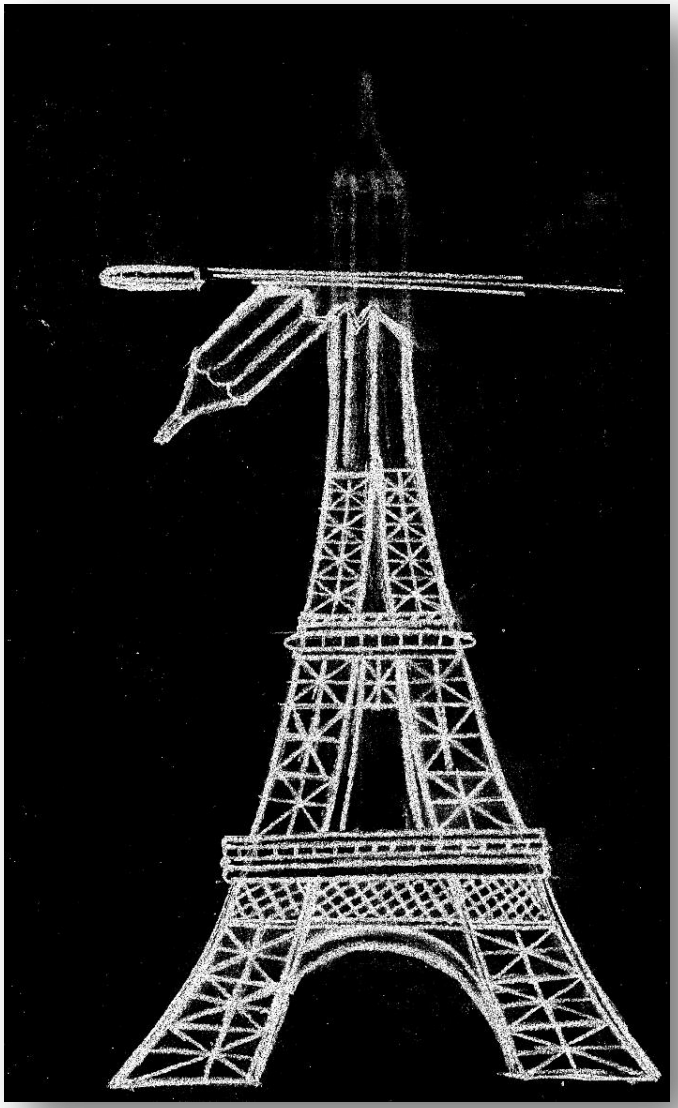
Controversies & updates in Vascular Surgery



Paris - january 22 – 24 2015

Session 1 : deep vein

Compression of the left renal vein : an algorithm for diagnosis by duplex

Philippe Lemasle

Le Chesnay - France

Disclosure

Speaker name : Lemasle Philippe

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

NutCracker Syndrome * (NCS)

- **Anatomical definition**

  = permanent stenotic compression of the ending of the left renal vein (LRV)

  - ant. : between abdominal aorta and superior mesenteric artery
  - post. : between abdominal aorta and lombar vertebra
  - mixed

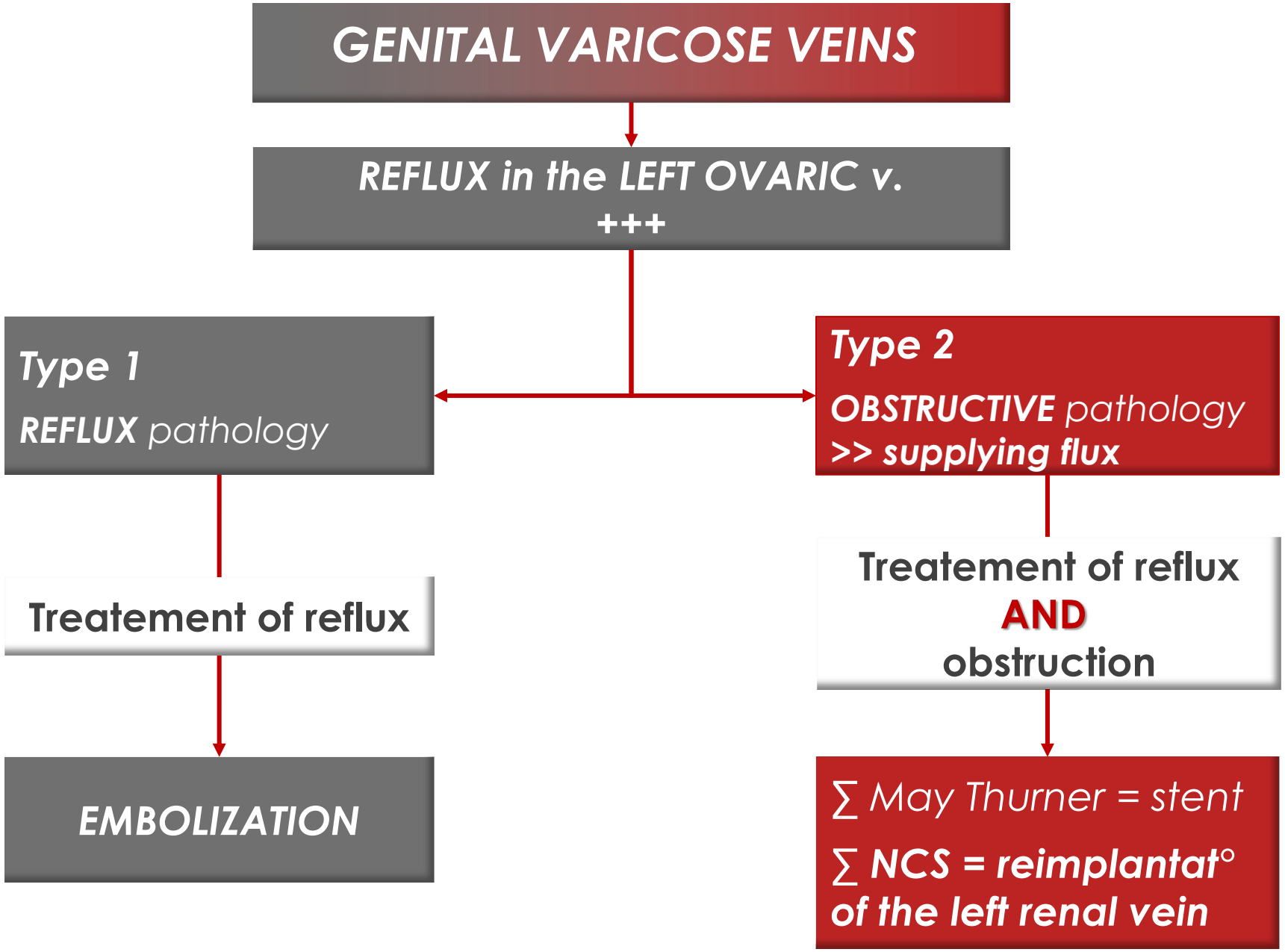
- **Haemodynamic definition**

  = renocaval pressure gradient ≥ 3 mmHg

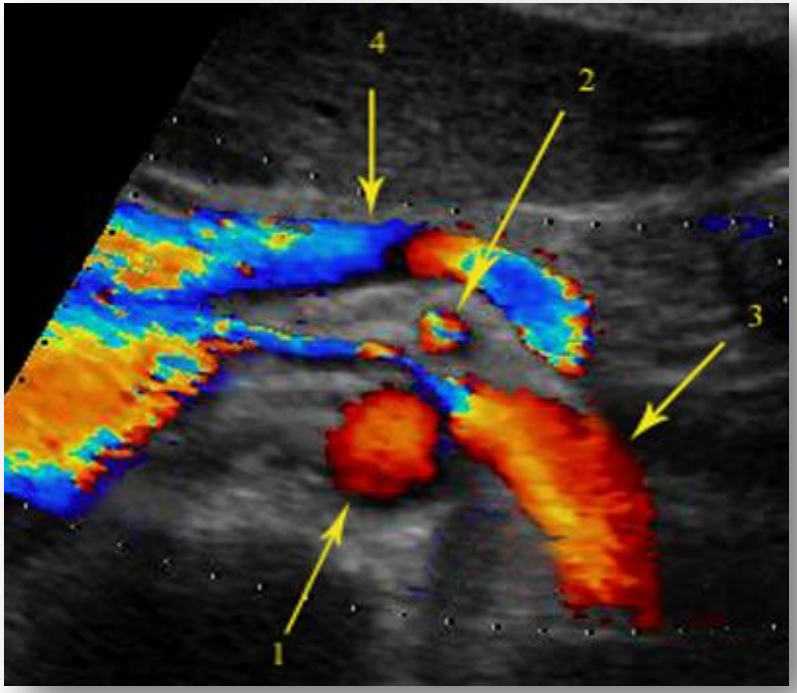
* De Schepper A -1972 – Nutcracker Phenomenon

Phlebographic diagnosis of NCS

- It is well codified and based on three criteria :
  - compression and narrowing of the LRV ending
  - renocaval pressure gradient ≥ 3 mmHg
  - visualization of collateral pathways



Milka Greiner

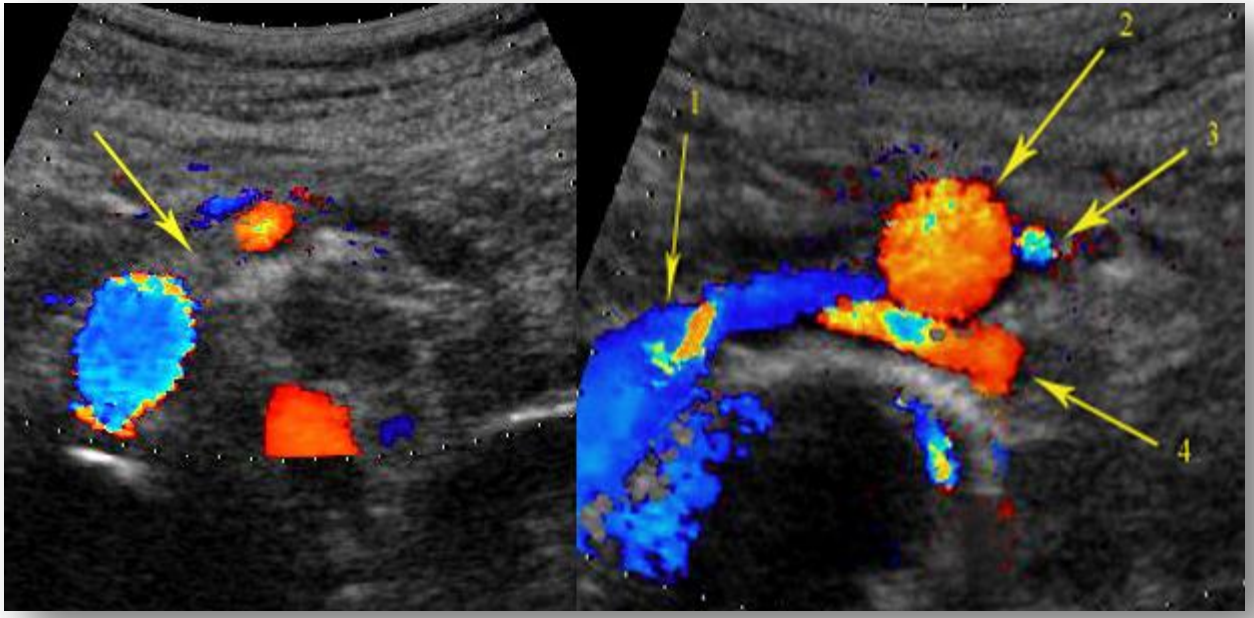


Anterior form

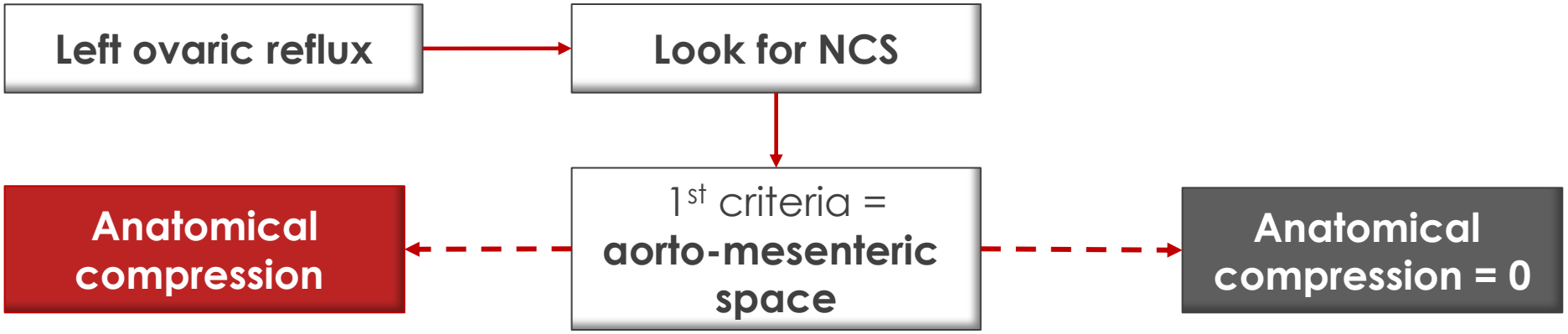
= aorto-mesenteric entrapment

Posterior form

= aorto-vertebral entrapment

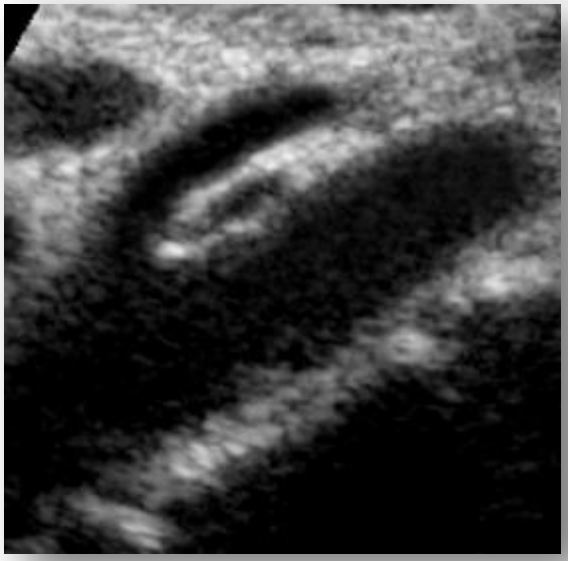


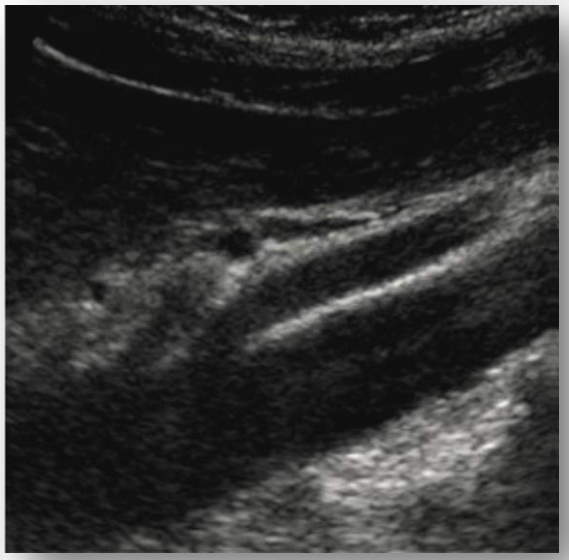

Left ovaric reflux
Look for NCS


Left ovaric reflux
Look for NCS
1st criteria = aorto-mesenteric space
Anatomical compression
Anatomical compression = 0

1st criteria = aorto-mesenteric space





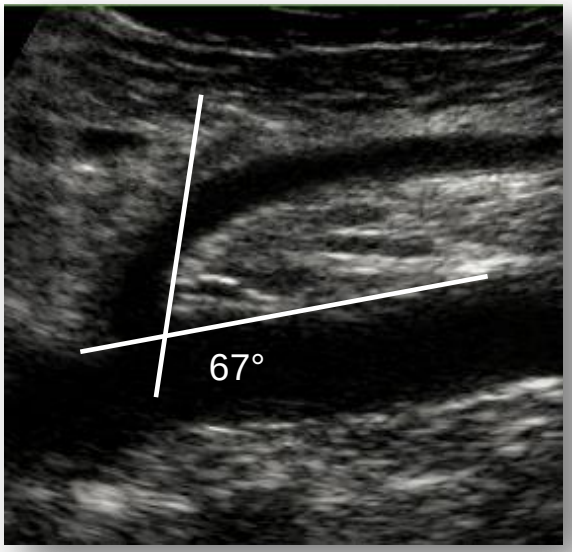
1st criteria = **aorto-mesenteric space**

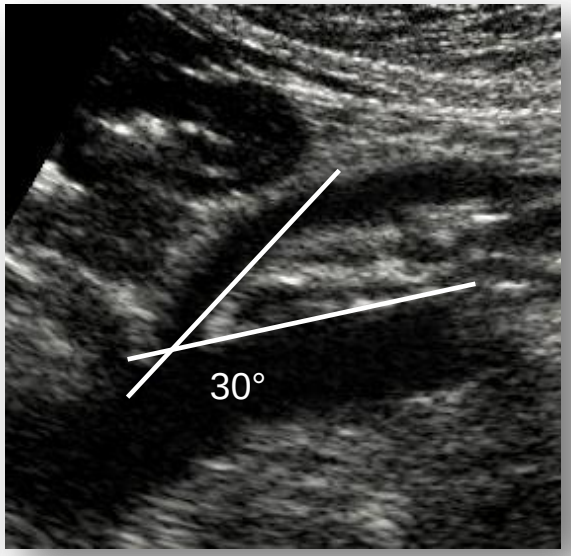
Quantitative approach :

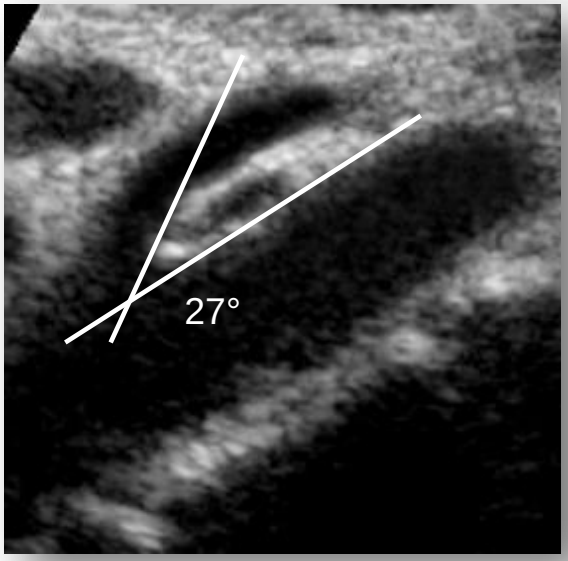
- normal subjects : average angle Ao/MS = 41,25° (31- 52°) [1]
- pathological angle Ao/MS if < 30° [1]
- symptomatic compression if angle Ao/MS < 16° [2]
- significant entrapment if space Ao/MS ≤ 5 mm

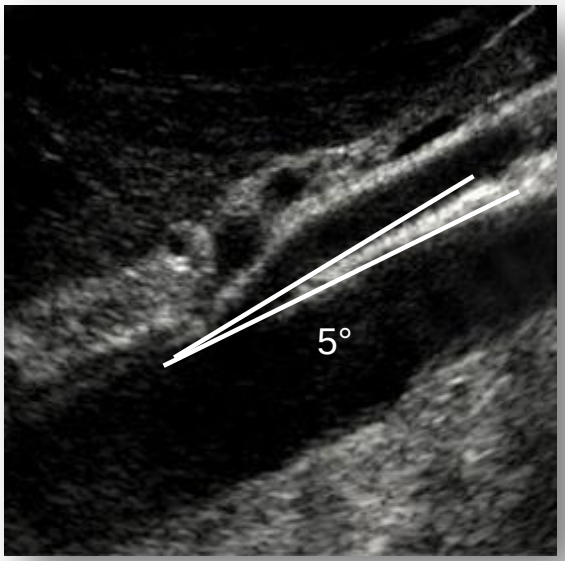
[1]Derrick JR - 1965 [2] Arima M – 1990

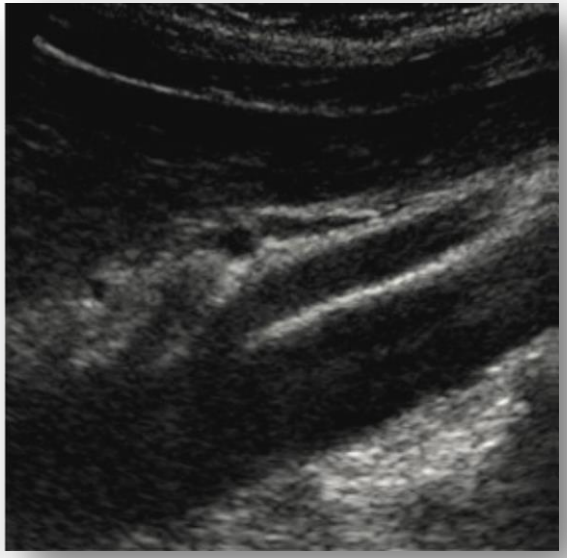
1st criteria = aorto-mesenteric space

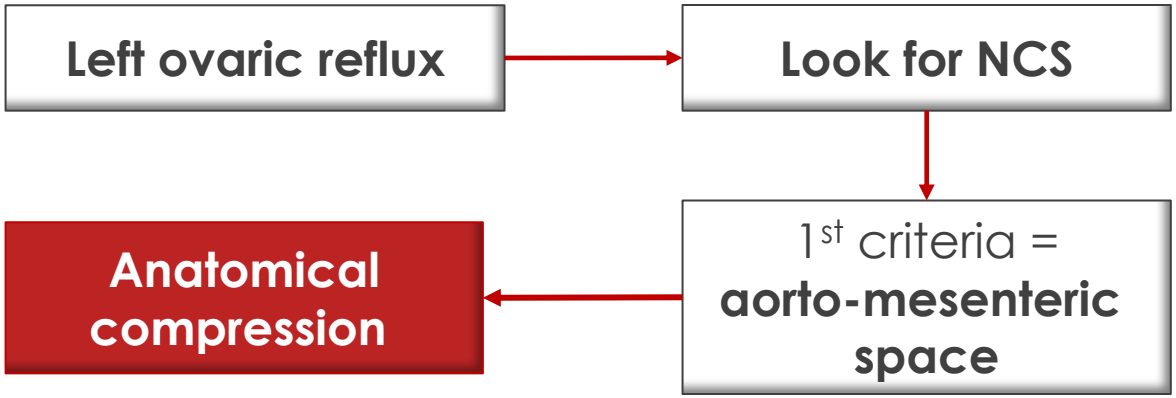


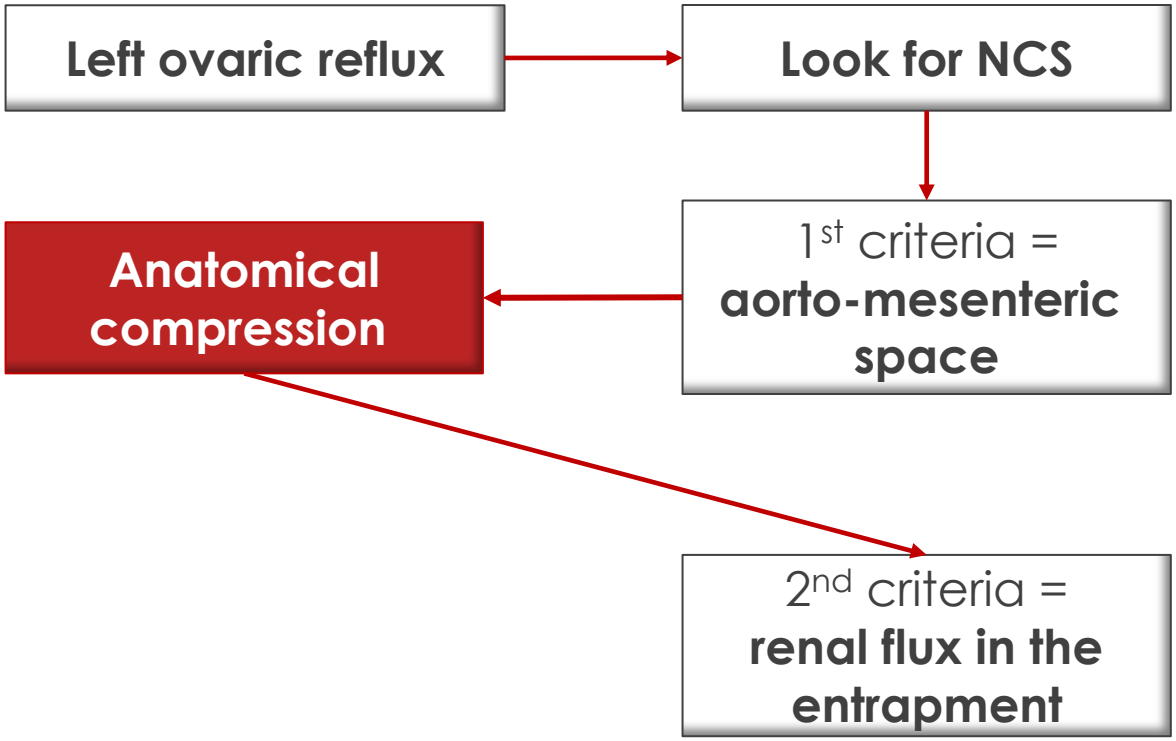


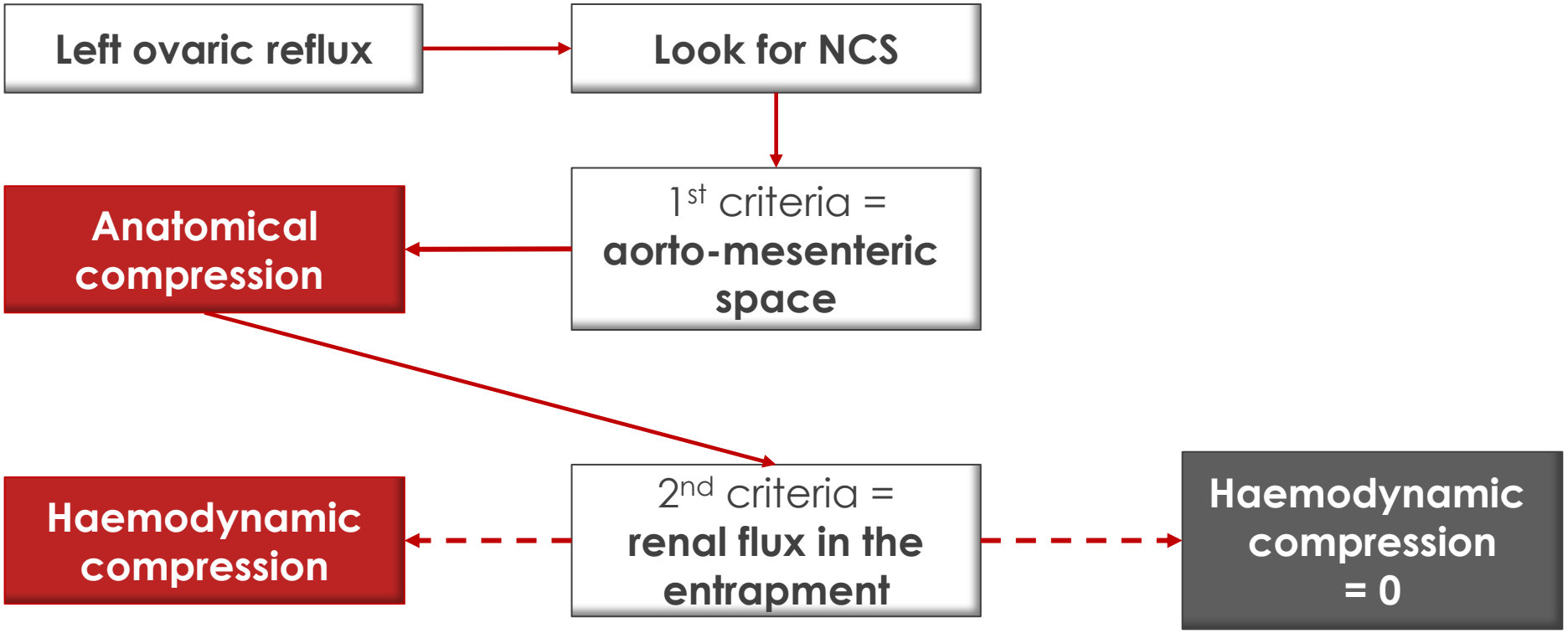







Left ovaric reflux
Look for NCS
1st criteria = aorto-mesenteric space
Anatomical compression


Left ovaric reflux
Look for NCS
1st criteria = aorto-mesenteric space
Anatomical compression
2nd criteria = renal flux in the entrapment


Left ovaric reflux
Look for NCS
1st criteria = aorto-mesenteric space
Anatomical compression
2nd criteria = renal flux in the entrapment
Haemodynamic compression
Haemodynamic compression = 0

2nd criteria = **LRV flux in the entrapment**

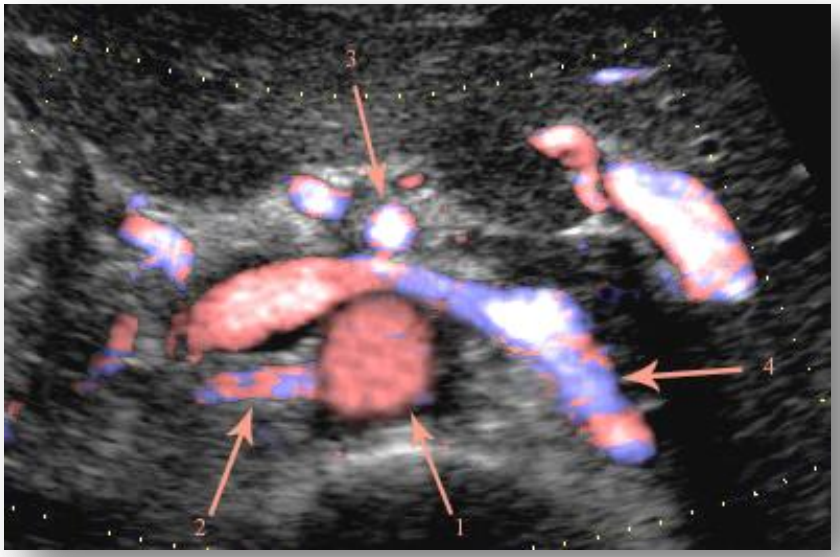
= **direct** signs of LRV stenosis

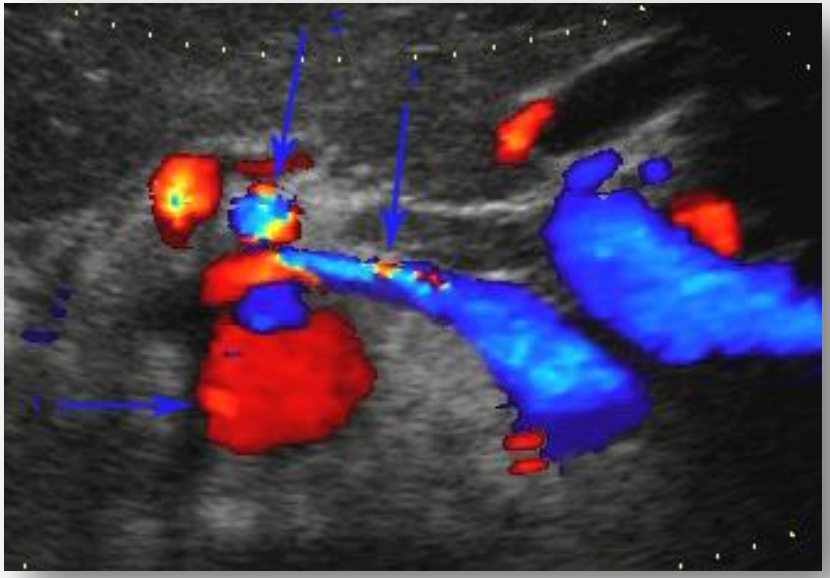
doppler & flow imaging (colour & energy) +++

- **anatomical criteria**
  - LRV compression in the entrapment
  - comparison between antero-posterior diameter of the LRV, upstream and in the entrapment : NCS if ratio > 5 (Se=69% - SP=89%) [1]
- **haemodynamic criteria :**
  - increase velocities in the LRV (PSV, aliasing)
  - comparison between PSV in the LRV, upstream and in the entrapment : NCS if ratio > 5 (Se=90% - SP=94%) [1]
  - sum of the 2 ratio / 2 : if result > 5 (Se=90% - SP=100%) [1]

[1] Kim SH - 1996

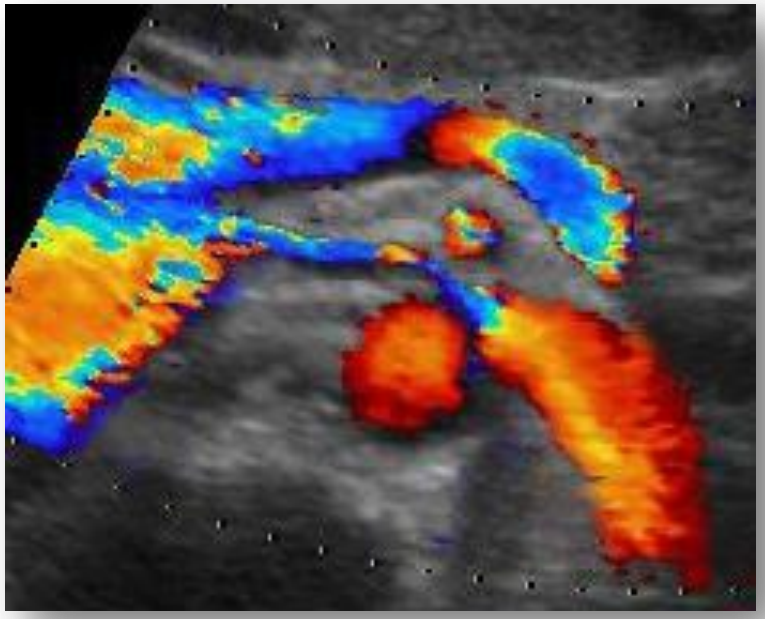
2nd criteria = **LRV flux in the entrapment**

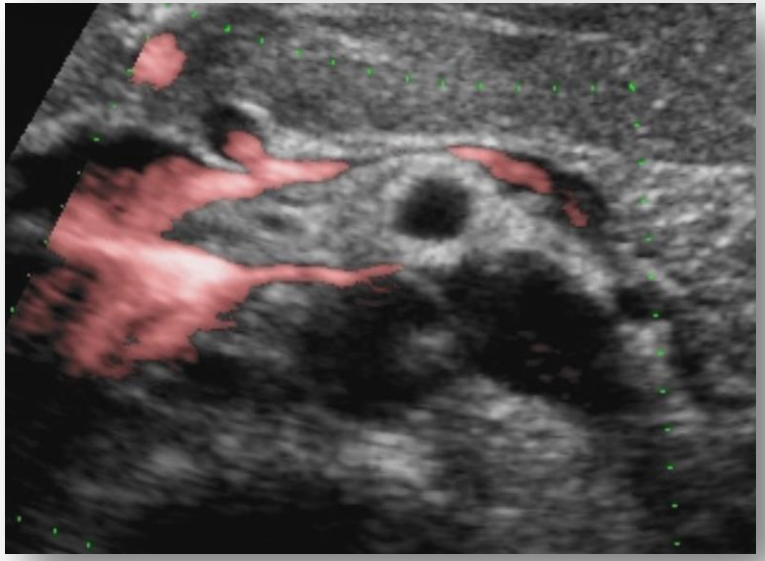




No anatomical compression of the LRV in the entrapment

2nd criteria = LRV flux in the entrapment

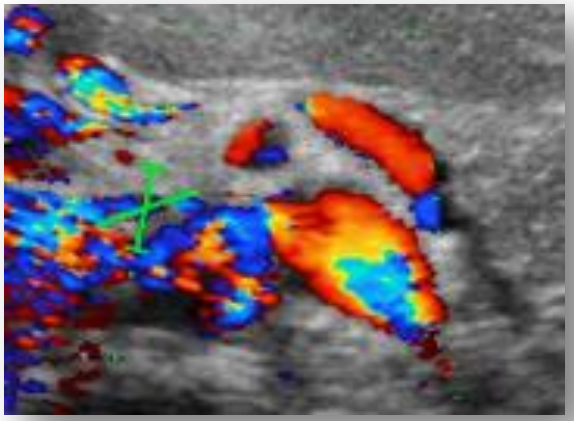


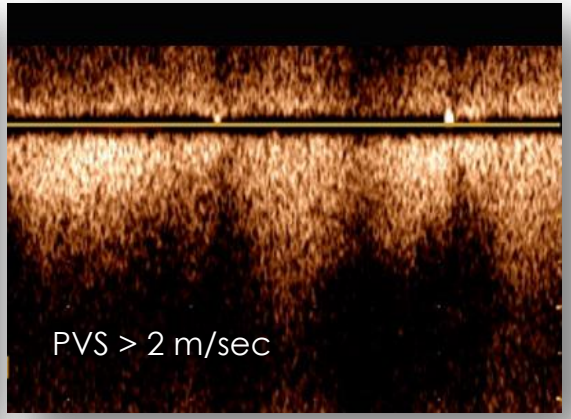


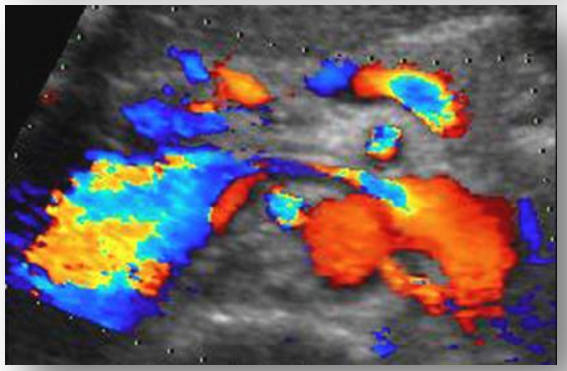
Anatomical direct signs

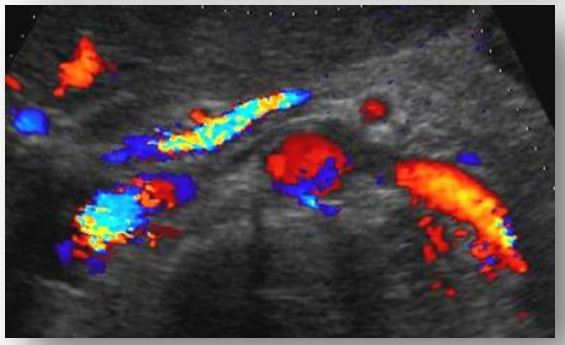
- rolling of the LRV
- ratio between antero-posterior diameter of the LRV, upstream and in the entrapment, > 5

2nd criteria = LRV flux in the entrapment



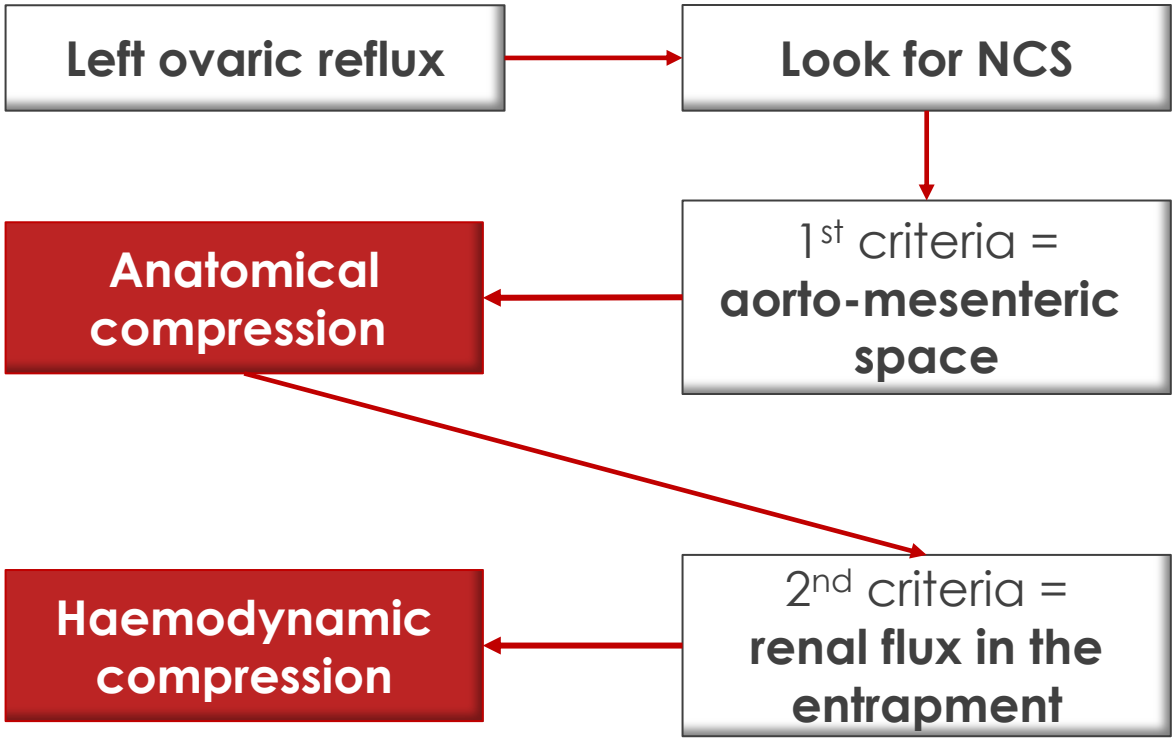


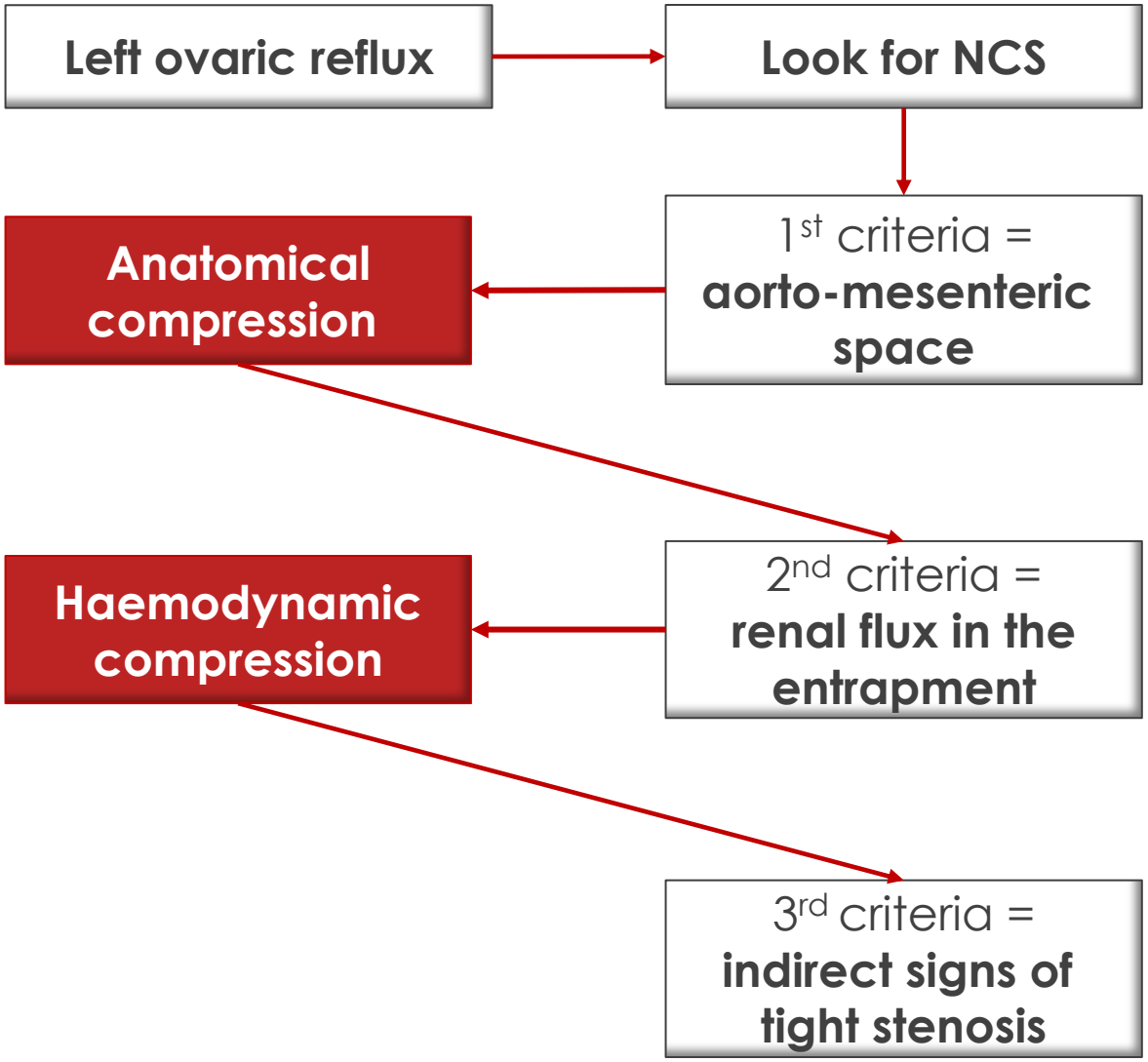


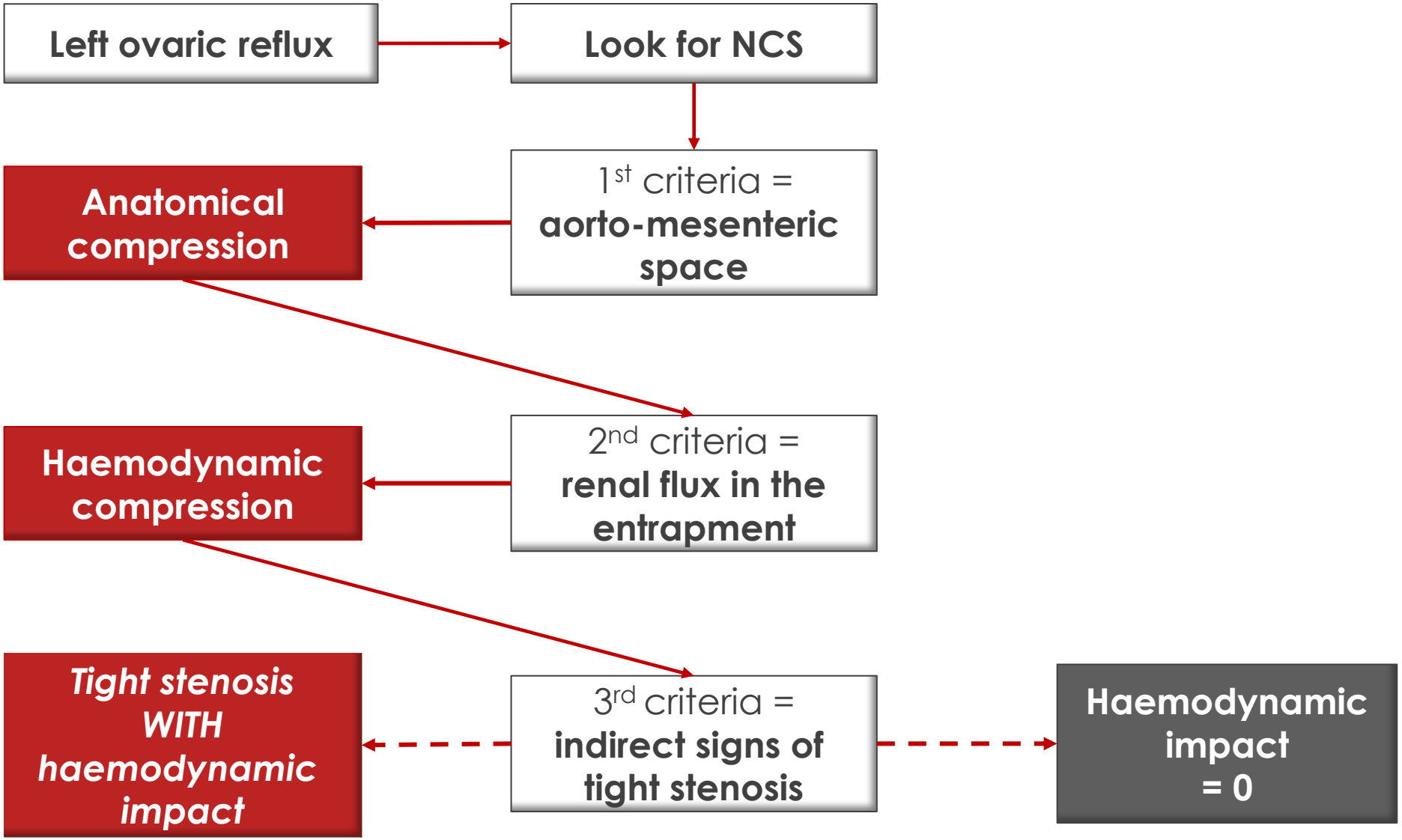


Haemodynamic direct signs

- PSV ⬆ in the entrapment
- aliasing
- no flux


Left ovaric reflux
Look for NCS
1st criteria = aorto-mesenteric space
Anatomical compression
2nd criteria = renal flux in the entrapment
Haemodynamic compression


Left ovaric reflux
Look for NCS
1st criteria = aorto-mesenteric space
Anatomical compression
2nd criteria = renal flux in the entrapment
Haemodynamic compression
3rd criteria = indirect signs of tight stenosis


Left ovaric reflux
Look for NCS
1st criteria = aorto-mesenteric space
Anatomical compression
2nd criteria = renal flux in the entrapment
Haemodynamic compression
3rd criteria = indirect signs of tight stenosis
Tight stenosis WITH haemodynamic impact
Haemodynamic impact = 0

3rd criteria = **upstream impact**

= **Indirect** signs of the LRV tight stenosis

doppler & flow imaging (colour & energy) +++

- **anatomical criteria :**
  - expansion of the LRV
  - visualization of collateral pathways
- **hemodynamical criteria :**
  - in the LRV upstream = flow with slow speeds, little or not modulated by respiration
  - in the left ovaric vein = **permanent reflux, little or not modulated by respiration**
  - in collateral pathways = flow with high speeds

3rd criteria = **upstream impact**

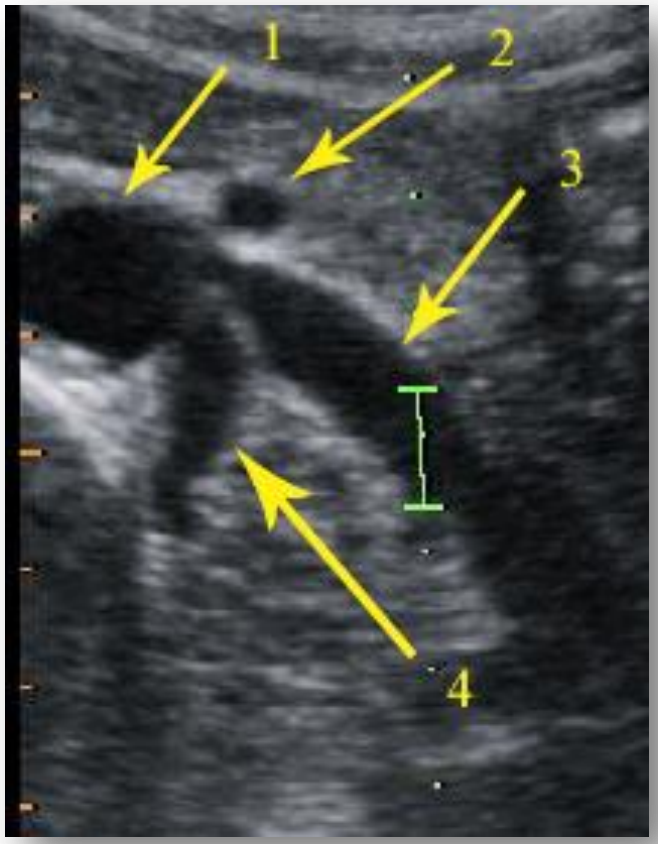
Indirect anatomical signs

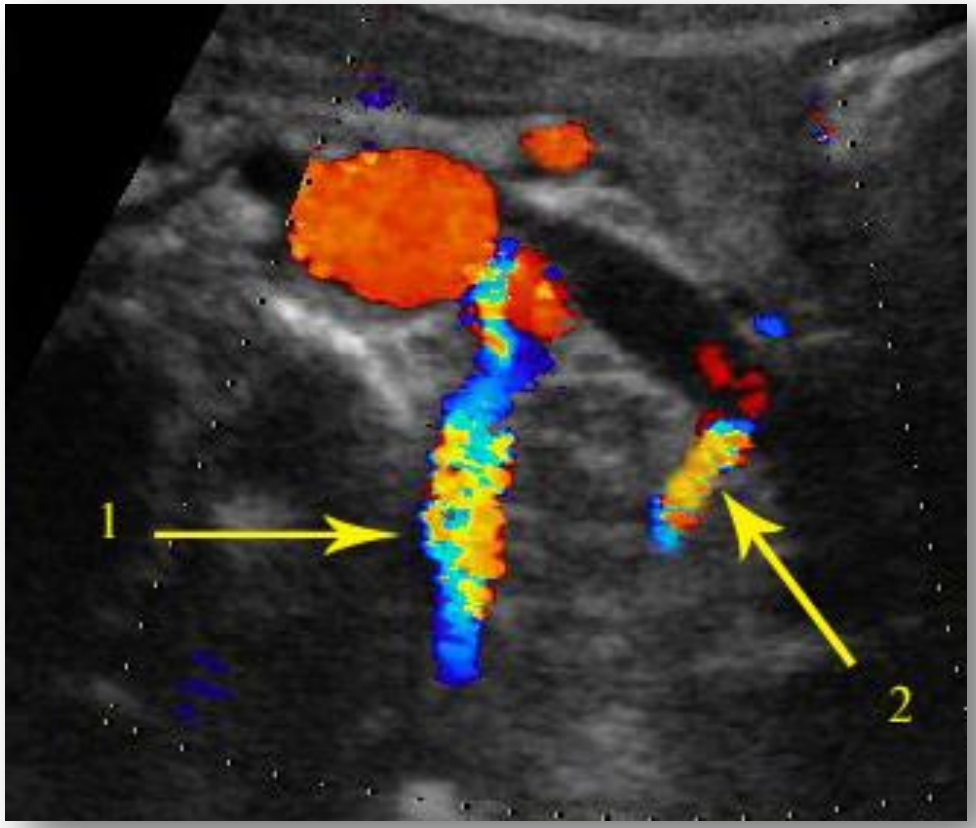
- distended LRV trunk
- distended hilar LRV

3rd criteria = upstream impact

Indirect anatomical signs

- abnormal visualization of supplying collateral pathways

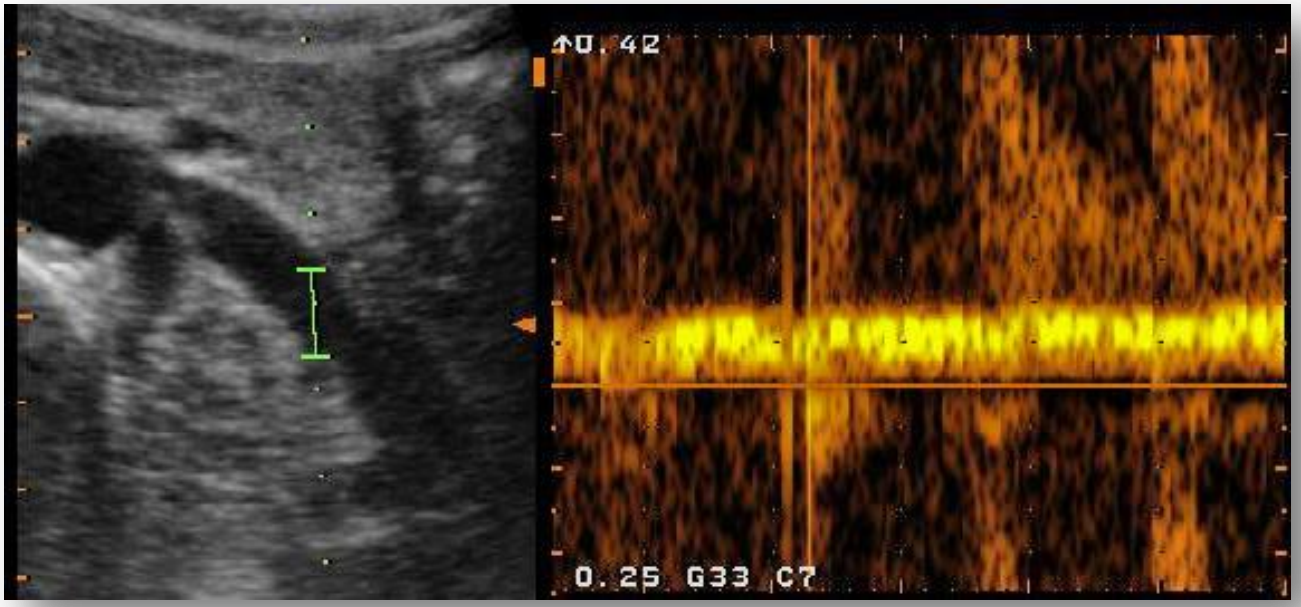




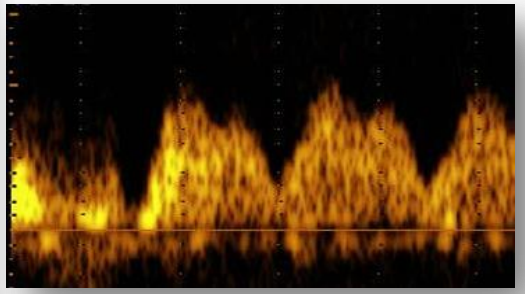
3rd criteria = **upstream impact**

Indirect haemodynamic signs

- **flow with slow velocities in the LRV trunk**, little or not modulated by respiration



LRV

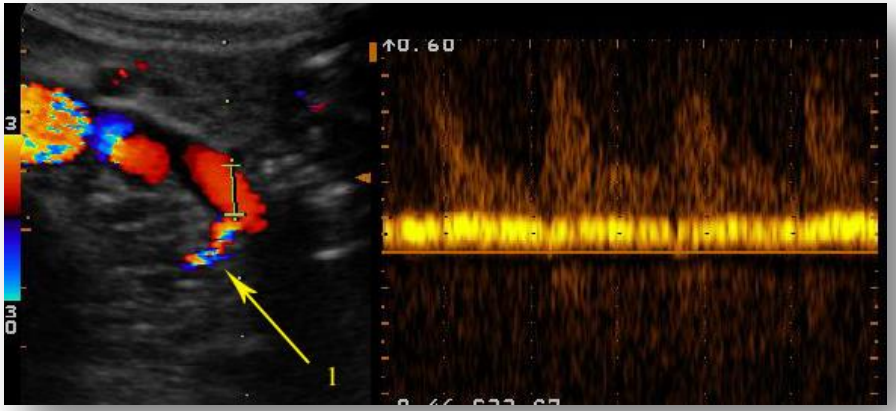


RRV

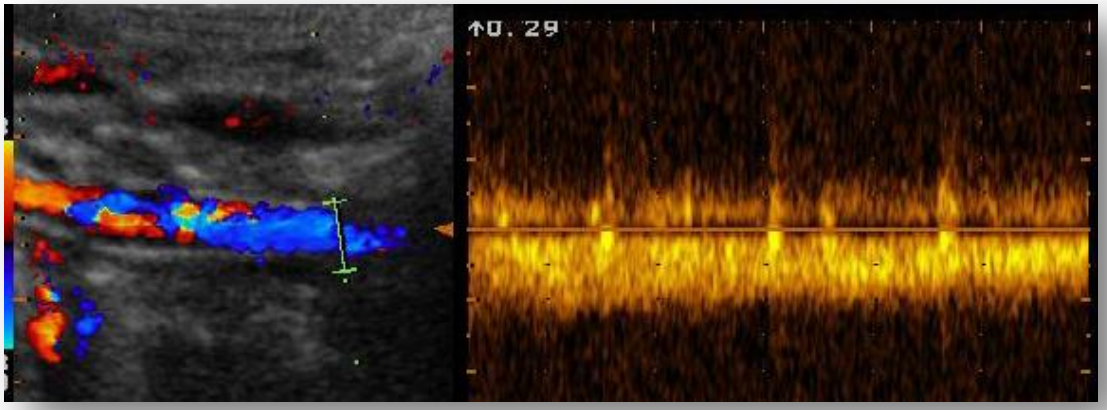
3rd criteria = **upstream impact**

Indirect haemodynamical signs

- **permanent reflux in the left ovaric vein**, little or not modulated by respiration



LRV ending

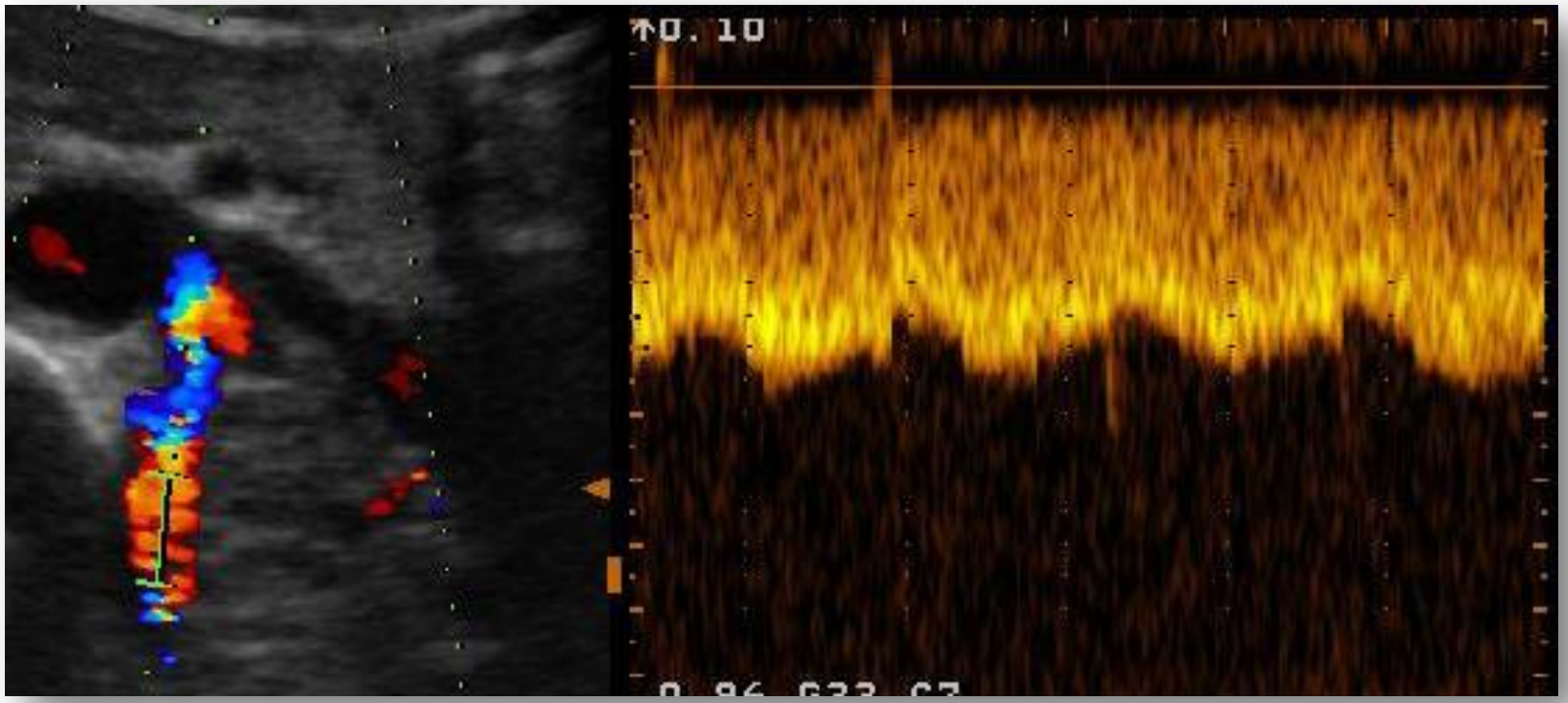


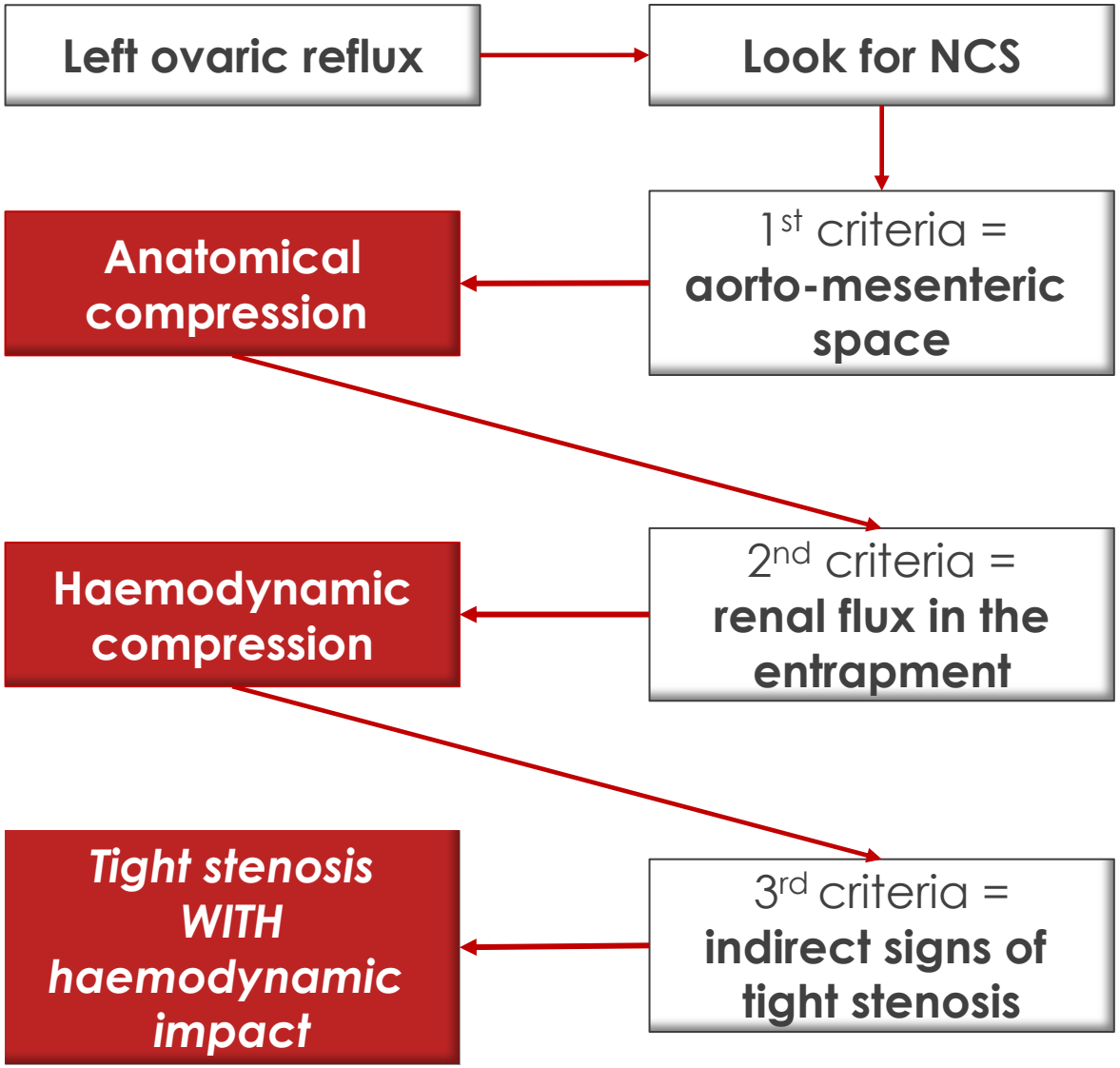
LRV at the psoas muscle level

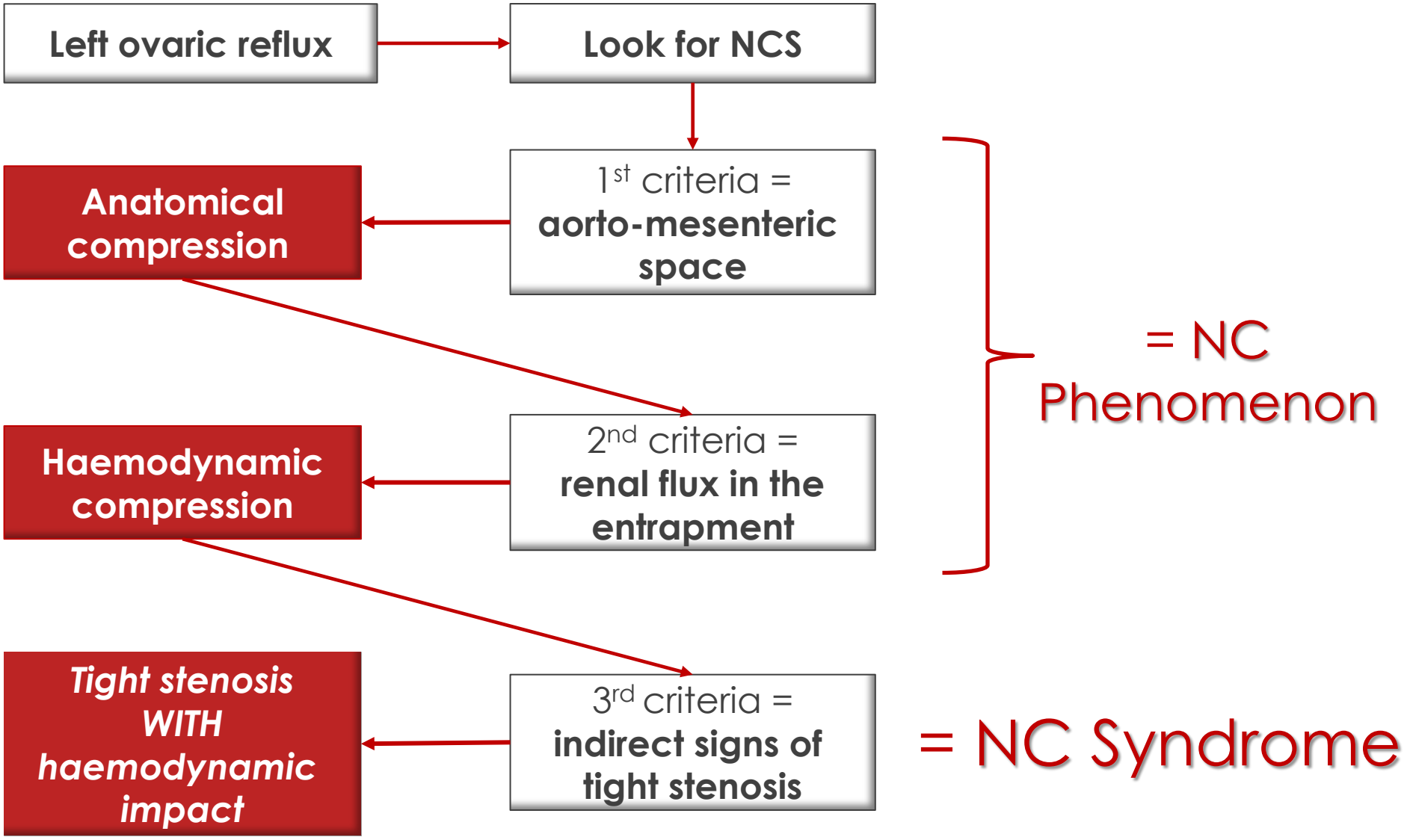
3rd criteria = **upstream impact**

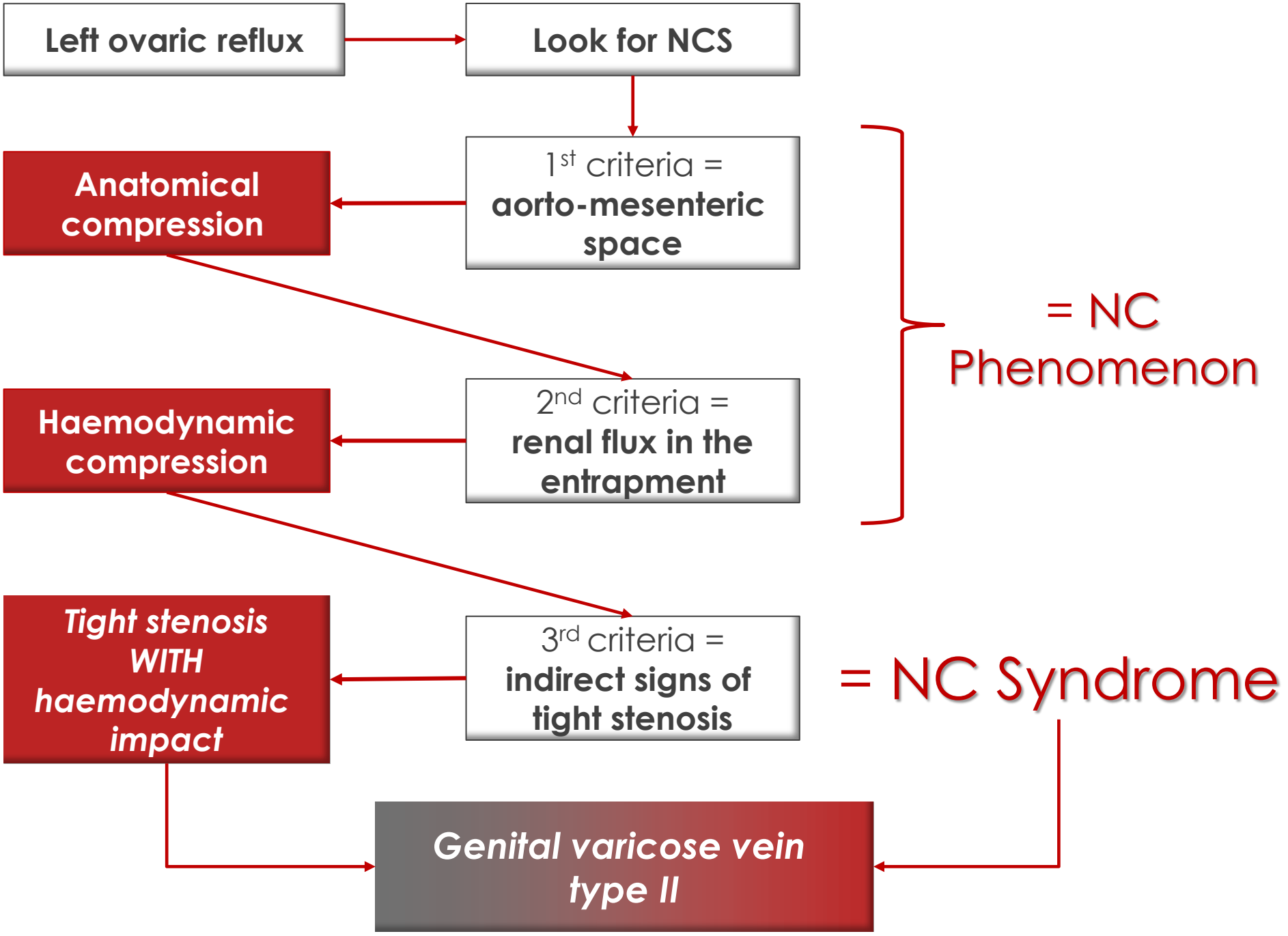
Indirect haemodymical signs

- **flow with high speeds in supplying collateral pathways**, little or not modulated by respiration - lombale vein



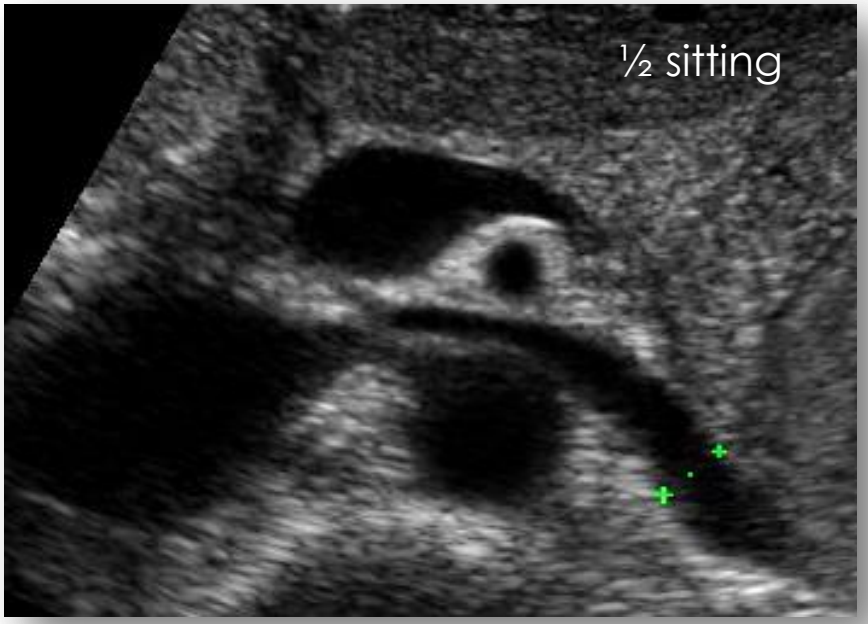

Left ovaric reflux
Look for NCS
1st criteria = aorto-mesenteric space
Anatomical compression
2nd criteria = renal flux in the entrapment
Haemodynamic compression
3rd criteria = indirect signs of tight stenosis
Tight stenosis WITH haemodynamic impact


Left ovaric reflux
Look for NCS
1st criteria = aorto-mesenteric space
Anatomical compression
2nd criteria = renal flux in the entrapment
Haemodynamic compression
3rd criteria = indirect signs of tight stenosis
Tight stenosis WITH haemodynamic impact
= NC Phenomenon
= NC Syndrome

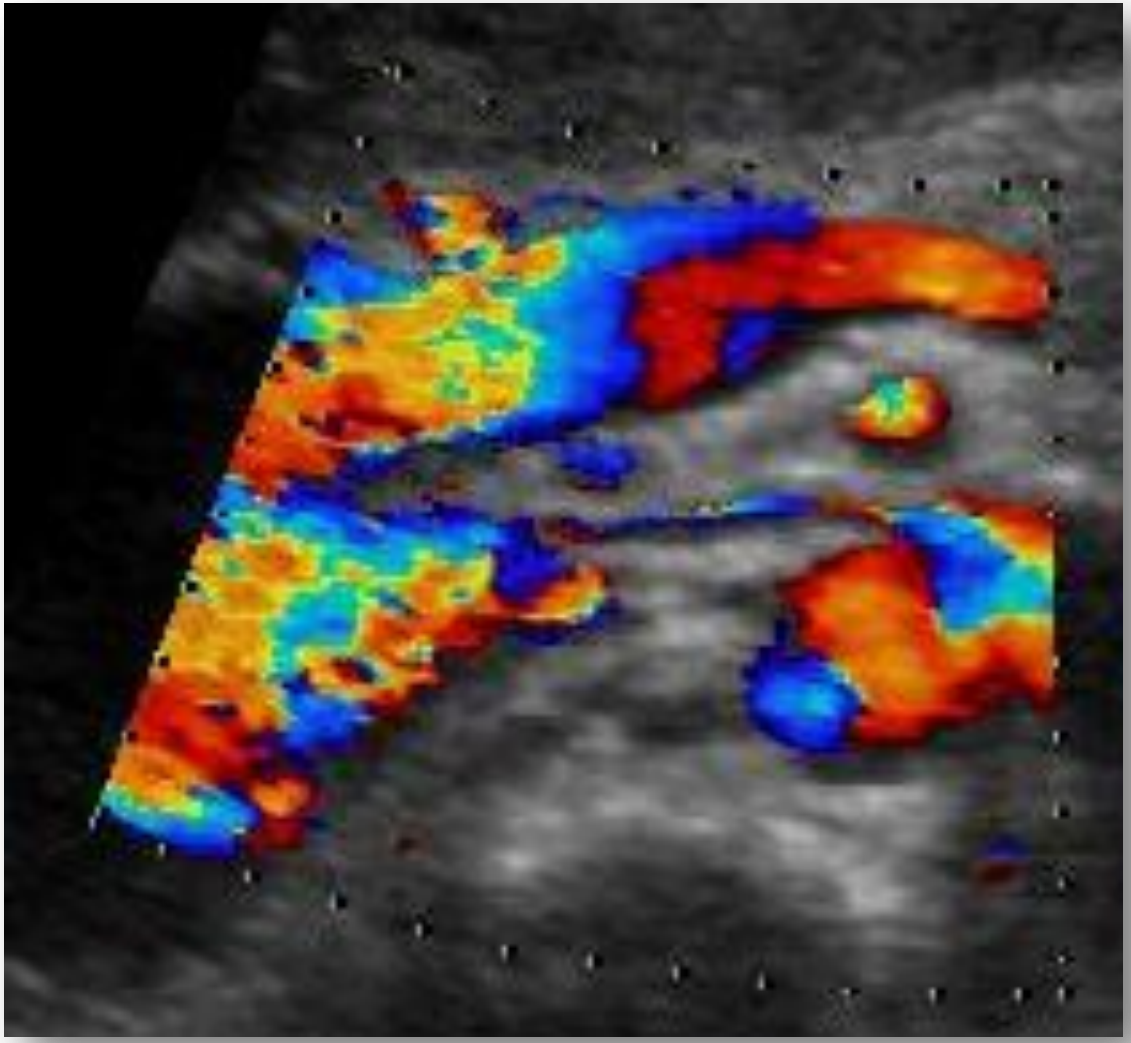

Left ovaric reflux
Look for NCS
1st criteria = aorto-mesenteric space
Anatomical compression
2nd criteria = renal flux in the entrapment
Haemodynamic compression
3rd criteria = indirect signs of tight stenosis
Tight stenosis WITH haemodynamic impact
Genital varicose vein type II
= NC Phenomenon
= NC Syndrome

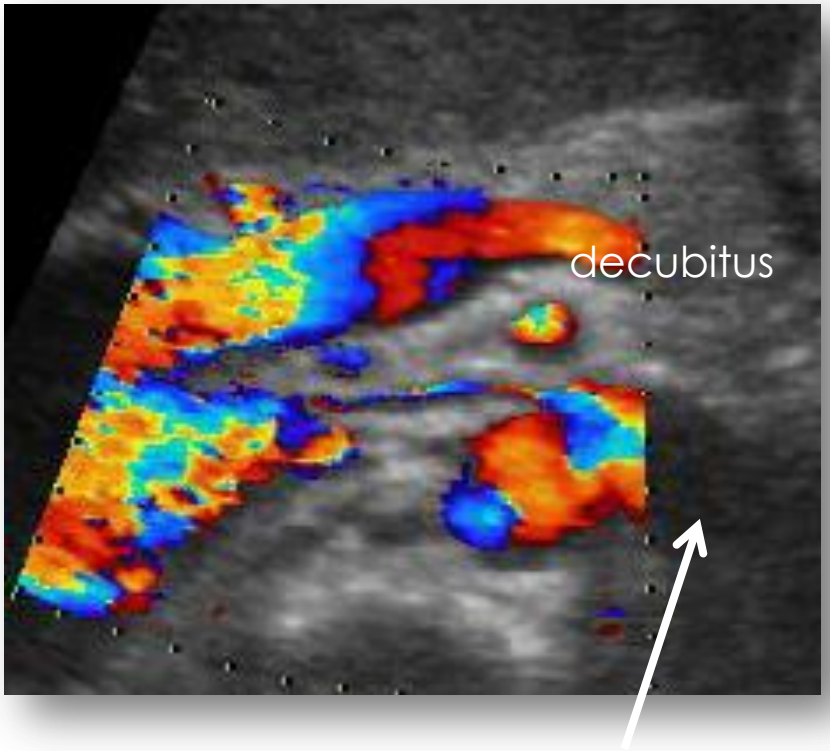
NCS & positional changes +++

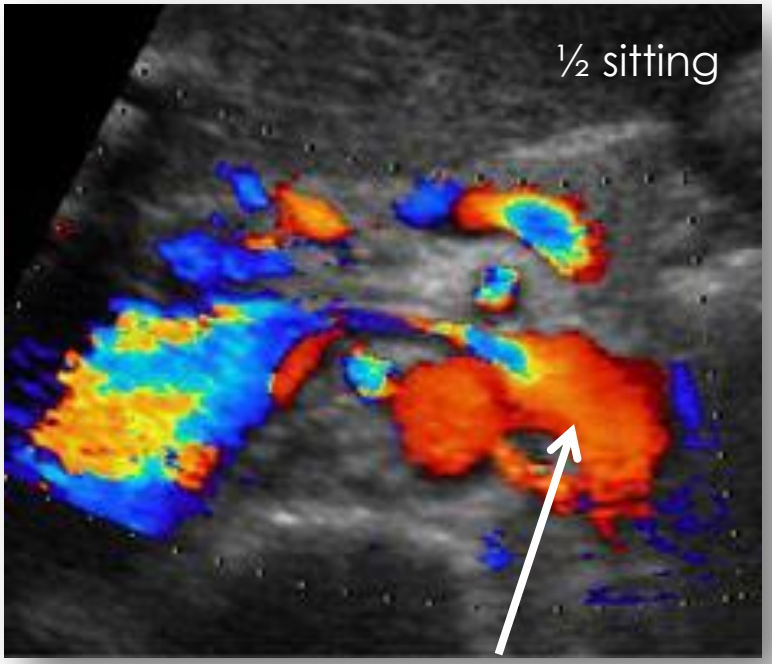

decubitus

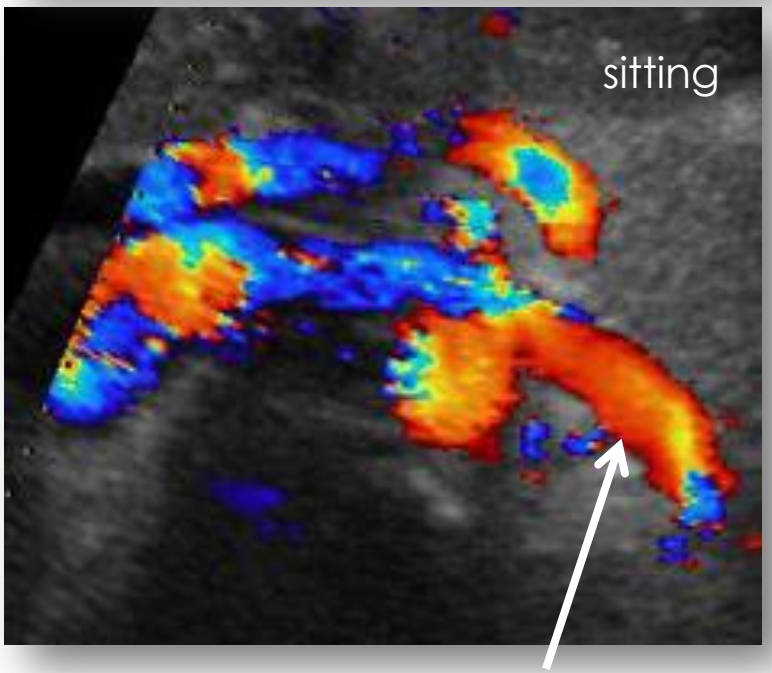

½ sitting


sitting




decubitus


½ sitting


sitting

Conclusion

- Doppler ultrasonography is a hepful, non invasive exploration in the assessment of NCS

  = first approach to differentiate phenomenom and syndrome

- Permanent reflux in the left ovaric vein, not modulated by respiration, is suggestive of a NCS

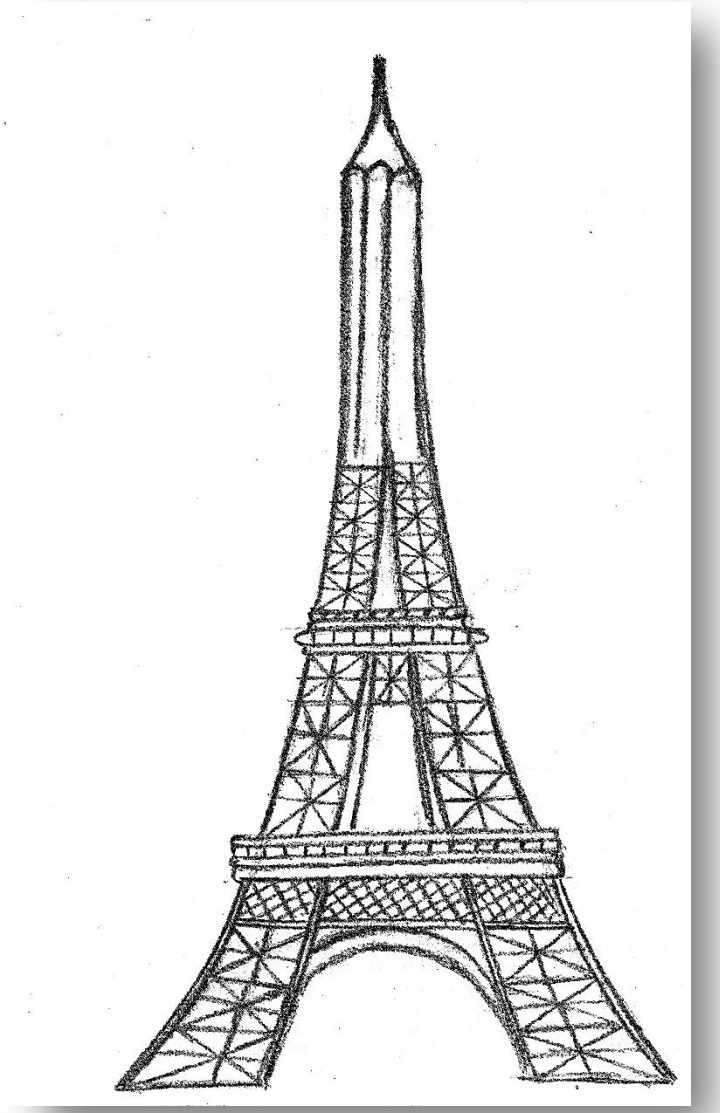
- Positional changes +++

  (perfectly valid for the other exams :TDM et phlébography)

- NCS is a diagnosis with important consequences

  >> multidisciplinary therapeutic decision

Controversies & updates in Vascular Surgery



Paris - january 22 – 24 2015