



CO₂ angiography for EVAR treatment Tips and tricks

2020

**E Ducasse, C Caradu
MD PhD FEBVS
CHU de Bordeaux**

Disclosure

Speaker name: **E Ducasse**

I have **NO** potential conflicts of interest to report:

Consulting

Employment in industry

Shareholder in a healthcare company

Owner of a healthcare company

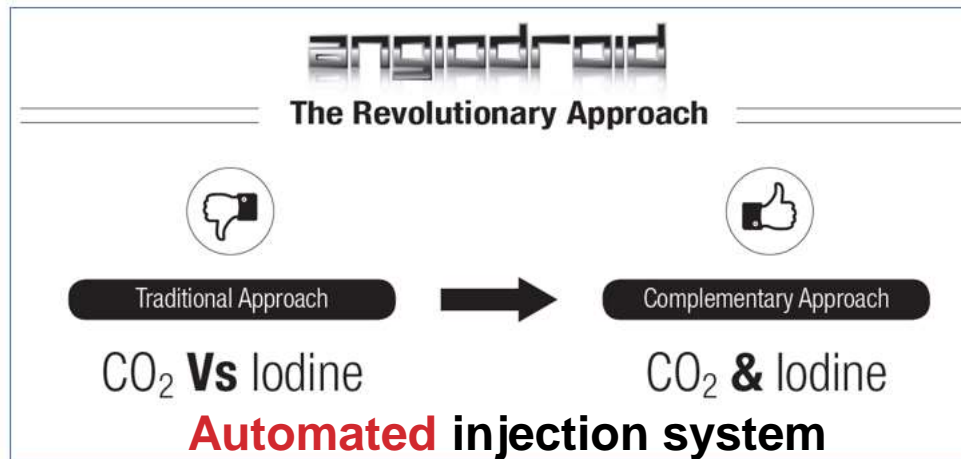
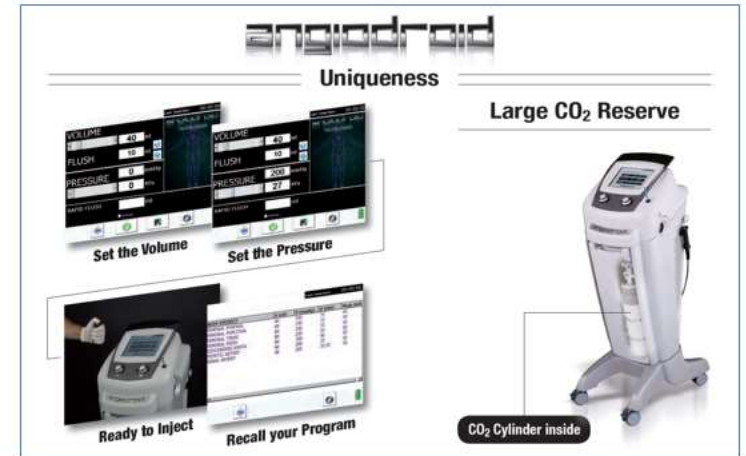
Other(s)

I do not have any potential conflict of interest

ADVANTAGES OF CO₂

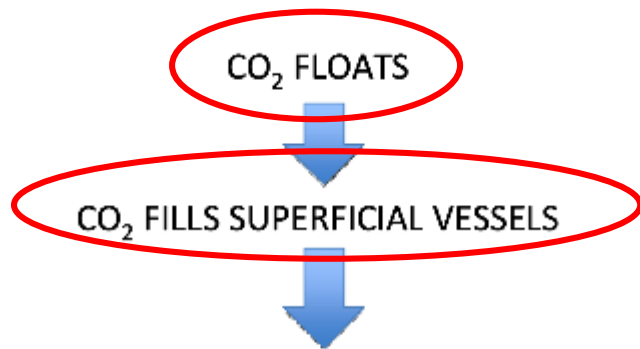
Compared with iodinated contrast media:

- **CO₂ has No Nephrotoxicity**
 - **No Allergic reactions**
 - Does not give hepatotoxicity
- **Safety gas for the body**



UNDERSTANDING CO₂ IMAGING

Carbon dioxide (white) will generate a representative image depending on the amount of blood that is displaced.



IF RENAL ARTERY IS IN A POSTERIOR POSITION FROM SAGITTAL PLANE POINT OF VIEW IT WILL BE DIFFICULT TO COMPLETELY FILL IT WITH CO₂

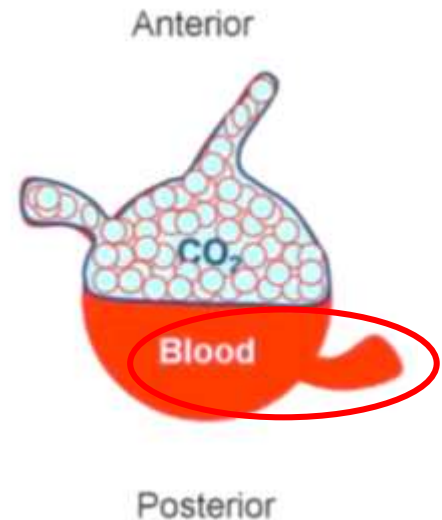
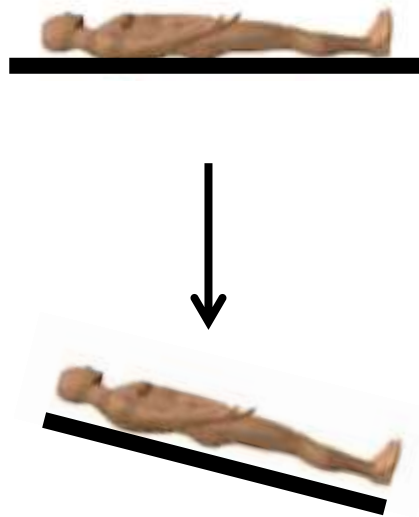


TABLE TILT

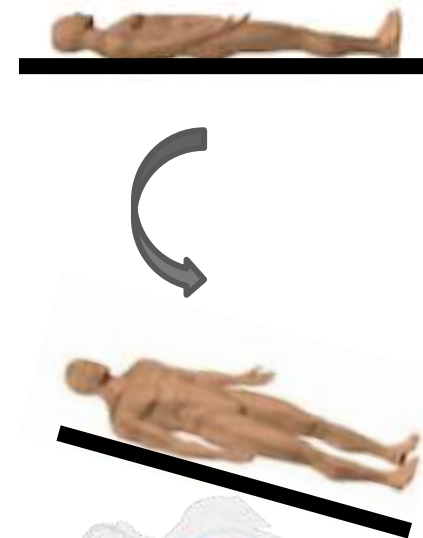
HEAD-UP TILTING OF PATIENT



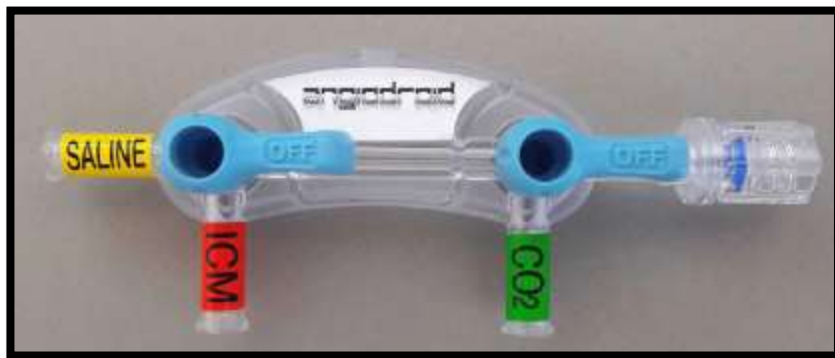
±

LATERAL TILTING OF PATIENT

tilt-up of appropriate side to highlight an individual renal artery

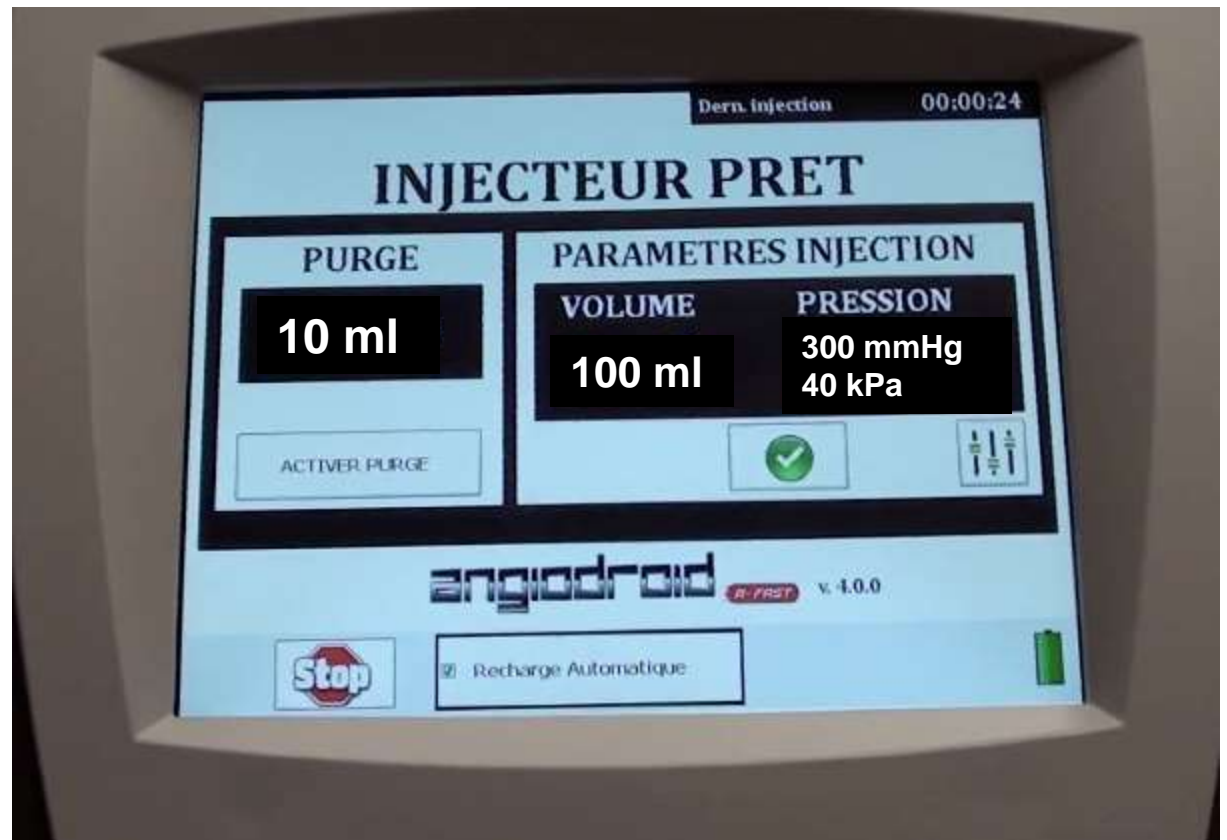
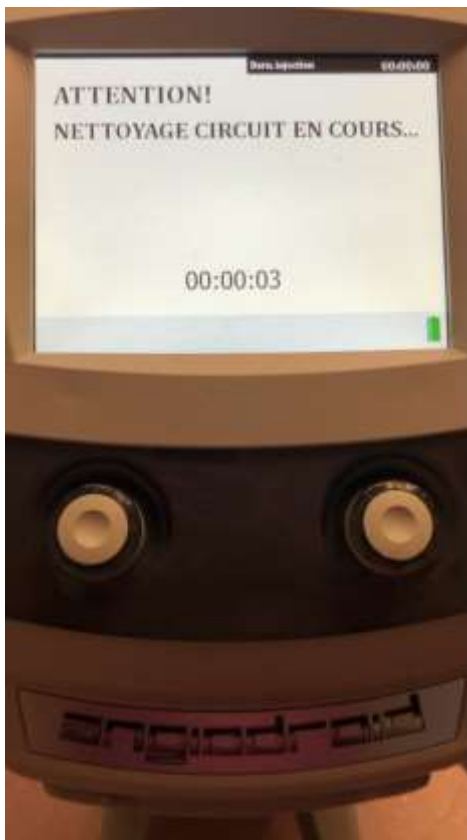


PREPARATION OF THE SHEATH



PREPARATION OF THE MACHINE

Injection parameters for the Aorta



PREPARATION OF IMAGE INTENSIFIER



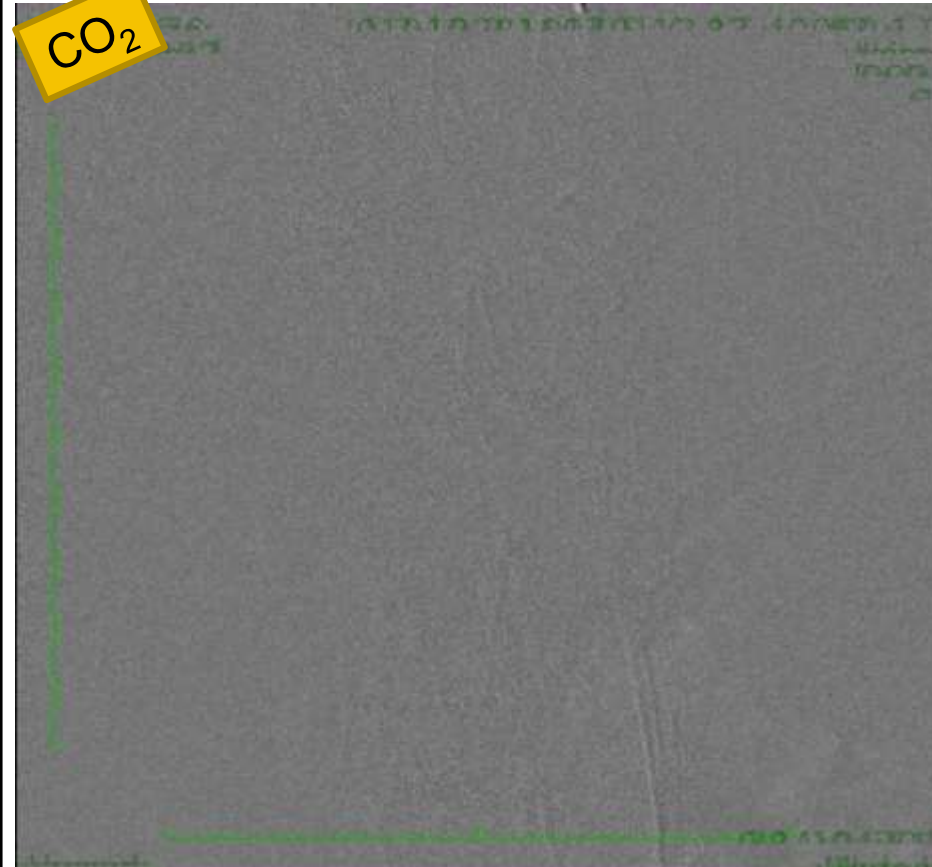
- A mobile or fixed C-arm can be used
- high frame rate (typically $>10\text{fps}$)
- colour inversion
- multiple runs can be obtained at minimum of one minute intervals

EVAR CLINICAL CASE : IDENTIFICATION OF RENAL ARTERIES POSITION



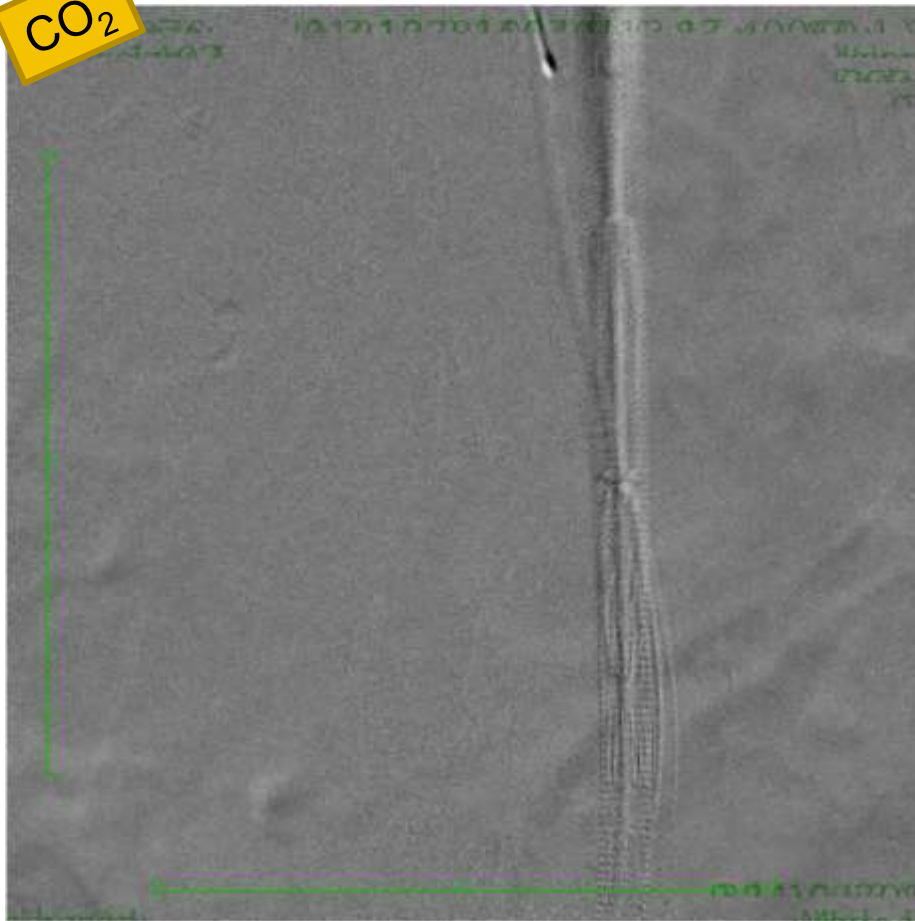
CO₂

Contrast

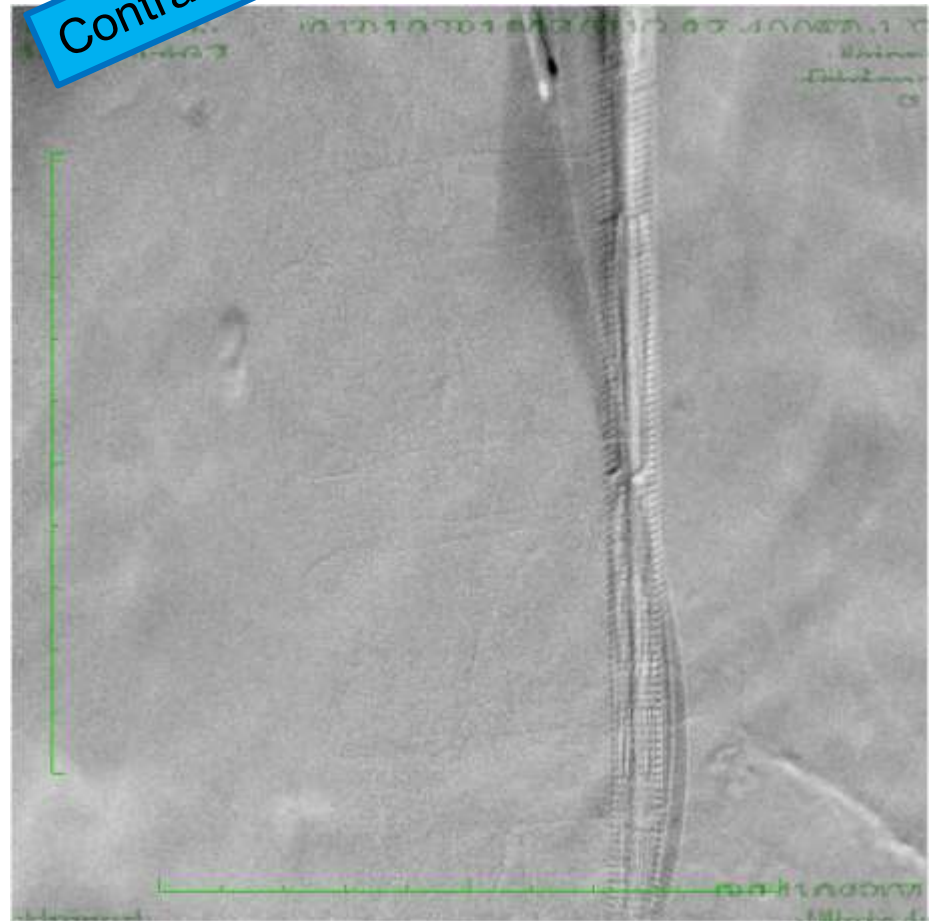


CONFIRMATION WITH ENDOGRAFT IN PLACE

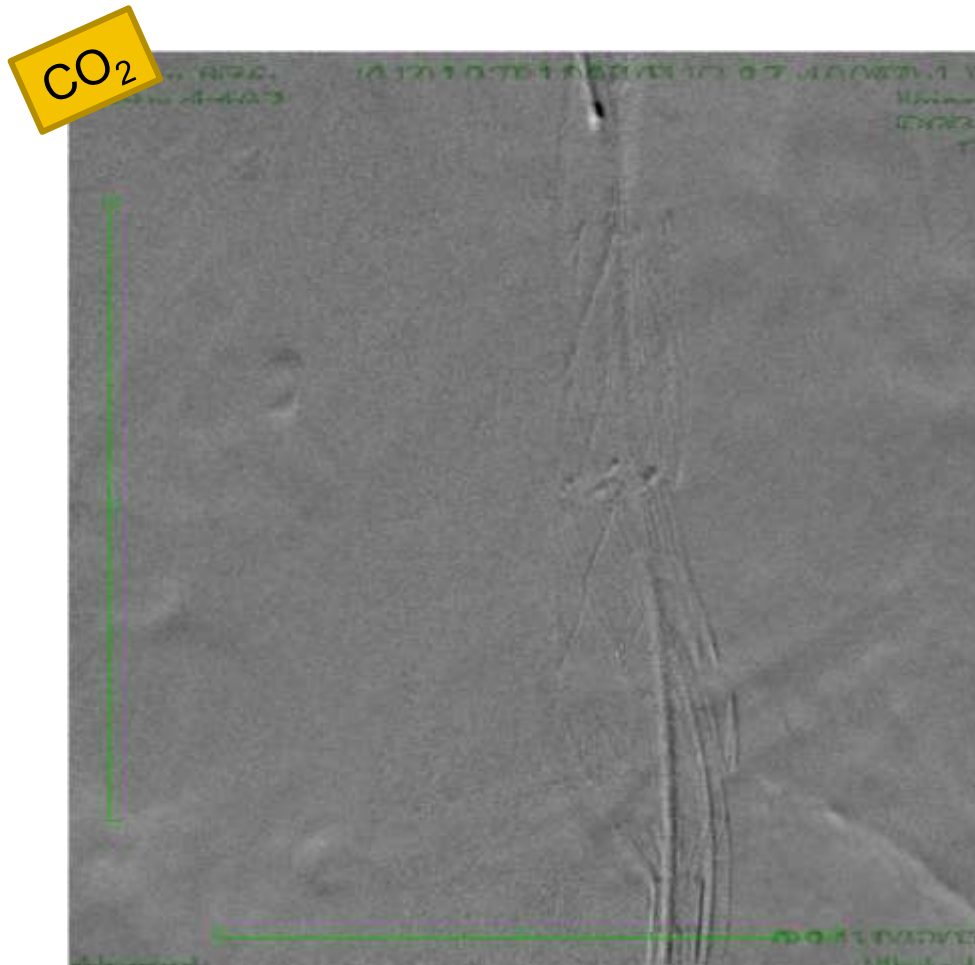
CO₂



Contrast



CONFIRMATION AFTER PROXIMAL DEPLOYMENT OF ENDOGRAFT

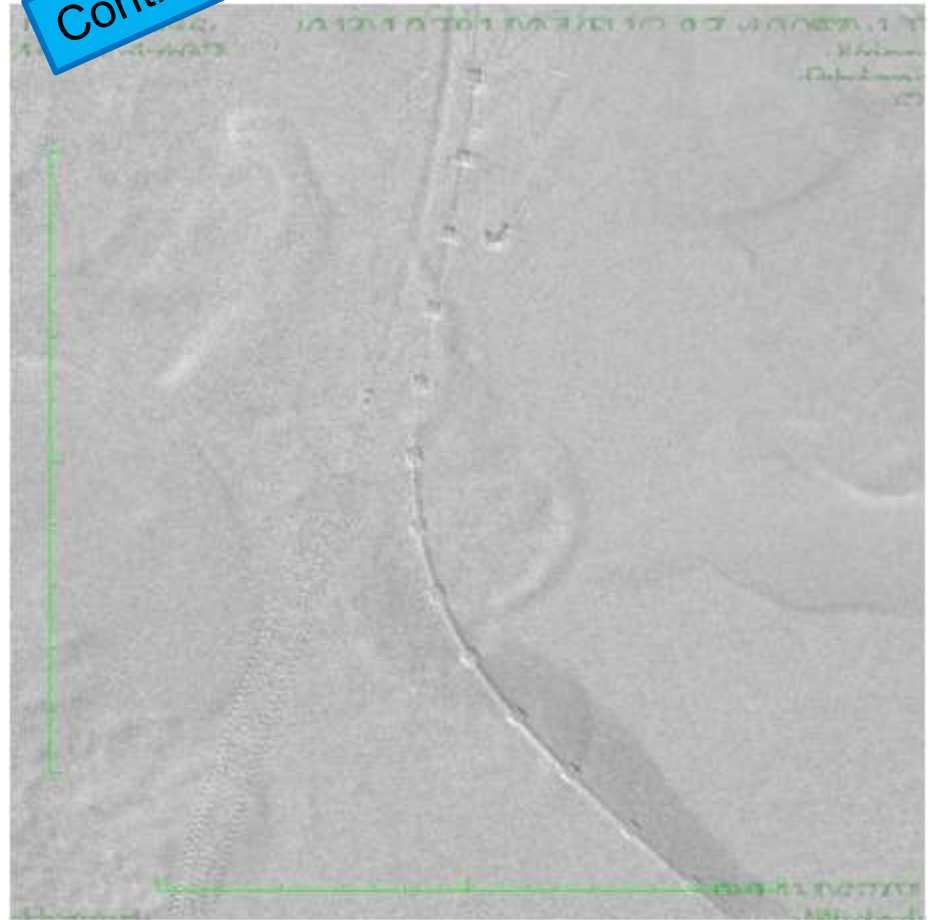


IDENTIFICATION OF LEFT HYPOGASTRIC ARTERY

CO₂



Contrast

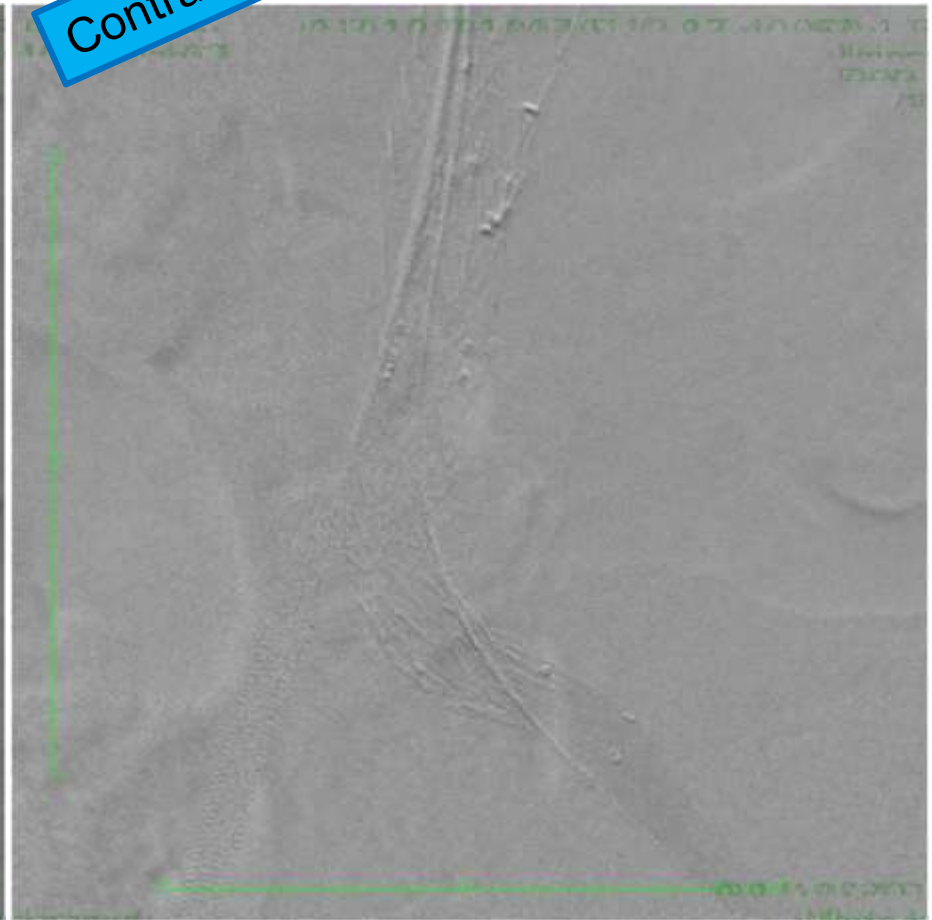


CONTROL OF THE PATENCY OF LEFT HYPOGASTRIC ARTERY

CO₂



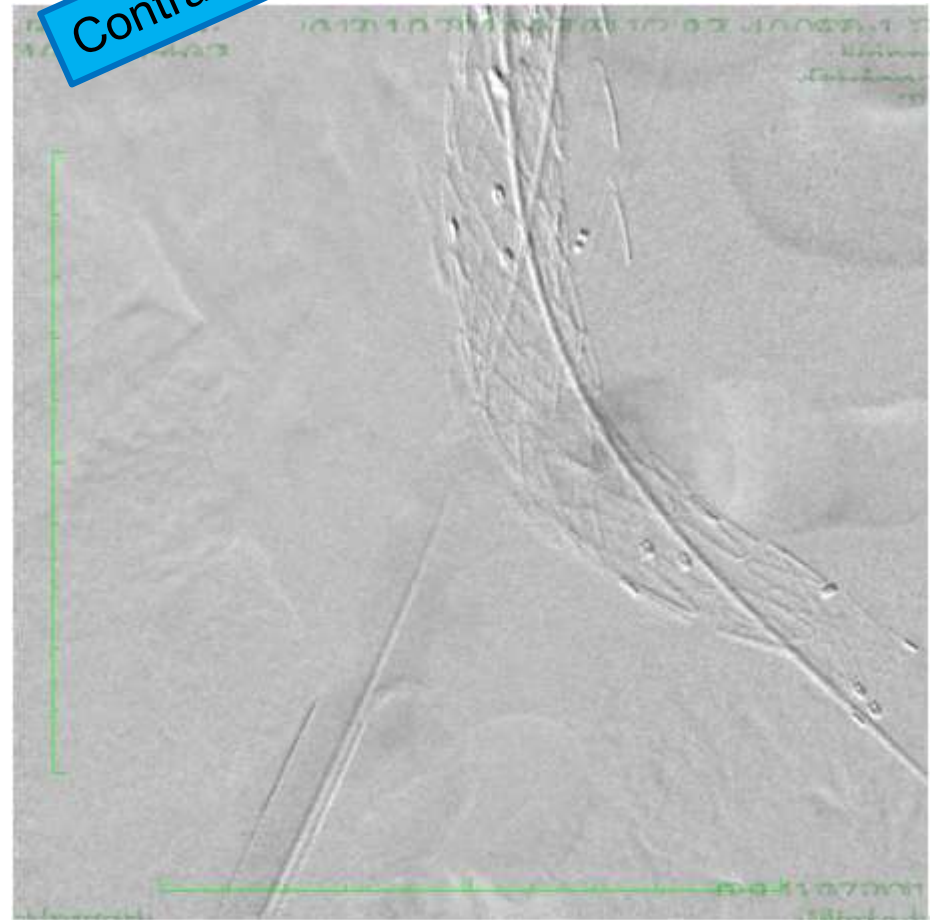
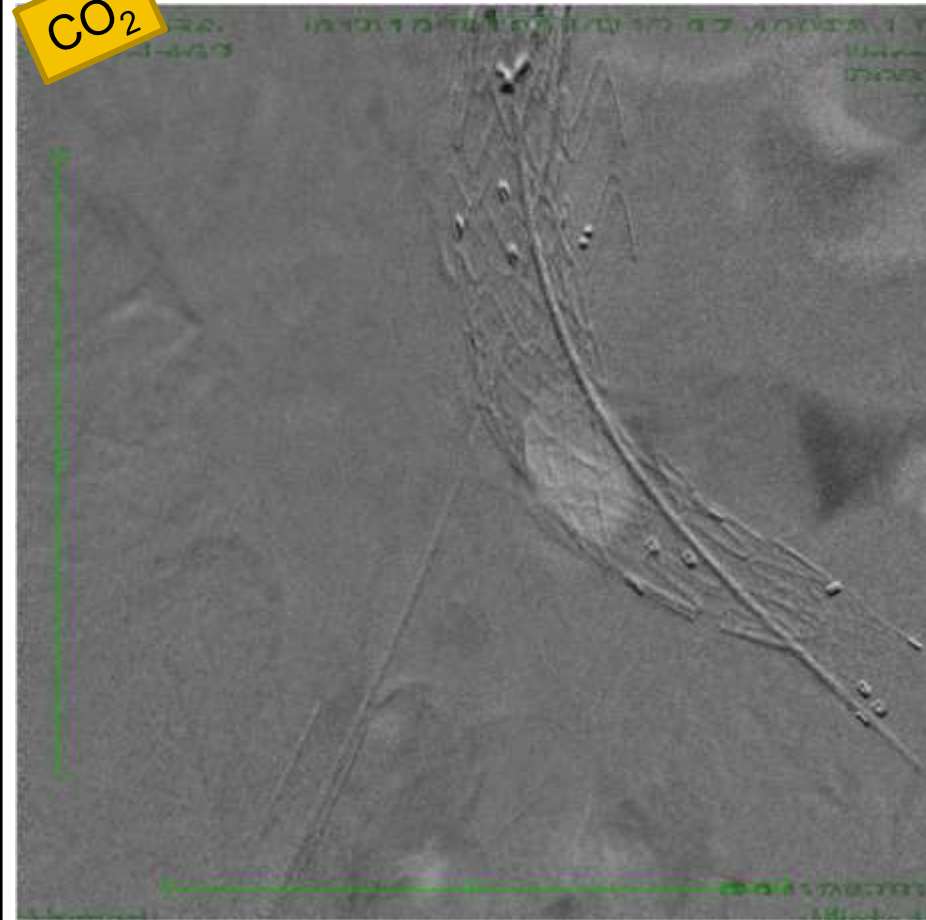
Contrast



IDENTIFICATION OF RIGHT HYPOGASTRIC ARTERY

CO₂

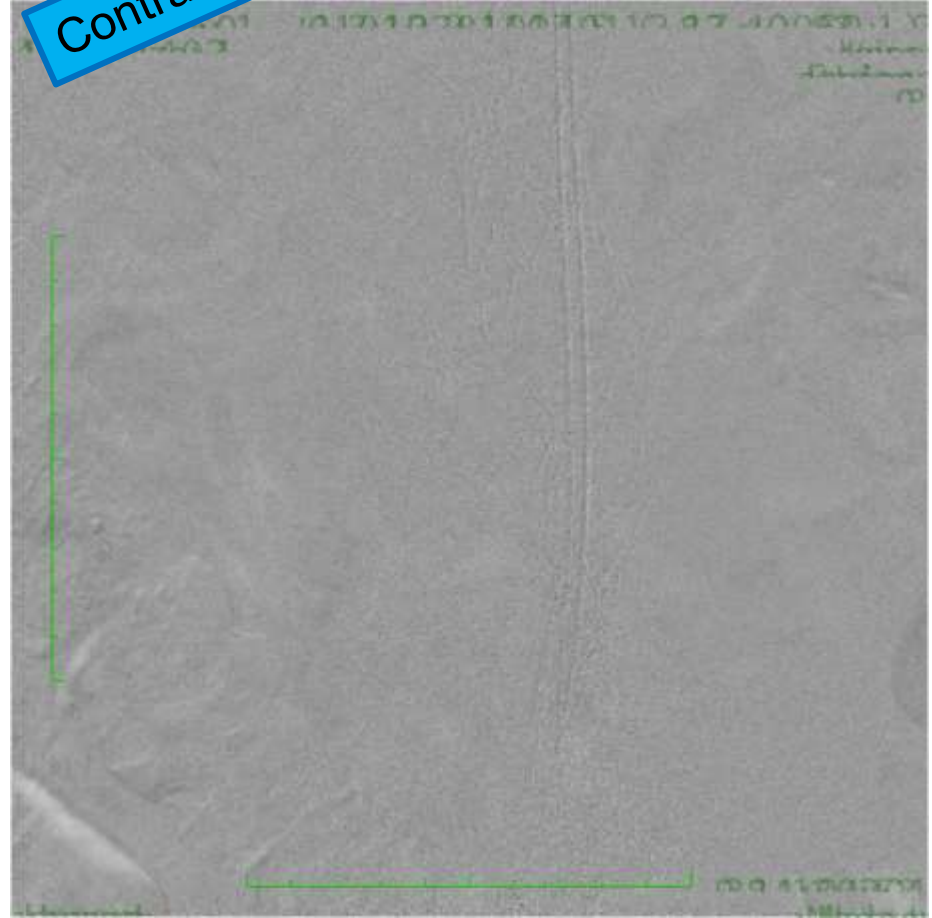
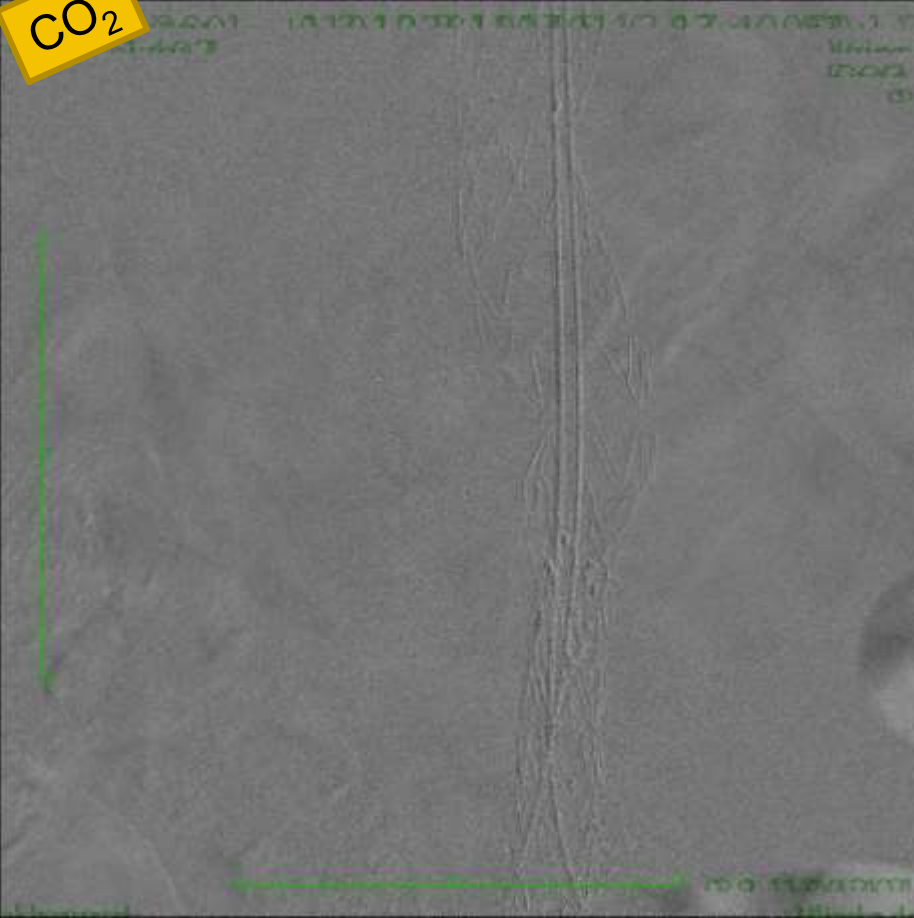
Contrast



FINAL CONTROL ANGIOGRAM

CO₂

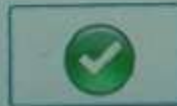
Contrast



END OF THE PROCEDURE

RECAPITULATIF PROCÉDURE

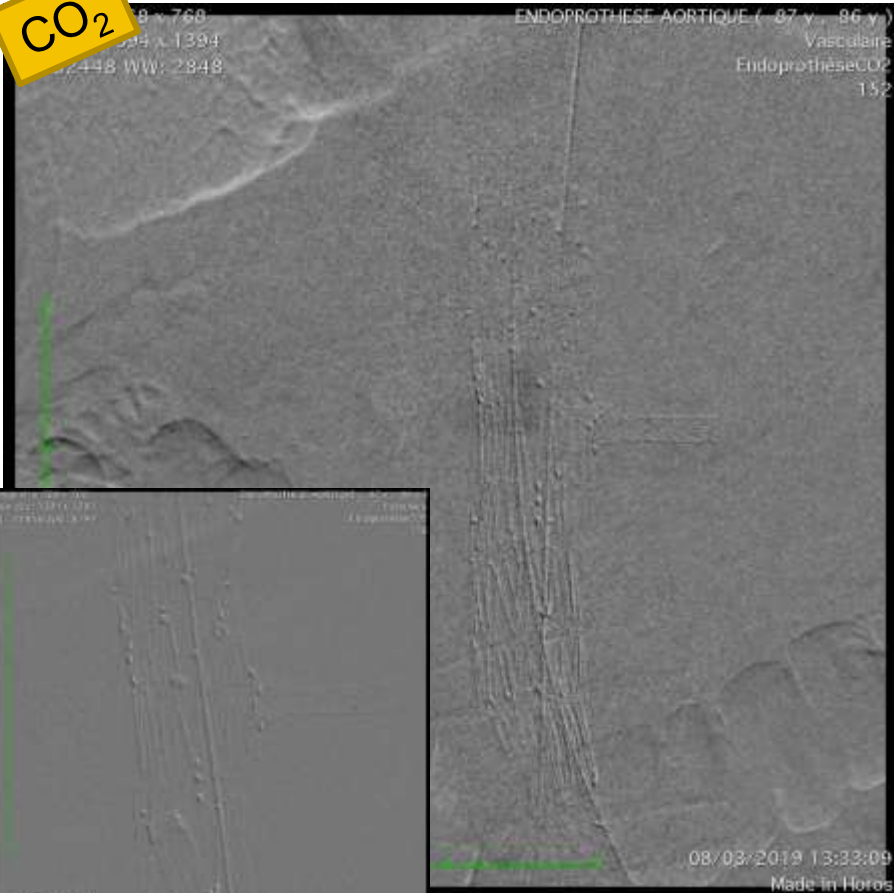
Injections effectuées	4
Volume d'injection total	120 ml
Volume de purge total injecté	0 ml
Total CO2 injectée	120 ml
Moyenne volume d'injection	30,0 ml
Moyenne pression d'injection	250,0 mmHg



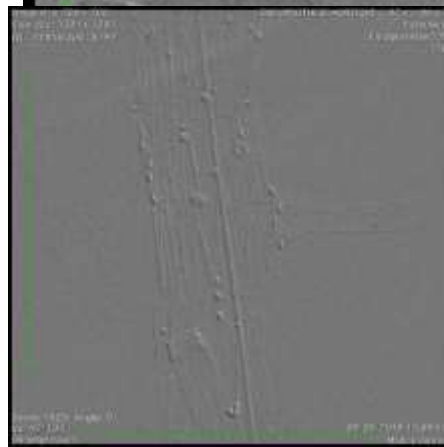
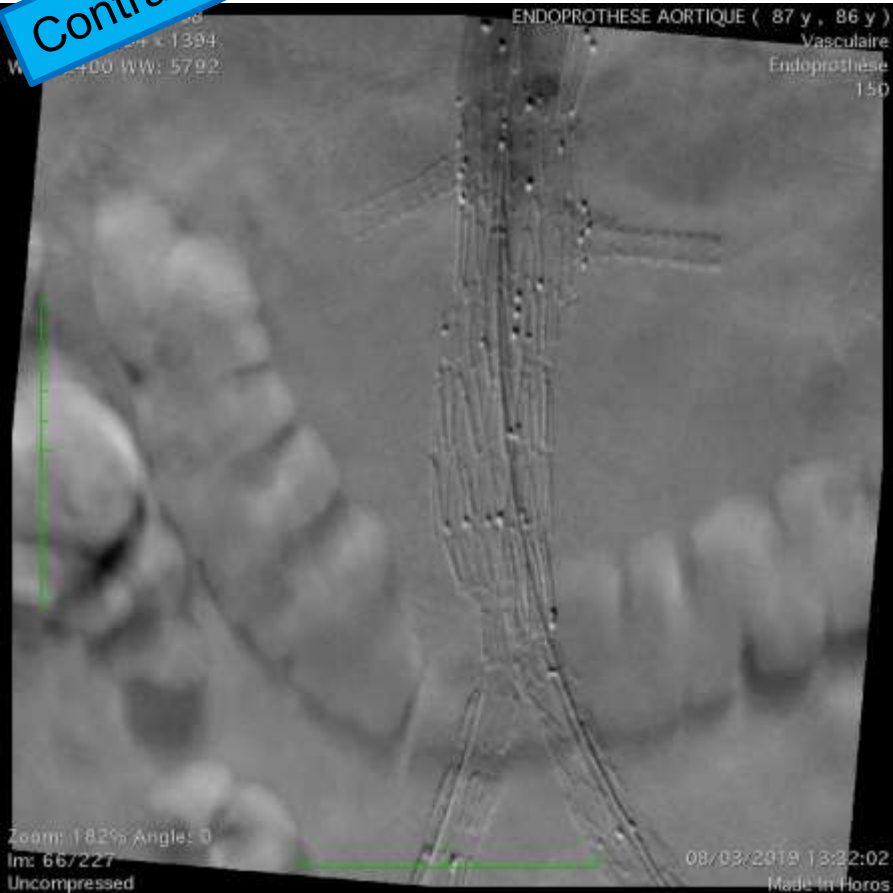
F-EVAR : CLINICAL CASE



CO₂



Contrast



TAKE HOME MESSAGE

- **Modern CO₂ delivery approaches : modern automatic angiography systems**
- **No renal insult**
 - applicable for renal transplants, CKD
- **No contrast allergy**
- **Allows EVAR and even F-EVAR with no iodinated contrast media at all or minimal injections**
- **Safe**
- **Excellent hypogastric artery visualization**
- **Excellent type II endoleak detection**
- **Renal arteries visualization to be improved but possible with table tilt**



THANK YOU FOR YOUR ATTENTION





CO₂ angiography for EVAR treatment Tips and tricks

2020

**E Ducasse, C Caradu
MD PhD FEBVS
CHU de Bordeaux**