CONTROVERSES ET ACTUALITÉS EN CHIRURGIE VASCULAIRE
CONTROVERSIES & UPDATES IN VASCULAR SURGERY
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MARRIOTT RIVE GAUCHE & CONFERENCE CENTER
PARIS, FRANCE

Angioaccess ultrasound guided dilatation / stenting is a reliable technique

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Disclosure

Speaker name:

Gary Maytham

- ☐ 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

Haemodialysis access

Angioaccesses prone to developing stenosis causing dysfunction or failure.

Require corrective action

- Surgical (revision, declotting, jump grafts)
- Endovascular (PTA & Stenting)

Endovascular intervention

Historic treatment of stenotic lesions

Percutaneous transluminal angioplasty (PTA)

- Stenting

Current Imaging modalities:

1. Fluoroscopic guidance (traditional)
   - Radiation (patient & staff)
   - Contrast medium (nephrotoxic & allergic reaction)

2. Ultrasound guidance (alternative)
   - Comparable results to conventional fluoroscopy

UGI published literature

U/S guided AV access intervention (PTA only)

Year	Author	Location	Technical success
2012	Wakabayashi	Japan	97% (4288/4414)
2012	Gorin	The Netherlands	95% (52/55)
2010	Fox	USA	98% (219/223)
2009	Ascher	USA	100% (32/32)
2007	Ascher	USA	100% (11/11)
2007	Marks	USA	100% (10/10)
2007	Kim	Korea	100% (10/10)
2000	Bacchini	Italy	100% (12/12)
1996	Wittenberg	Germany	97% (38/39)

94% primary patency rate at one month
(Wakabayashi et al, 2012)

UGI at St George's Hospital

- February 2014 to February 2016
  - 29 UGI cases (13 PTA / 16 Stent)
- Theatre suite & local anesthetic
- Intervention: vascular consultant (access & endovascular experience)
- U/S guidance: vascular sonographer (access experience)

Diagnostic Ultrasound

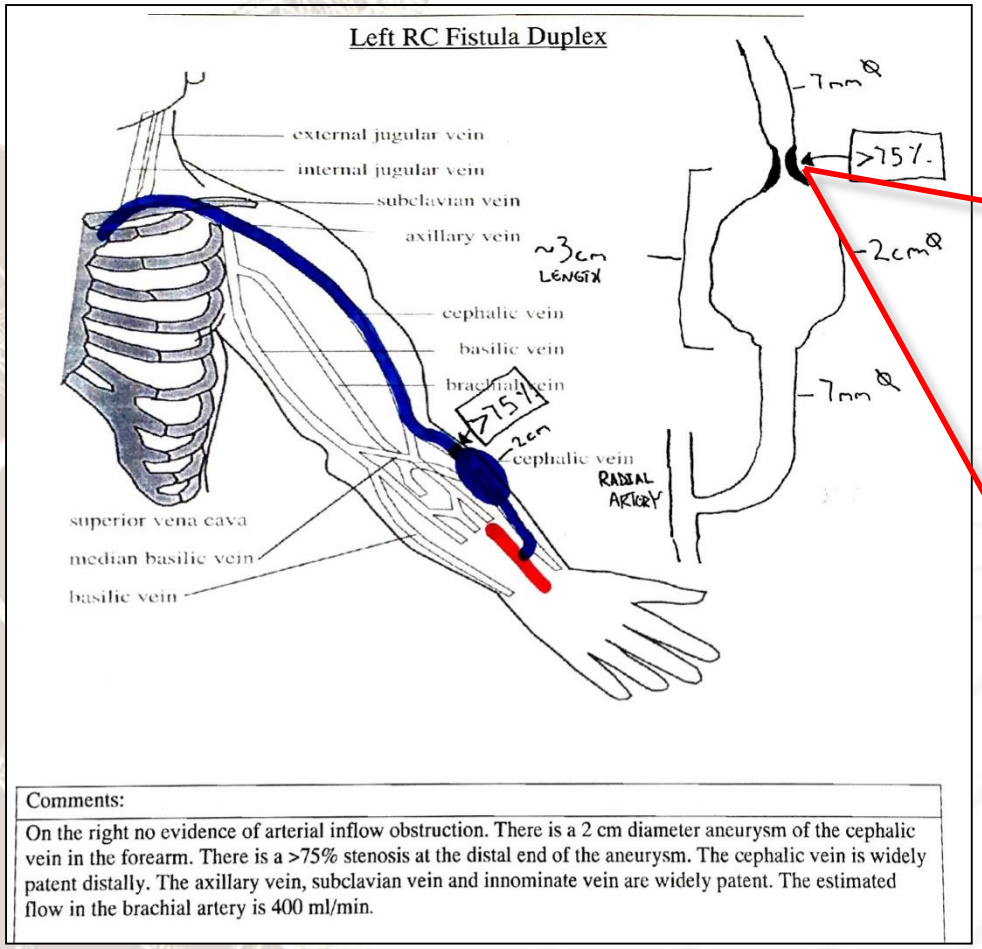
U/S assessment:

- Anatomy & configuration of access
- Stenotic lesions
- Lumen diameter
- Volume flow
- Suitability for UGI

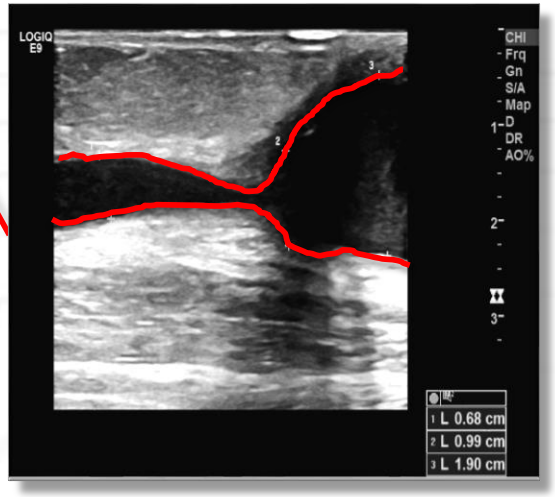
UGI inclusion criteria:

- ✓ Clinical abnormal finding
  - Transonic flow or physical assessment
- ✓ >50% stenosis on U/S
- ✓ Adequate U/S views of treatment site
- ✓ No suspected central venous obstruction

UGI work-up


Left RC Fistula Duplex
external jugular vein
internal jugular vein
subclavian vein
axillary vein
~3cm LENGTH
cephalic vein
basilic vein
brachial vein
>75%
2cm
cephalic vein
RADIAL ARTERY
superior vena cava
median basilic vein
basilic vein
7mm
>75%
2cm
7mm
Comments:
On the right no evidence of arterial inflow obstruction. There is a 2 cm diameter aneurysm of the cephalic vein in the forearm. There is a >75% stenosis at the distal end of the aneurysm. The cephalic vein is widely patent distally. The axillary vein, subclavian vein and innominate vein are widely patent. The estimated flow in the brachial artery is 400 ml/min.


LOGIQ E9
PS 539.5 cm/s
ED 390.6 cm/s
AC 60
800
600
400
200
cm/s
-200


LOGIQ E9
1 L 0.68 cm
2 L 0.99 cm
3 L 1.90 cm

Brief overview of UGI PTA/stenting

1. On table U/S assessment:
   - Confirm access patency
   - Mark treatment site on skin

2. Sheath & guidewire (GW):
   - Advance GW beyond stenosis

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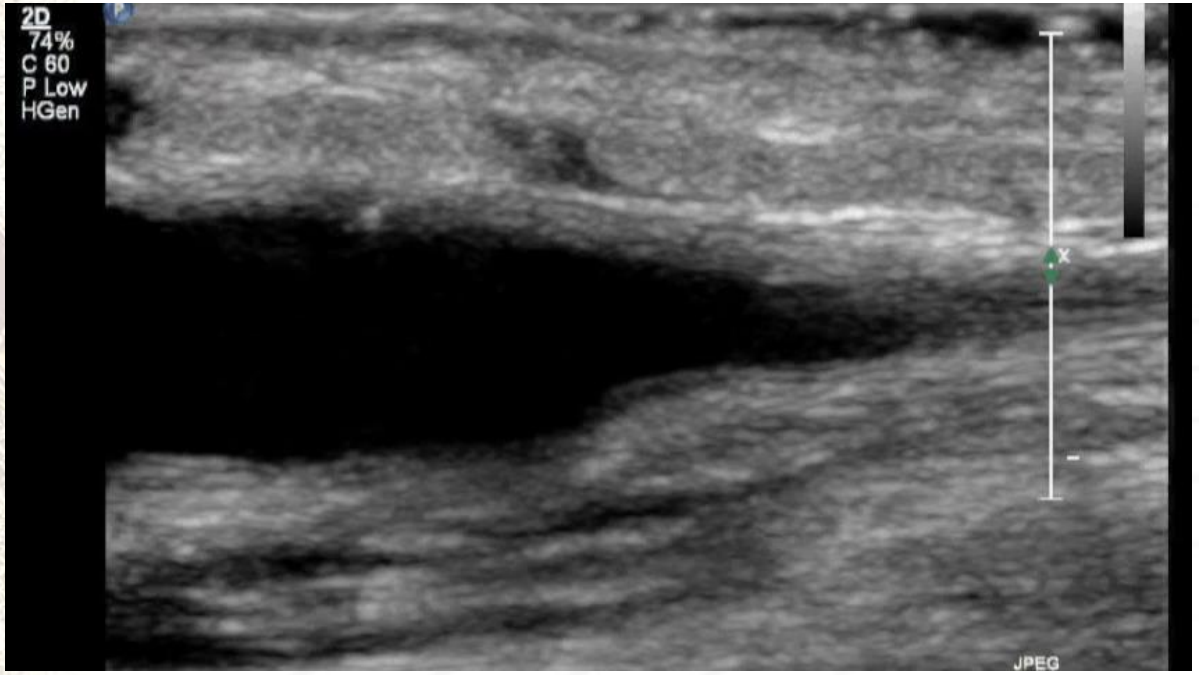
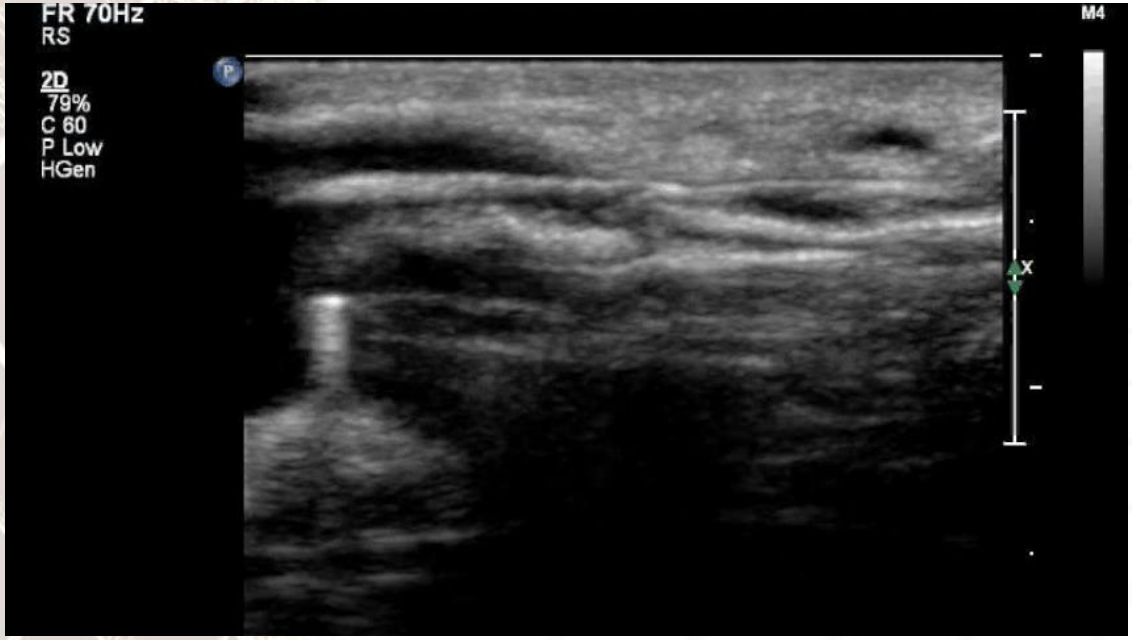
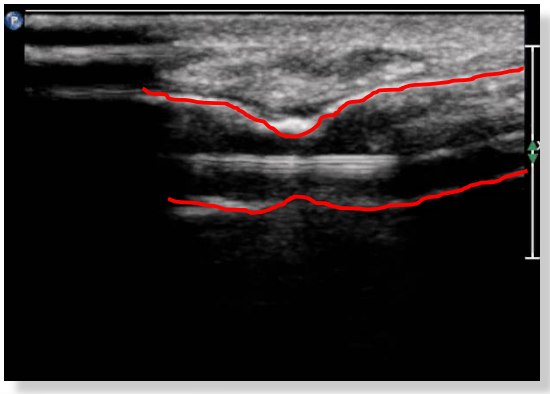


PTA

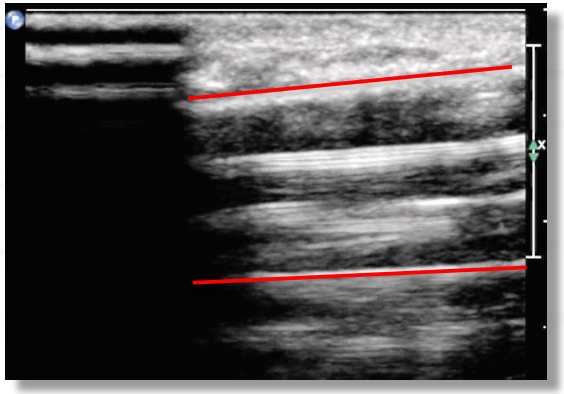
1. Balloon placement & inflation
   - Advance balloon over stenosis
   - Inflate and look for balloon waisting



A. Balloon inflation



B. Balloon waisting

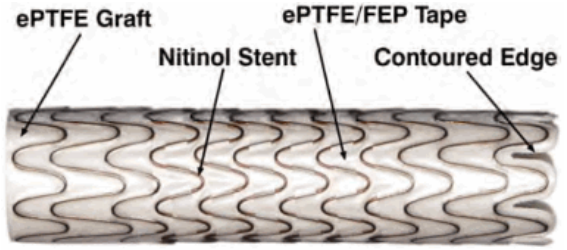


C. Stenosis dilated

GORE
Creative Technologies Worldwide

Gore Viabahn stent

1. Nitinol metal stent with ePTFE liner and heparin bioactive surface



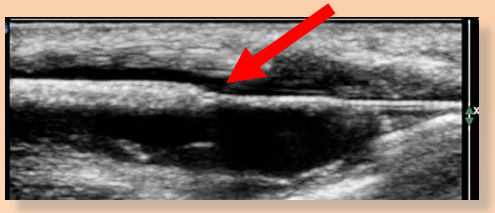
2. Flexible & durable
   - Transverse tortuous vessels
   - Conform to complex anatomy

3. FDA approved for A-V access using fluoroscopic giuded imaging
   - U/S guided imaging is considered ‘off label’

Viabahn stent placement

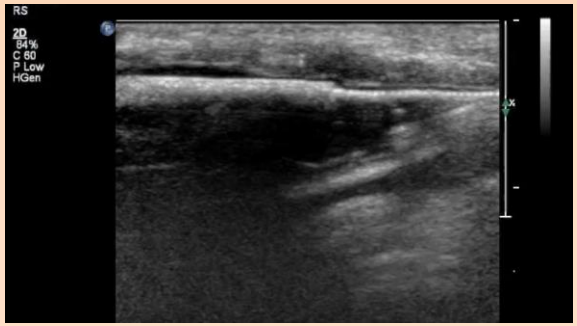
1. Distal end of stent:
   - Unique U/S appearance (Stent/GW diameter difference)

A.



B.

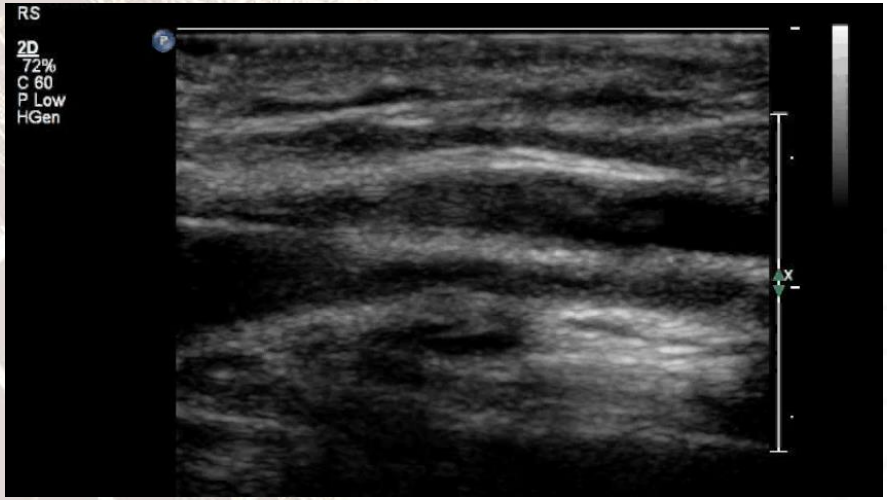
C.

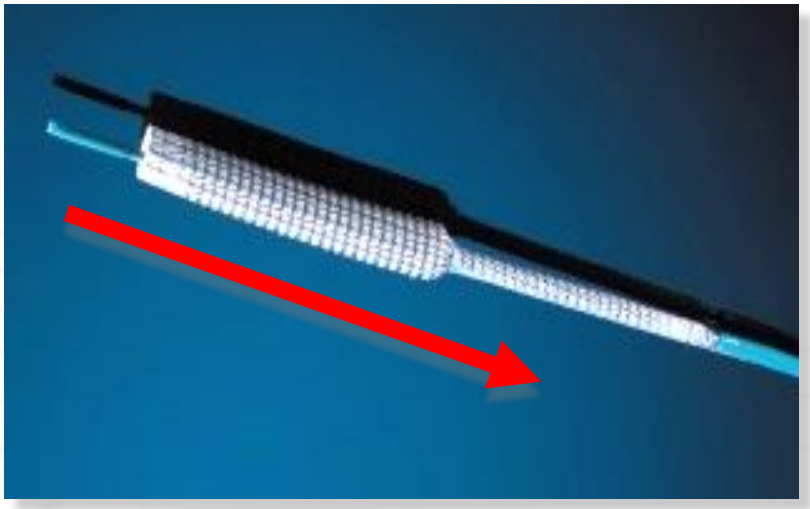


2. Proximal end of stent:
   - Starting from the distal end of the stent, measure proximally the length of the stent being used.

Viabahn stent deployment

1. Tip to hub deployment system





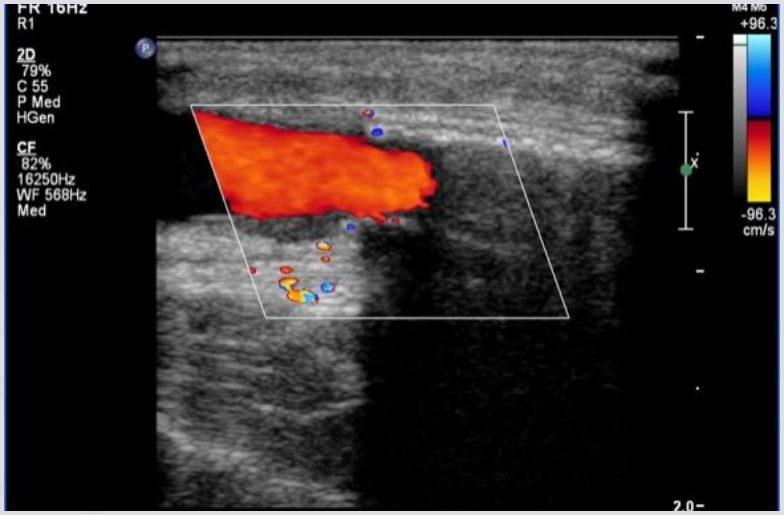
2. Balloon inflation of stent

Pre/post intervention comparison

Pre stenting

Vol flow: 350 ml/min

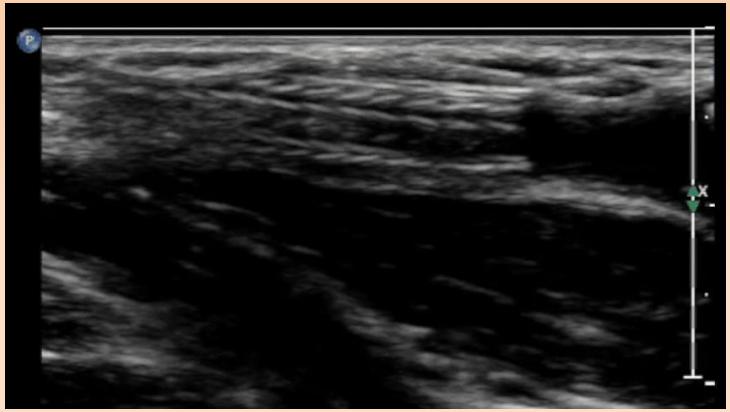
Post stenting

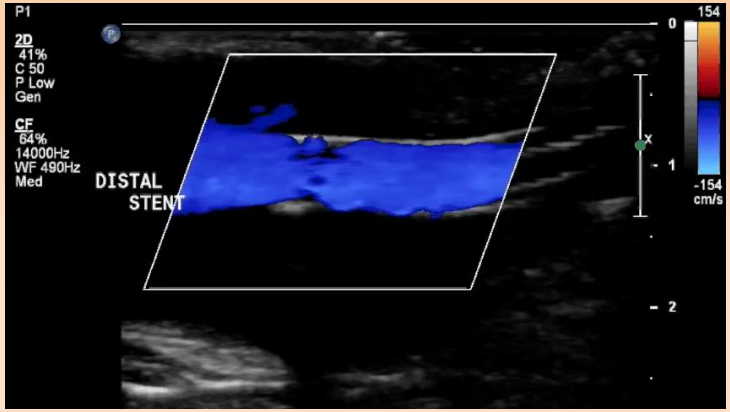


Vol flow: 900 ml/min **(+174%)**

2-3 days post intervention

Complete U/S visualisation of Viabahn stent possible





Results to date

Access type	Total
BA Graft	7
BVT	7
RC AVF	7
BC AVF	8
Total	29

Intervention type	Success	n
PTA only	100%	13
Stent	93.7%	16
All interventions	96.6%	29

Volume flow pre/post UGI

Volume flow	PTA (n=13)	Stent (n=16)	Overall (n=21)
Pre VF average (ml/min)	507	468	485
Post VF average (ml/min)	1072	1080	1076
VF increase average (ml/min)	564	613	591
Average VF increase	2.1	2.3	2.2

Primary patency

At time of reporting:

Intervention	Primary patency (Days)
PTA	282.5
Stented	271.8
All	277.4 (r = 13 -770 days)

7 patients required further procedures
(mean primary patency =160.4 days)

2 patients died during the study - fistula running satisfactorily.

Ultrasound Guided Intervention (UGI)

Advantages:

- ✓ No contrast
- ✓ Patent & occluded vessels can be seen
- ✓ Morphology of vessel can be examined
- ✓ Direct measurement of treatment site
- ✓ Real-time haemodynamic information
- ✓ Can be performed in clinic setting without need for radiation protection

Disadvantages:

- ✗ Operator dependent
- ✗ Poor image quality at depth
- ✗ Limited field of view – due to the size of the U/S probe

Conclusion

1. UGI for vascular access can be performed safely and effectively.
2. UGI is now our preferred method for intervention.
3. Key to successful UGI:
   - ✓ Pre-intervention planning using diagnostic U/S
   - ✓ Patient selection
   - ✓ Physician & Sonographer with access and endovascular experience

Thank You