARY 23-25 2020

MARRIOTT RIVE GAUCHE & CONFERENCE CENTER | PARIS | FRANCE

WWW.CACVS.ORG



DUPLEX PRE OPERATIVE MAPPING

APPLICABILITY OF PERCUTANEOUS
AVF CREATION
BASED ON A PROSPECTIVE
ULTRASOUND EVALUATION

**G.FRANCO
CLINIQUE ARAGO
PARIS**

Disclosure

Speaker name: G. FRANCO

.....

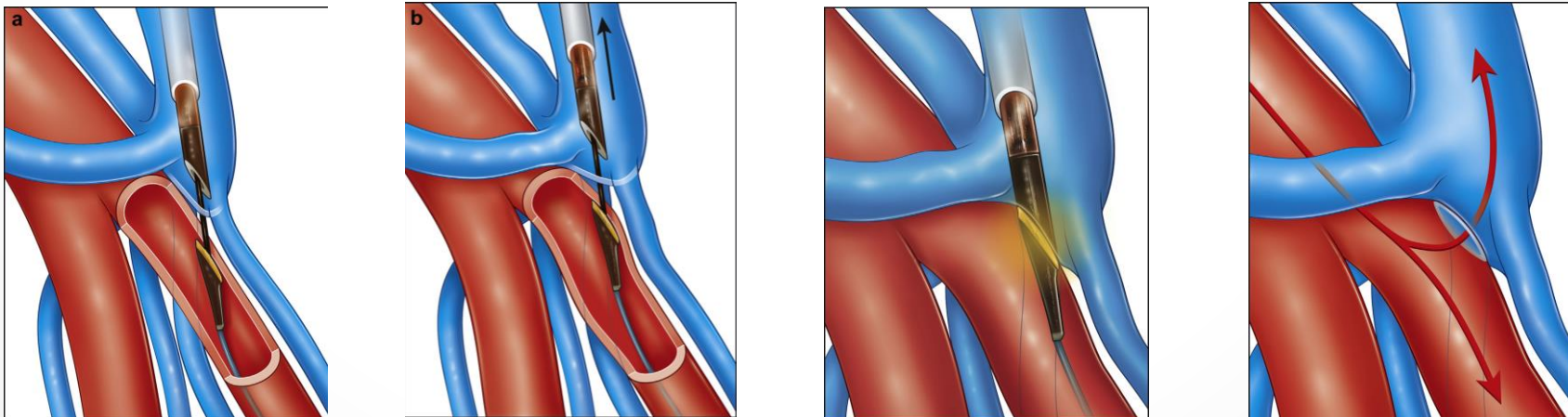
- I have the following potential conflicts of interest to report:
- Consulting
- Employment in industry
- Shareholder in a healthcare company
- Owner of a healthcare company
- Other(s)
- I do not have any potential conflict of interest

STATEMENT OF THE PROBLEM

- **AVF at wrist is the first option for vascular access creation (KDOQI, EBPG) despite:
High early thrombosis and non-maturation rate ranging from 5 to 50%**
- **PERFORATING VEIN AT CUBITAL FOSSA
Valuable resource for the creation of a vascular access
Surprisingly it doesn't take any place in the recommendations of AVF creation**

WHEREAS

- **Easy to perform surgically or now better PERCUTANEOUSLY
Allows future construction of AVF using the predilated veins if necessary: CV-BV -BR VEINS**

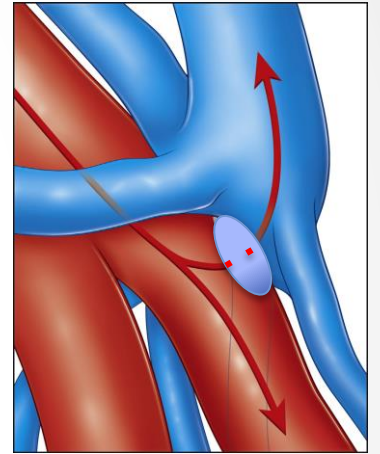


AVF CREATION

**Percutaneous AVF creation
with ELLIPSIS[®] vascular access system
between**

deep communicating vein (DCV) and proximal radial artery (PRA)

Needs to meet specific anatomic criteria



VASCULAR MAPPING

- The specific study of the deep communicating vein(DCV) at the elbow is not part of the

USUAL VASCULAR MAPPING

- Except when it is the only drainage of the veins of the forearm

➤ BUT NOW

- The advent of percutaneous AVF creation

- **MAKES THIS STUDY MANDATORY**

P.AVF or SURGICAL AVF CREATION

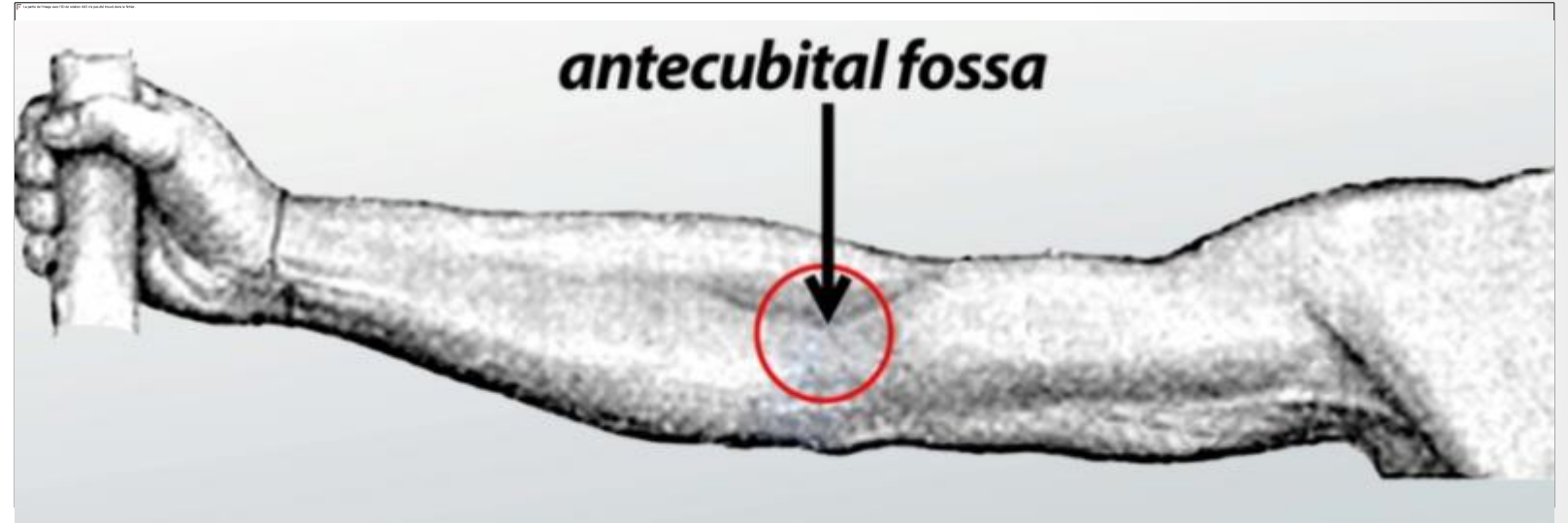
**Knowledge of the venous arrangements
of the cubital fossa
may imply better outcomes and lower complications rates
of the
procedure**

SPECIFIC US INVESTIGATION

THE ASSESSMENT BEFORE PERCUTANEOUS AV FISTULA IS FOCUSED ON THE ANTECUBITAL FOSSA.

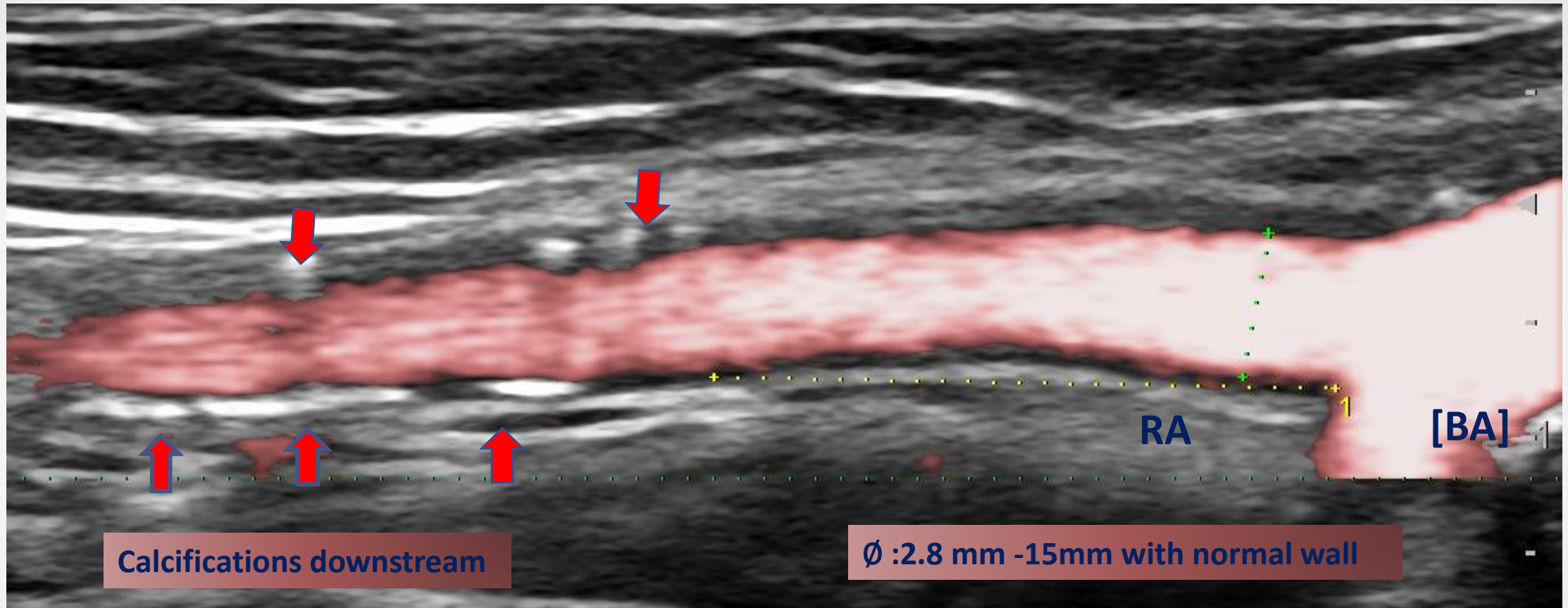
SPECIFIC EXAMINATION INCLUDES

- -DCV WALL QUALITY & Ø
- -DISTRIBUTION OF VENOUS M
- -PATENCY of CV/BV
- -RELATIONSHIP WITH THE PRA
- QUALITY OF PRA WALL and Ø
- -PATENCY OF BRACHIAL VEINS



- SPONTANEOUS DRAINAGE FLOW
- TOURNIQUET ABOVE THE ELBOW AND PROXIMAL
- DRAINAGE TEST BELOW THE TOURNIQUET

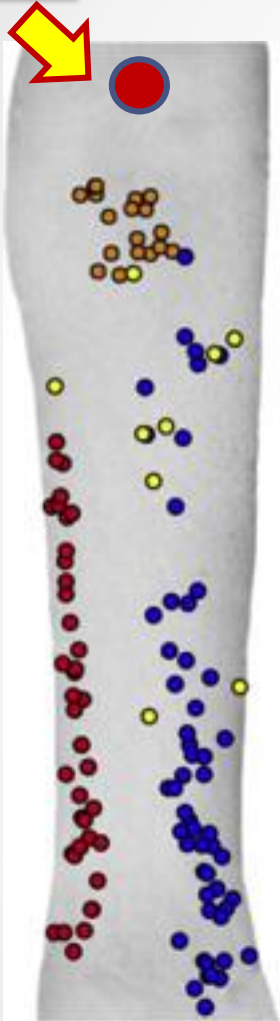
PROXIMAL RADIAL ARTERY(PRA)



Proximal radial artery is about 30% bigger than distal radial artery .
Even if the wall is thickened it remains most of the time free of calcification at the origin facilitating puncture

LOCALISATION OF THE PERFORATING VEINS OF THE UPPER EXTREMITY

Elbow crease



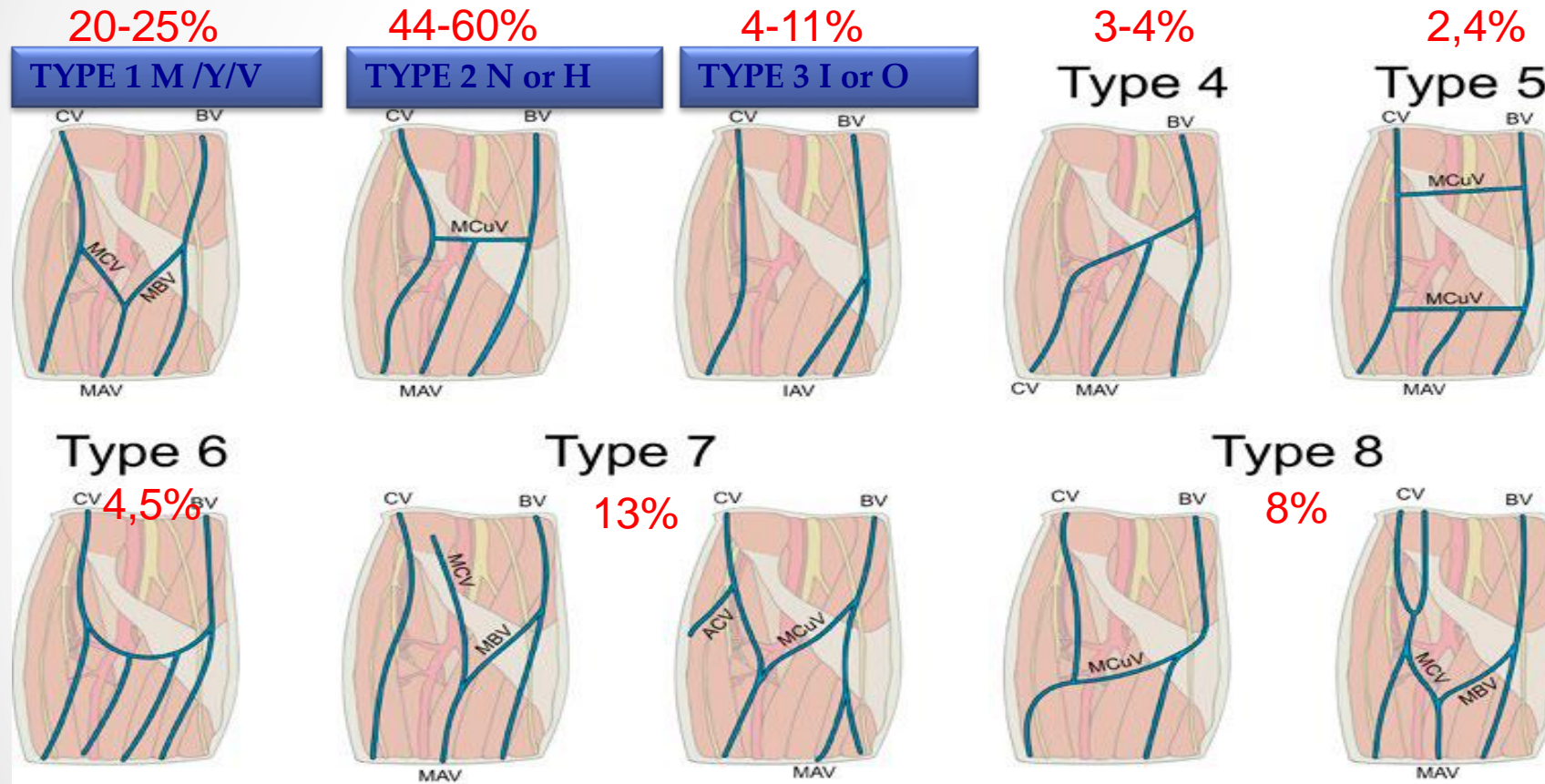
- DCV at ELBOW: CONSTANT
- \emptyset 2 to 5 mm \emptyset AVERAGE :3.6 mm

- : 20 to 30 CONSTANTS PERFORATORS AT FOREARM WITH VARIABLE DISTRIBUTION
- \emptyset AVERAGE FOREARM PERFORATORS: 1 mm

DCV is the most voluminous perforator with a mean \emptyset of 3,6 mm among 20 or 30 tiny perforators at forearm

PATTERN TYPES OF SUPERFICIAL CUBITAL VEINS

Venous arrangement shows regional, side and gender differences among populations



GENDER:
 ♂:higher frequencies Type 1-7
 ♀:higher frequencies Type 3

INDIAN/JAPANESE:
 lesser frequencies of type 1
 higher frequencies of type 2

MALAY:
 higher frequencies Type 3

INDIAN:
 higher frequencies of type 4

CV = cephalic vein; BV = basilic vein; MAV = median antebrachial vein; MCuV = median antecubital vein; MBV = median basilic vein; MCV = median cephalic vein; ACV= accessory cephalic vein

DCV AND DISTRIBUTION OF SUPERFICIAL VEINS

Many anatomical variation exist that must be investigated and reported on the shema
Some are less favorable to the creation and development of the AVF such as these
which are eccentric with incomplete or rudimentary venous disposition

The “M” of the elbow veins

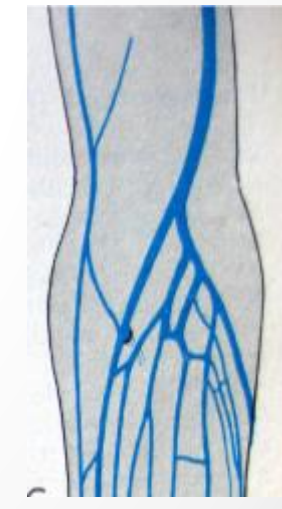
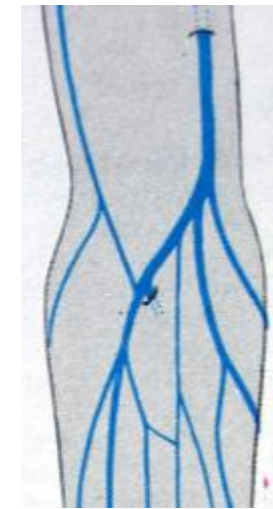
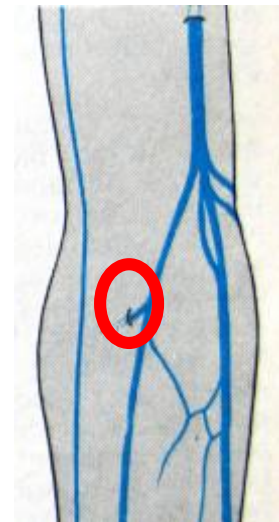
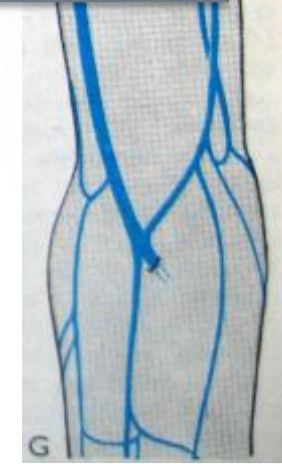
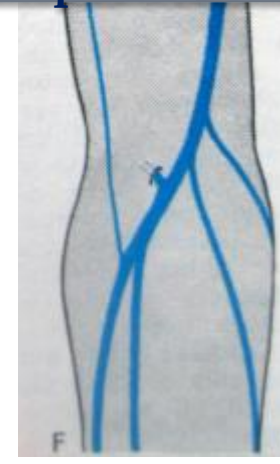
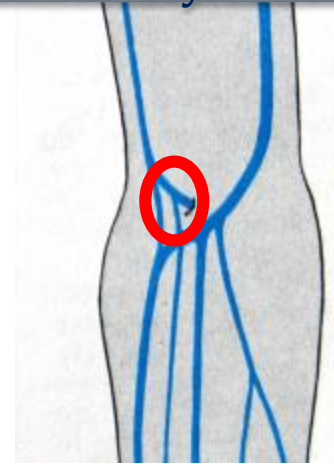
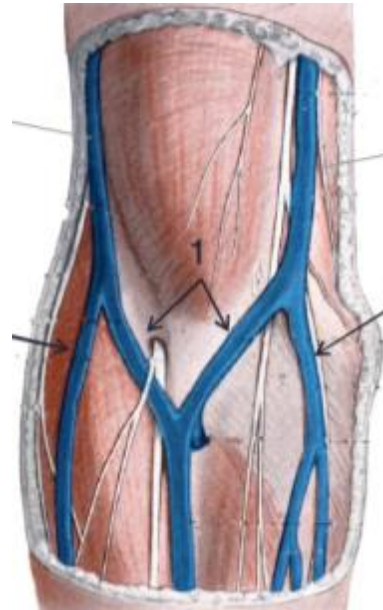
- 3 parallel branches + V
- medially: the basilic vein
- laterally: the cephalic vein
- middle: the median cubital vein

Capital “V”:

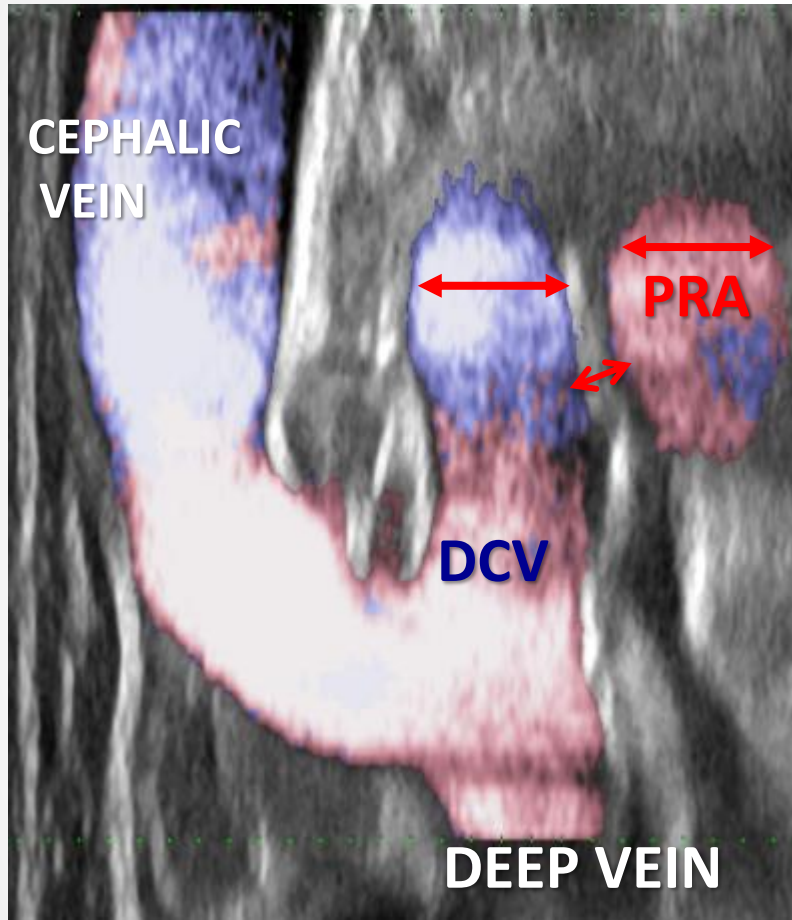
- medially: the median basilic vein
- laterally: the median cephalic
- Perforator vein at the point of the V

•DOWNSTREAM ?

•CRANIO-CAUDAL OBLIQUE



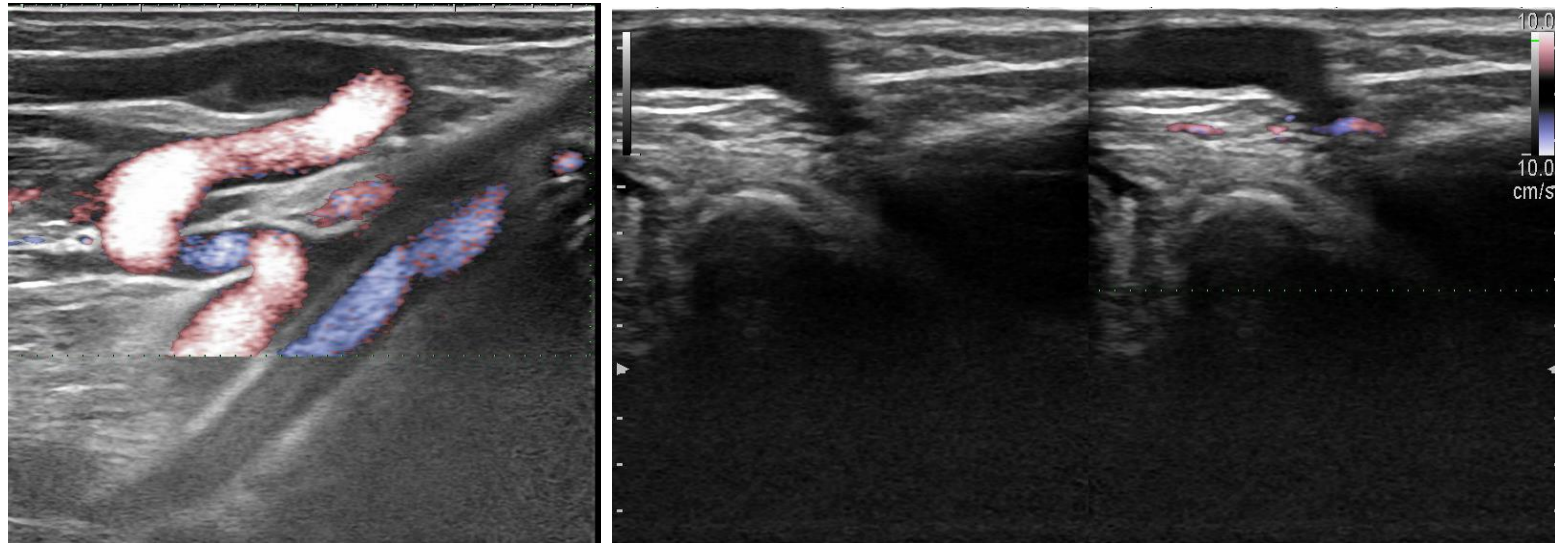
DUPLEX /PHLEBOGRAPHY



Duplex easy to perform provides all necessary information often on a single scan as on this longitudinal plane
Of easier understanding contrary to invasive and expensive investigations

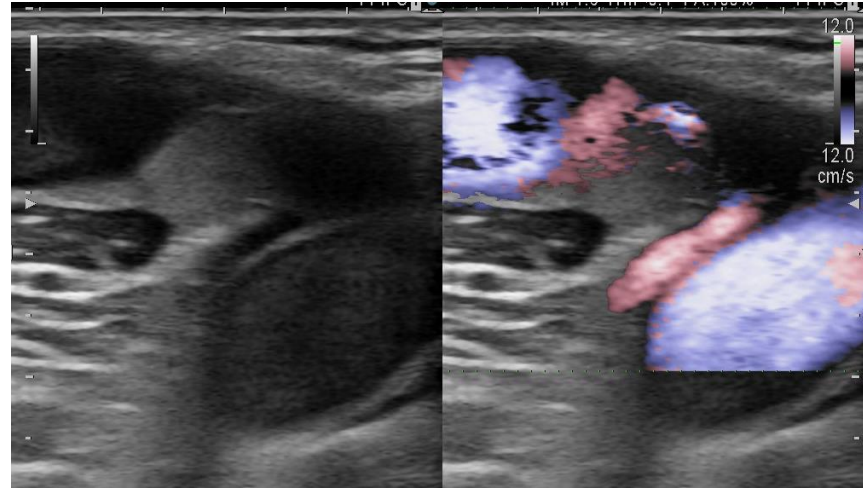
DCV VALVELESS VEIN

BEFORE AVF CREATION
SPONTANEOUS FLOW DIRECTION: from deep to superficial vein
BIDIRECTIONAL FLOW OBTAINED BY COMPRESSION



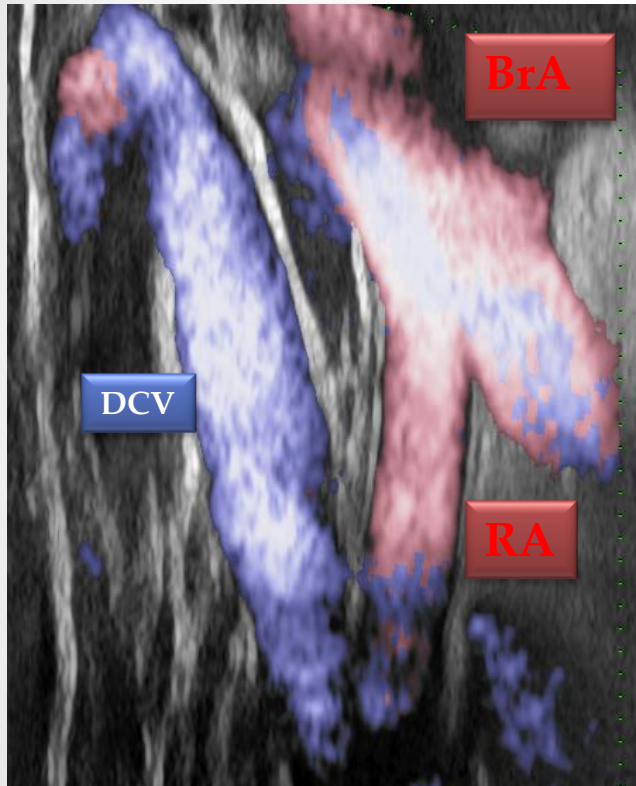
Testut, Jacob. 1952
Testut, Latarjet .1958
Gardner. 1978
Goss.1977,
Latarjet, Liard.1993,
Moore .2014

ROLLOVER VALVE LEAFLET

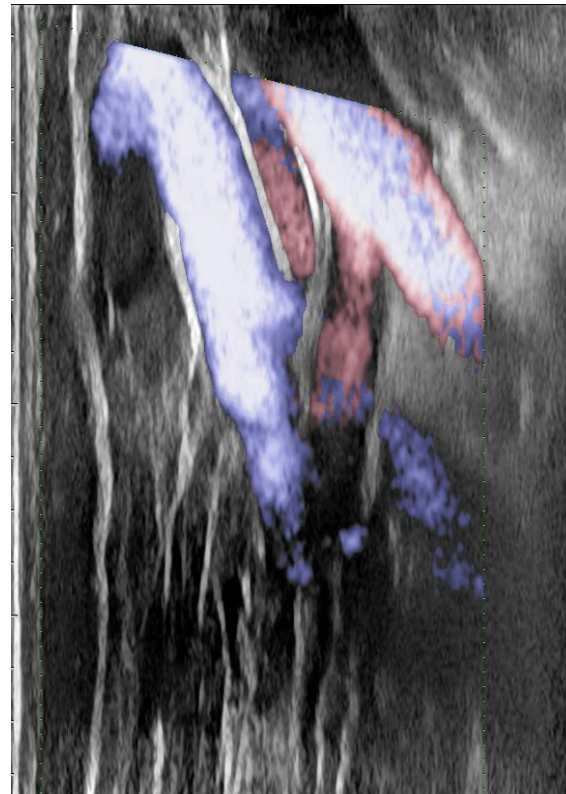


US-ANATOMY of ANTECUBITAL FOSSA

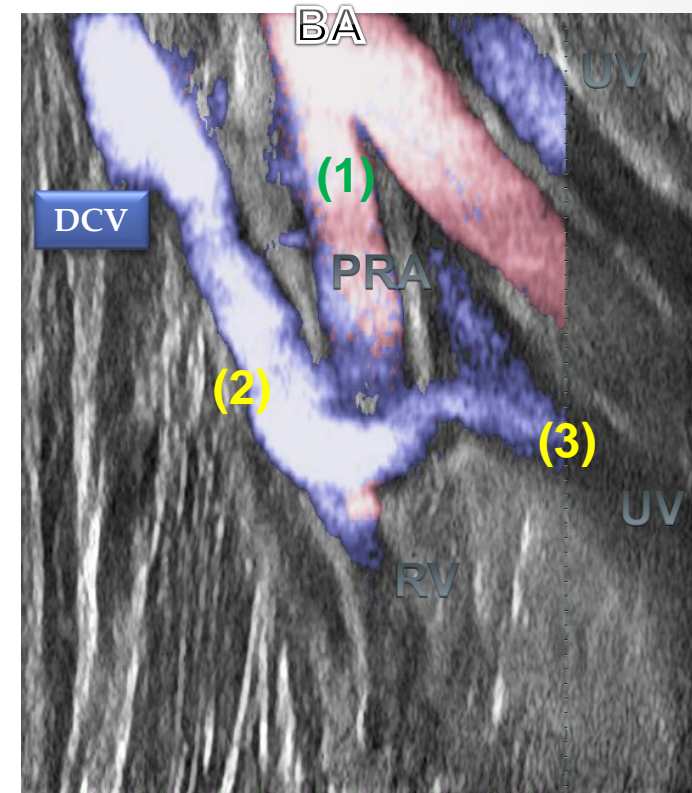
Longitudinal duplex-scan of antecubital fossa: Relationship between (1)RA -PV (2)and vena comitans (3)



Radial artery and DCV are close to each other

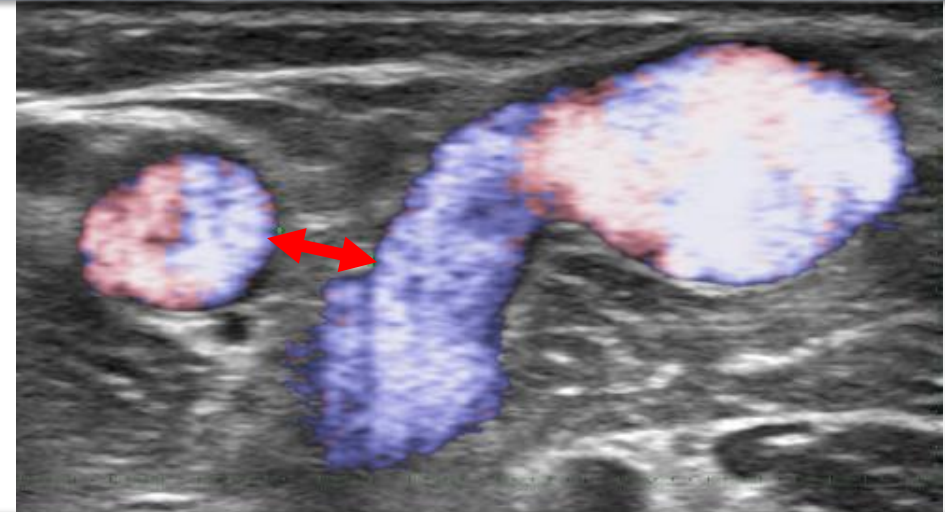
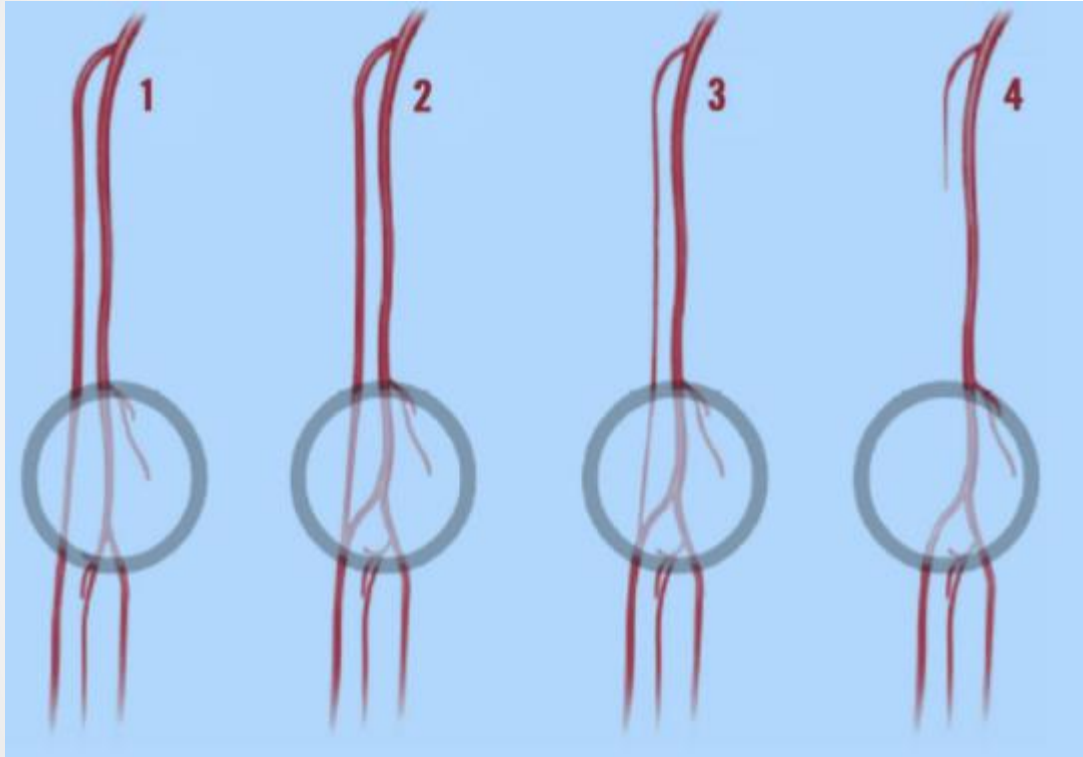


Junction of the veins and distribution of different ascending blood streams are displayed thanks to rock and roll maneuver, slight lateral motion of the probe

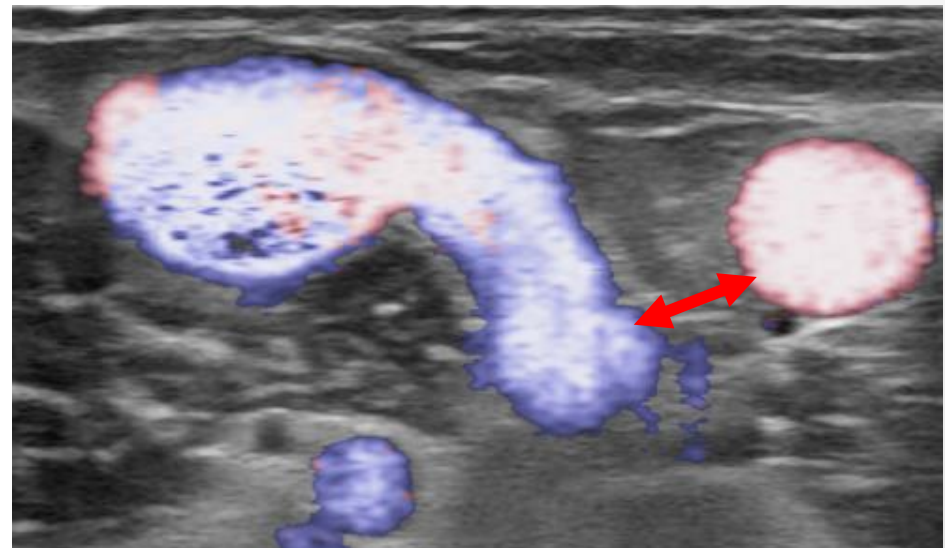


HIGH BIFURCATION OF BRACHIAL ARTERY

High bifurcation of brachial artery can cause problems because the distance between the vein and the artery can be too important to safe percutaneous creation



BILATERAL HIGH BIFURCATION :DISTANCE > 3 mm



- Hamon M, McFadden E. In Transradial Approach for Cardiovascular Interventions. 2nd edition. Chapter 1. Blood supply to the upper limb: Normal Anatomy. Hamon M and McFadden E, ed. ESM, Paris; 2010.
- Schwalbe, 1898 ; Bremer, 1899 ; Muller, 1903 ; Adachi, 1928 ; Skopakoff, 1959 ; Wankoff, 1962; Fuss 1985

MATERIALS and METHODS

A FIRST PROSPECTIVE STUDY
OF 100 NAIVE CONSECUTIVE PATIENTS
REFERRED TO THE VASCULAR LAB
PRIOR TO FIRST AVF CREATION
WAS CARRIED OUT TO ASSESS THE
FEASIBILITY OF P.AVF CREATION

- 100 PATIENTS
- 67 men
- 33 women
- Mean age:61 years (range 21-87 SD 20,8)

A total of 200 limbs
were investigated

ELIGIBILITY CRITERIA

DEEP COMMUNICATING VEIN

NORMAL VENOUS WALL

DIAMETER ≥ 2.0 mm

DIRECT AND COMPLETE DRAINAGE TOWARD AT LEAST ONE SUPERFICIAL VEIN AT THE ARM

DEPTH < 1 cm

ARTERY

PROXIMAL RADIAL ARTERY WITH NORMAL WALL OR AT LEAST FREE OF CALCIFICATION

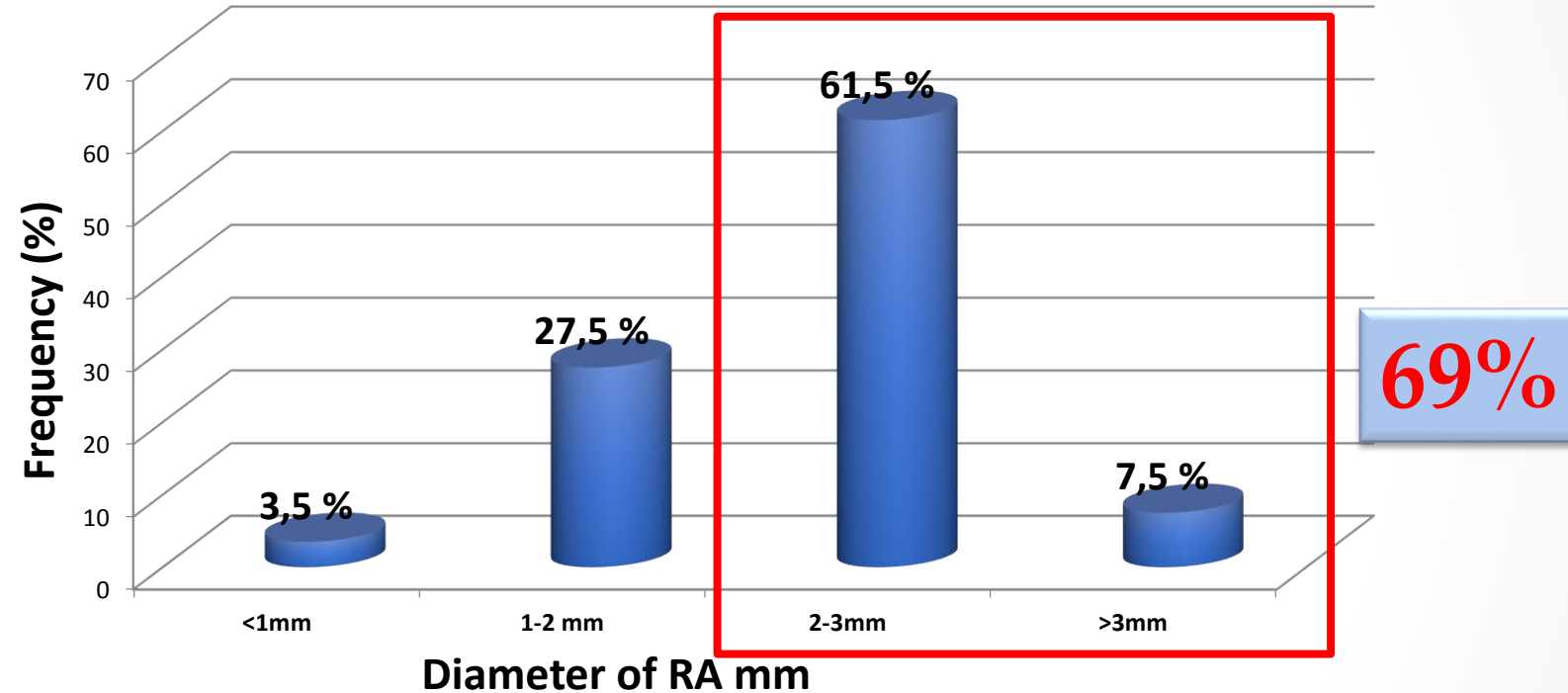
DIAMETER ≥ 2.0 mm

ANATOMICAL VARIATION ARE MENTIONED

ARTERIAL-VENOUS DISTANCE ≤ 1.5 mm

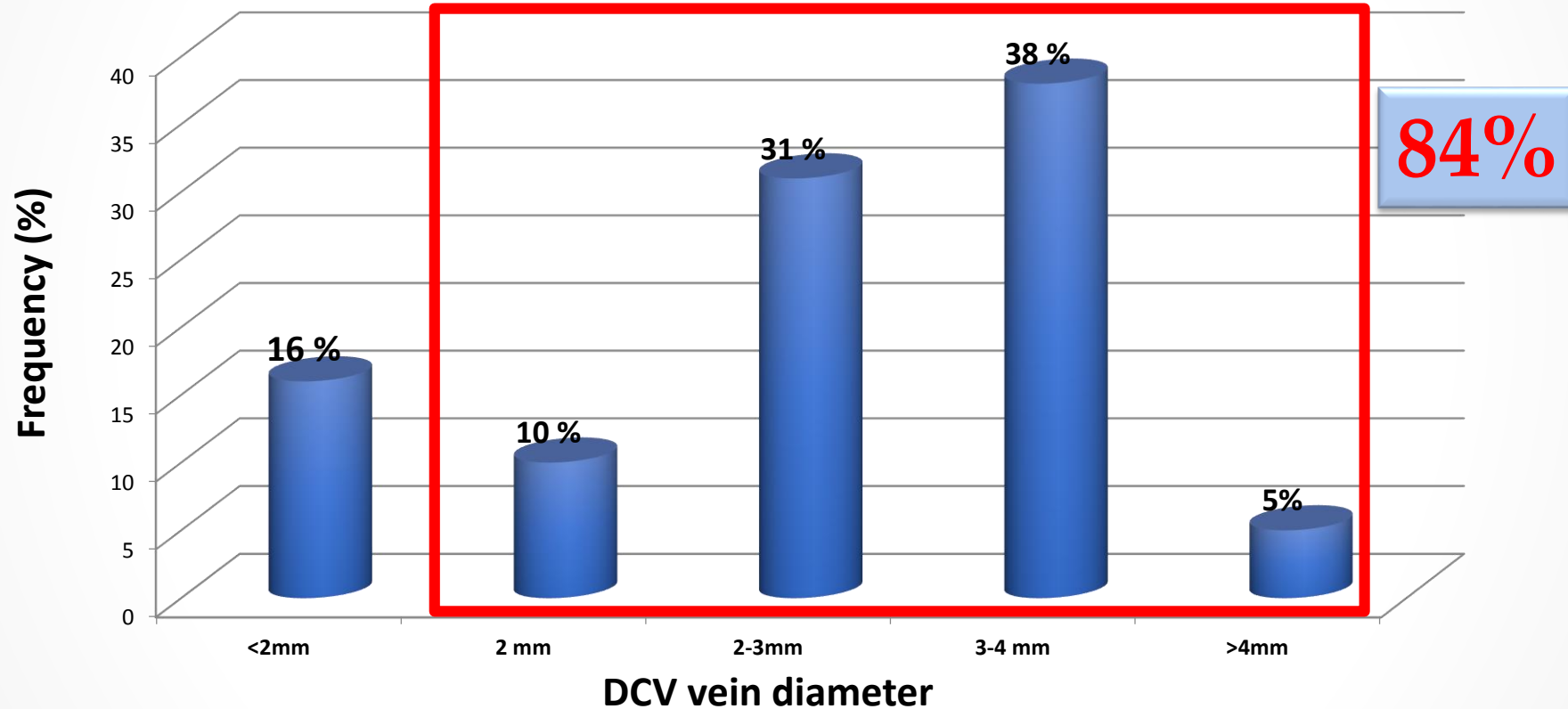
BDP and DBI WERE RECORDED IF ANY CONCERN ABOUT ISCHEMIC RISK

RADIAL ARTERY DIAMETER



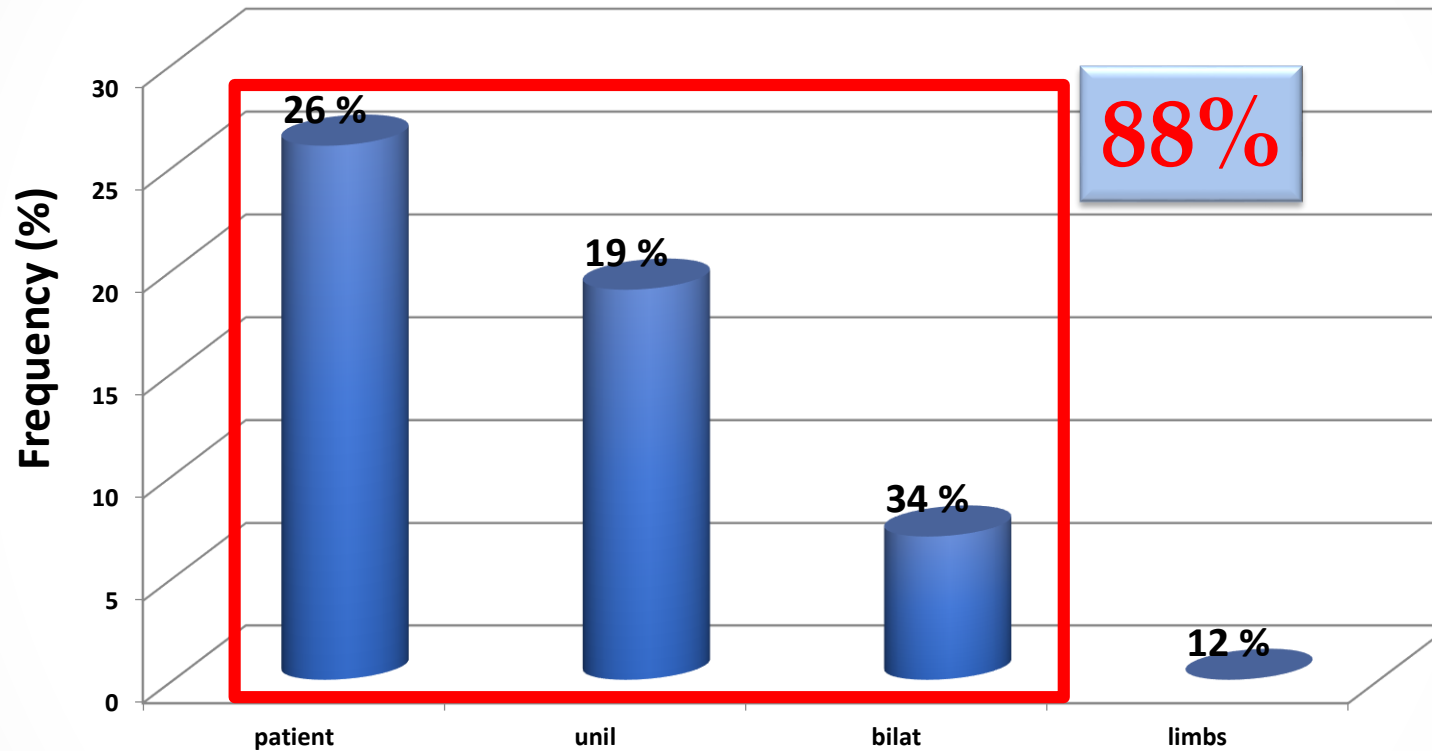
In 69 % of the limbs : proximal radial artery (PRA) has a diameter ≥ 2 mm suitable to P .AVF CREATION
In 31 % of the limbs : radial artery (PRA) has a diameter < 2 mm

DCV DIAMETER



In 84% of the limbs DCV diameter was ≥ 2 mm

DISTANCE between RA and DCV



In 88% of the limbs distance between PRA and DCV was ≤ 1.5 mm

RESULTS/LIMBS

ELIGIBILITY

100 limbs (50%)

- PRA \geq 2mm
- DCV $> \geq$ 2 mm
- A-V Distance \leq 1,5 mm

26 (26%)
UNILATERAL

74 (37%)
BILATERAL

INEGIBILITY

37 patients (37%)

- 62 limbs (31%): PRA $<$ 2mm →
- 32 limbs (16%): DCV $<$ 2mm
- 24 limbs (12%) : distance $>$ 1,5 mm

45% ♀
23% ♂

RESULTS/PATIENTS

ELIGIBILITY

63 patients (63%)

- **PRA \geq 2mm**
- **DCV \geq 2 mm**
- **A-V Distance \leq 1,5 mm**
- **MCV or MBV at least**

**26 (26%)
UNILATERAL**

**37 (37%)
BILATERAL**

INEGIBILITY

37 patients (37%)

- **15 patients (15%):no superficial veins**
- **14 patients (14%): too small vessels**
- **8 patients (8%) : distance $>$ 1,5 mm**

ANATOMICAL VARIATIONS

PITFALLS RELATED TO ARTERIAL ANATOMICAL VARIATIONS

ANATOMICAL VARIATIONS					
PATIENT	UNILATERAL	BILATERAL	LIMBS	HBRA	HBUA
26	19	7	33	31	2
26%	19%	7%	(16.5%)	(15.5%)	(1%)

Frequency of anatomical variations by patient and limbs

HBRA:High birth of radial artery

HBUA:High birth of ulnarlartery

DISTANCE DCV-PRA > 1,5 mm/42%
or
PRA Diameter < 2mm:48%



ONLY
6 P.AVF
23 %

CONCERN ABOUT P.AVF CREATION ?

Suitable vessels for a SUCCESSFULL distal AVF creation were found in 91 extremities (45%)

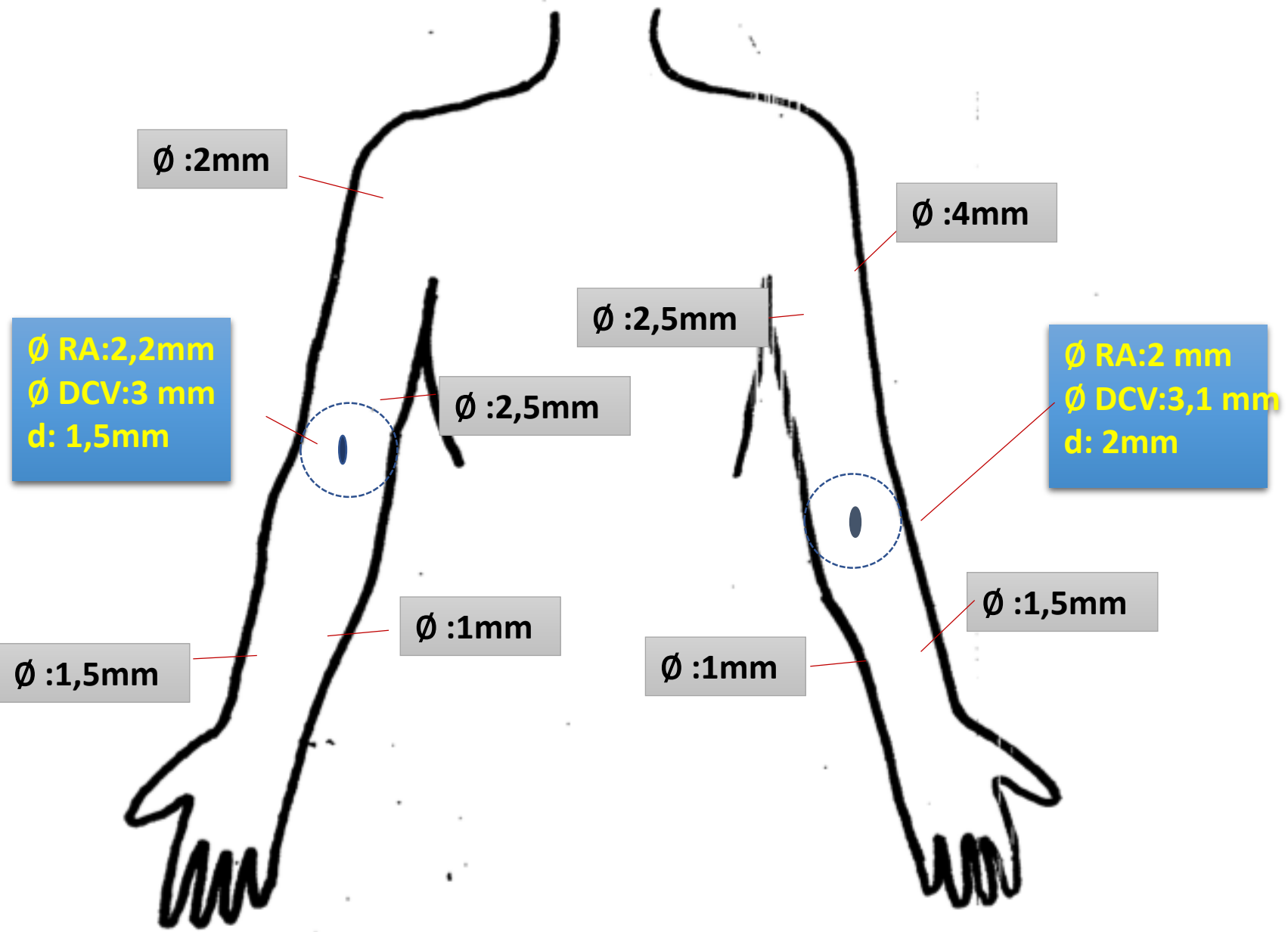
BUT

ONLY IN 17% in patients over 70 years old

Among the 100 limbs eligible for percutaneous arteriovenous fistula, only 30 (30%) were eligible for distal AVF



**it is therefore more than ever necessary to set up multidisciplinary concertation meetings
in order to avoid any detrimental effect**



SHEMA / MAPPING

CONCLUSION I

- **This is the first prospective study of naives consecutive patients**
- **Half of the limbs in two third of the patients are eligible**
- **Regardless of the lack of median basilic or cephalic vein:
74% of patients would have been suitable for P.AVF creation
underlying the need for preservation of venous capital at the elbow**
- **However these results are less optimistic than in the retrospective study :
J E Hull:87.9% feasibility (29 patients /33 limbs)**

CONCLUSION II

THE STUDY OF:

- **Deep communicating vein**
- **Proximal radial artery**
- **Relationship between them**



**Should now be part of the basic assessment
Prior AVF creation
To discuss the possibility of P.avf**



**THANKS FOR
YOUR
ATTENTION
ANY QUESTIONS?
NO? GREAT!**