

The background is a gradient from deep red at the top to dark blue at the bottom, speckled with white dots. On the left side, there are several concentric circles and a large circular scale with degree markings from 140 to 260. Some circles have arrows indicating a clockwise direction.

# L'EMBOLISATION EN URGENCE

# Traumatique :



- Impact direct en regards de l'organe atteint
- Arrachement d'un organe par décélération brutale

# Angio-CT



- Détection d'un saignement actif à partir de **0.3 ml/min** (contre 0,5 ml/min pour l'angiographie)



# Rôle du CT

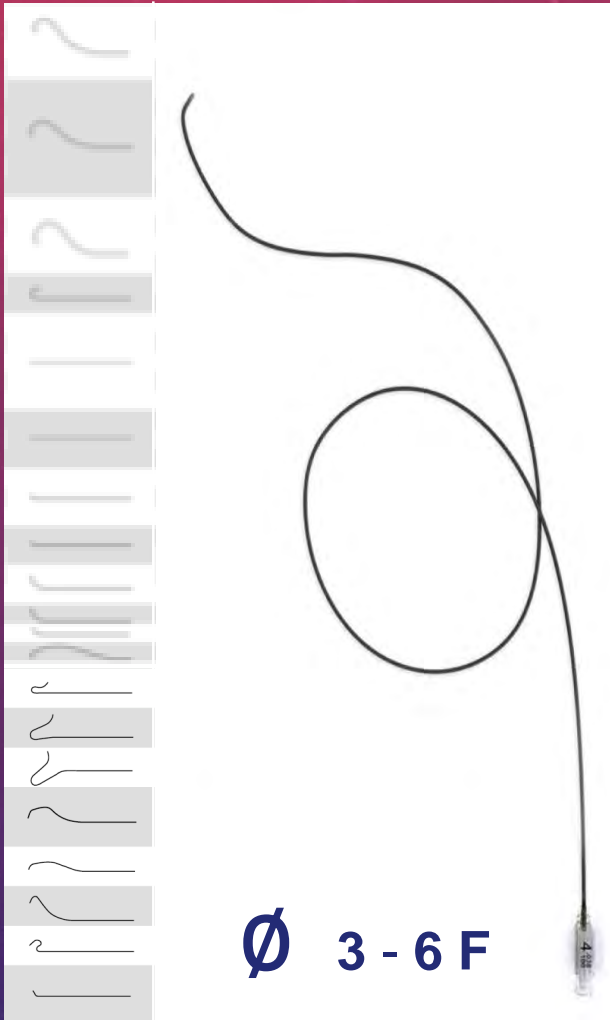
- score de sévérité
- localiser et quantifier l'hémorragie
- différencier une hémorragie veineuse ou artérielle
- constitution d'une cartographie vasculaire
- prédire les complications hémorragiques tardives (pseudo-anévrisme)



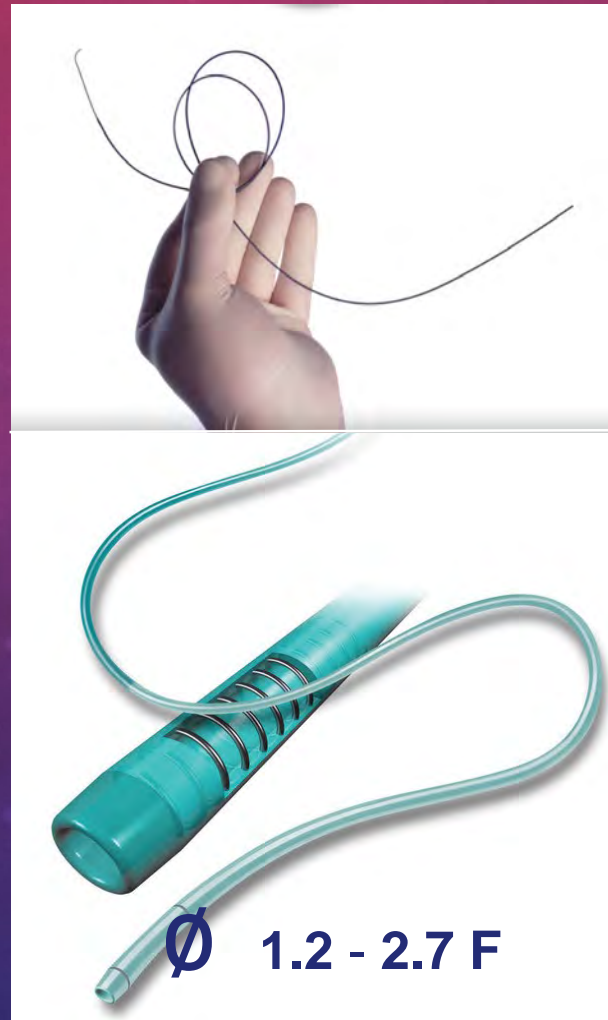
# Signe CT en vue d'une embolisation:

- extravasation de contraste
- pseudo-anévrisme
- «cut-off» sign
- score sévère ( 3-4 ou plus)
- hémopéritoine important

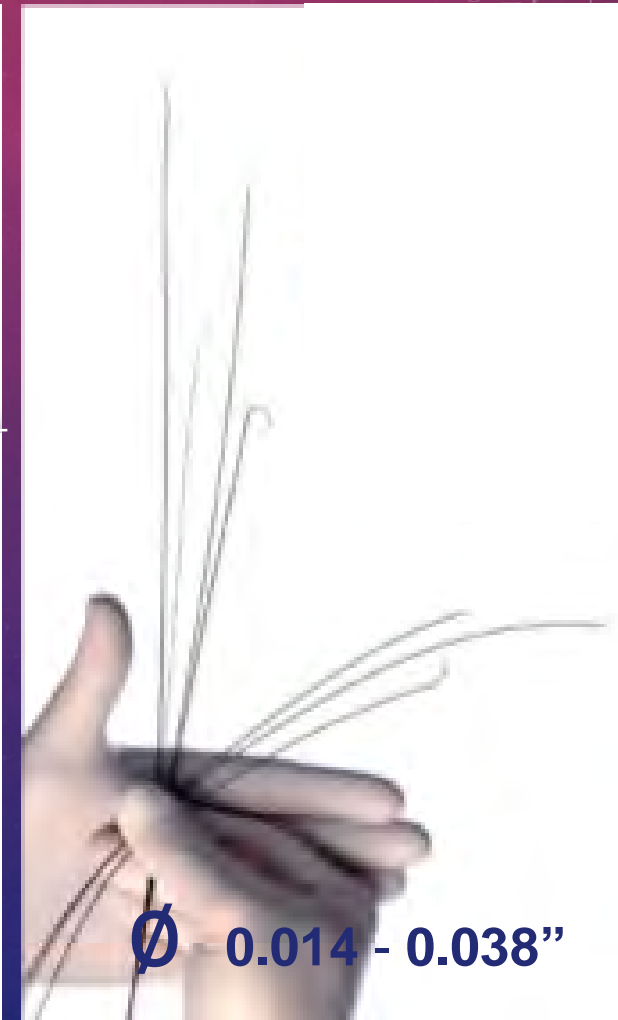
catheters



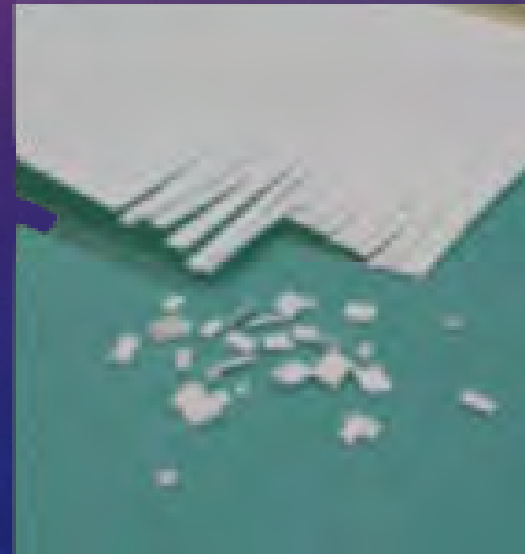
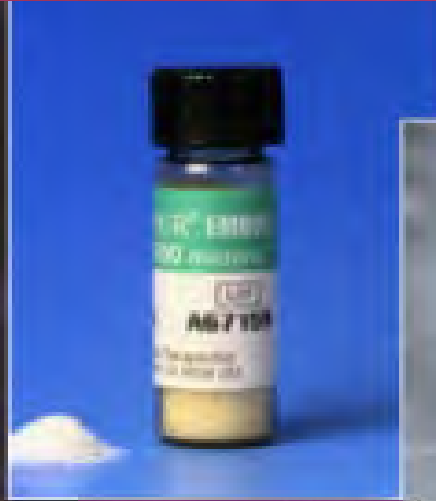
microcatheters



guide  
wires

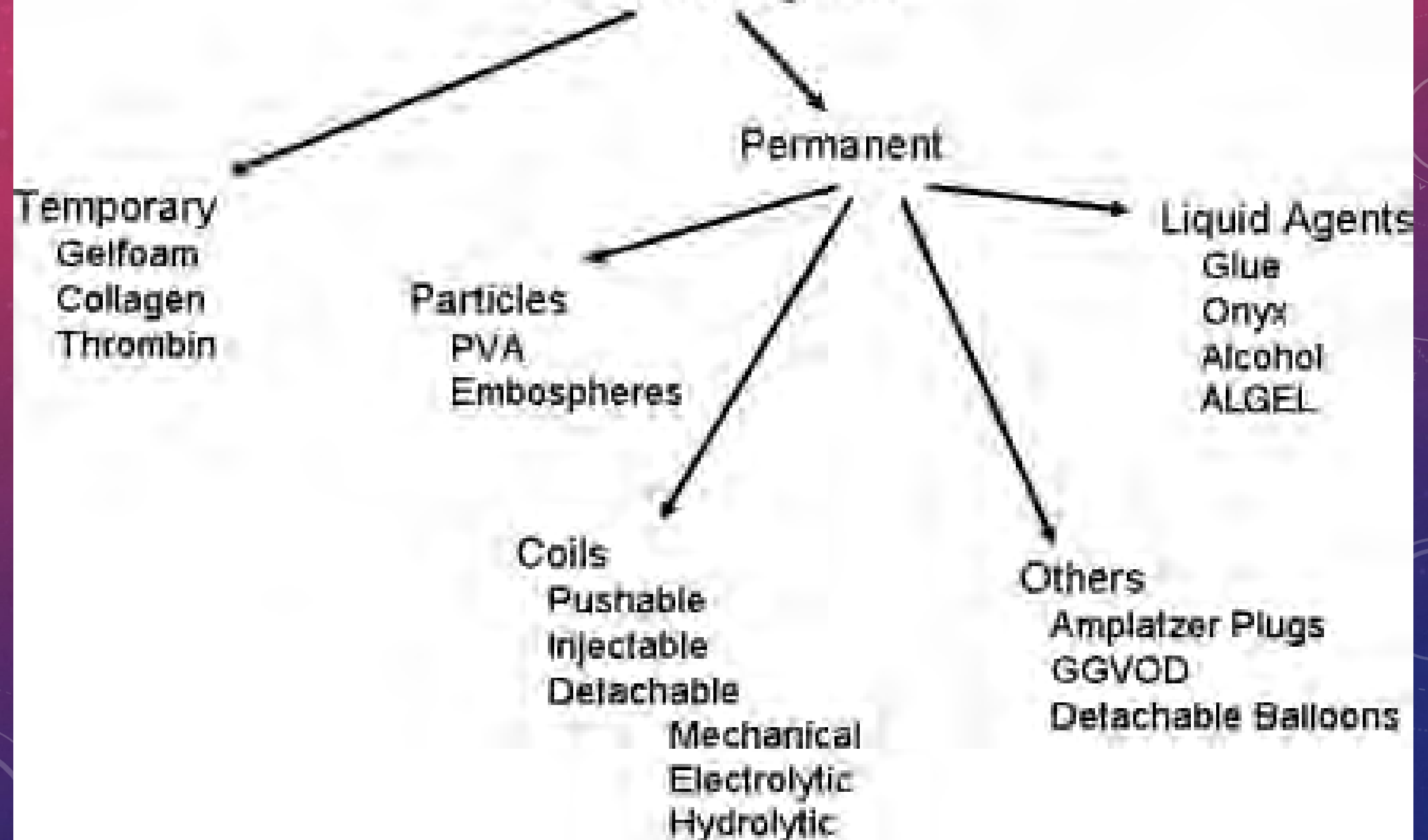


# Matériel:





# Embololic Agents





# Gelfoam:

- Résorbable
- recanalisation (quelques semaines)
- faible coût



## n-Butyl cyanoacrylate:

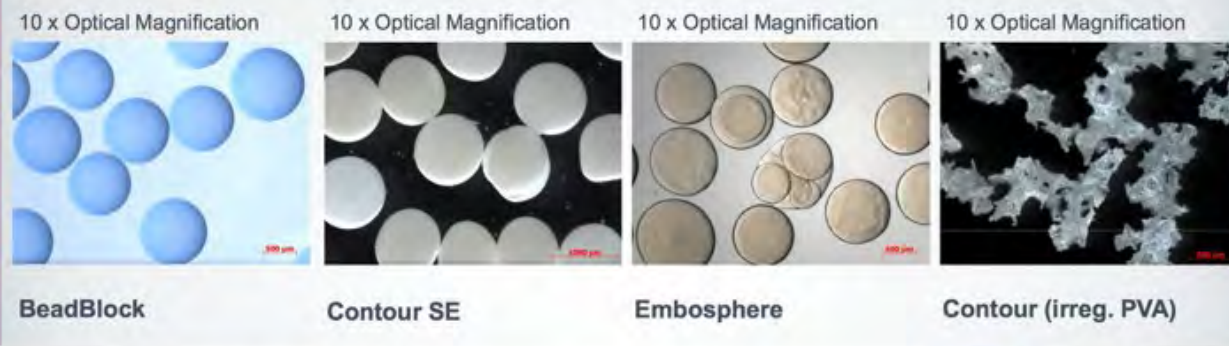
- précipite au contact sang
- irréversible
- faible coût



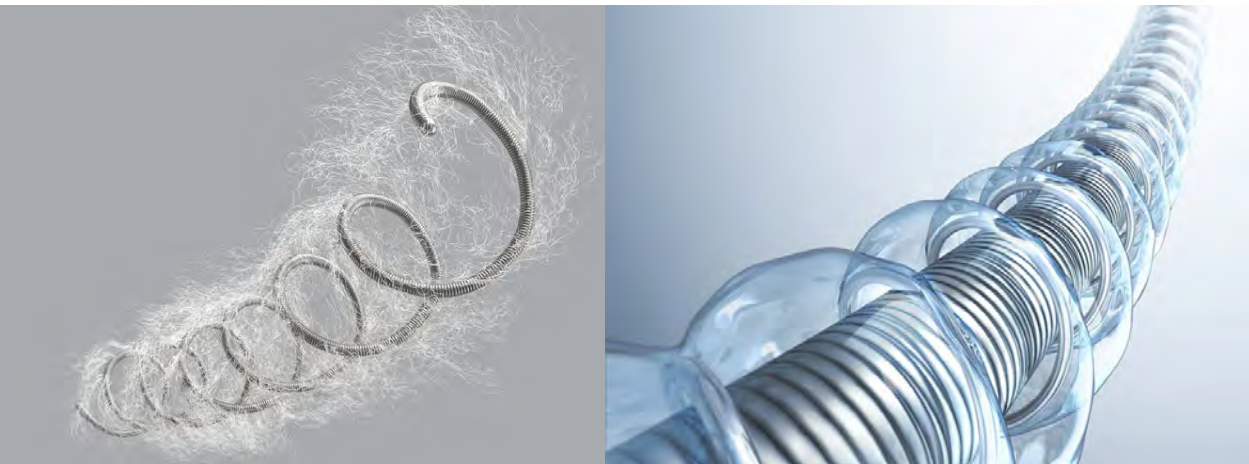
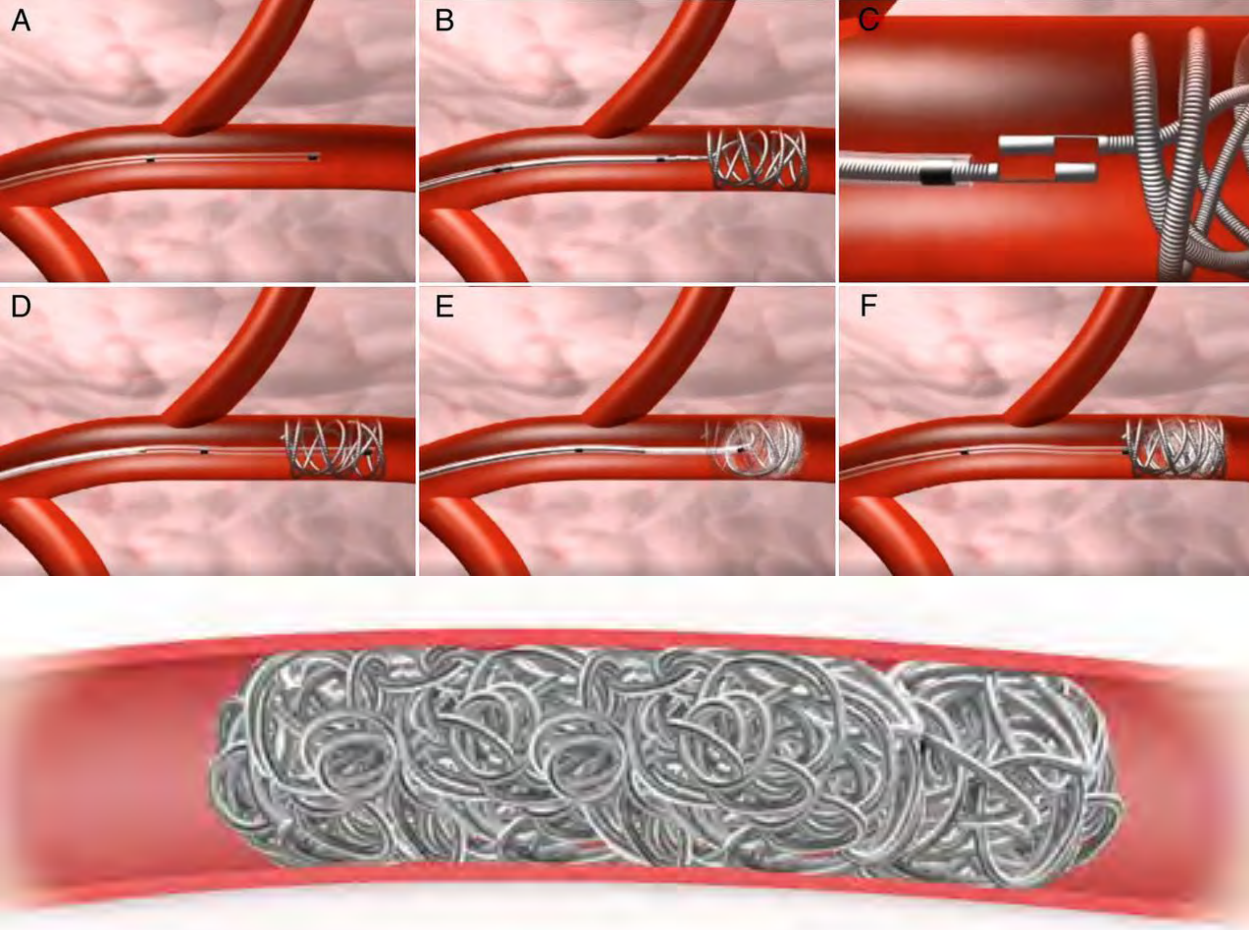


# Sphère :

- non résorbable
- différents diamètres  
40 - 1300 $\mu$ m
- risque ischémique moyen

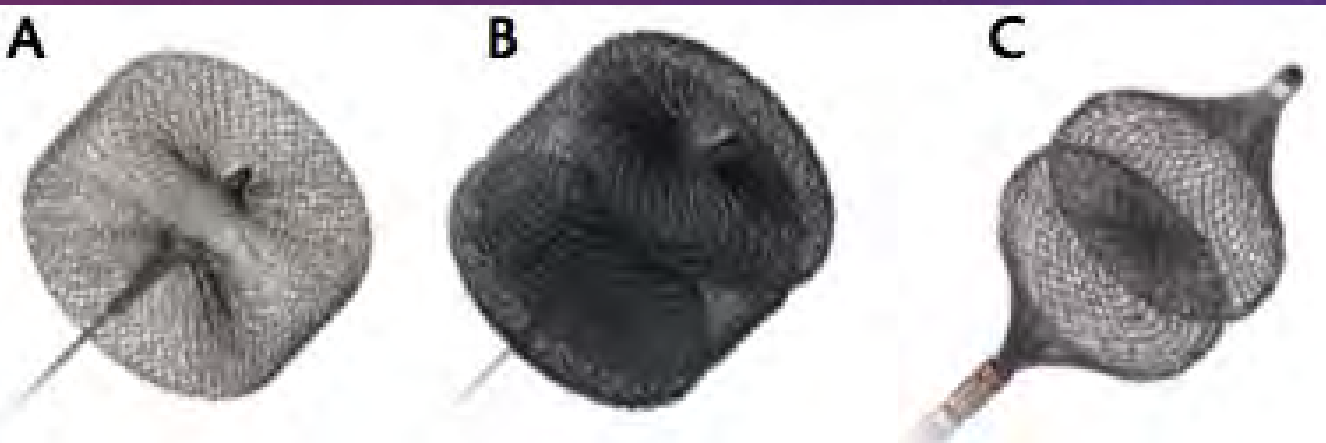
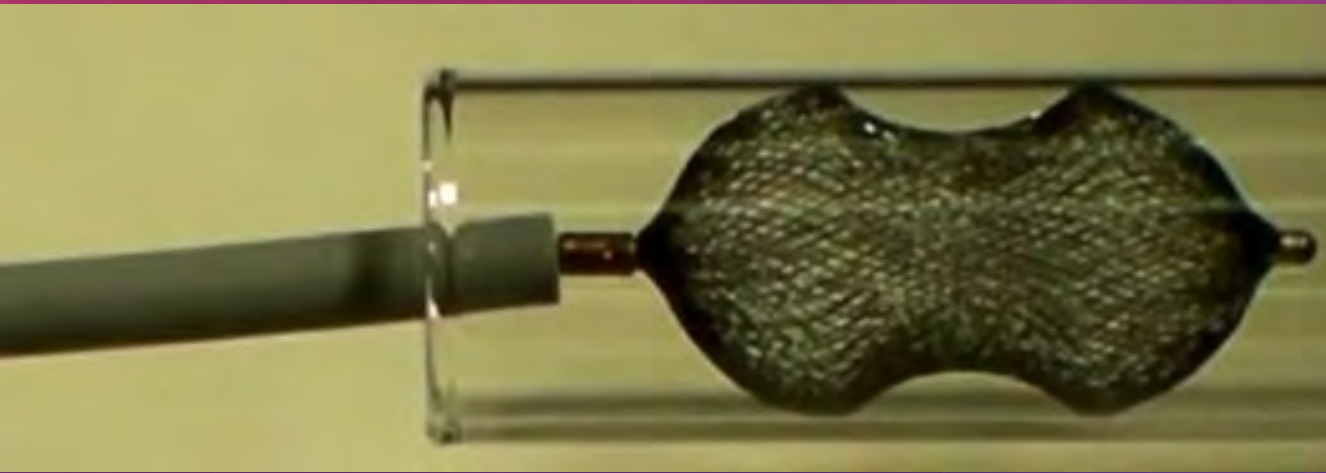
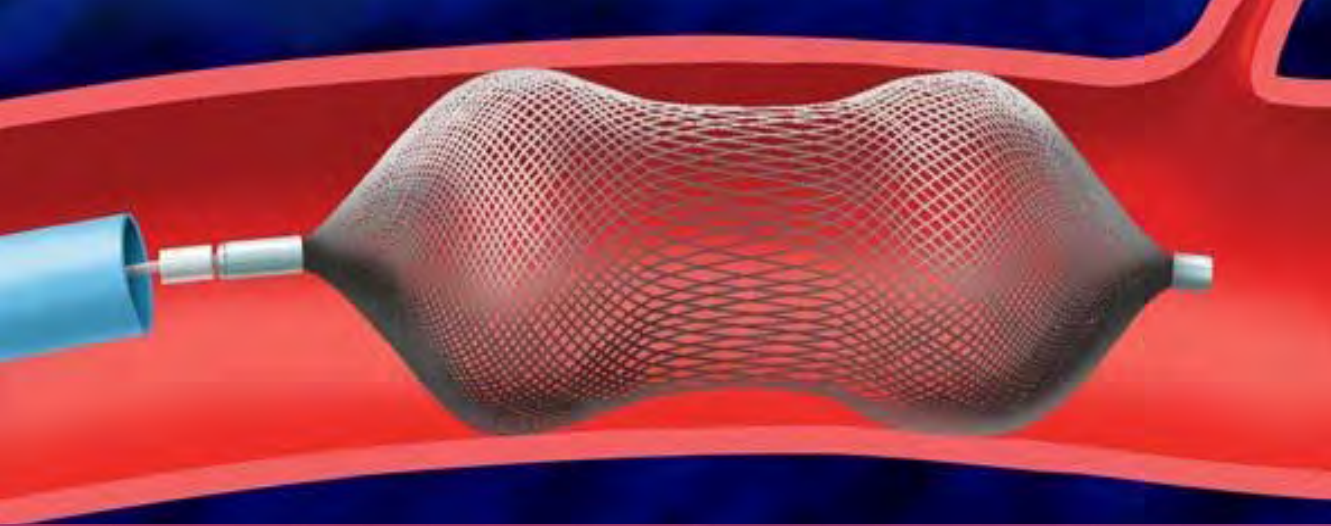






# Coils:

- Sélectif
- Detachable / pushable
- risque ischémique bas



Plug vasculaire:  
occlusion proximale  
rapide





# Stent couvert:

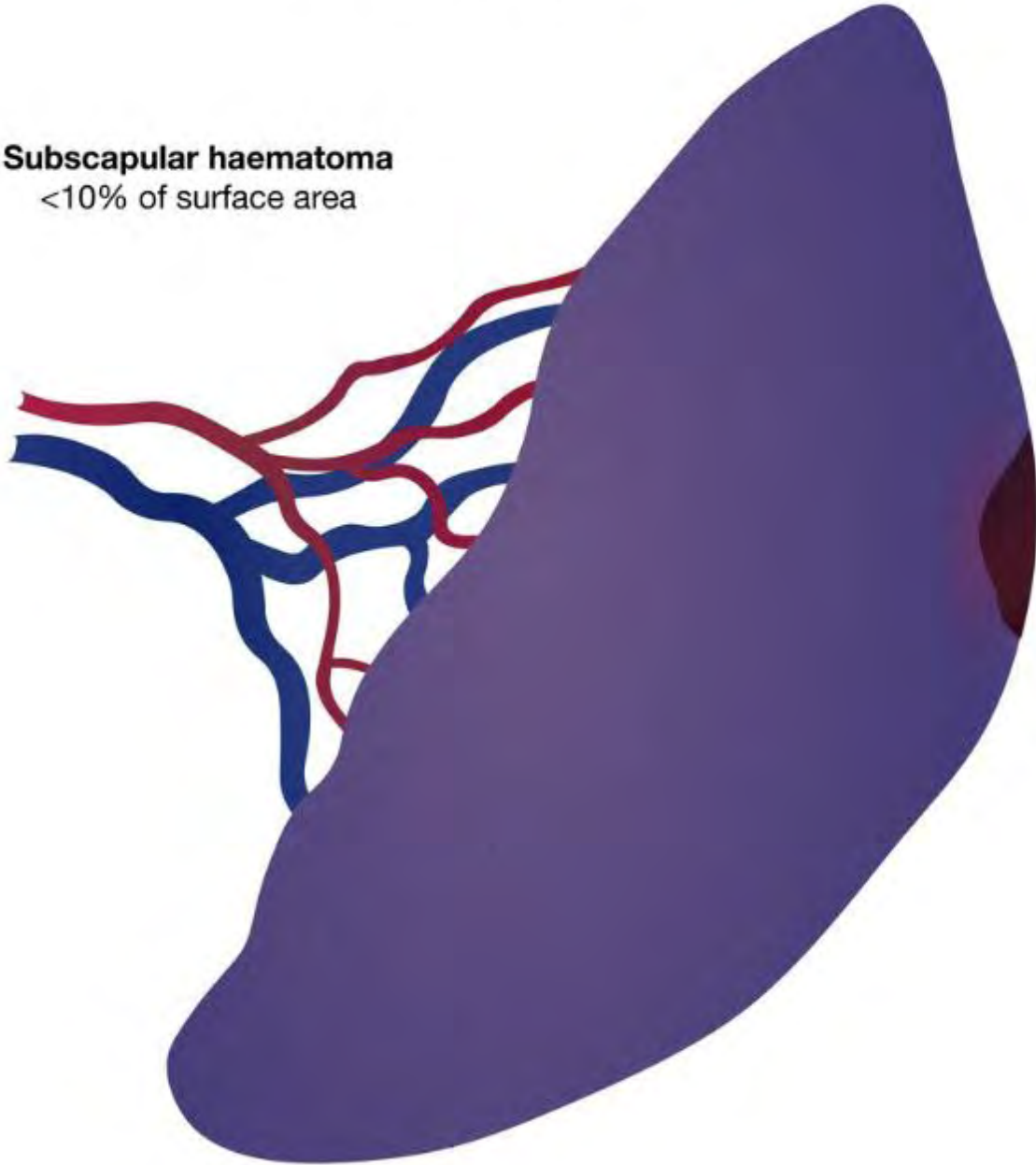
- dommage vasculaire
- irréversible

RATE:



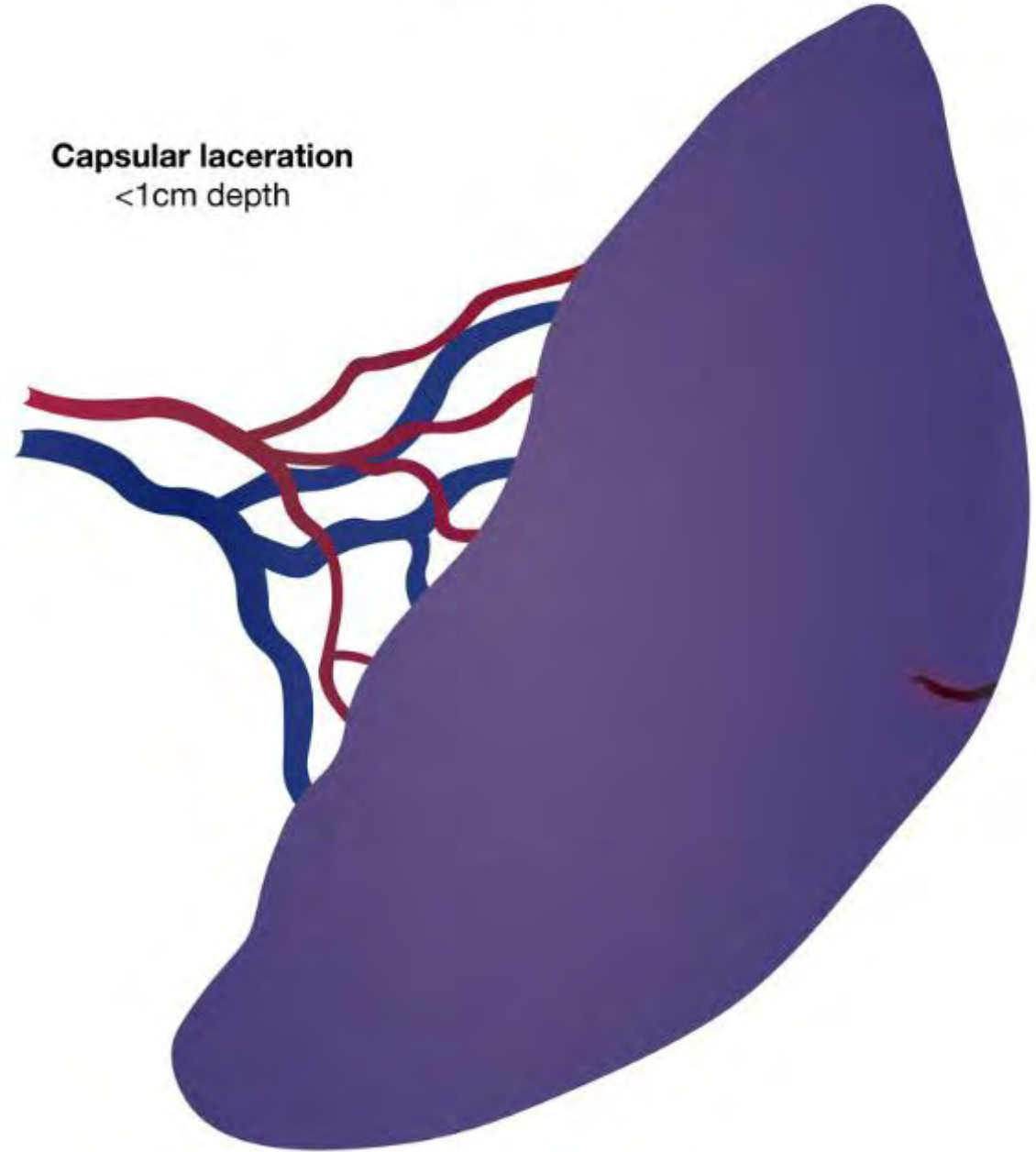
## Grade I

**Subscapular haematoma**  
<10% of surface area



## Grade I

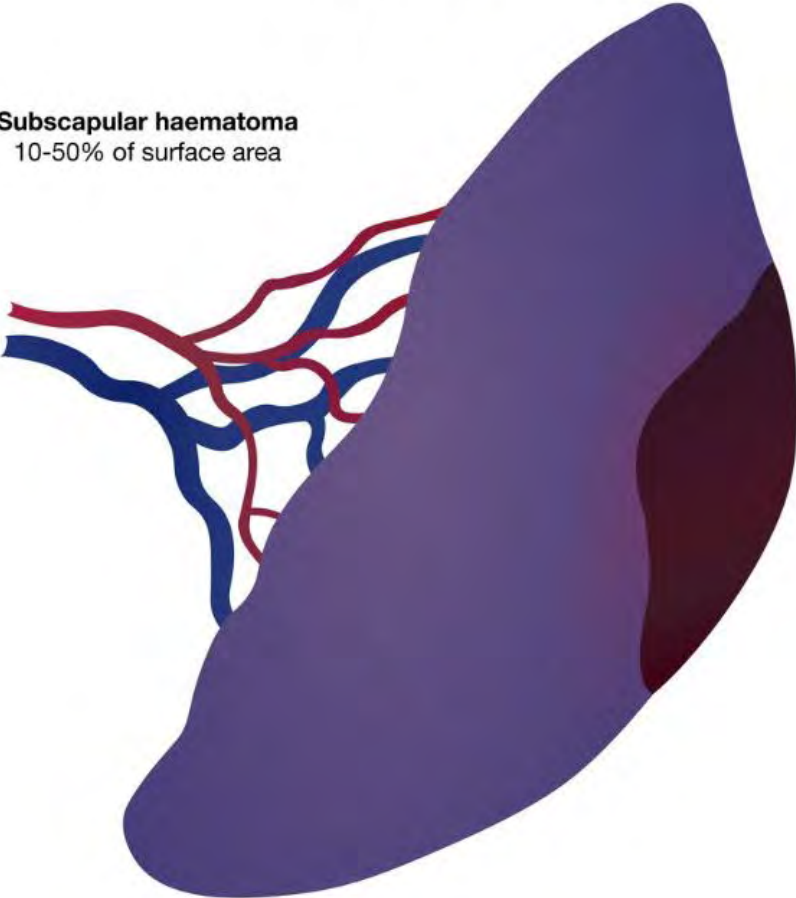
**Capsular laceration**  
<1cm depth





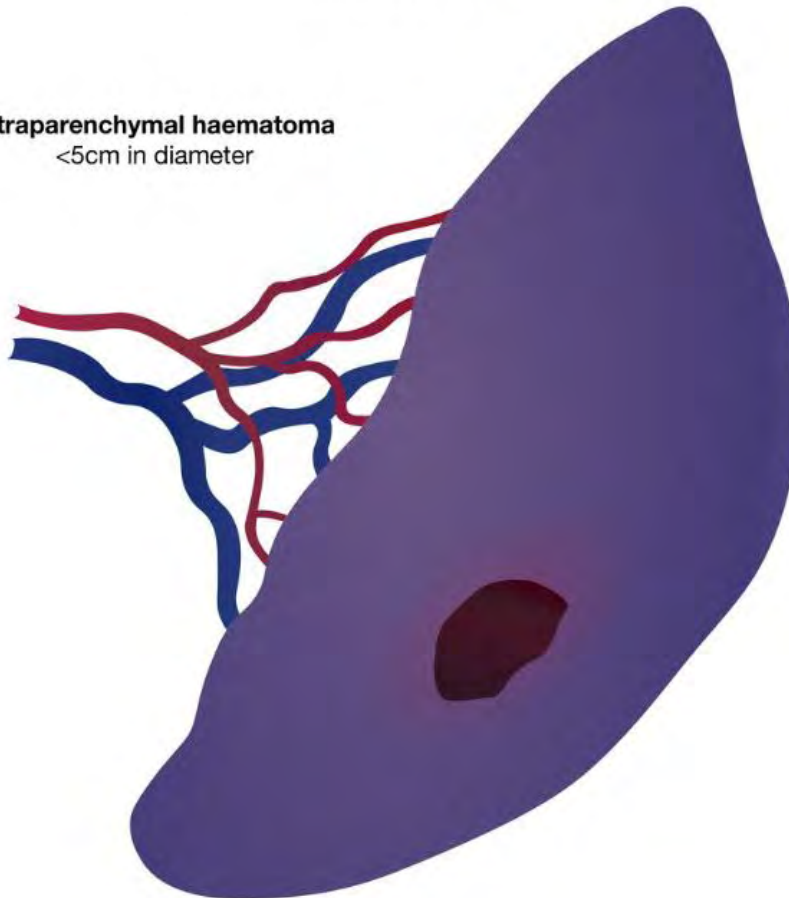
## Grade II

**Subscapular haematoma**  
10-50% of surface area



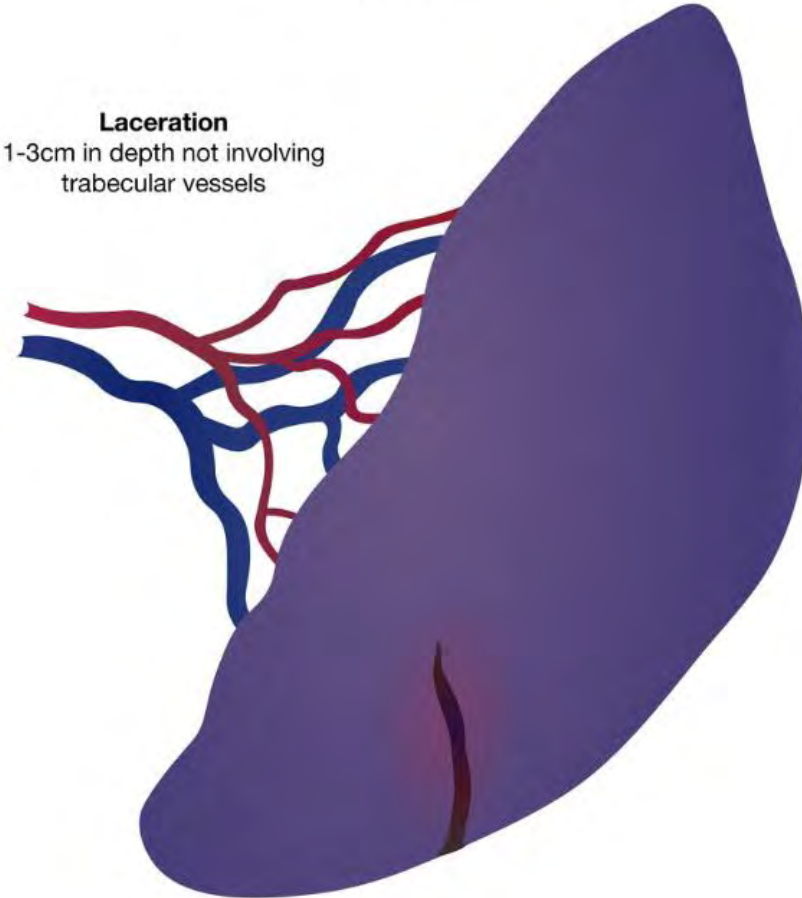
## Grade II

**Intraparenchymal haematoma**  
<5cm in diameter



## Grade II

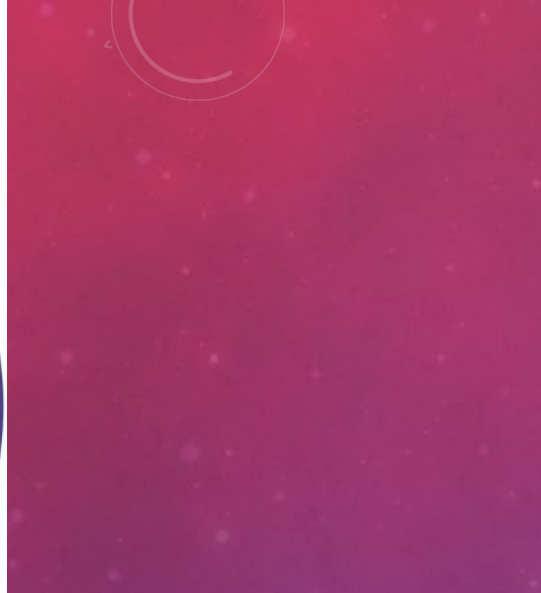
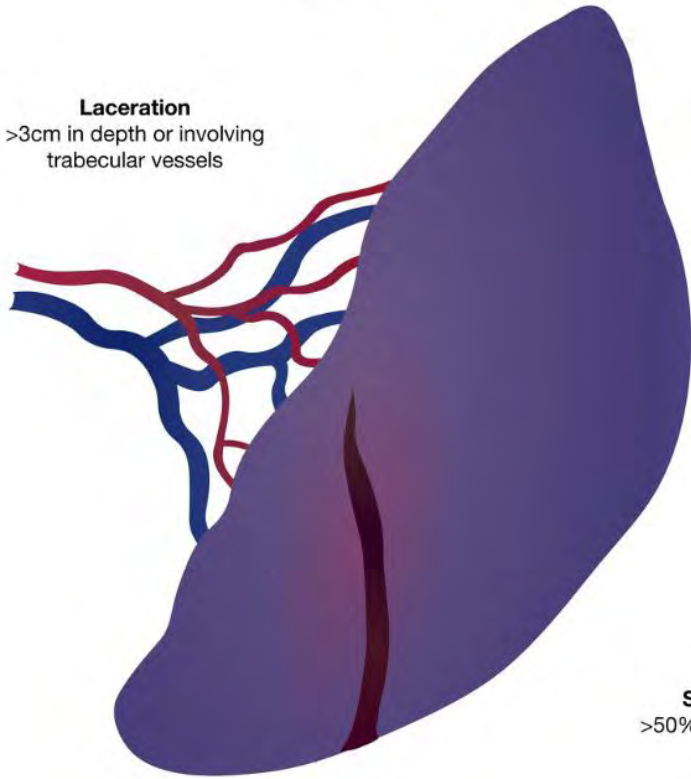
**Laceration**  
1-3cm in depth not involving  
trabecular vessels



**NB:** Ajouter un grade en cas de lésions multiples jusqu'au grade III

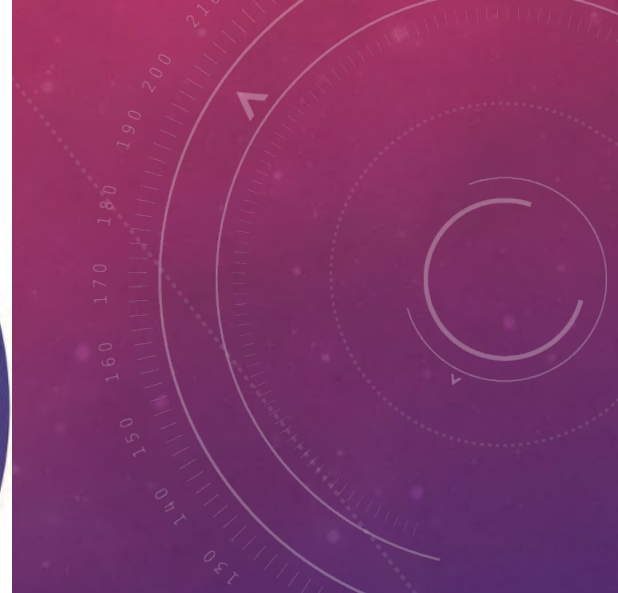
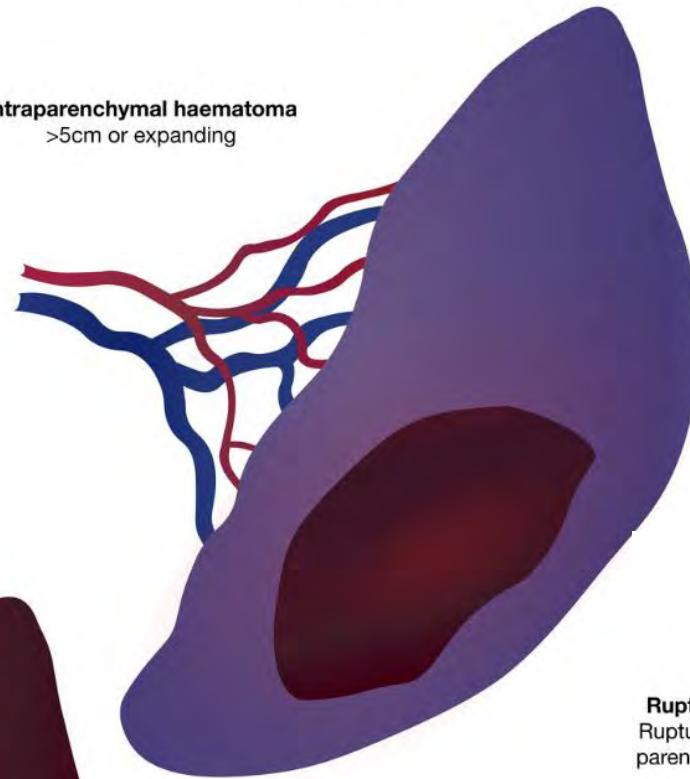
### Grade III

**Laceration**  
>3cm in depth or involving  
trabecular vessels



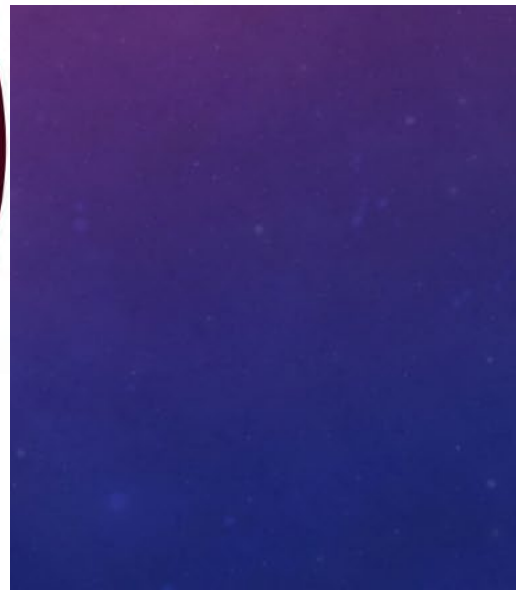
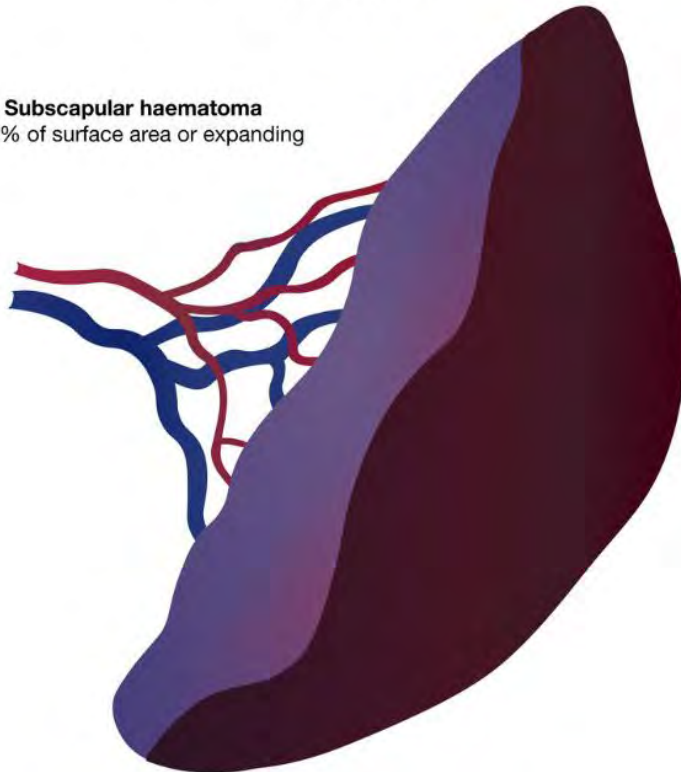
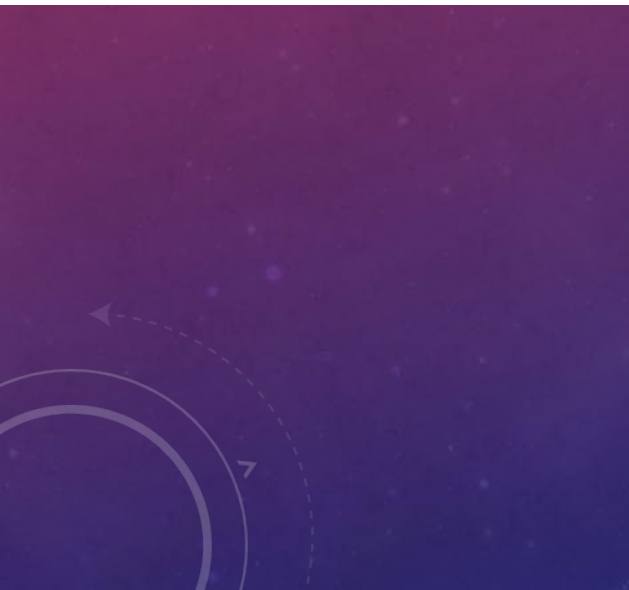
### Grade III

**Intraparenchymal haematoma**  
>5cm or expanding



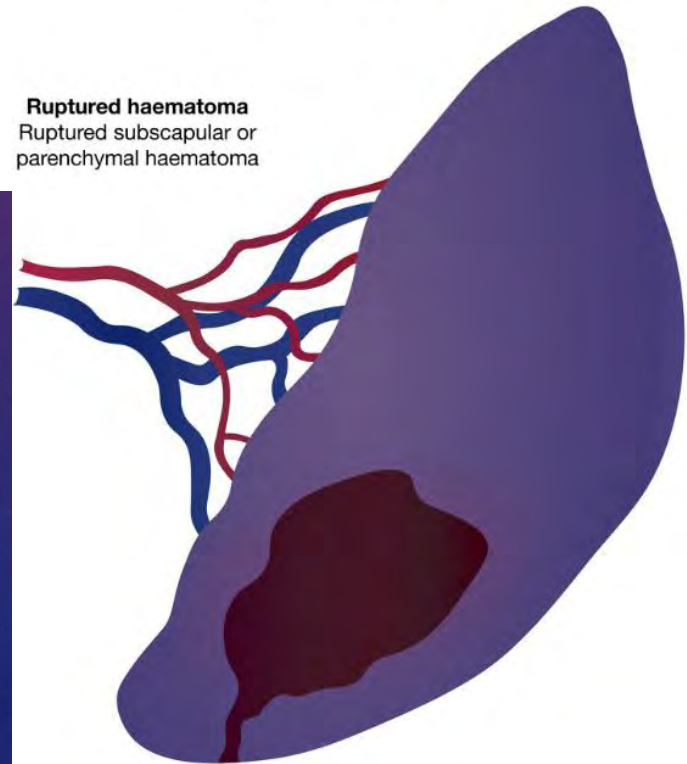
### Grade III

**Subcapsular haematoma**  
>50% of surface area or expanding



### Grade III

**Ruptured haematoma**  
Ruptured subcapsular or  
parenchymal haematoma

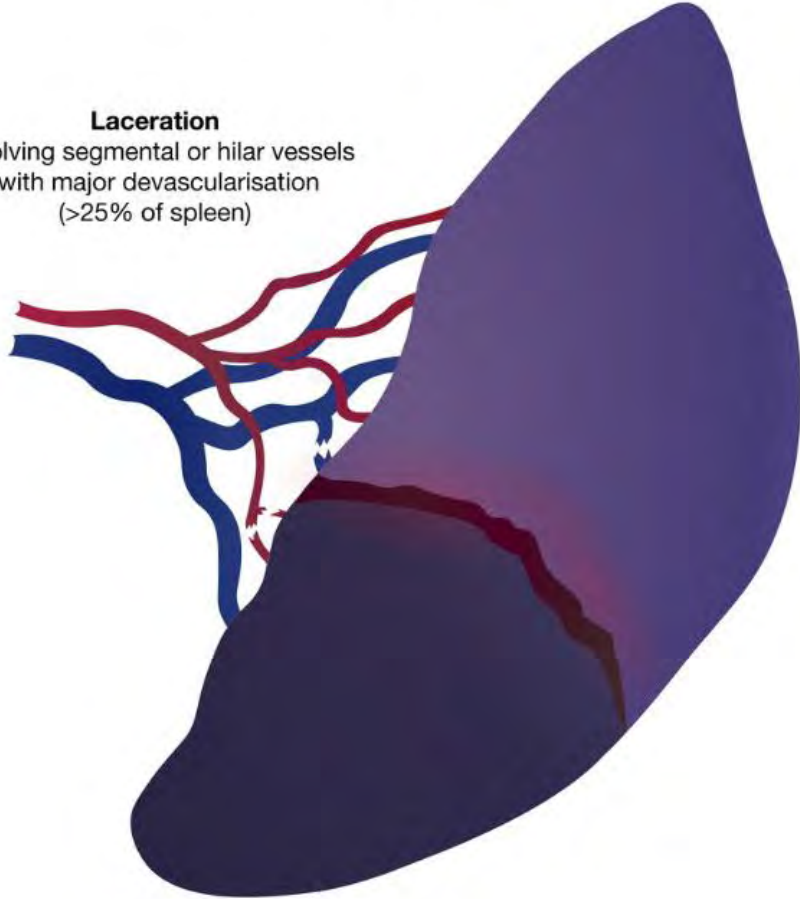




## Grade IV

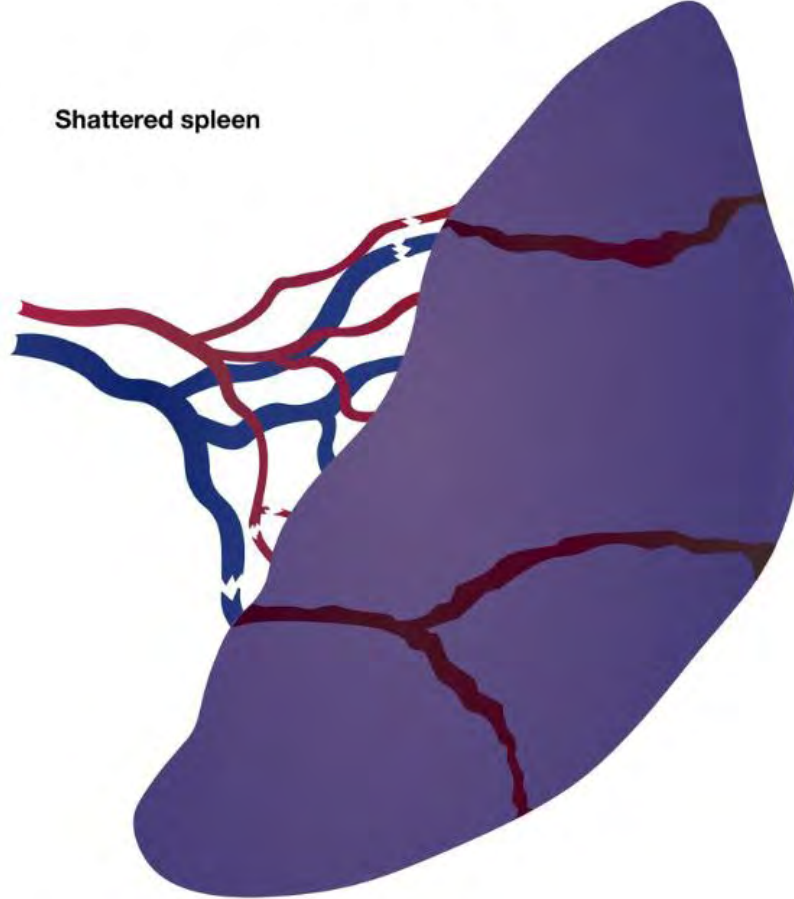
### Laceration

Involving segmental or hilar vessels  
with major devascularisation  
( $>25\%$  of spleen)



## Grade V

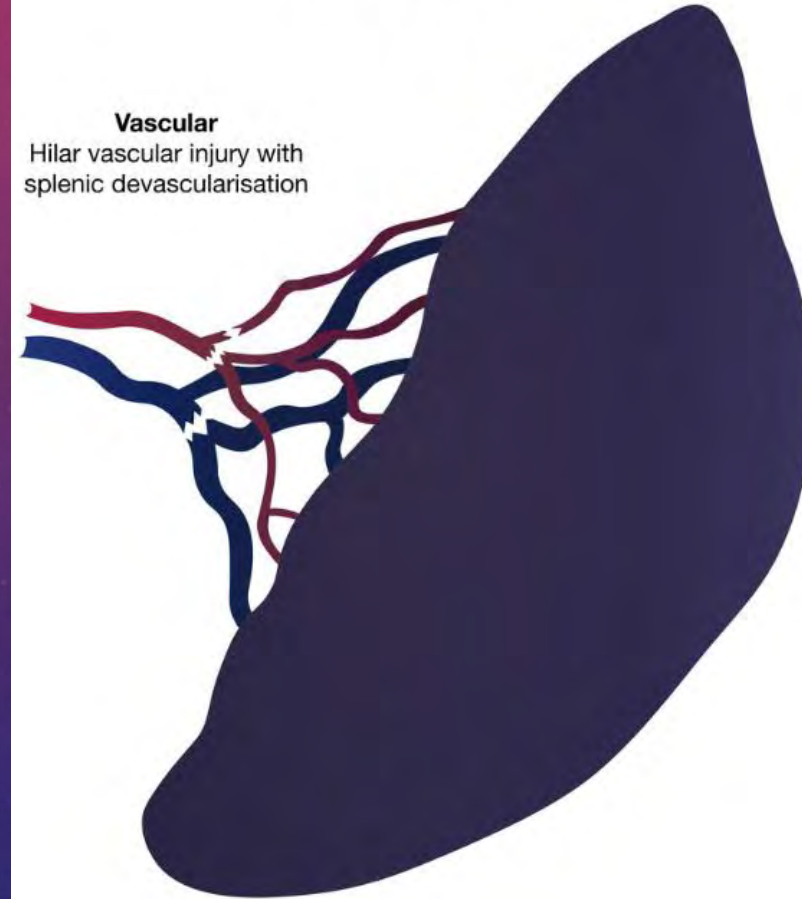
### Shattered spleen



## Grade V

### Vascular

Hilar vascular injury with  
splenic devascularisation





## Imaging and transcatheter arterial embolization for traumatic splenic injuries: review of the literature

Antony Raikhlin,<sup>\*</sup> Mark Otto Baerlocher,<sup>\*</sup> Murray R. Asch,<sup>†</sup> and Andy Myers<sup>‡</sup>

[J Trauma](#). 2005 Mar;58(3):492-8.

## Nonoperative management of blunt splenic injury: a 5-year experience.

Haan JM<sup>1</sup>, Bochicchio GV, Kramer N, Scalea TM.

[J Trauma](#). 2004 Mar;56(3):542-7.

## Splenic embolization revisited: a multicenter review.

Haan JM<sup>1</sup>, Biffl W, Knudson MM, Davis KA, Oka T, Majercik S, Dicker R, Marder S, Scalea TM; Western Trauma Association Multi-Institutional Trials Committee.

[J Trauma](#). 2004 May;56(5):1063-7.

## Blunt splenic injuries: high nonoperative management rate can be achieved with selective embolization.

Dent D<sup>1</sup>, Alsabrook G, Erickson BA, Myers J, Wholey M, Stewart R, Root H, Ferral H, Postoak D, Napier D, Pruitt BA Jr.

[J Trauma](#). 2003 Aug;55(2):317-21; discussion 321-2.

## Protocol-driven nonoperative management in patients with blunt splenic trauma and minimal associated injury decreases length of stay.

Haan J<sup>1</sup>, Ilahi ON, Kramer M, Scalea TM, Myers J.

[Radiology](#). 2000 Oct;217(1):75-82.

## Nonsurgical management of blunt splenic injury: use of CT criteria to select patients for splenic arteriography and potential endovascular therapy.

Shanmuganathan K<sup>1</sup>, Mirvis SE, Boyd-Kranis R, Takada T, Scalea TM.

[J Trauma](#). 2006 Sep;61(3):541-4; discussion 545-6.

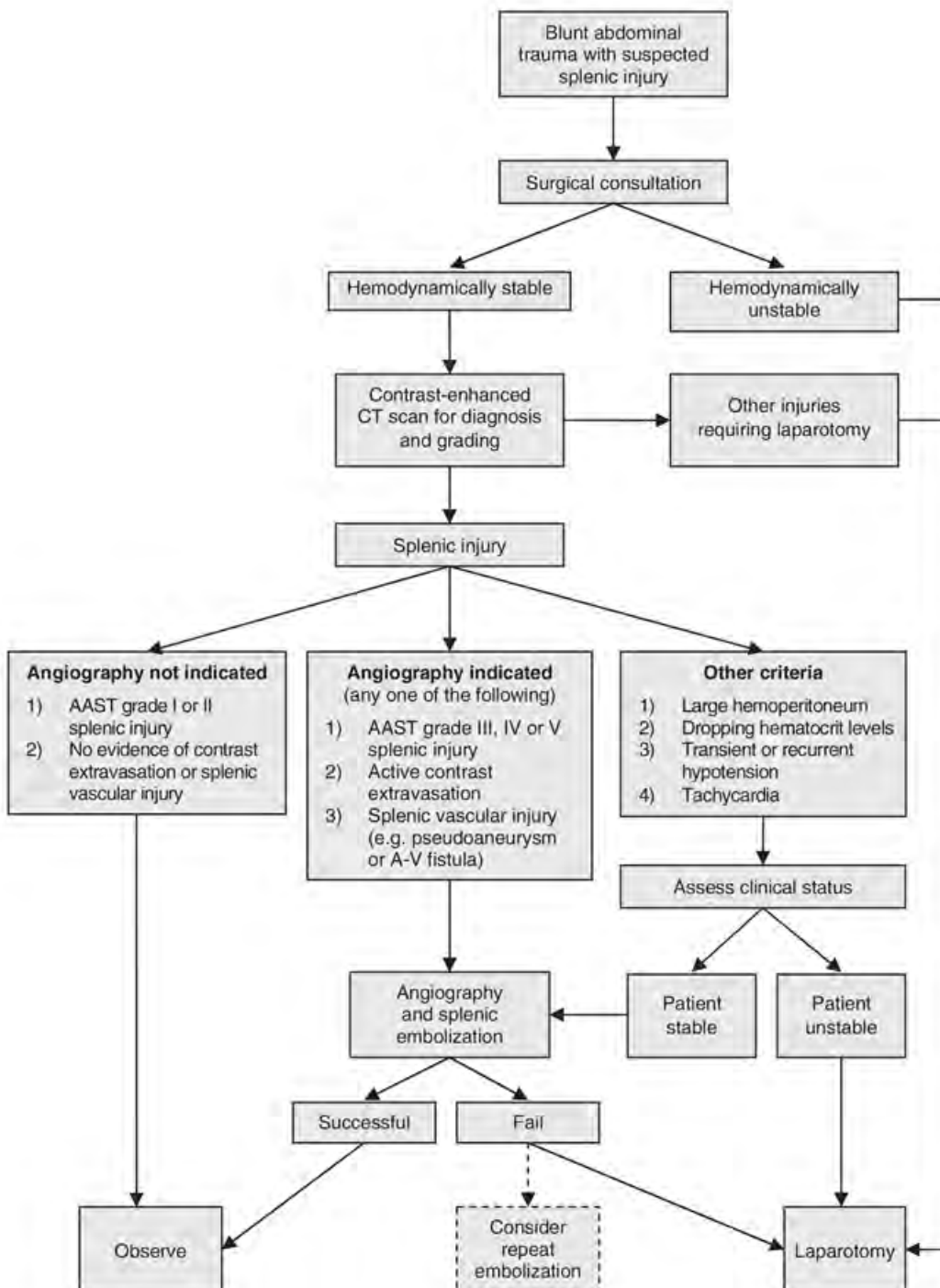
## Splenic artery embolization: Have we gone too far?

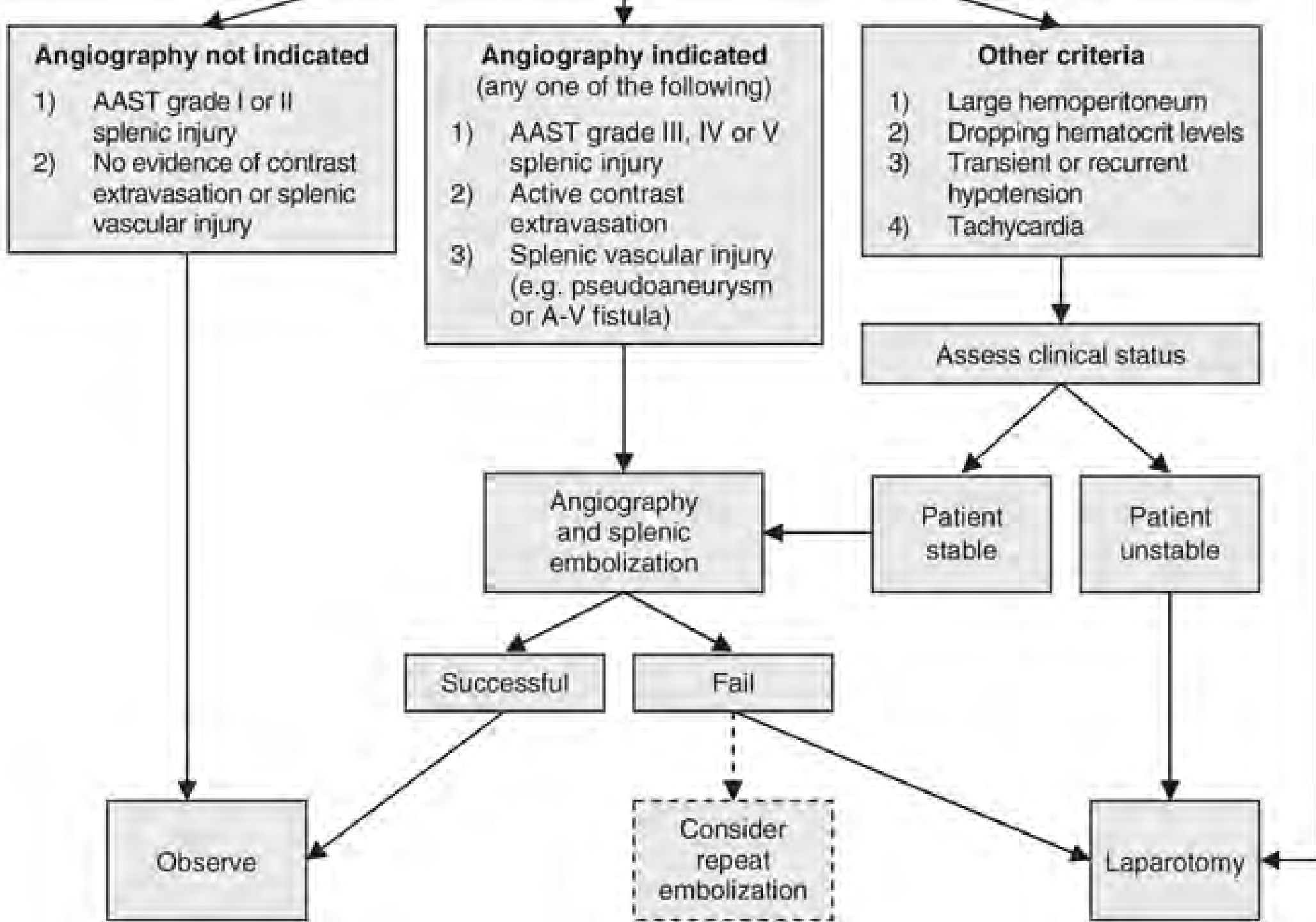
Smith HE<sup>1</sup>, Biffl WL, Majercik SD, Jednacz J, Lambiase R, Cioffi WG.

[J Trauma](#). 2004 Apr;56(4):768-72; discussion 773.

## Use of splenic artery embolization as an adjunct to nonsurgical management of blunt splenic injury.

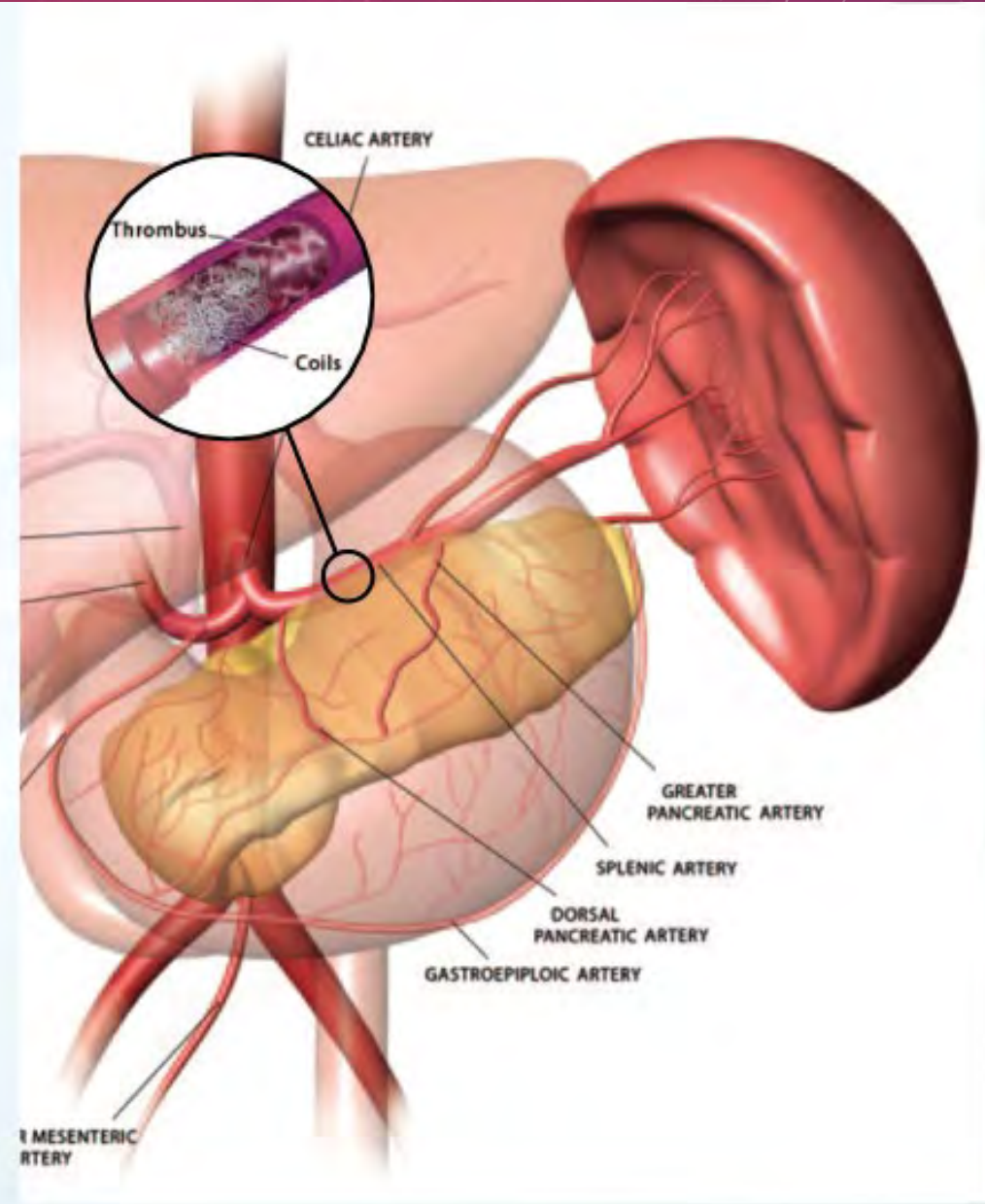
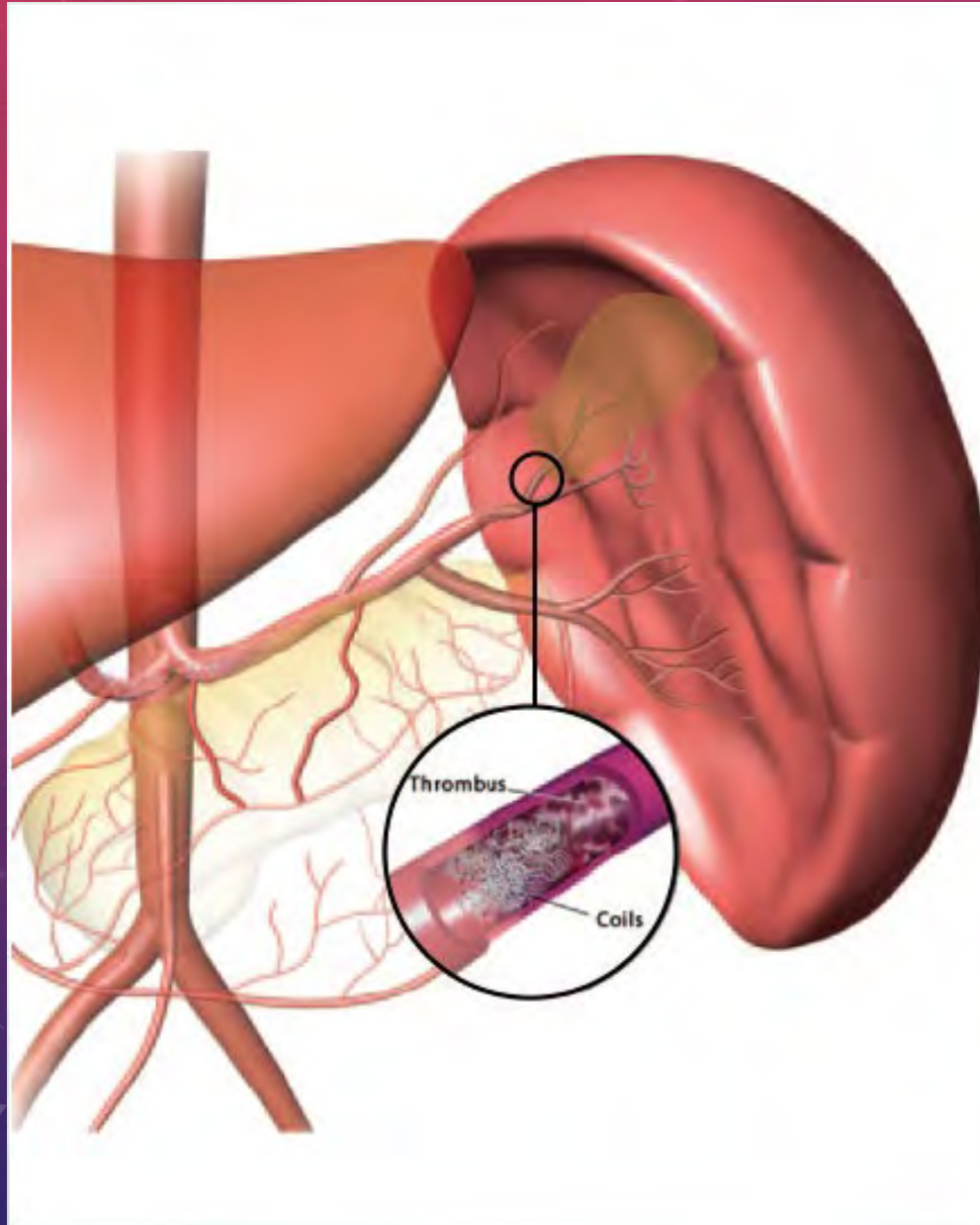
Liu PP<sup>1</sup>, Lee WC, Cheng YF, Hsieh PM, Hsieh YM, Tan BL, Chen FC, Huang TC, Tung CC.







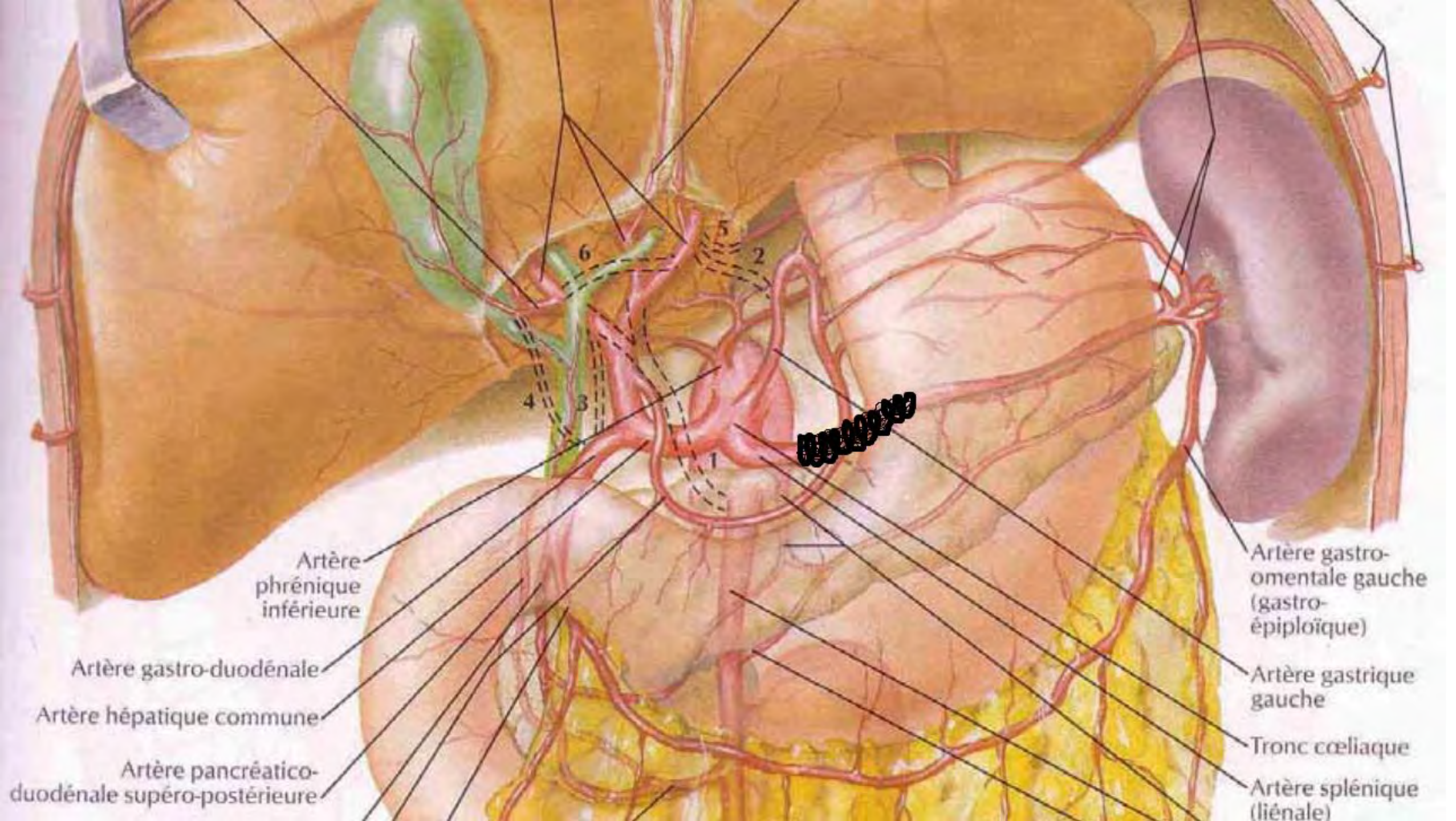
# Distale Vs. Proximale



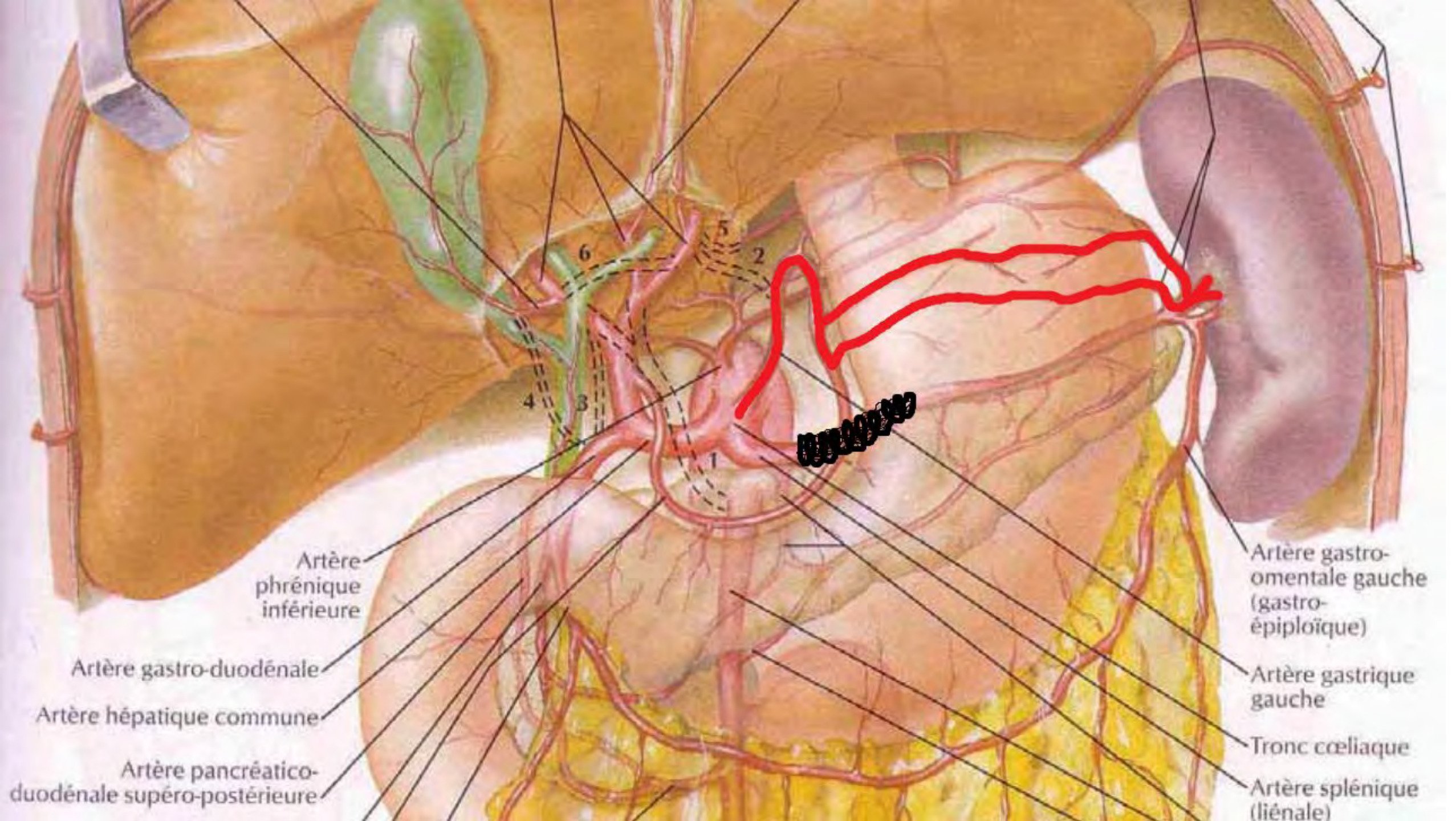


# Embolisation PROXIMALE

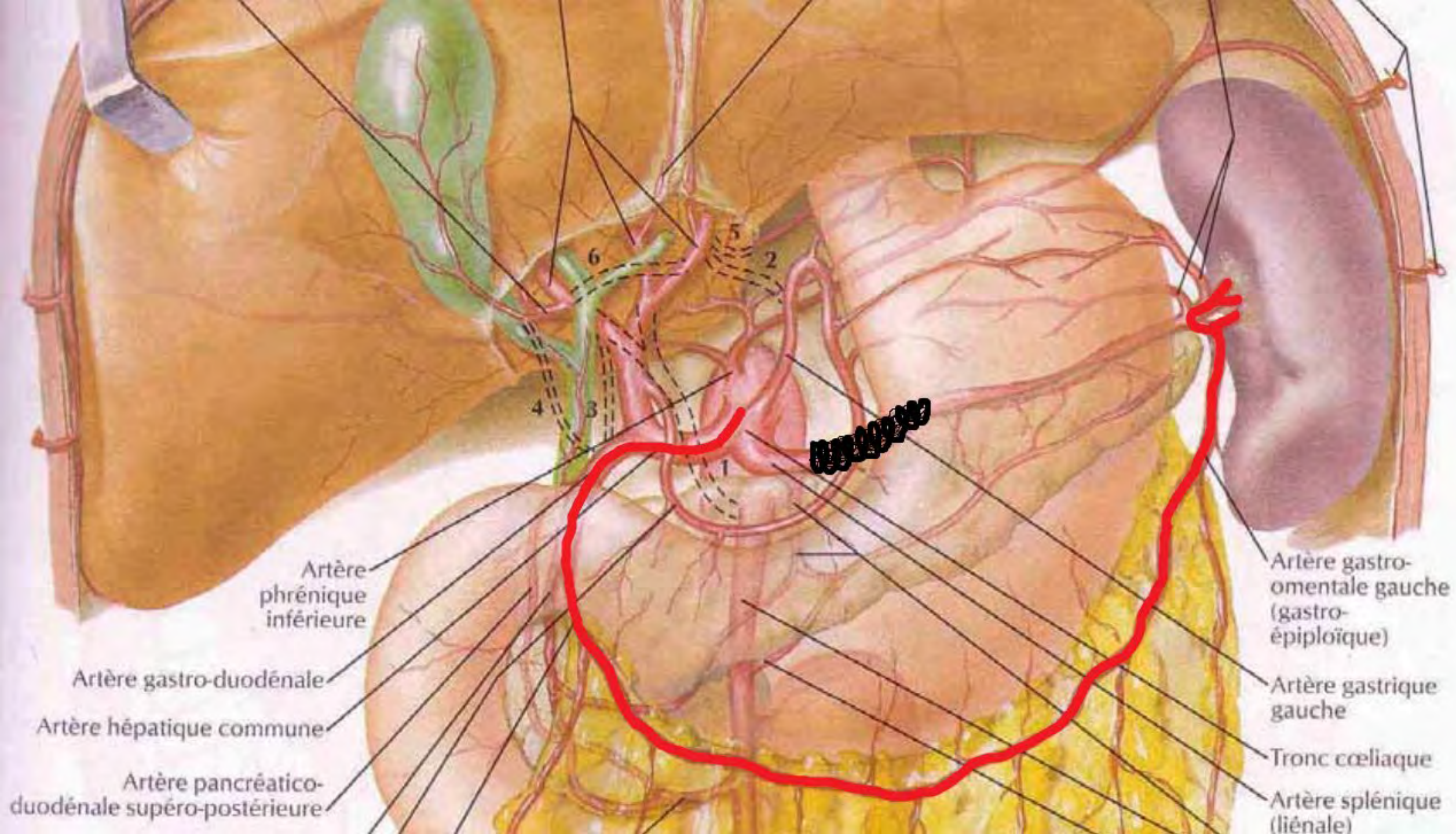




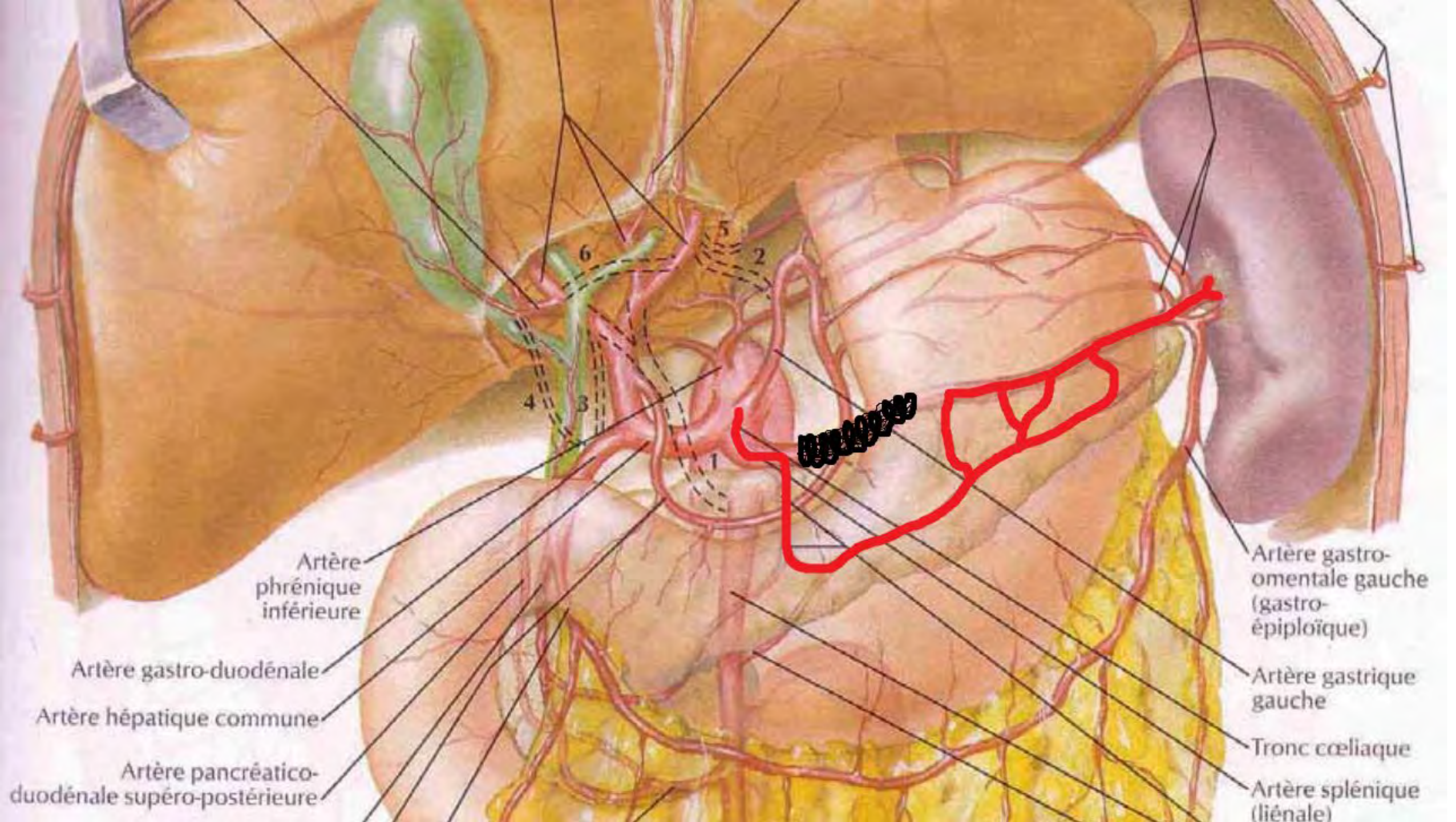




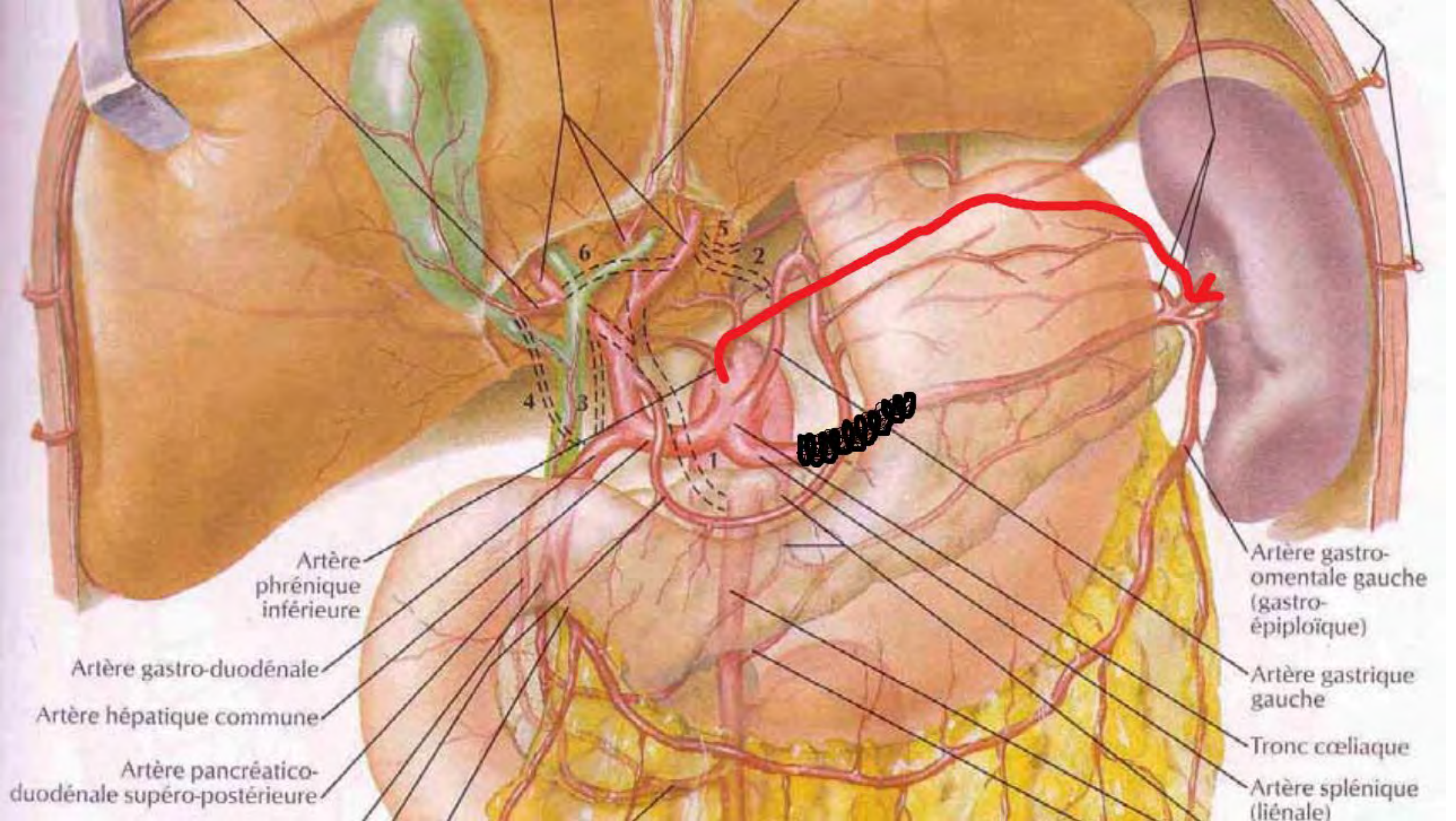




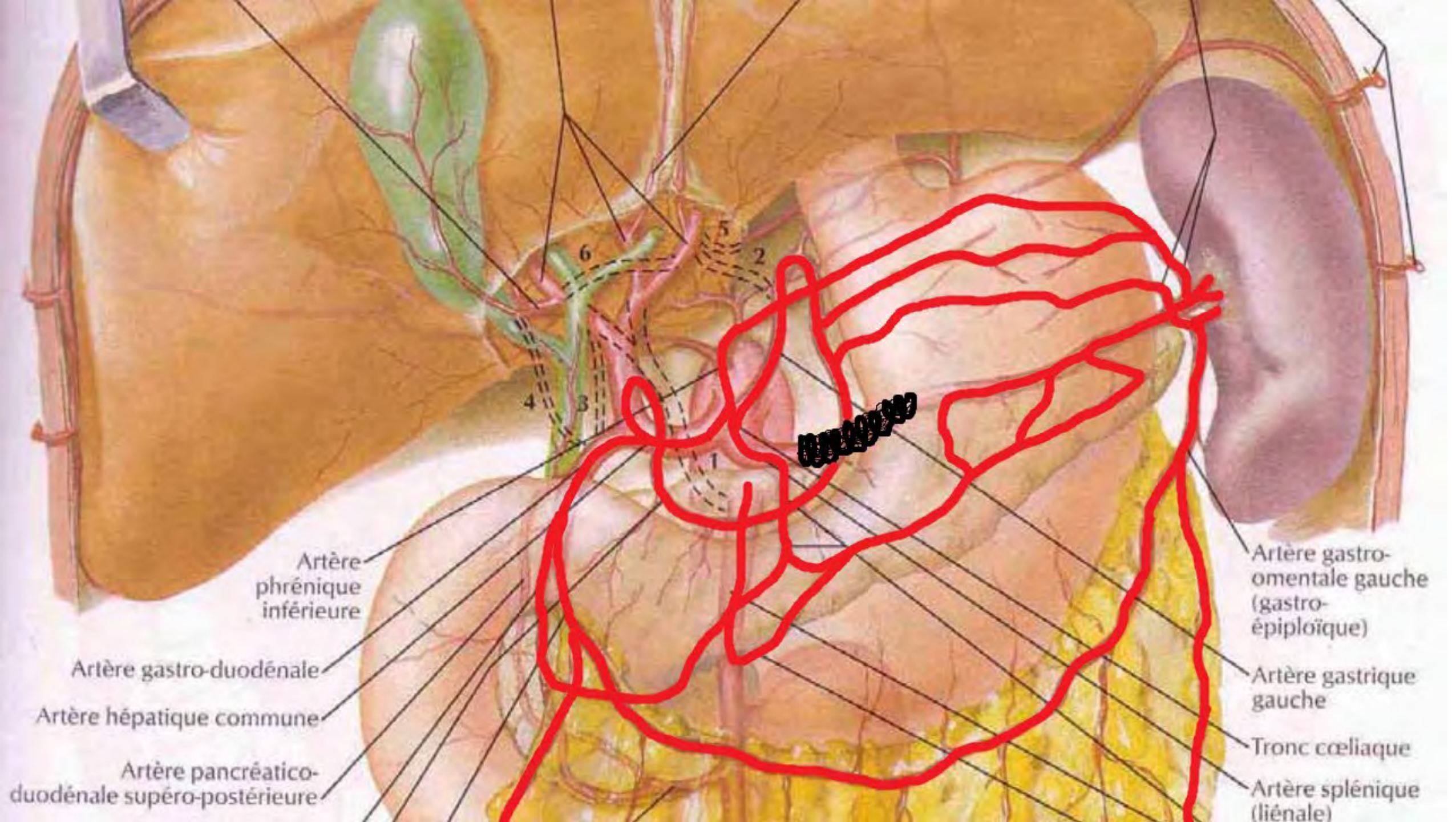












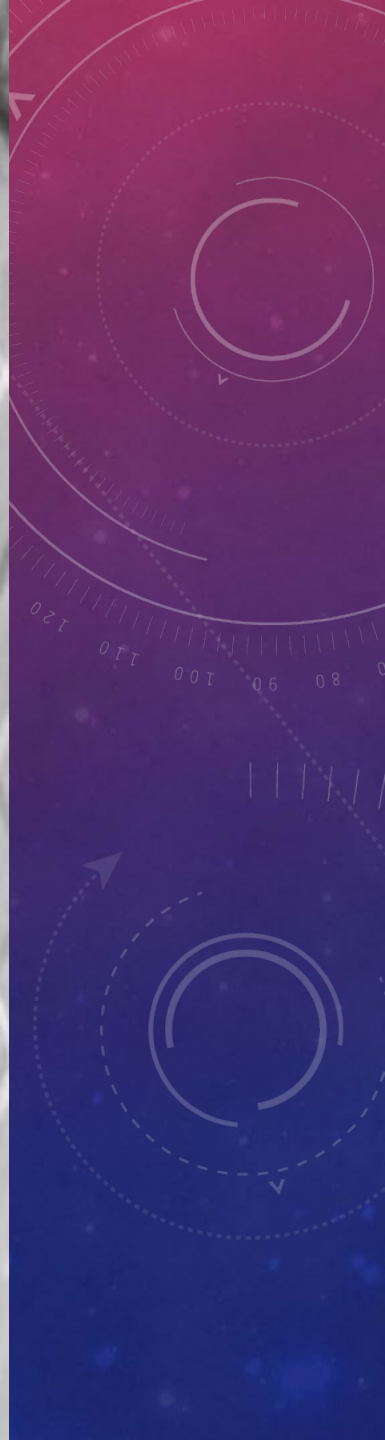


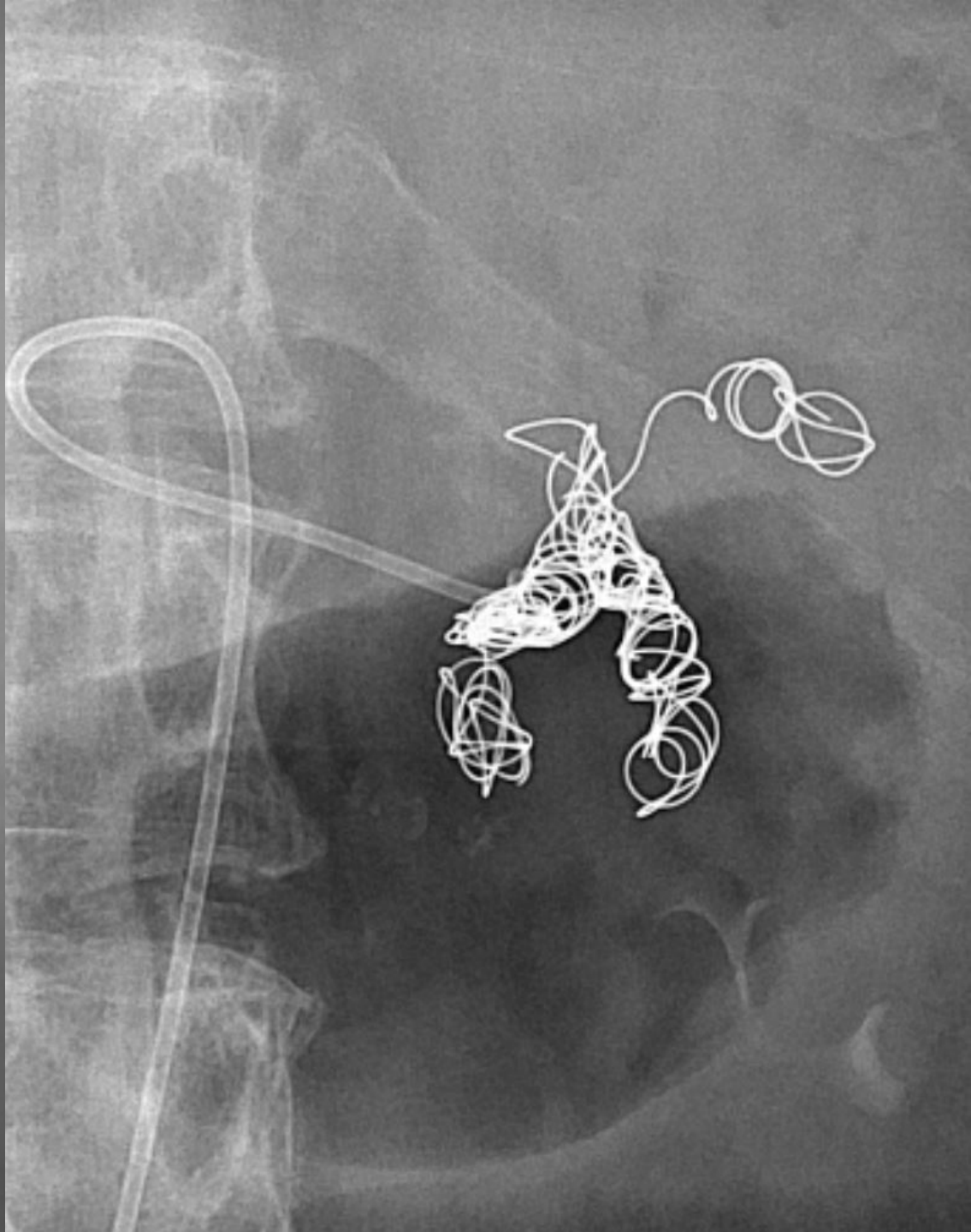
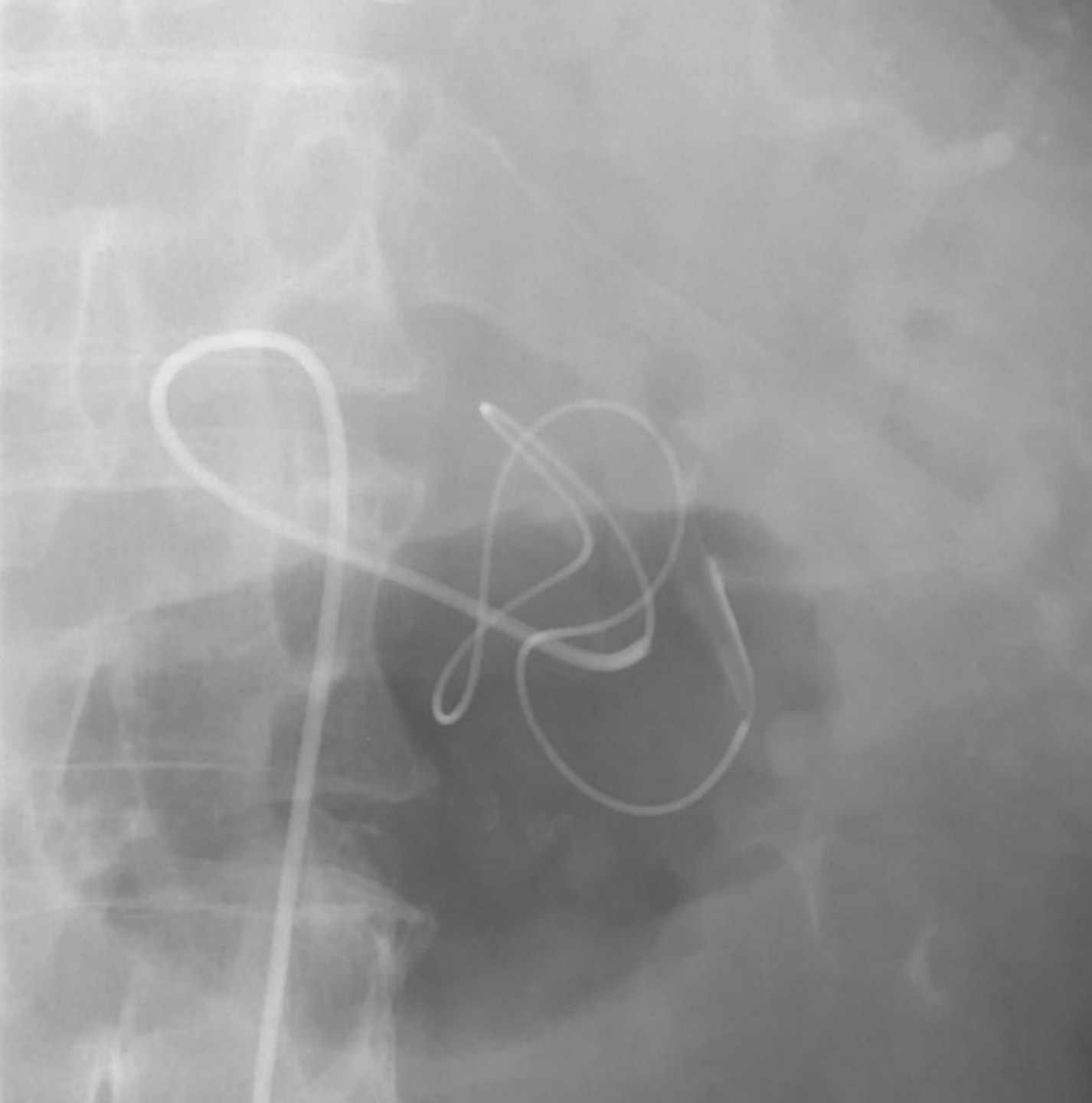
- 50% de la pression artérielle



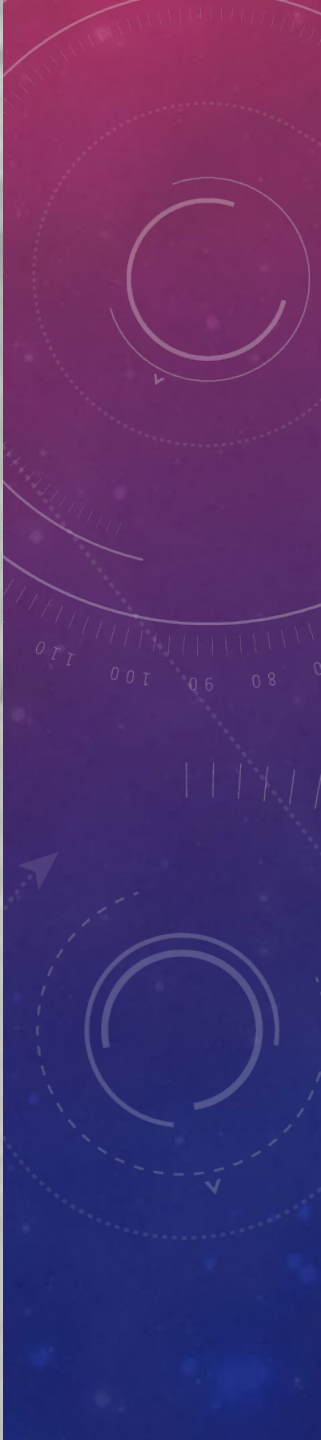
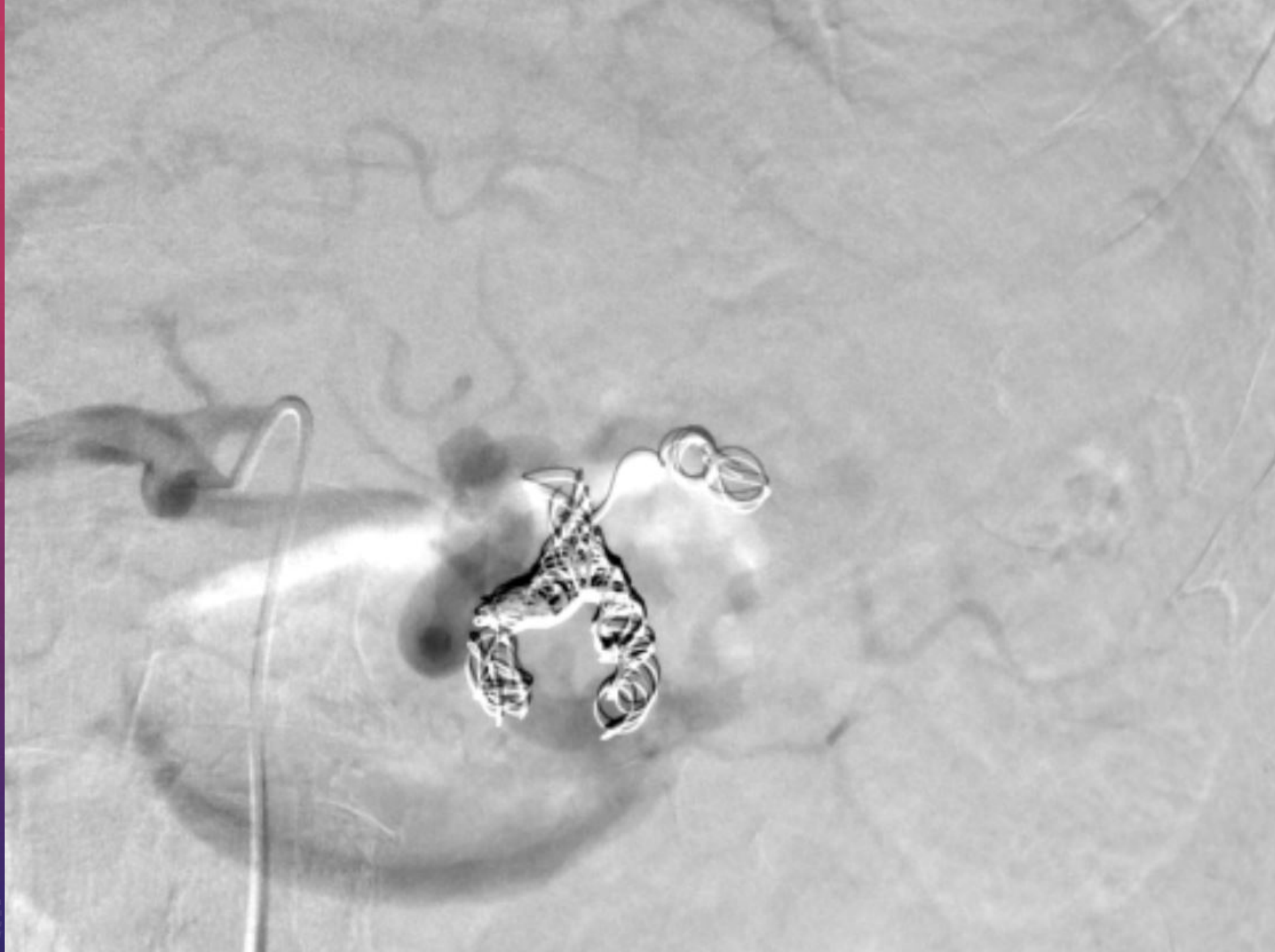






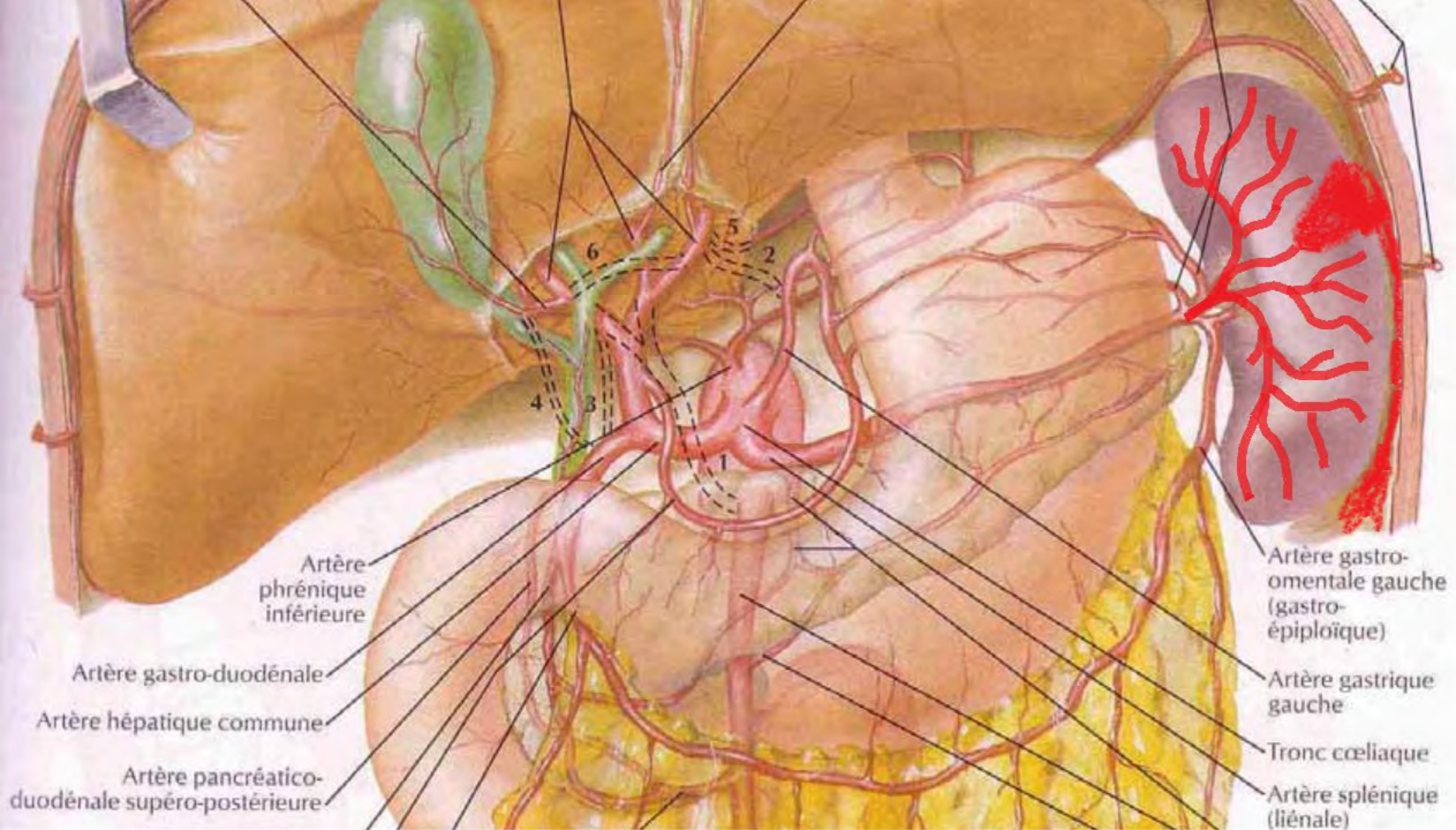




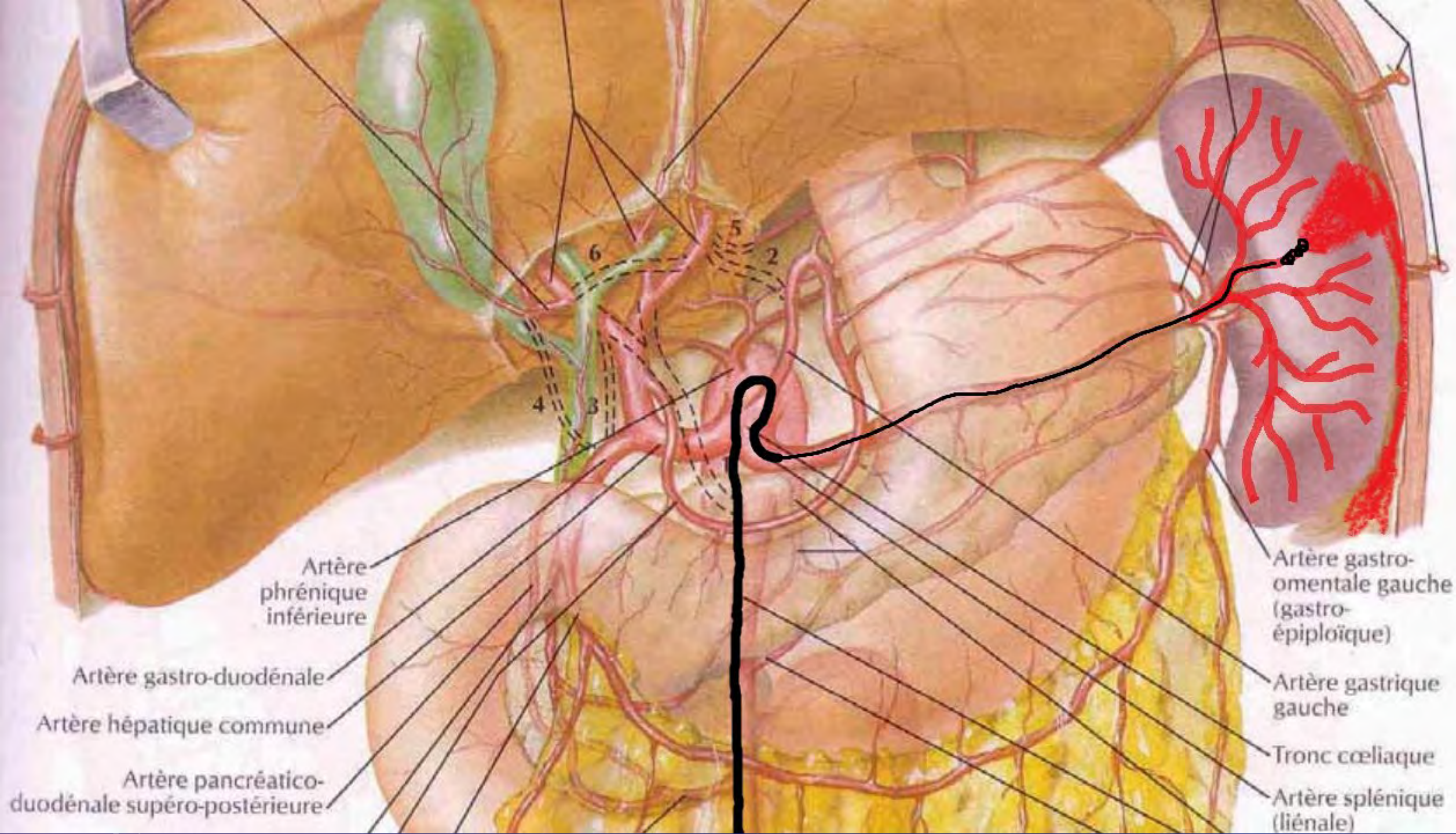


# Embolisation DISTALE

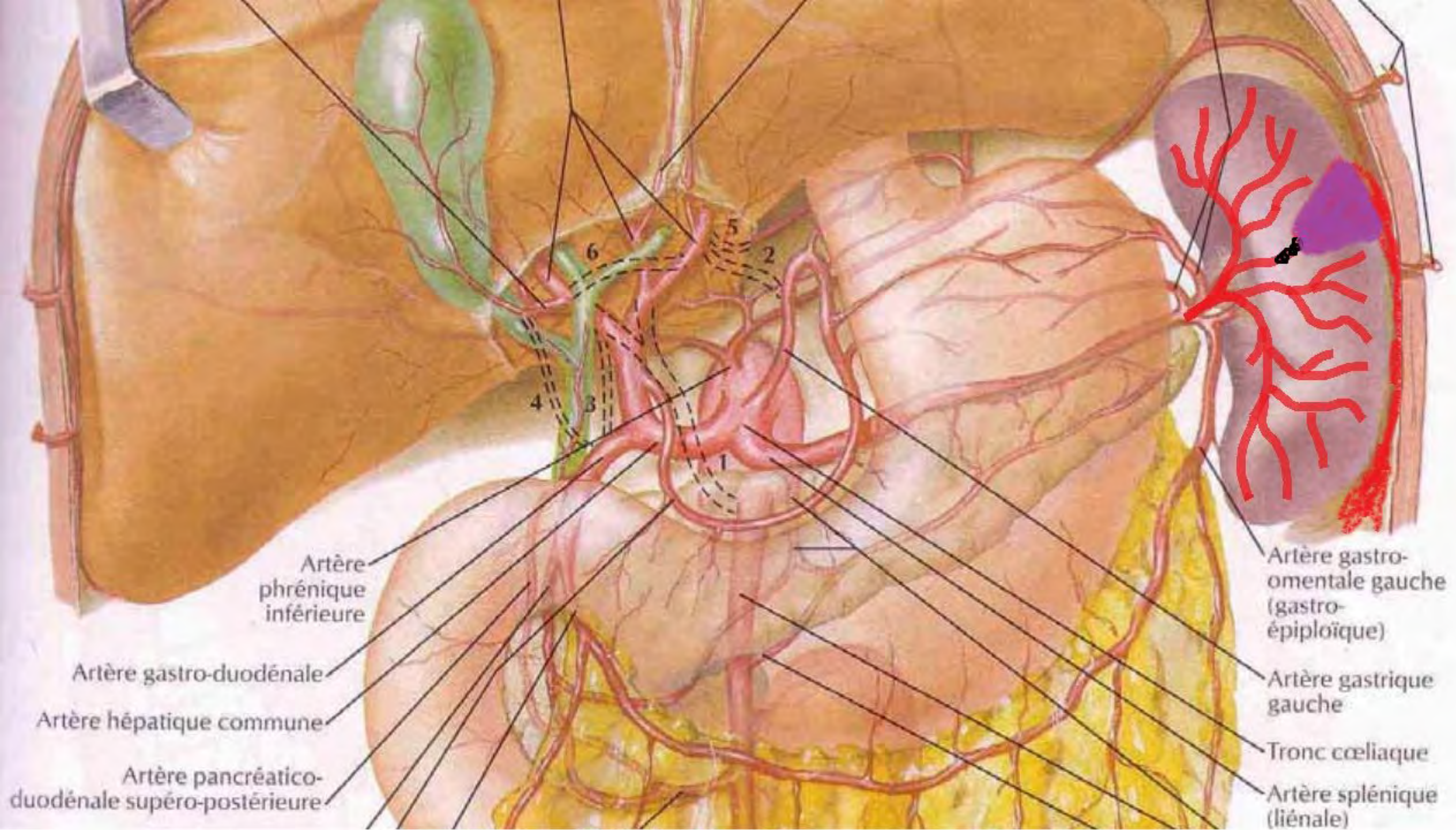








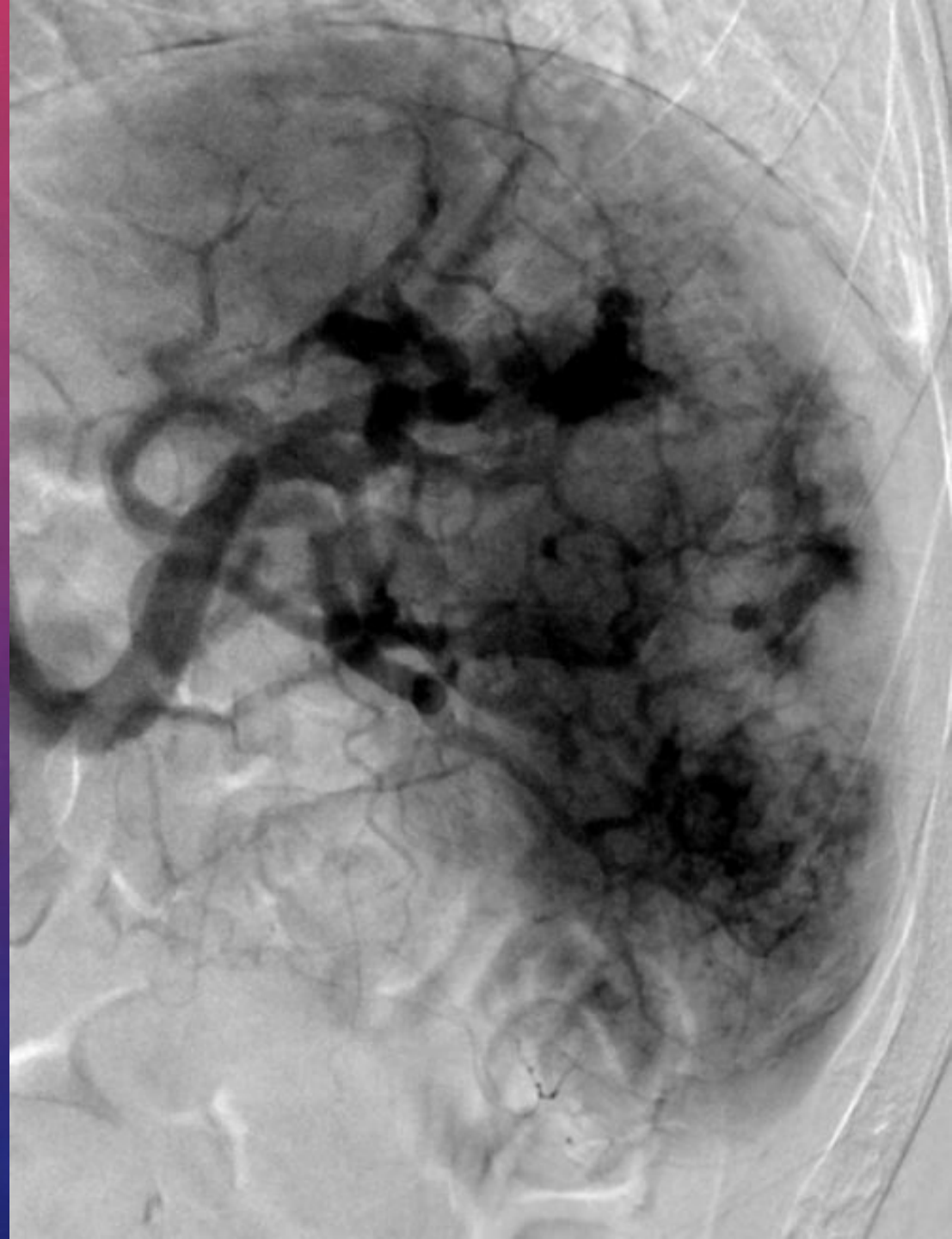


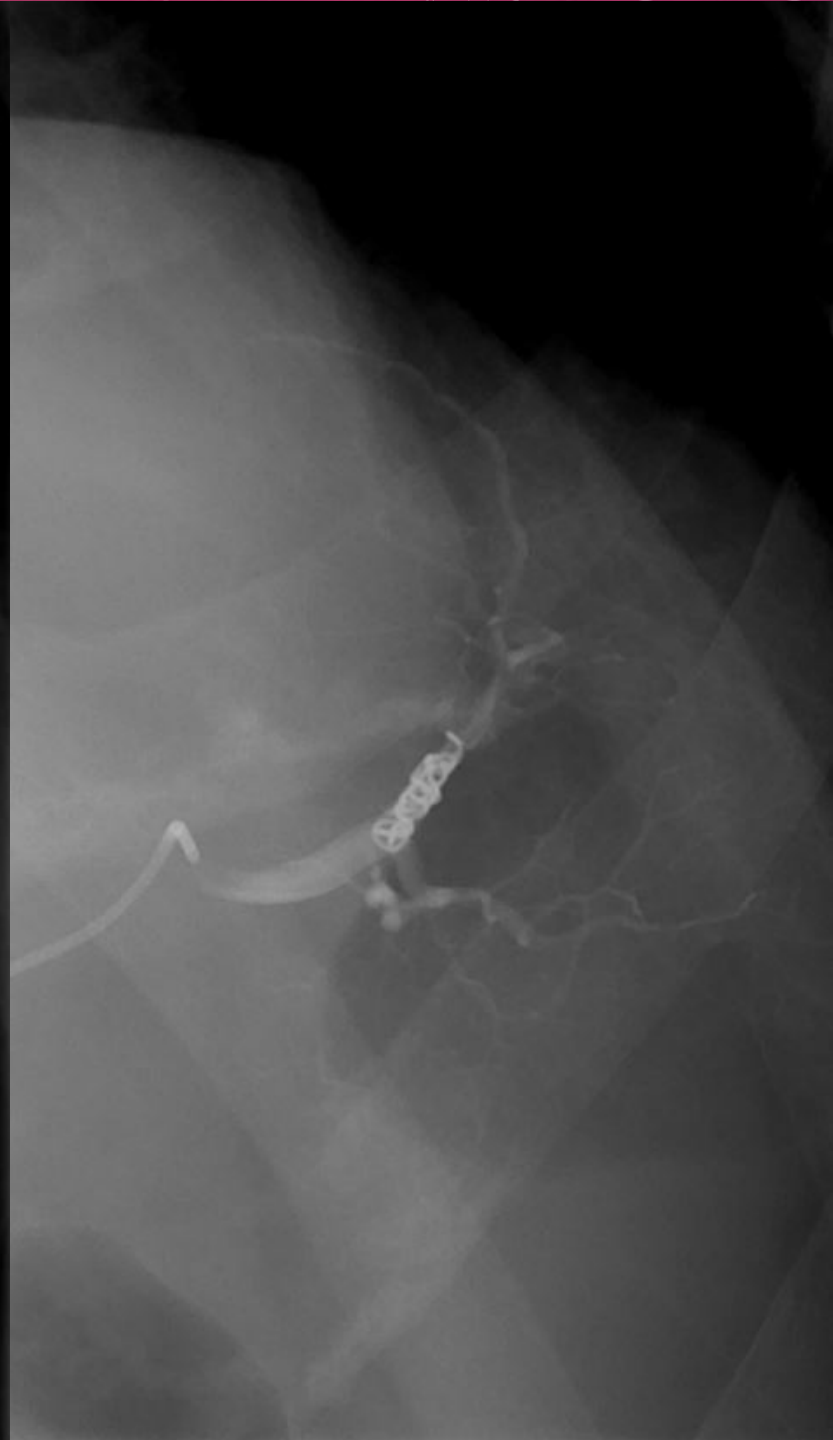
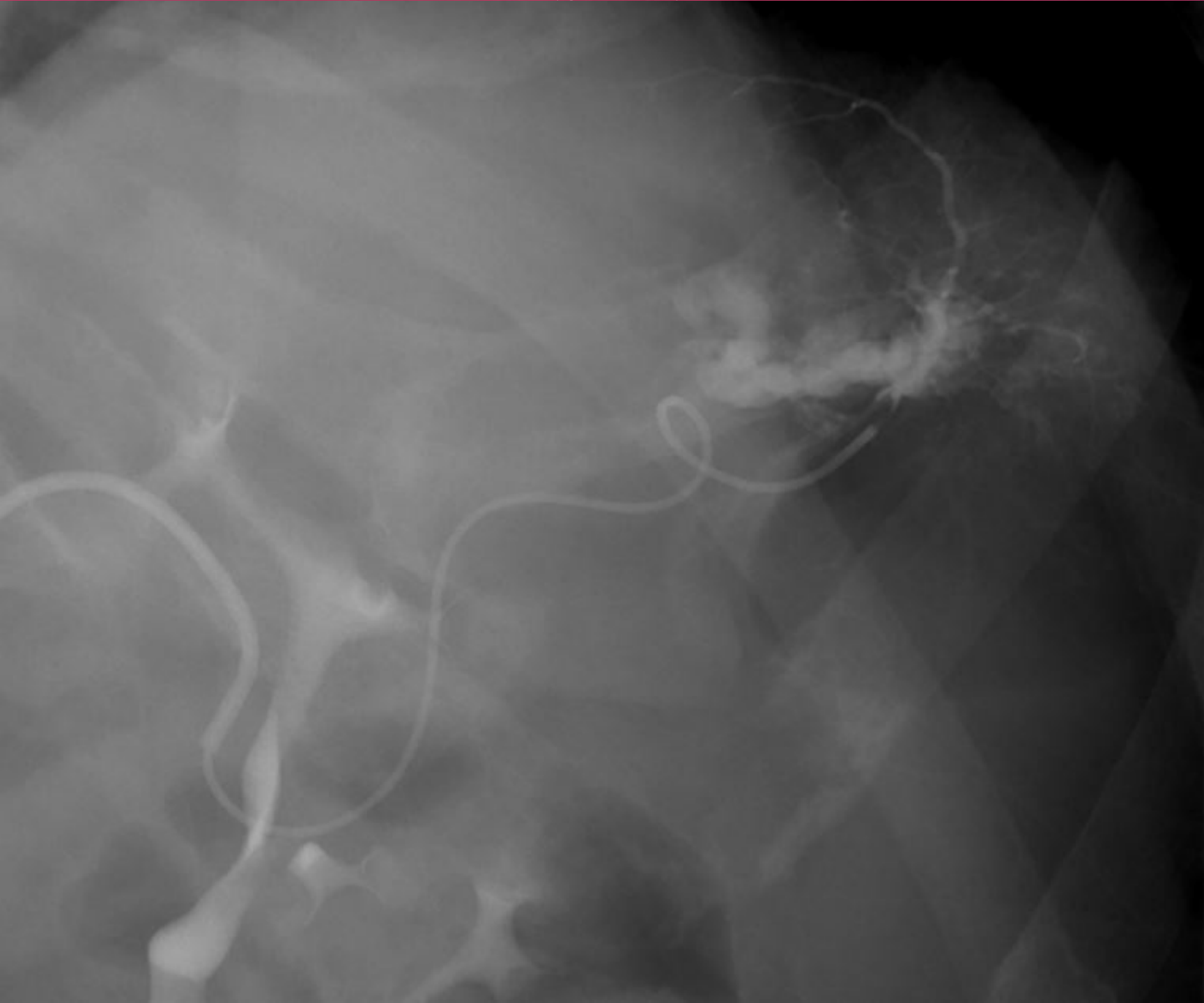














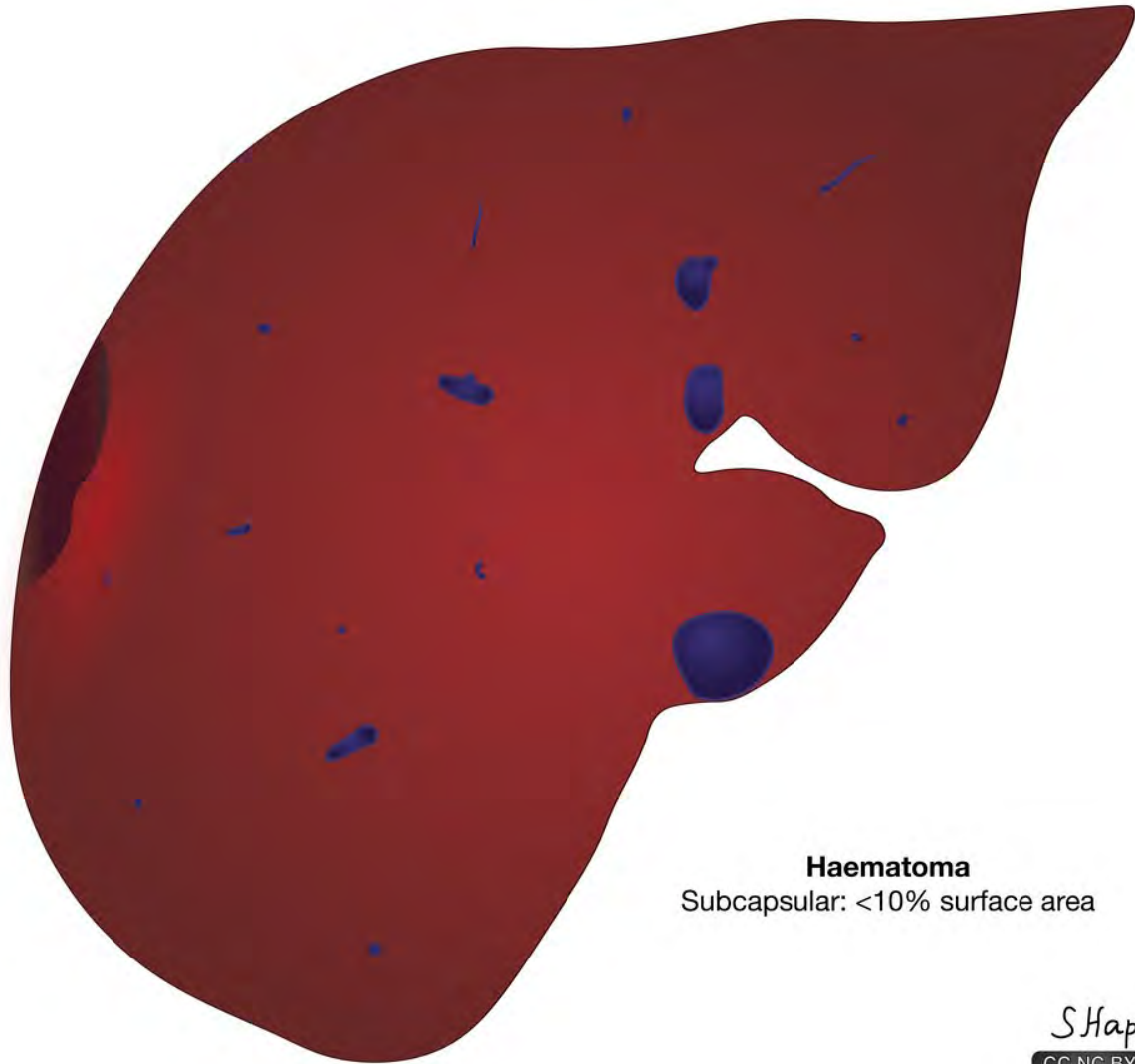


FOIE:





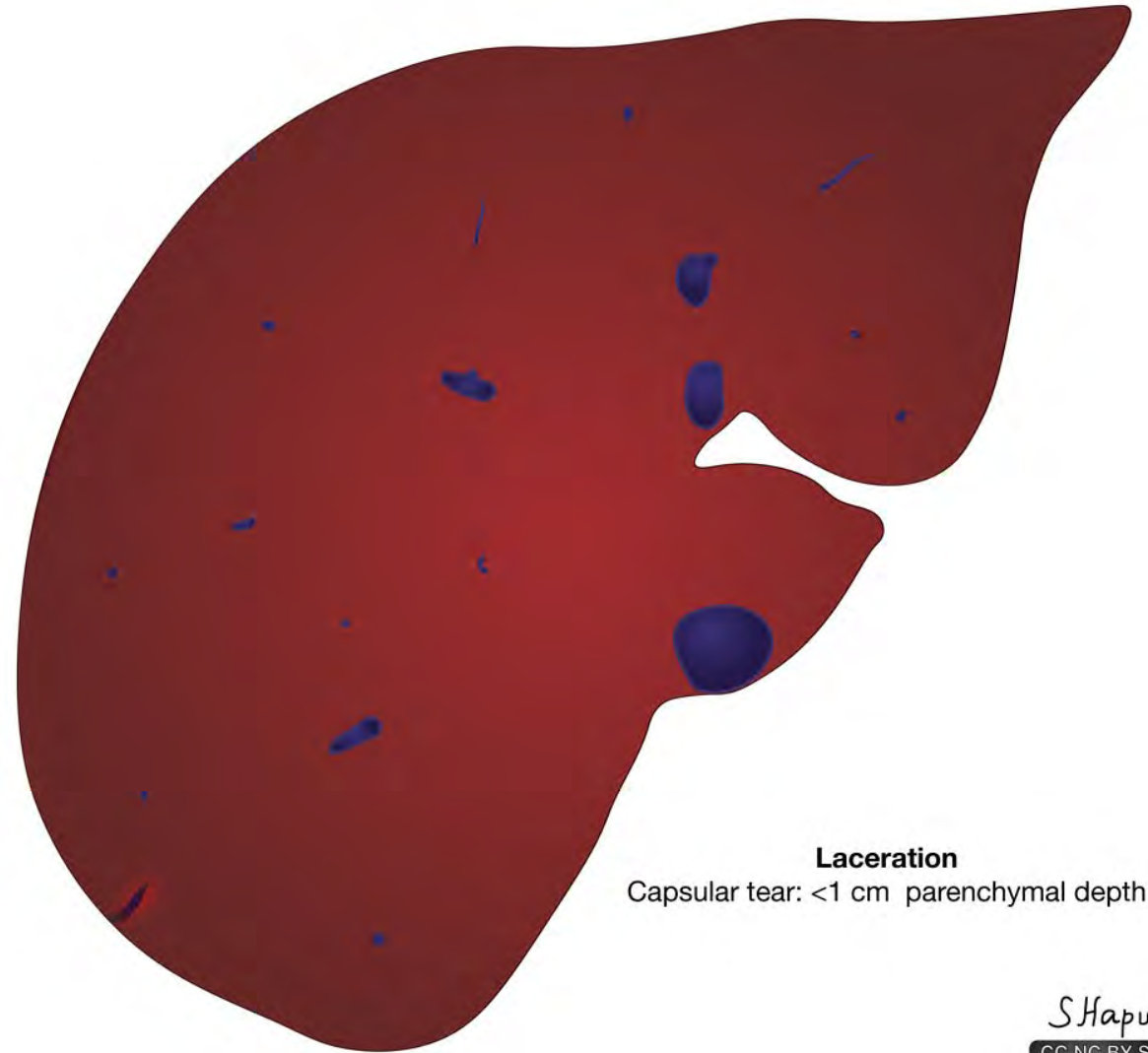
## Grade I



### Haematoma

Subcapsular: <10% surface area

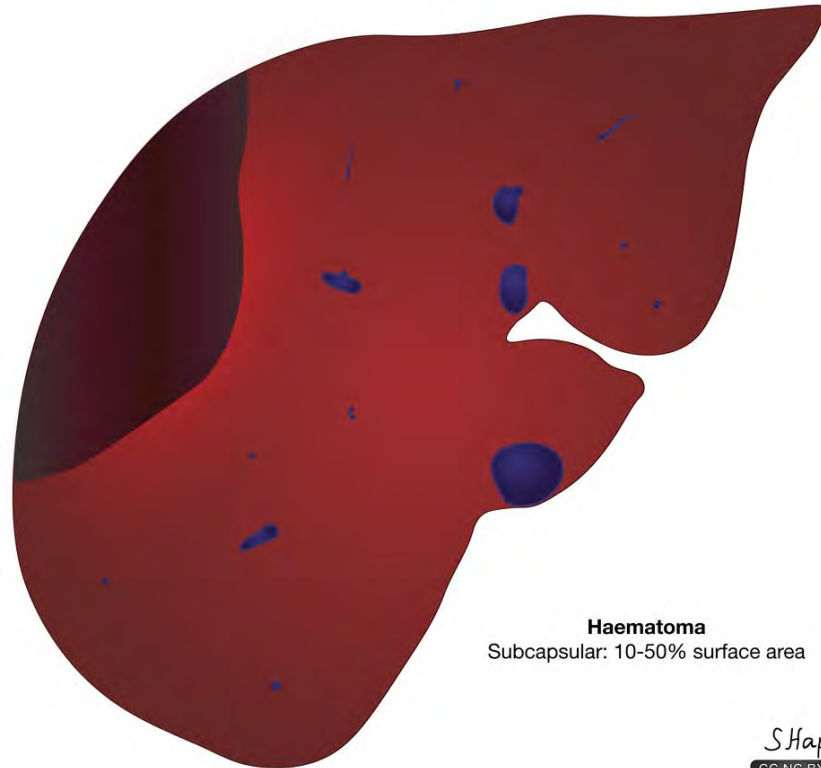
## Grade I



### Laceration

Capsular tear: <1 cm parenchymal depth

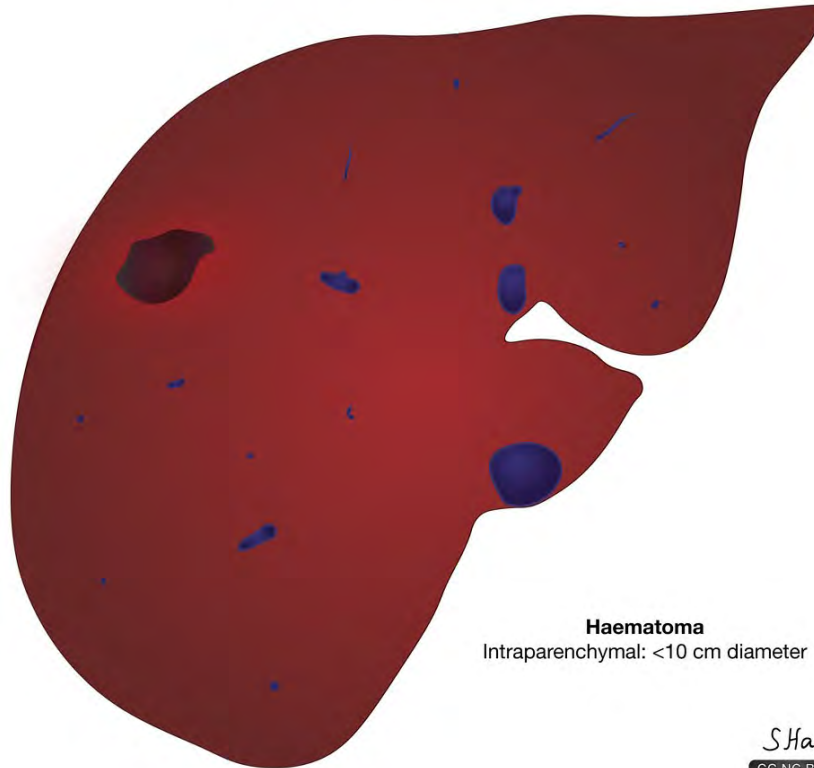
## Grade II



**Haematoma**  
Subcapsular: 10-50% surface area

SHapu  
CC BY SA  
Radiopaedia.org

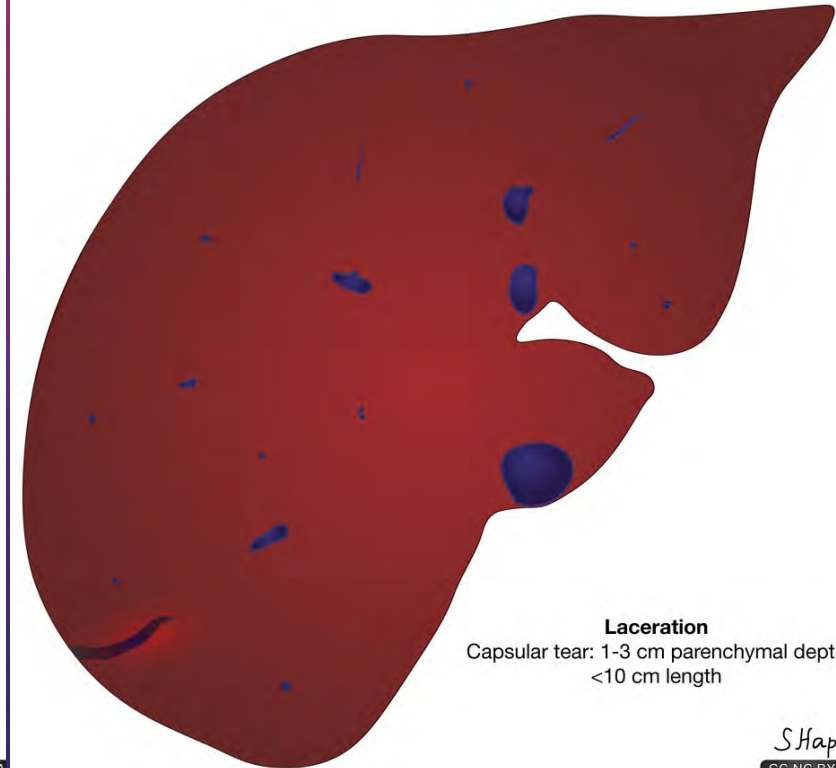
## Grade II



**Haematoma**  
Intraparenchymal: <10 cm diameter

SHapu  
CC BY SA  
Radiopaedia.org

## Grade II



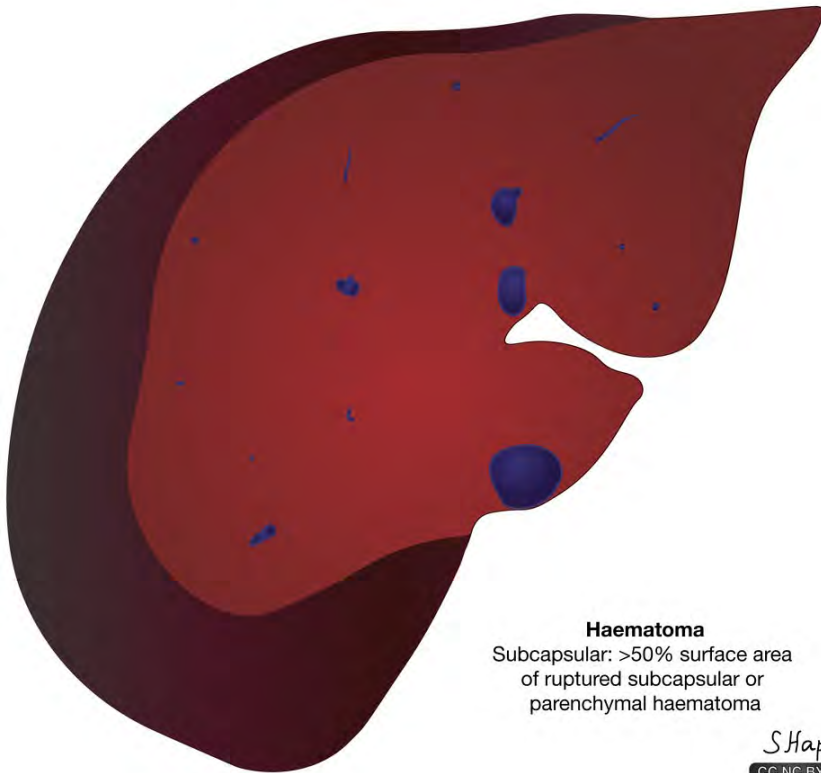
**Laceration**  
Capsular tear: 1-3 cm parenchymal depth  
<10 cm length

SHapu  
CC BY SA  
Radiopaedia.org

**NB:** Ajouter un grade en cas de lésions multiples jusqu'au grade III



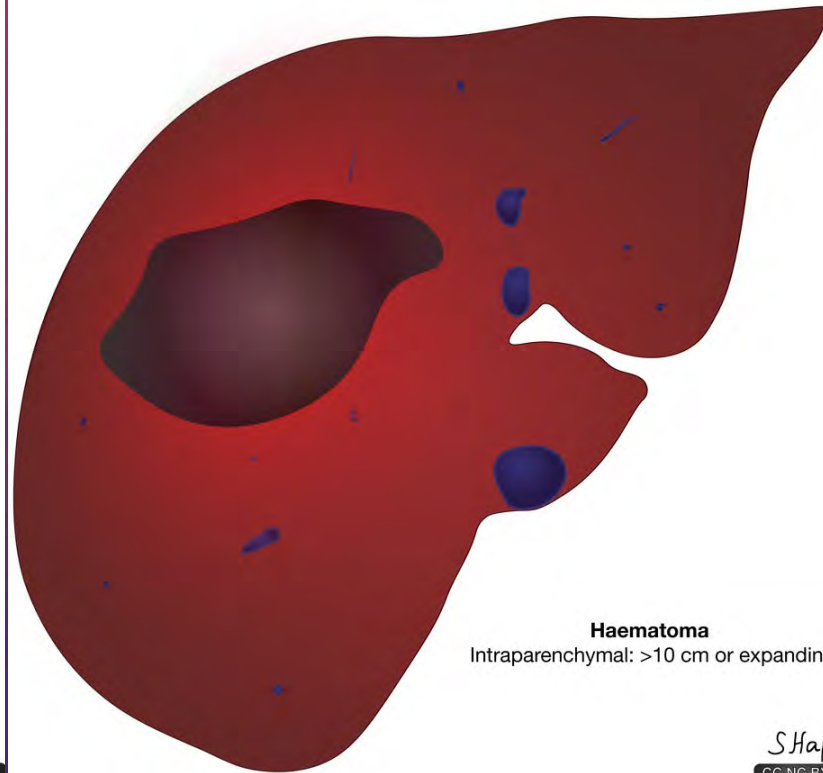
### Grade III



**Haematoma**  
Subcapsular: >50% surface area  
of ruptured subcapsular or  
parenchymal haematoma

*SHapu*  
CC BY SA  
Radiopaedia.org

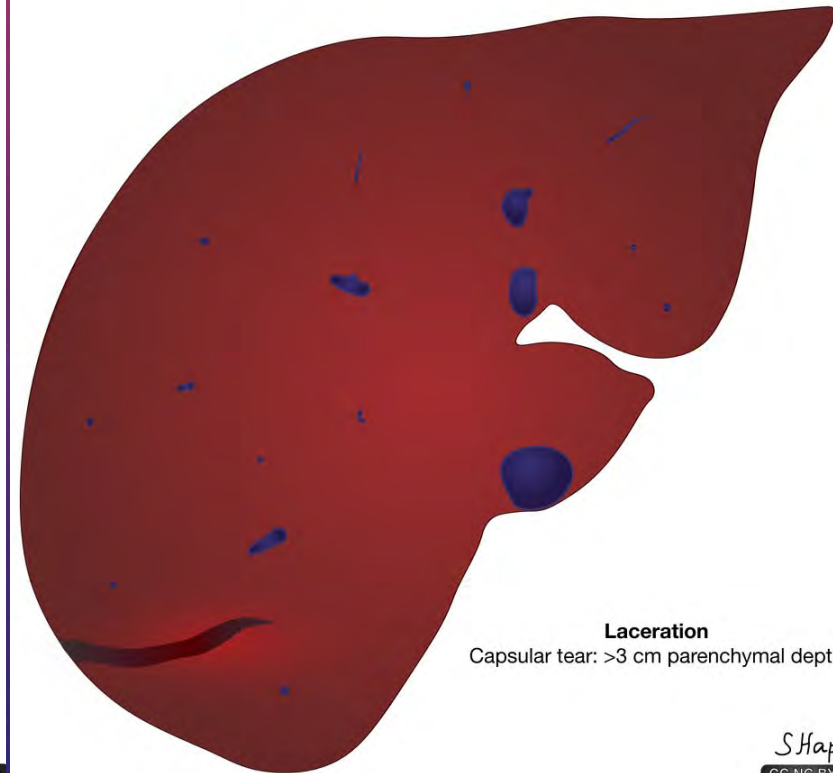
### Grade III



**Haematoma**  
Intraparenchymal: >10 cm or expanding

*SHapu*  
CC BY SA  
Radiopaedia.org

### Grade III

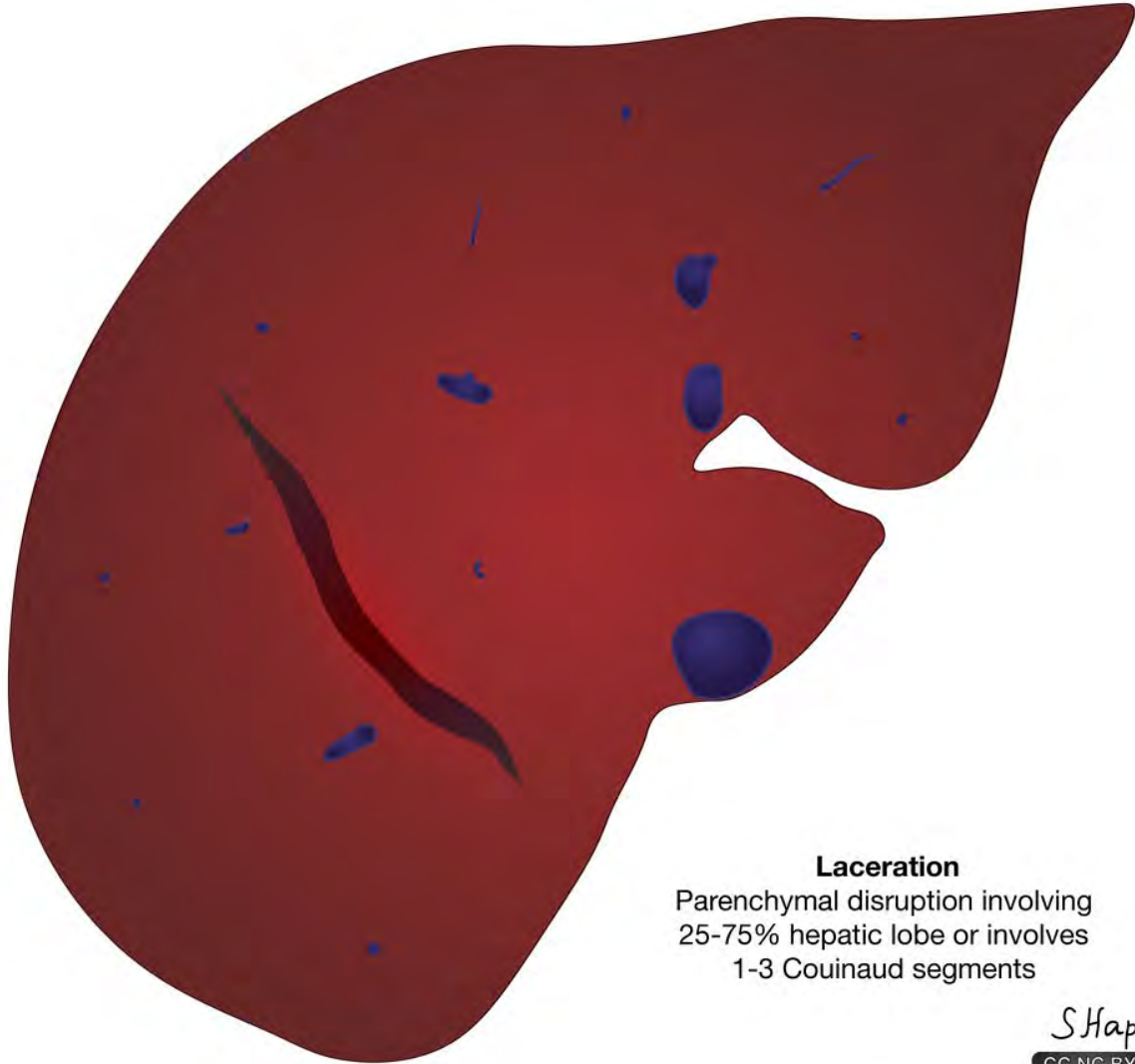


**Laceration**  
Capsular tear: >3 cm parenchymal depth

*SHapu*  
CC BY SA  
Radiopaedia.org

**NB:** Ajouter un grade en cas de lésions multiples jusqu'au grade III

## Grade IV



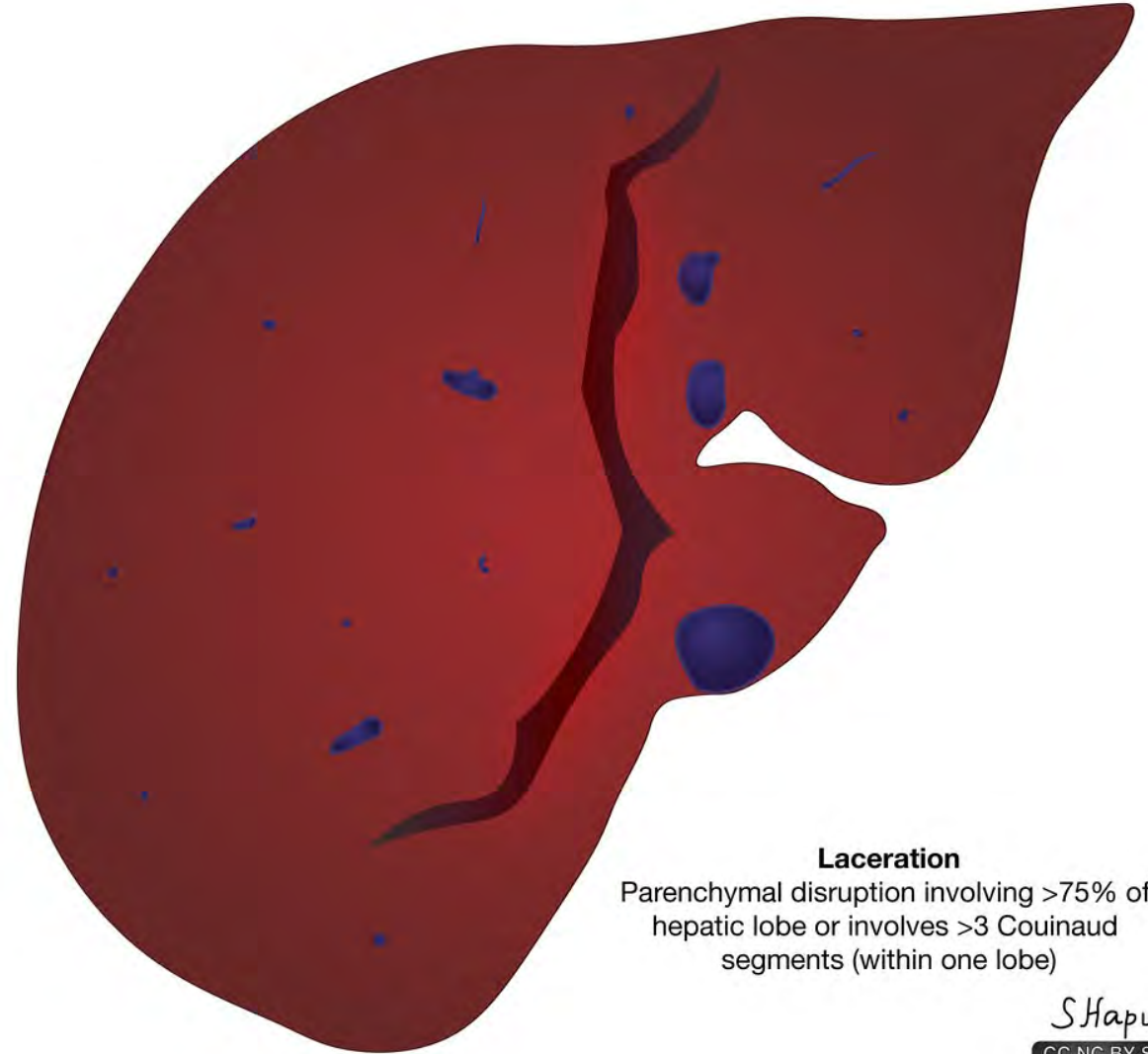
### Laceration

Parenchymal disruption involving  
25-75% hepatic lobe or involves  
1-3 Couinaud segments

*SHapu*

CC NC BY SA  
Radiopaedia.org

## Grade V



### Laceration

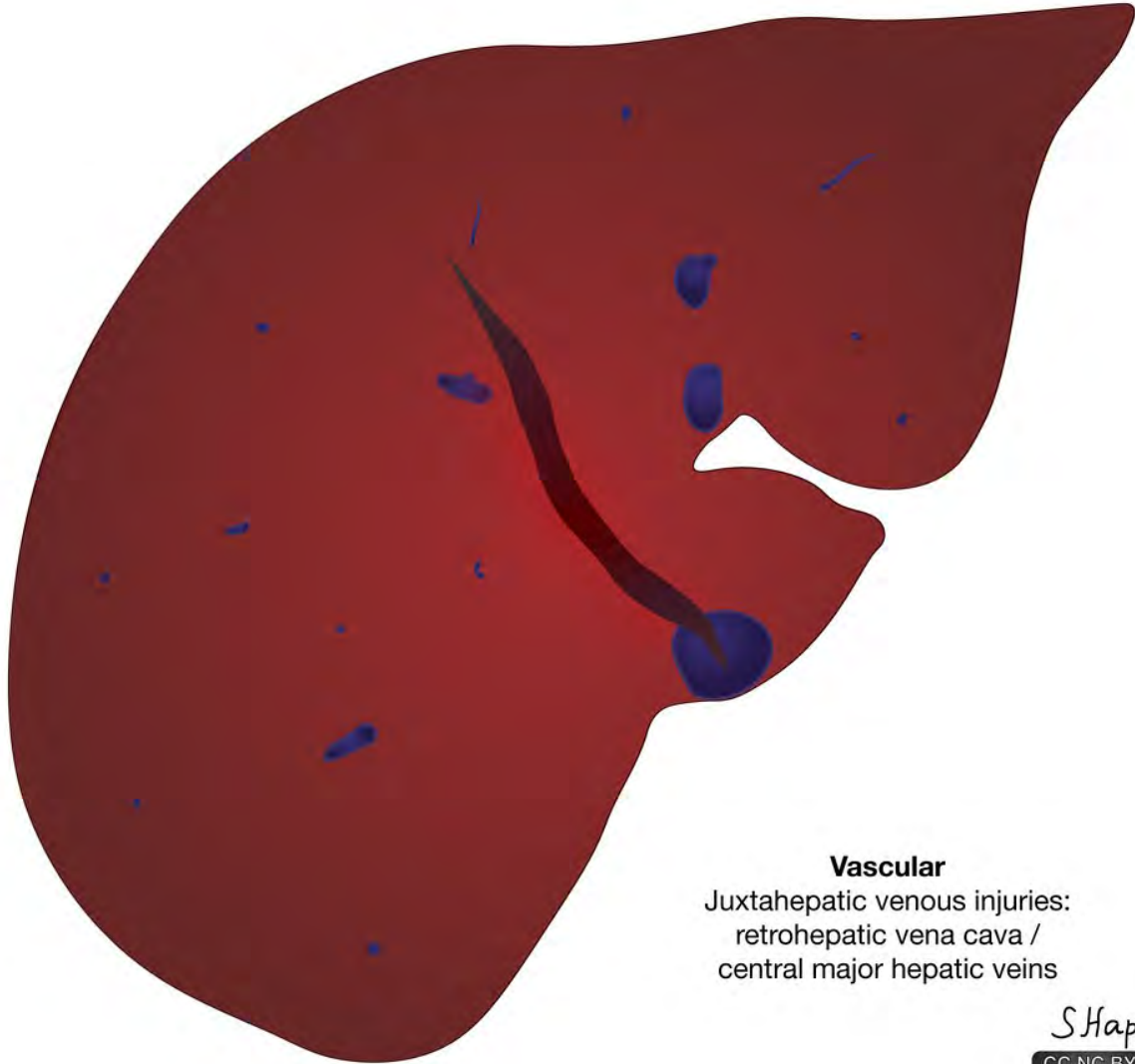
Parenchymal disruption involving >75% of  
hepatic lobe or involves >3 Couinaud  
segments (within one lobe)

*SHapu*

CC NC BY SA  
Radiopaedia.org



## Grade V



### Vascular

Juxtahepatic venous injuries:  
retrohepatic vena cava /  
central major hepatic veins

## Grade VI

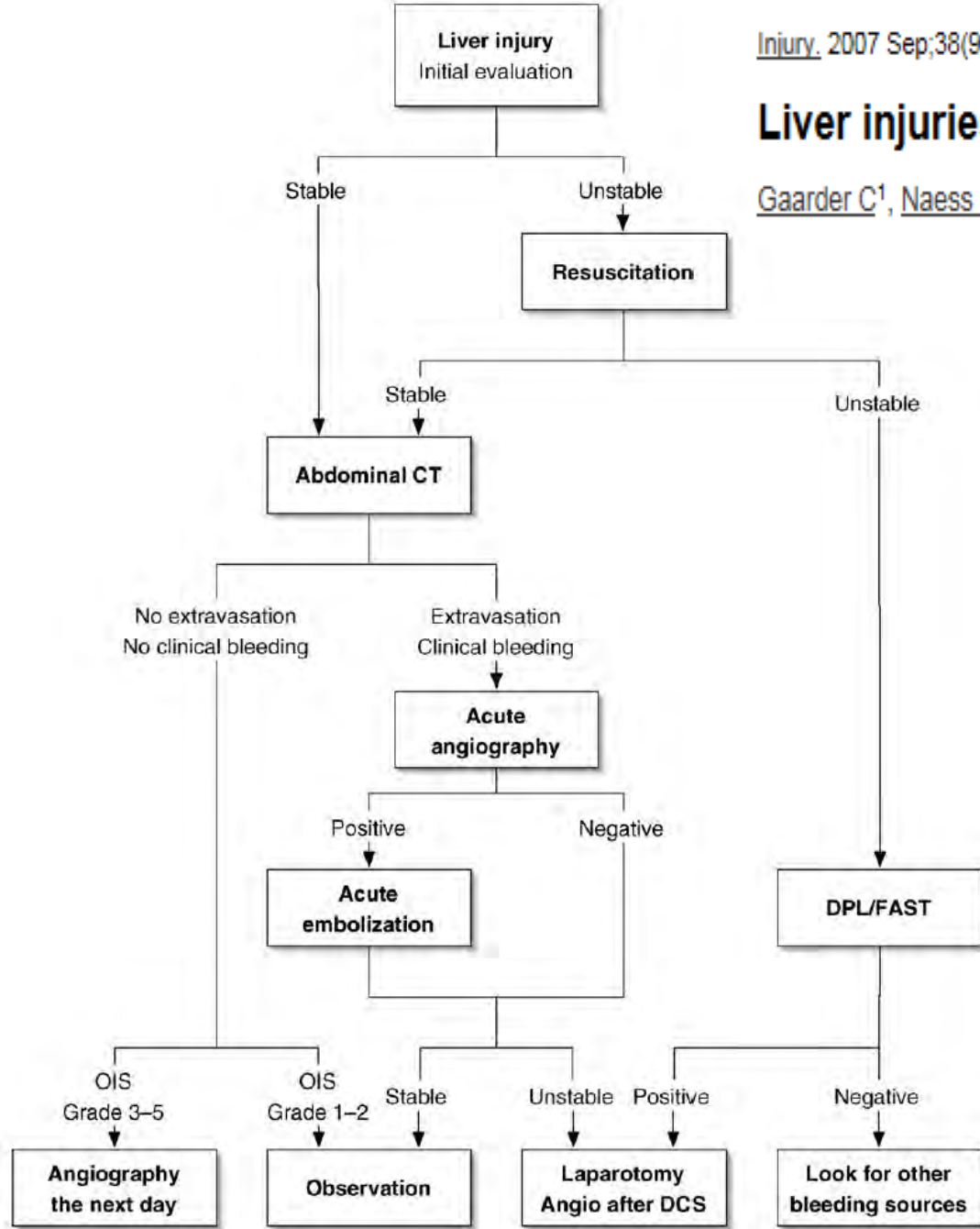


### Vascular

Hepatic Avulsion

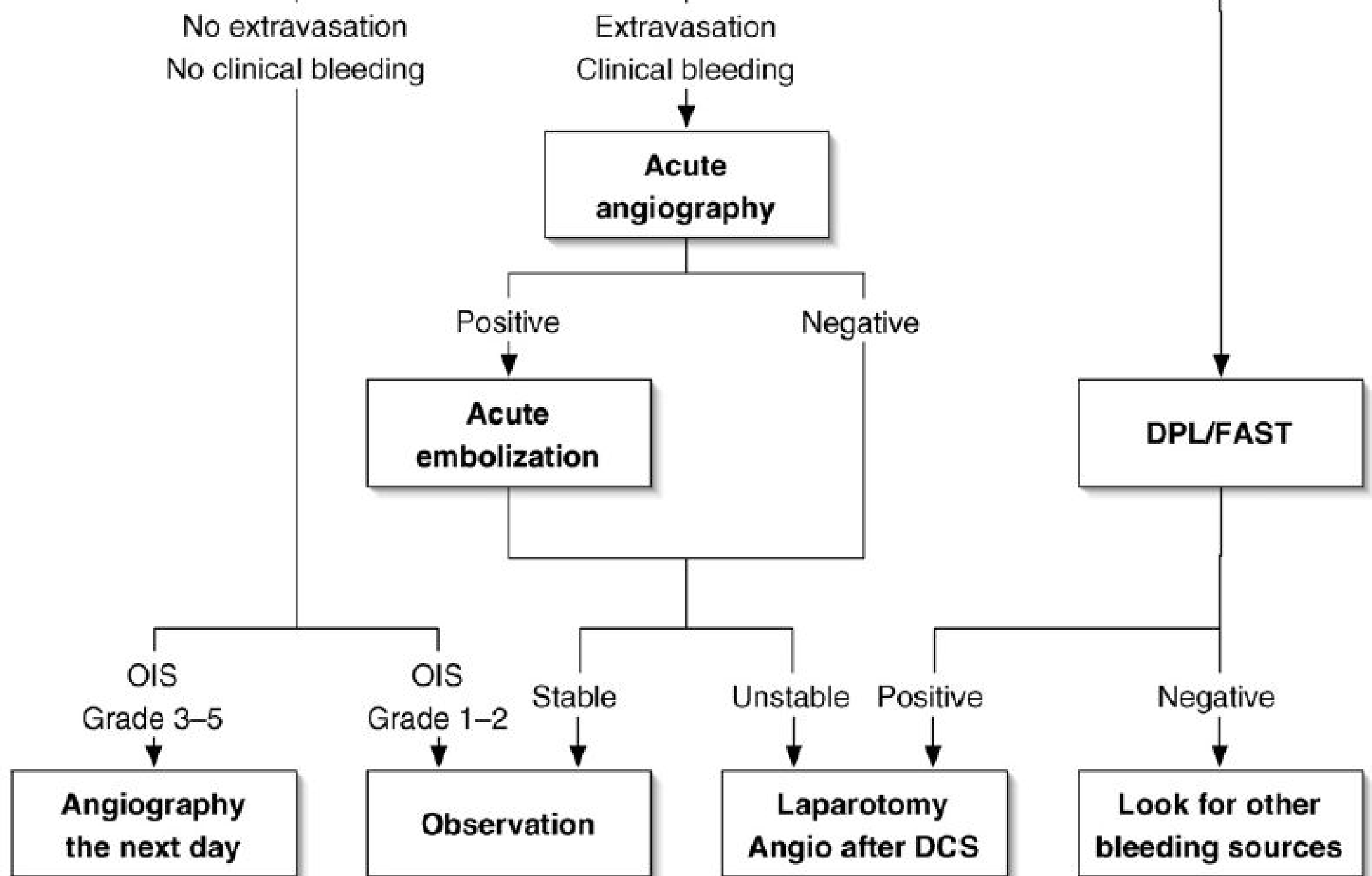
## Liver injuries--improved results with a formal protocol including angiography.

Gaarder C<sup>1</sup>, Naess PA, Eken T, Skaqa NO, Pillgram-Larsen J, Klow NE, Buanes T.



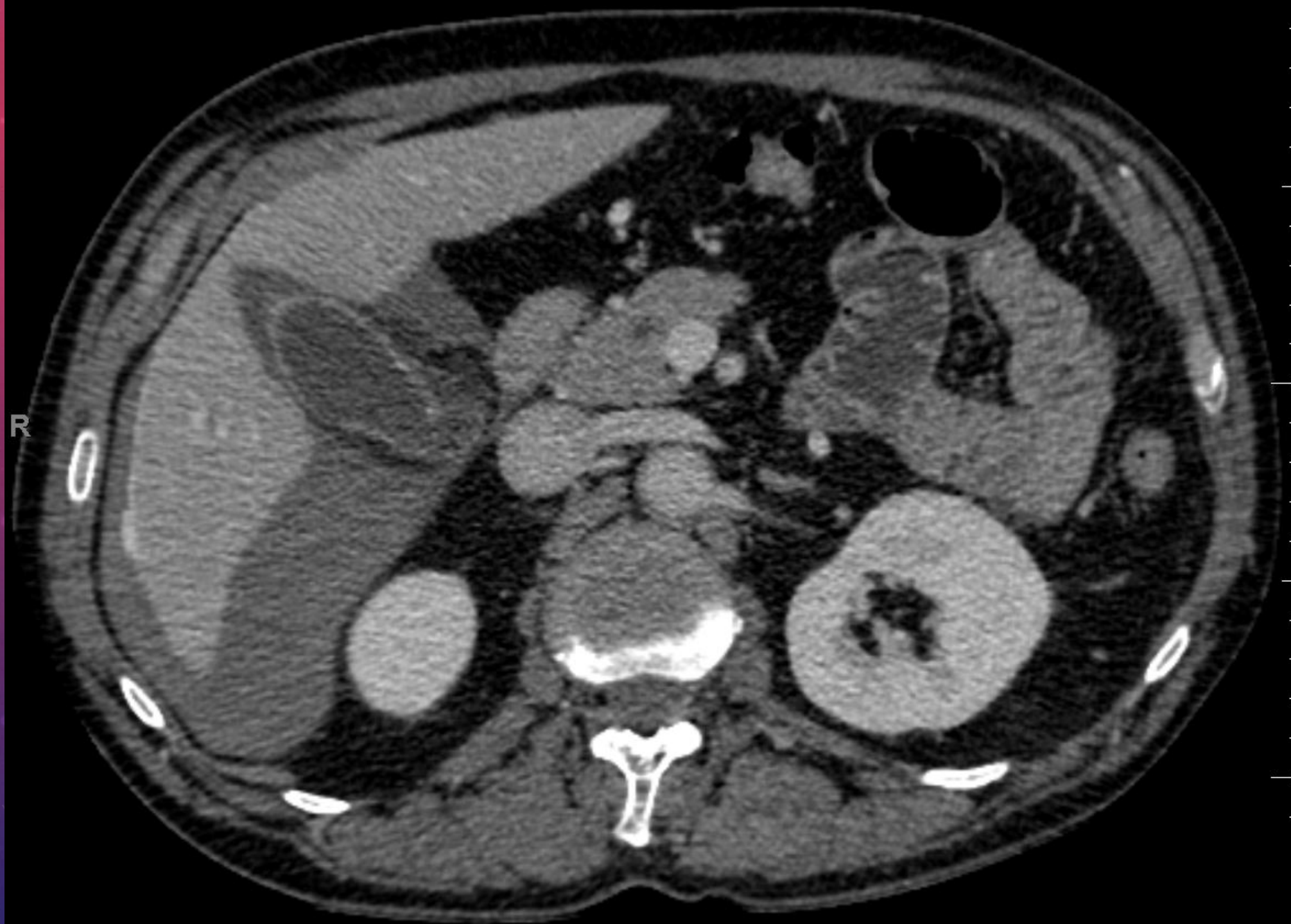
**Figure 1** Algorithm for treatment of liver injuries. DPL, diagnostic peritoneal lavage; FAST, focused assessment with sonography in trauma; OIS, Organ Injury Scale; DCS, Damage Control Surgery.





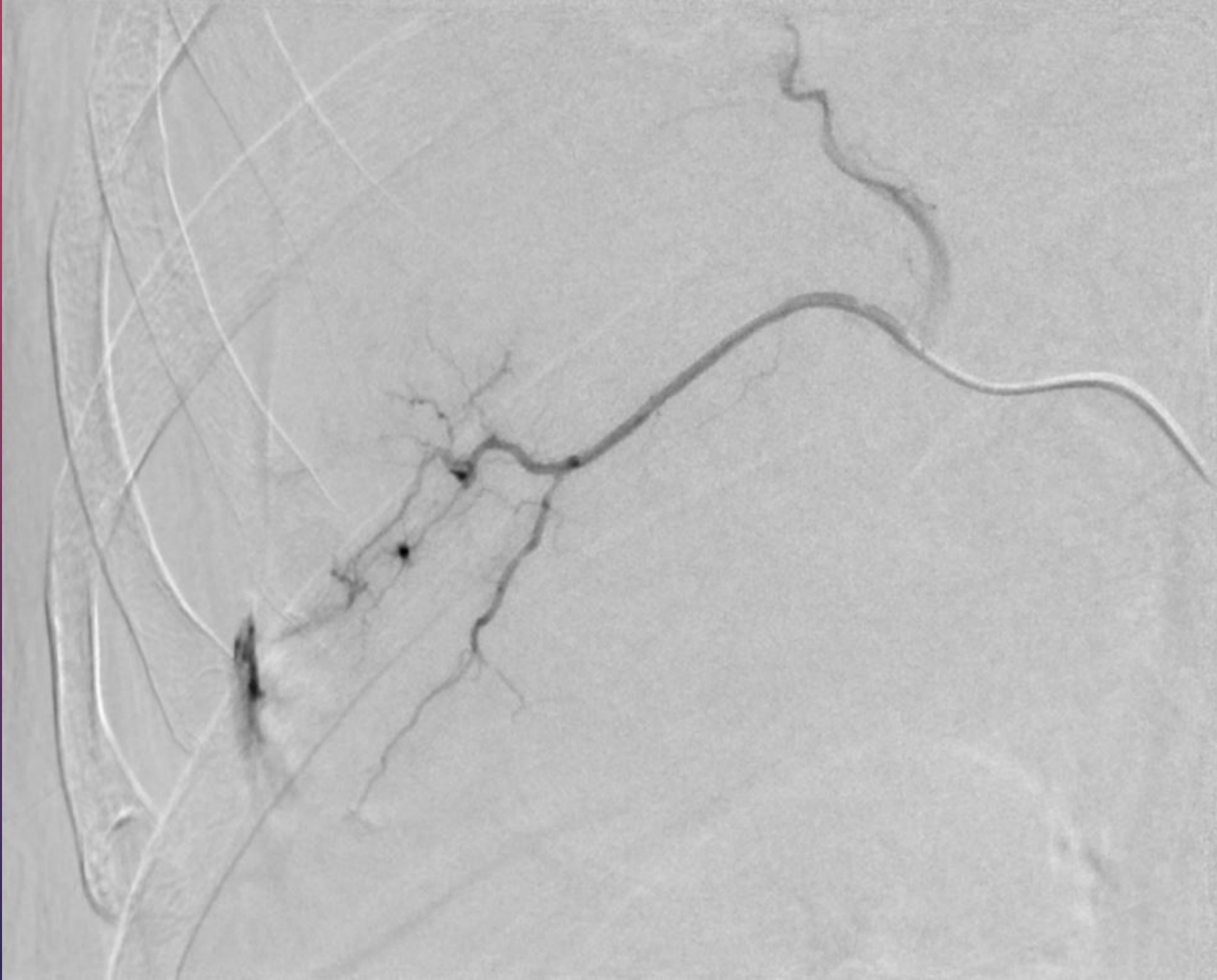


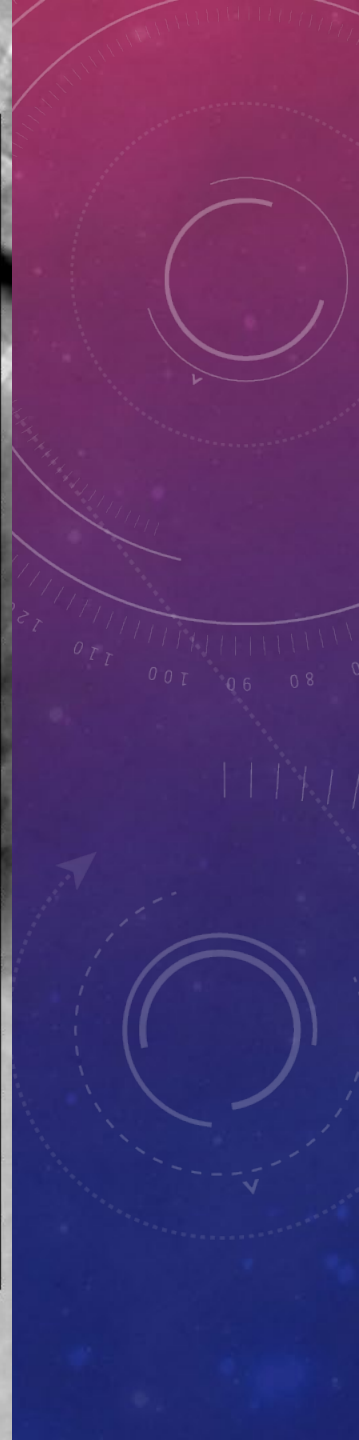














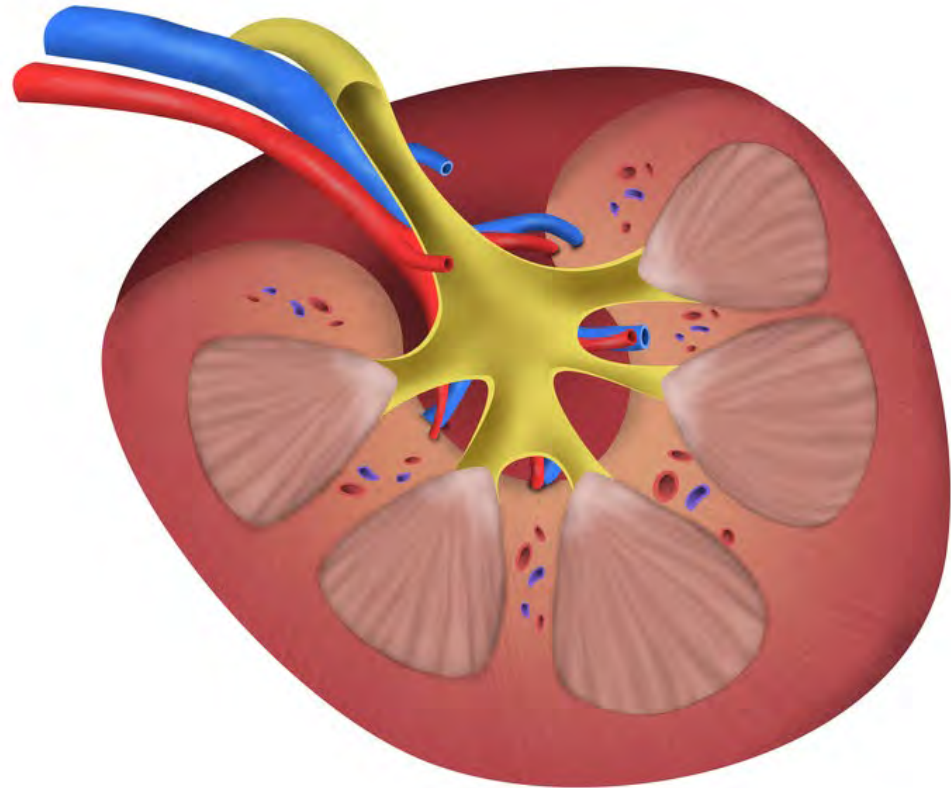


REIN:





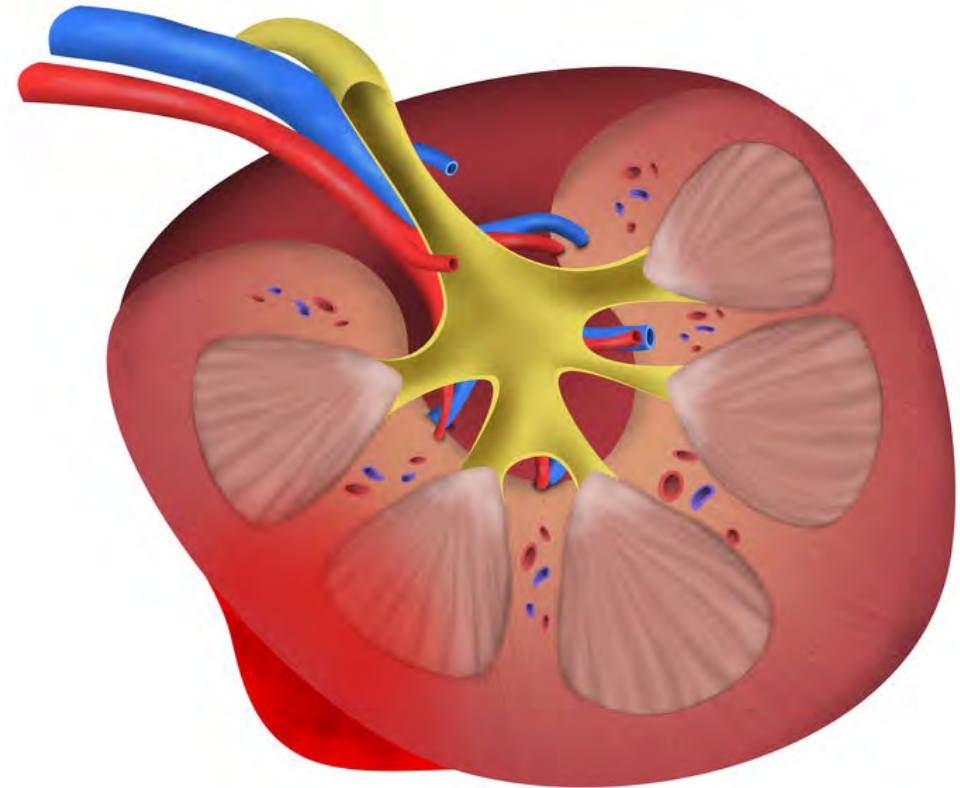
# Normal



*M. Skalski*



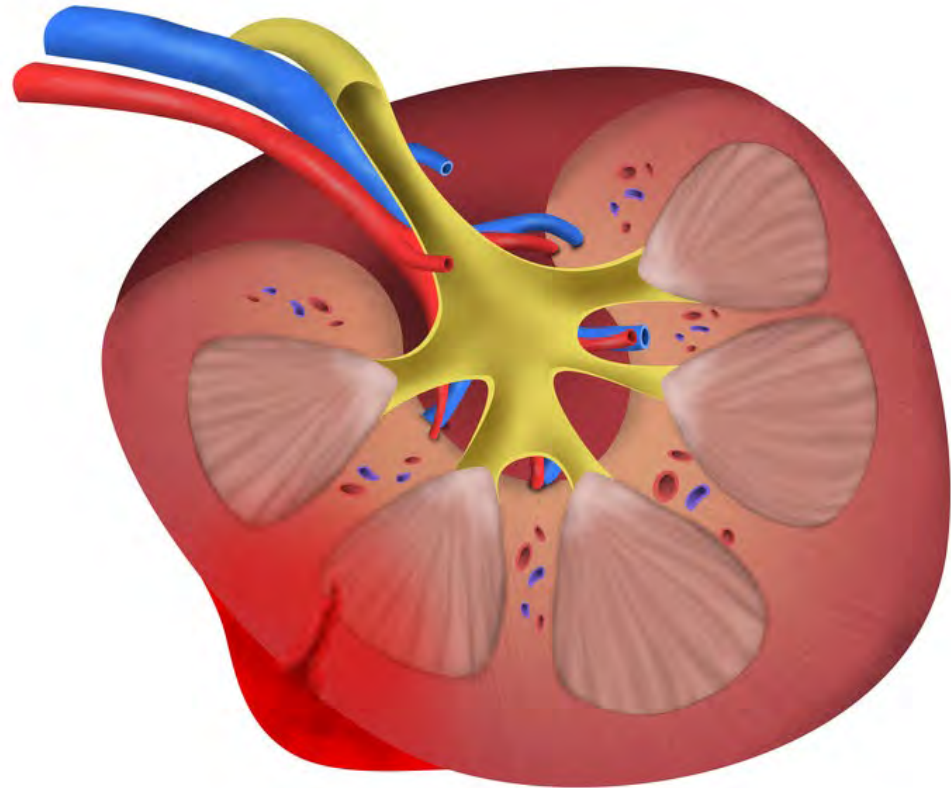
# Grade 1



*M. Skalski*



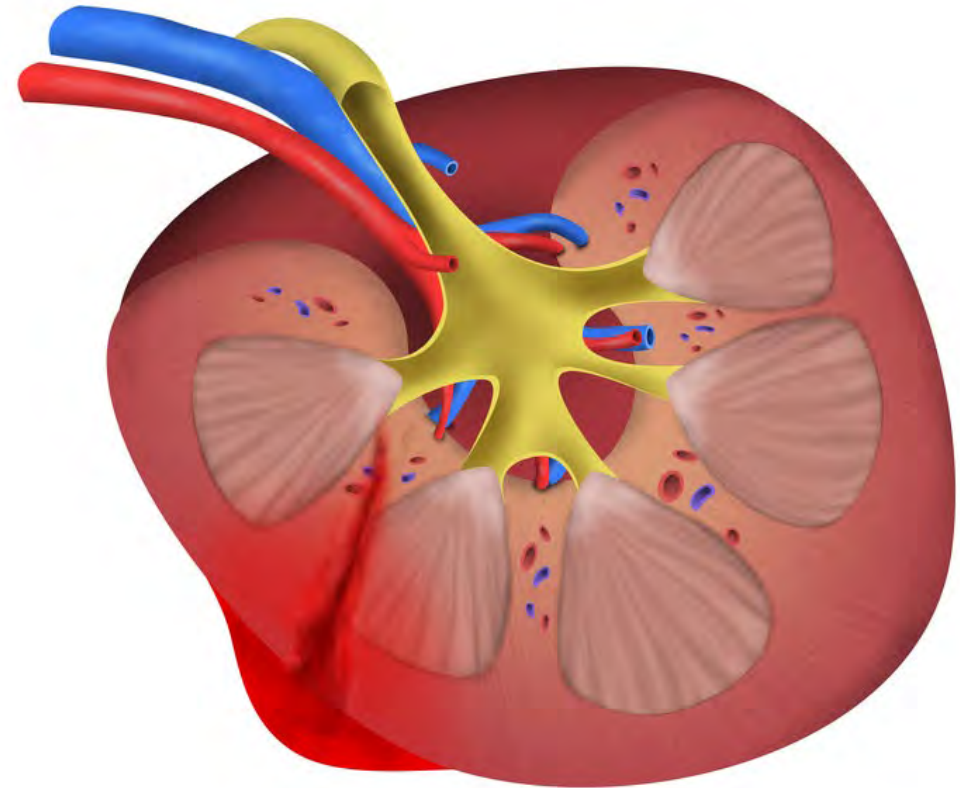
# Grade 2



*M. Skalski*



# Grade 3

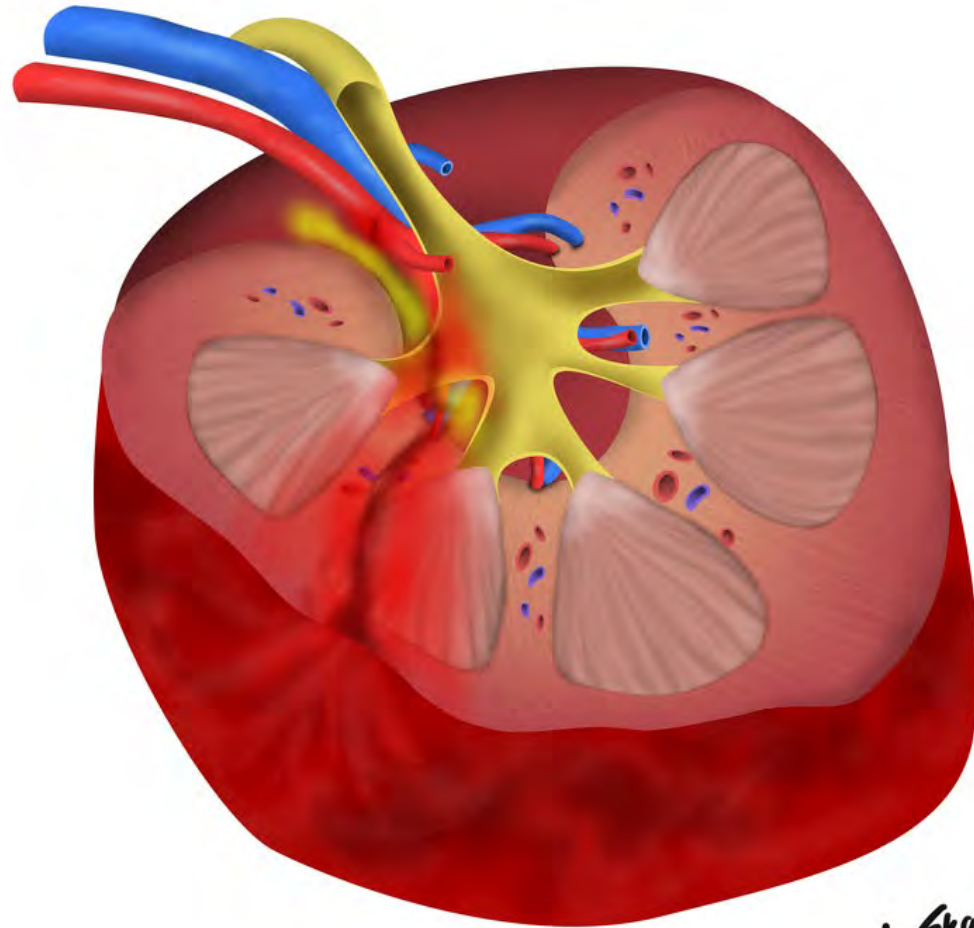


*M. Skalski*





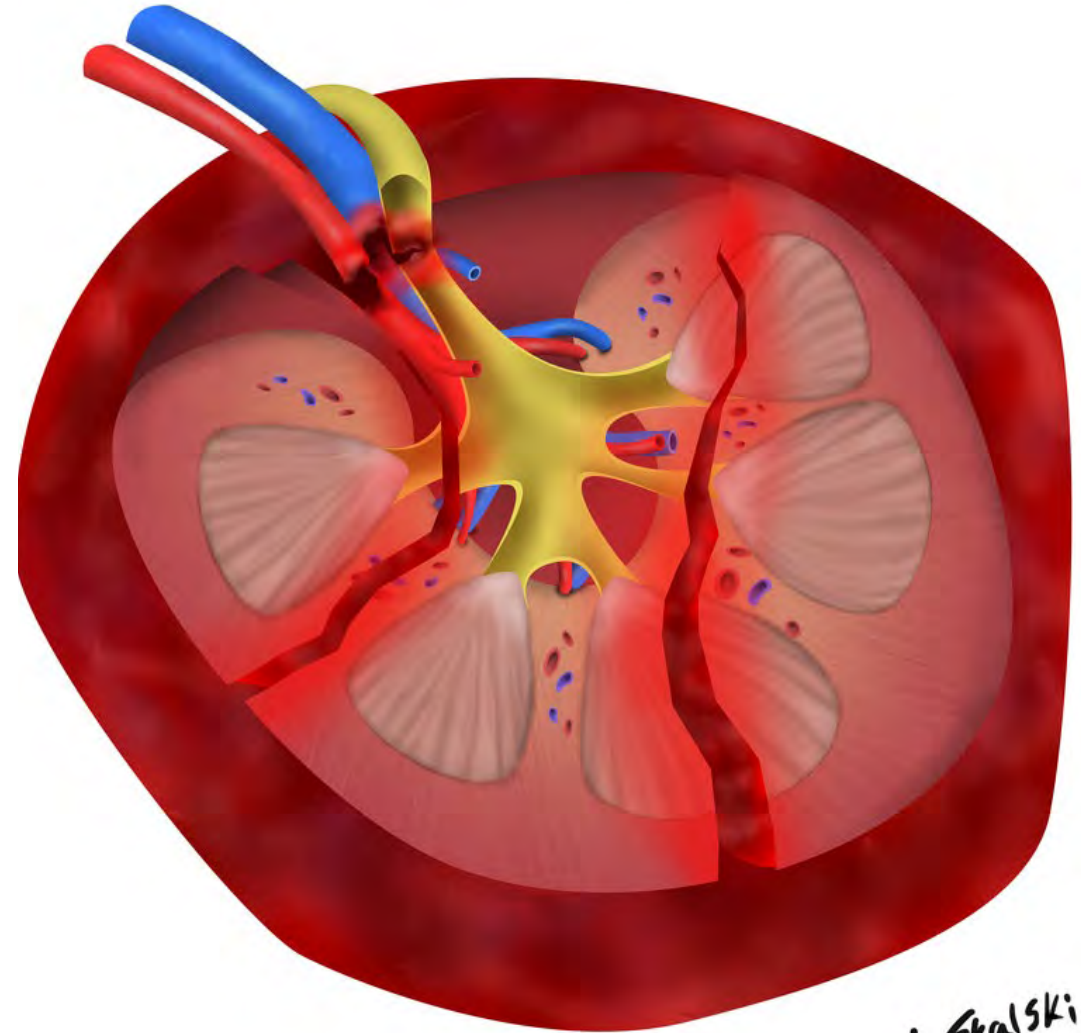
# Grade 4



*M. Skalski*

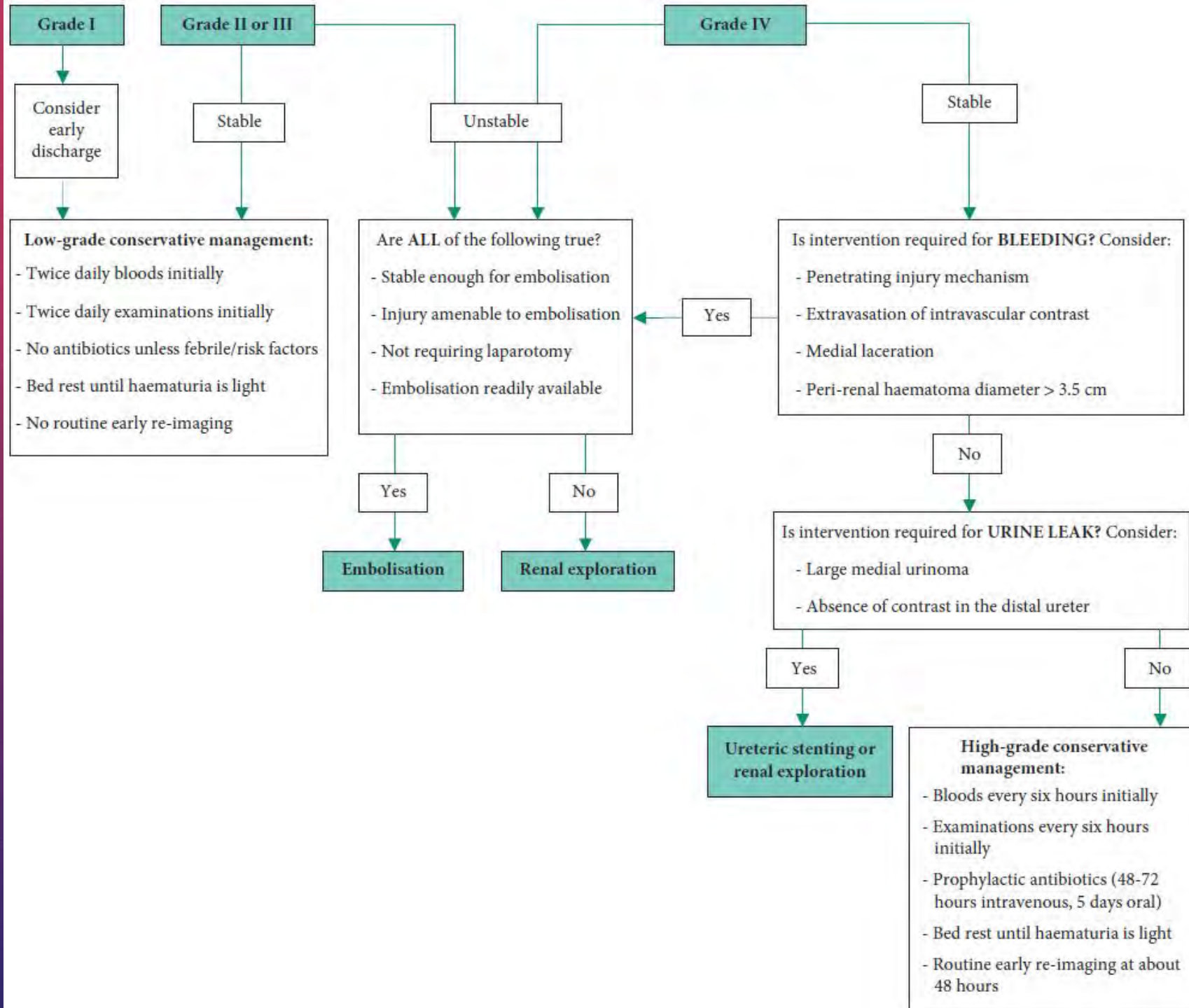


# Grade 5



*M. Skalski*





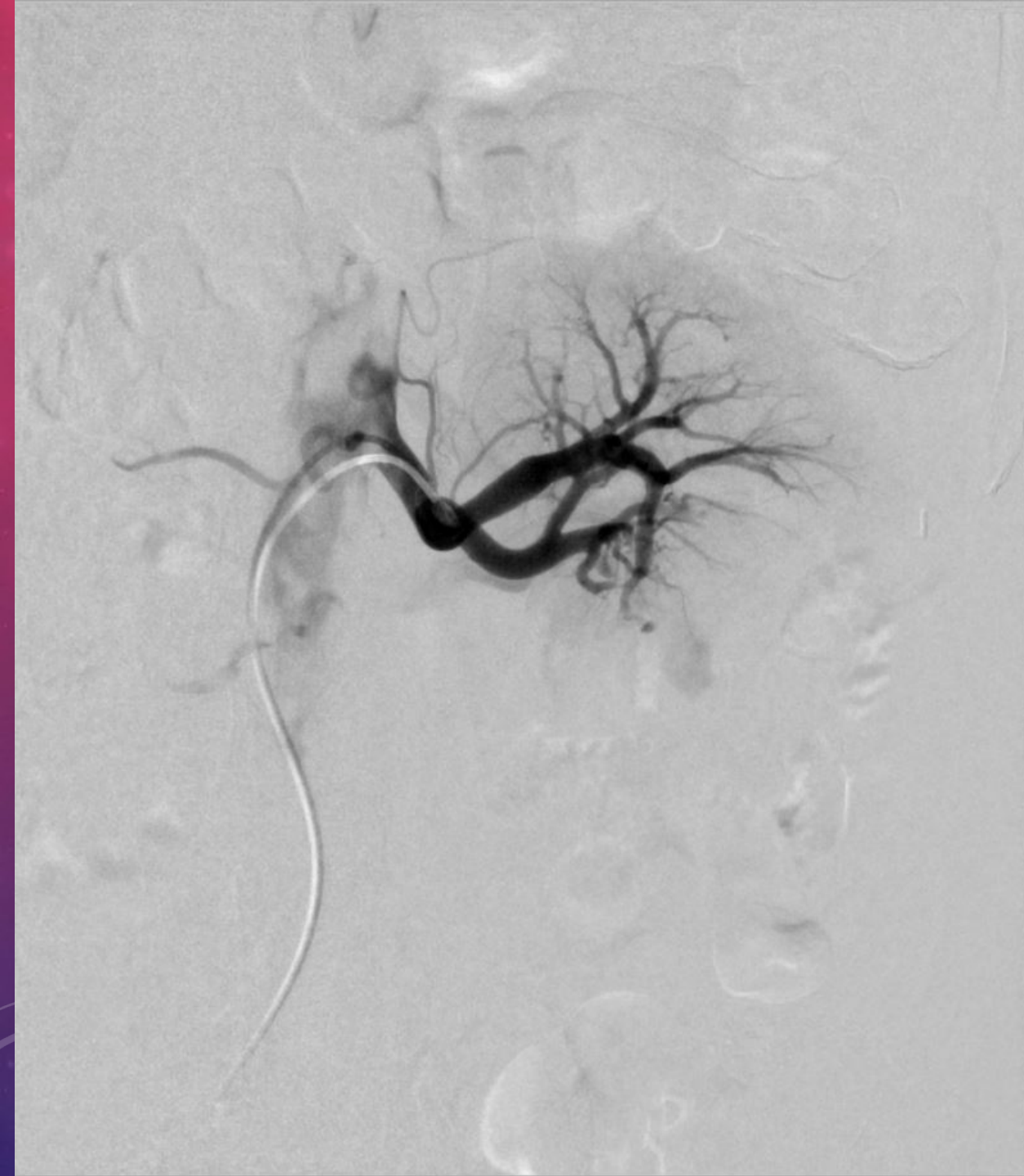






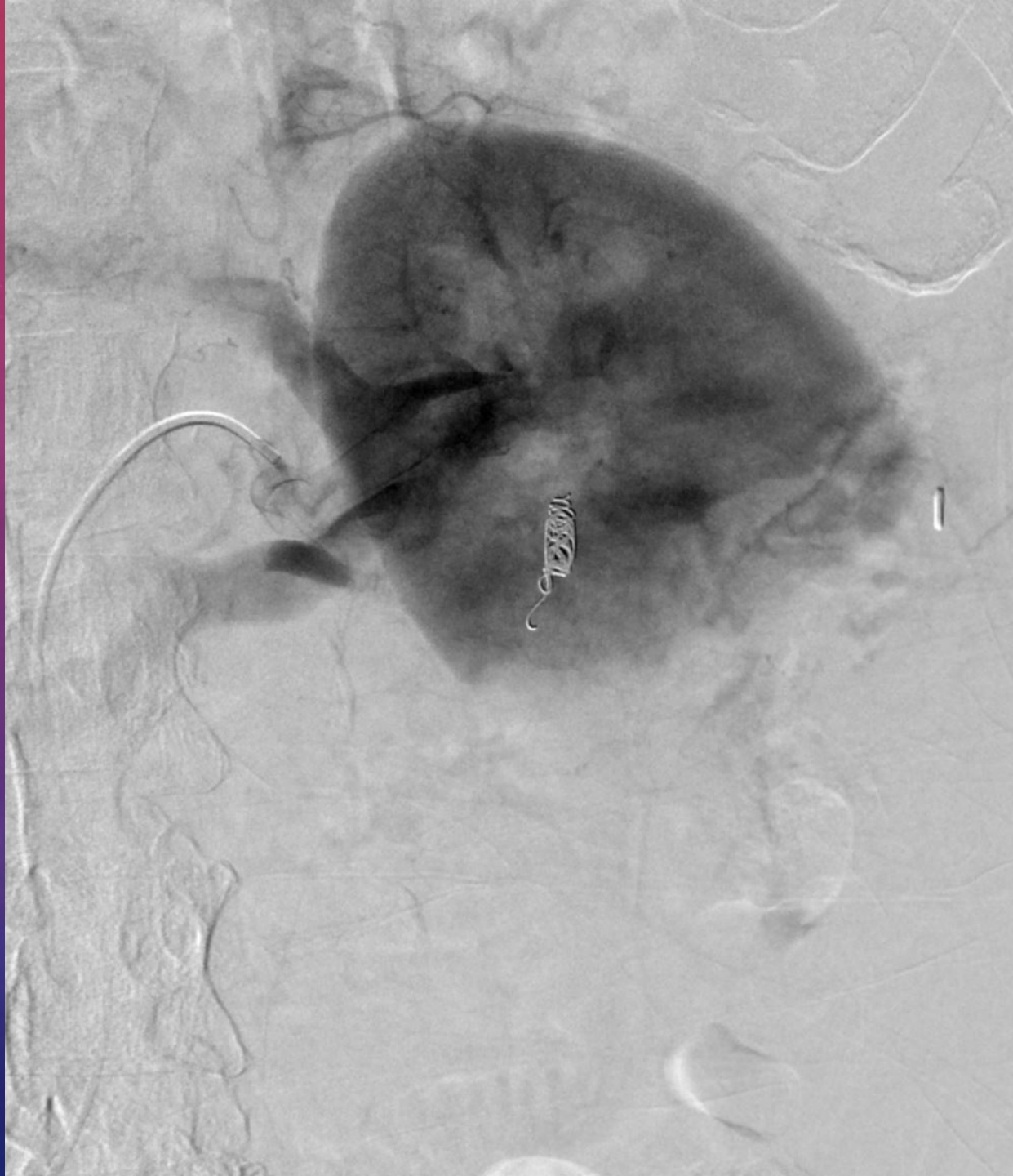
M1  
32.7 mm (3D)





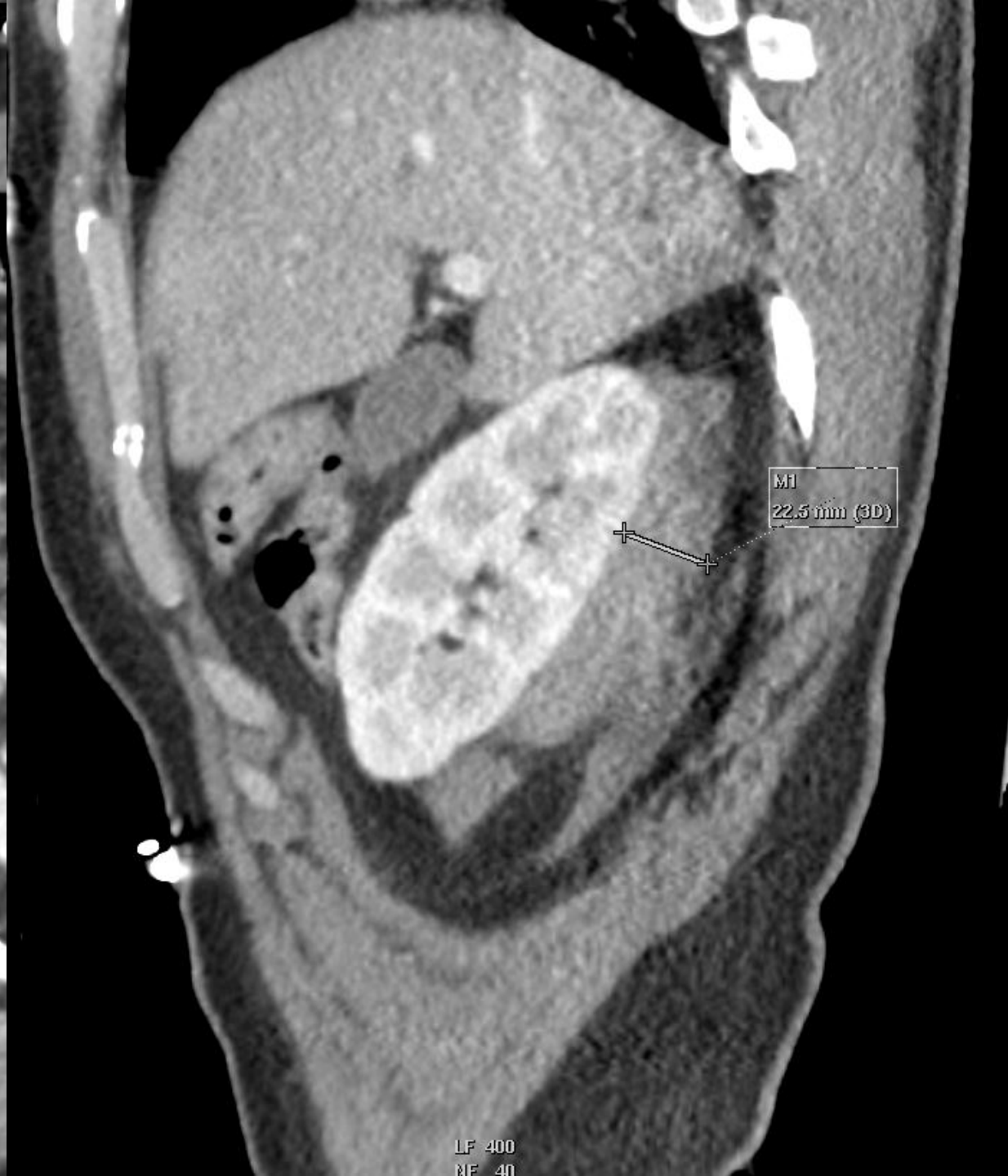
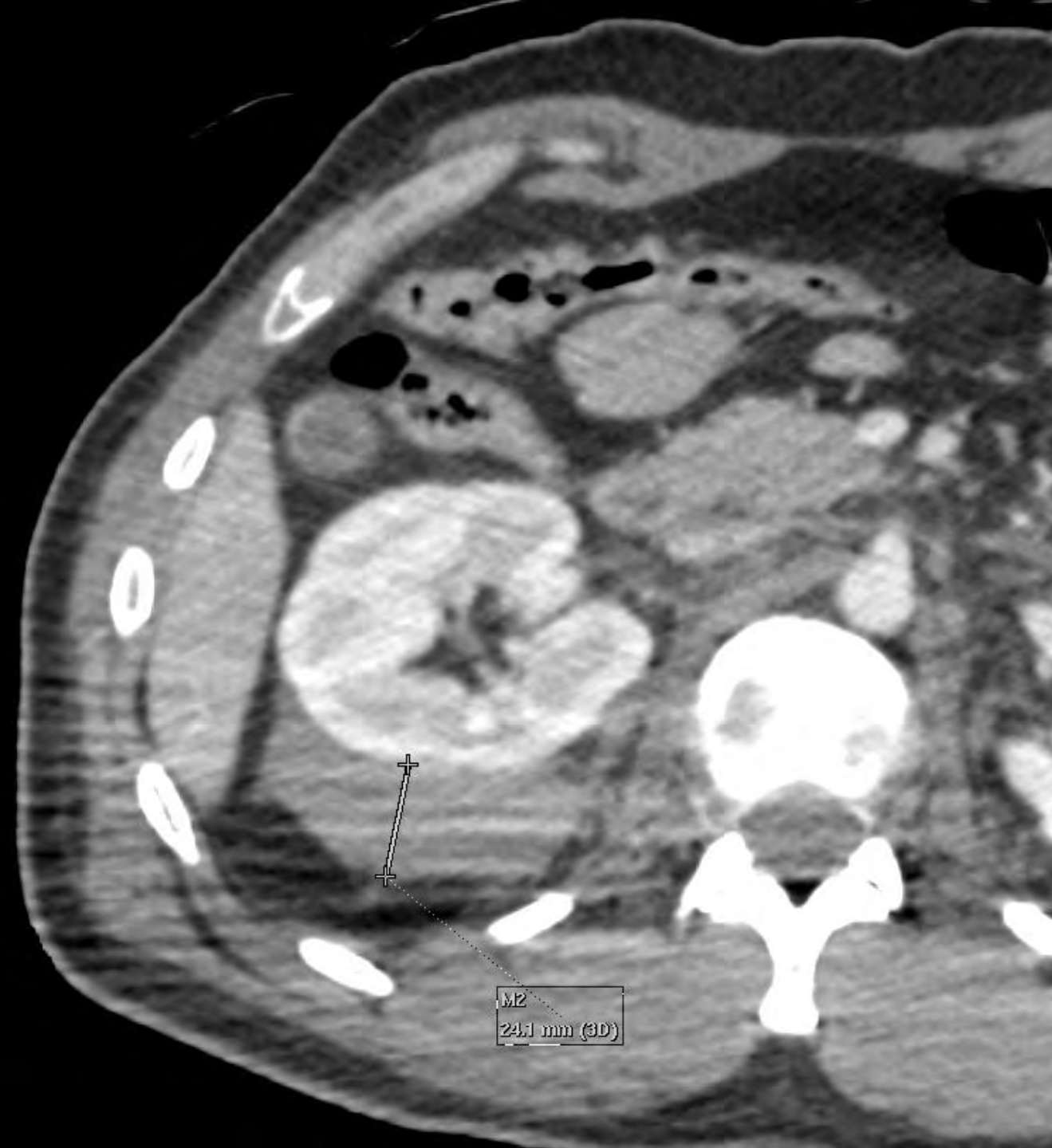


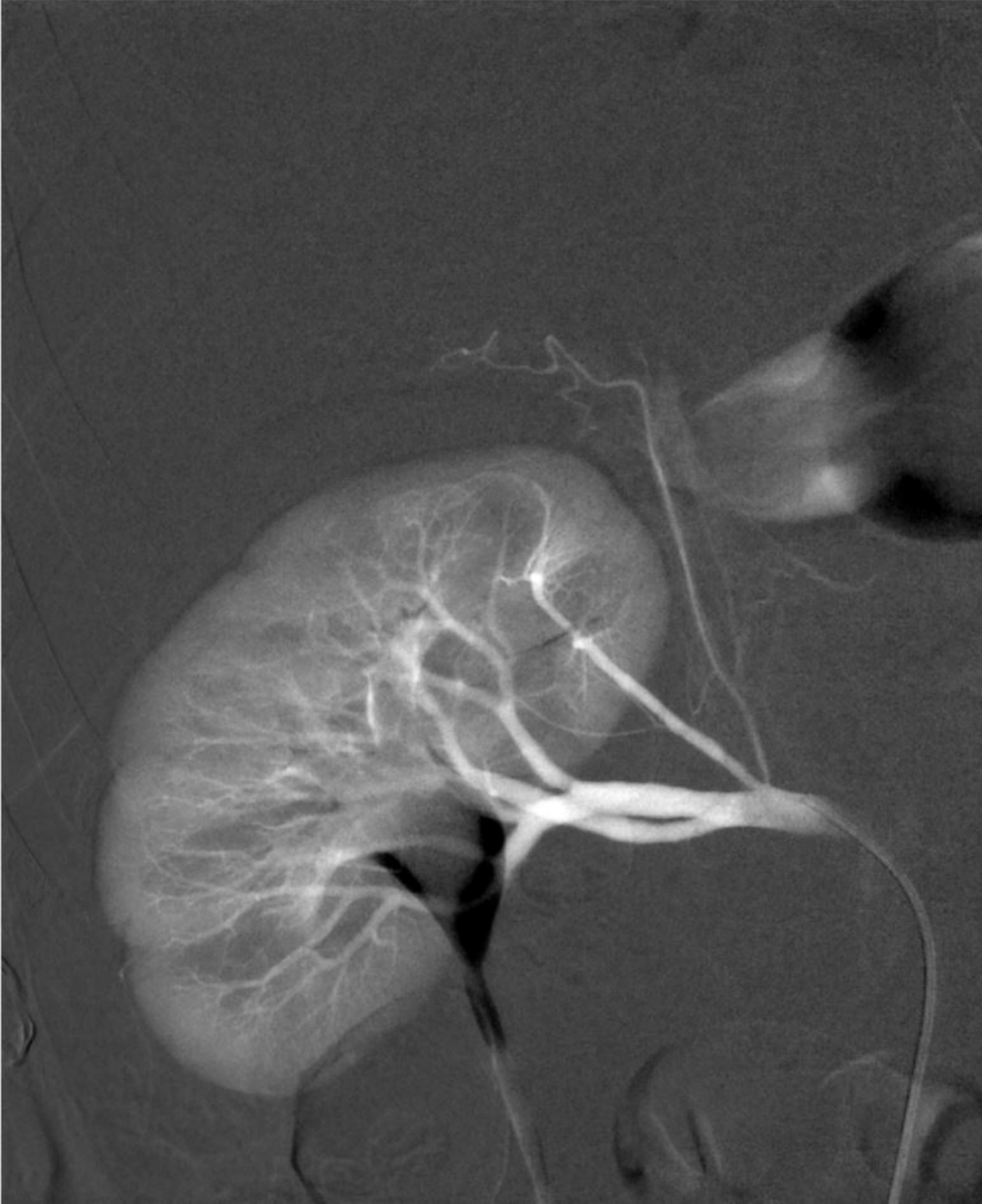




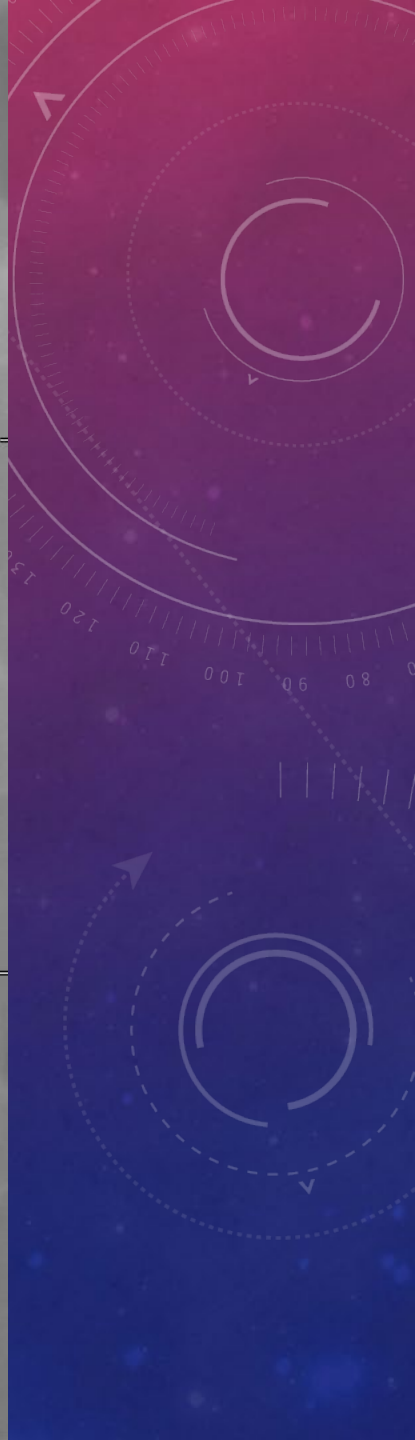
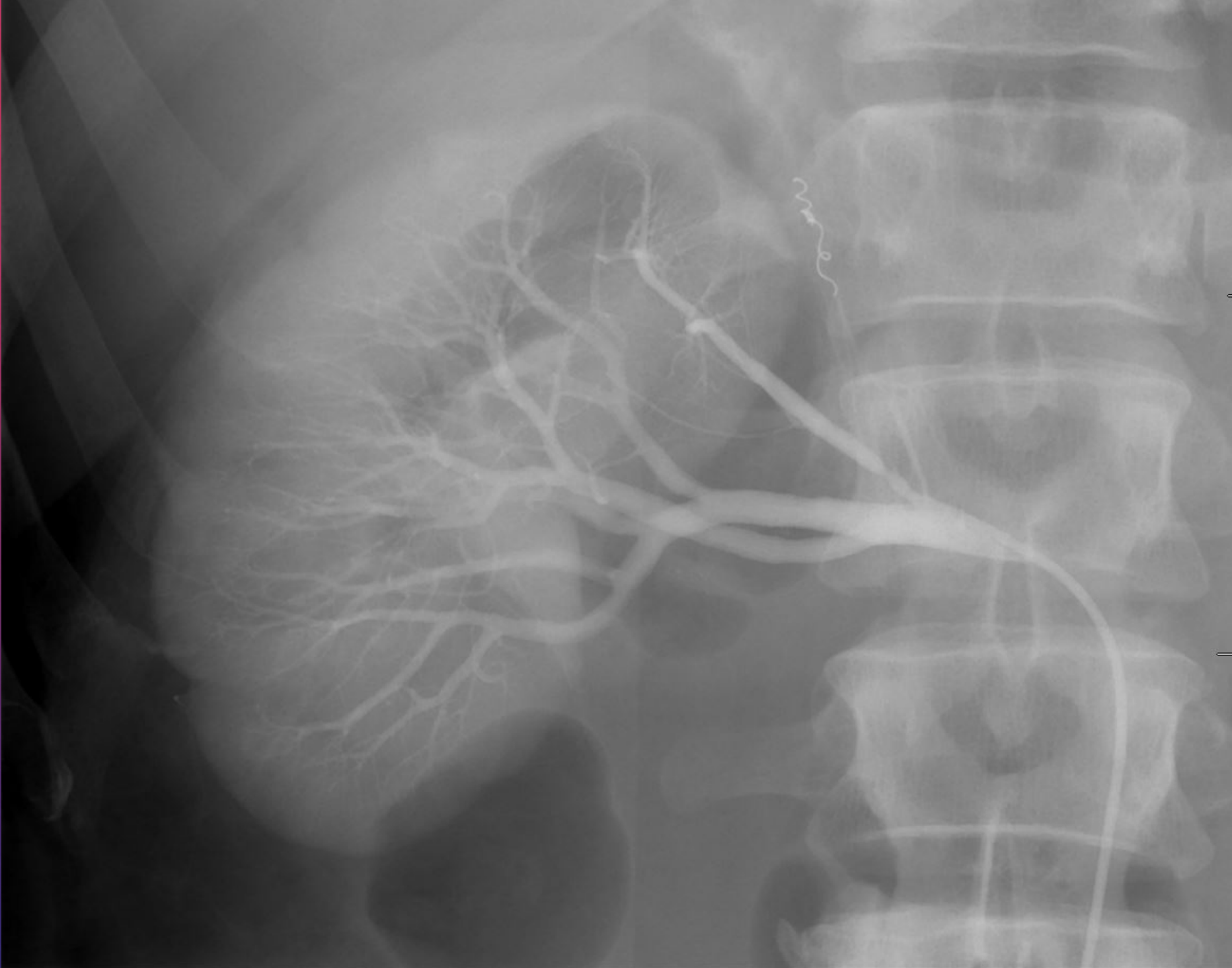
# Embolisation surrénalienne













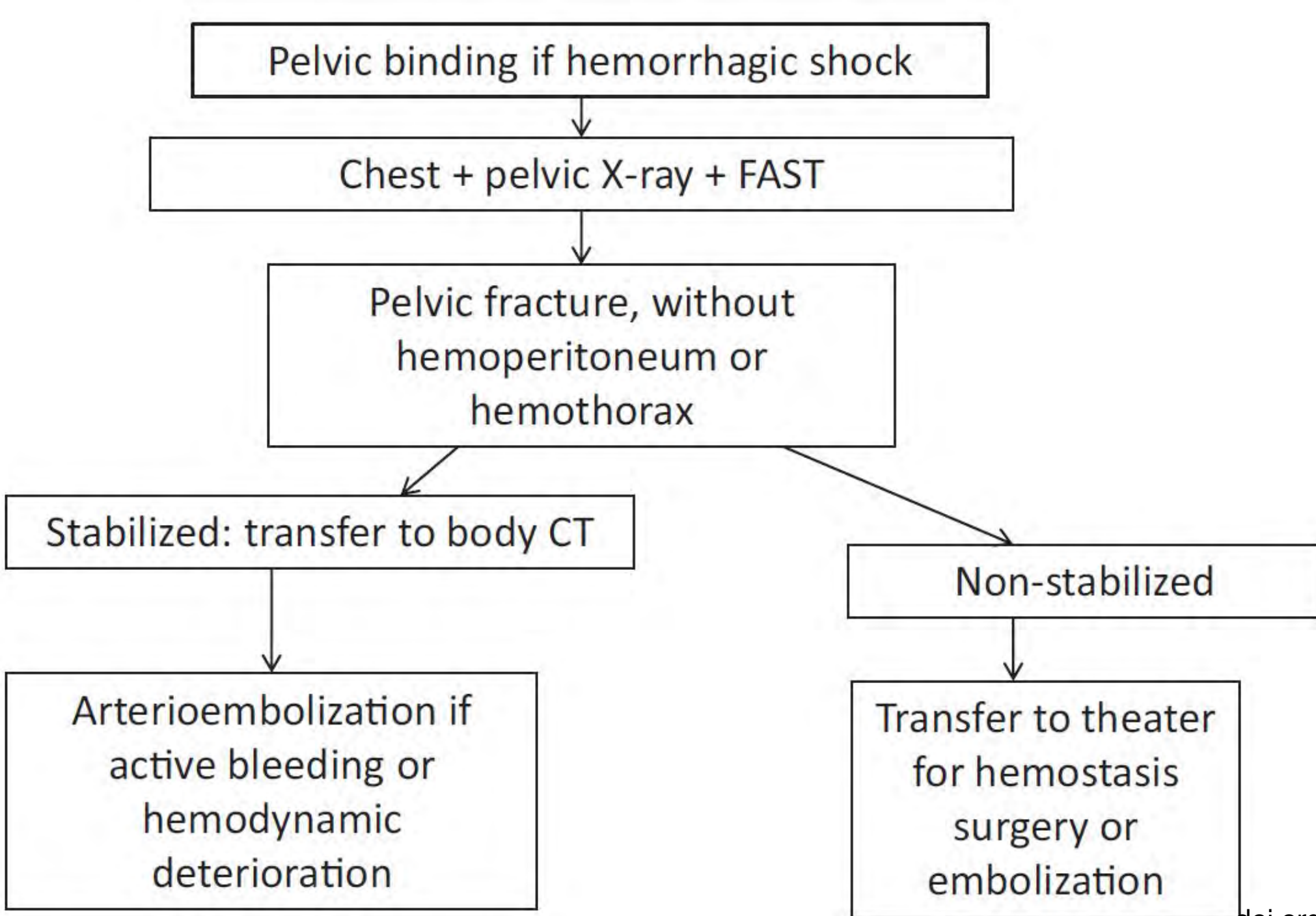
# BASSIN:





# Traumarisme pelvien:

- mortalité élevée
- source de saignement massif :
  - rupture veine/plexus veineux
  - rupture artères
  - saignement diffus osseux



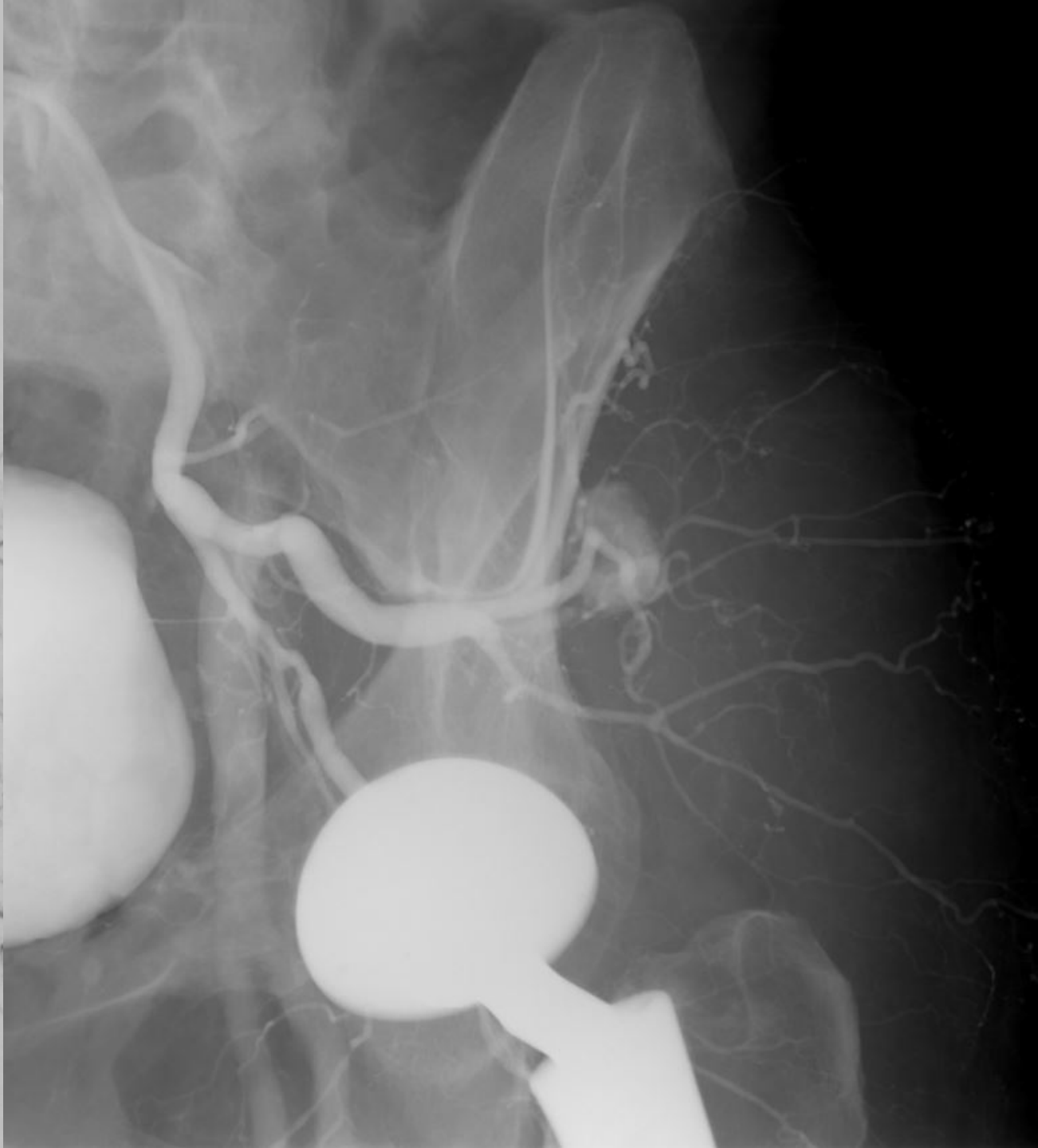


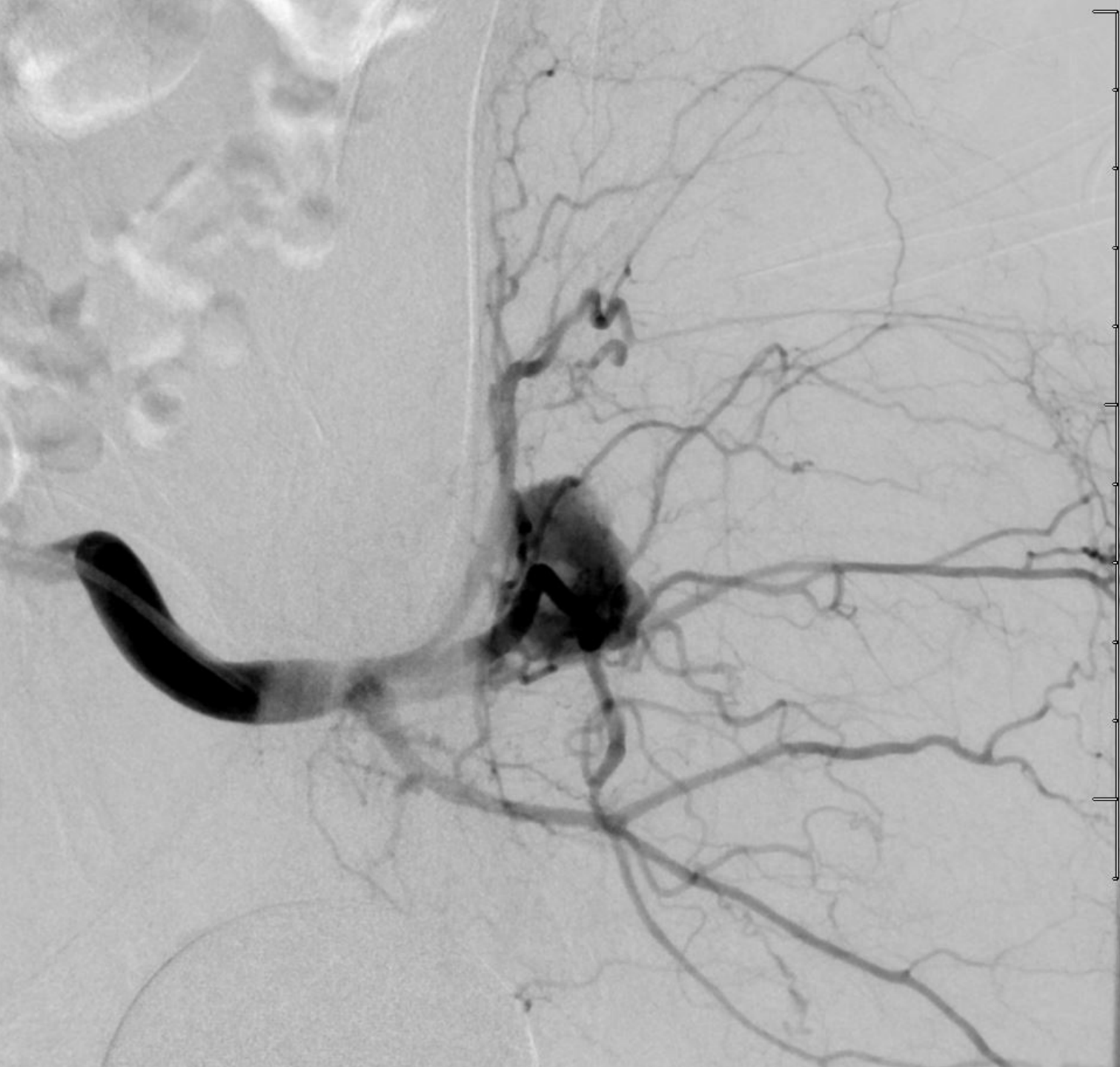
# Hématomes des parties molles:

- **Type I** - sans saignement actif (SA) surveillance
- **Type II** - avec SA et aucune rupture de fascia musculaire (RFM)
  - a. thérapie anticoagulant SANS CI pour arrêt surveillance
  - b. thérapie anticoagulant AVEC CI pour arrêt EMBOLISATION
  - c. pas de thérapie anticoagulant +/- EMBOLISATION
- **Type III** - avec SA et RFM EMBOLISATION
- **NB! Patient INSTABLE** EMBOLISATION











A wide-angle photograph of a massive concrete dam situated in a high-altitude mountain valley. The dam is a long, grey structure with a series of buttresses, holding back a large body of water with a striking turquoise or milky blue color. The surrounding landscape is rugged, with steep, rocky slopes and patches of green vegetation. In the far distance, jagged mountain peaks are visible, some with patches of snow or ice. The sky is a clear, pale blue. The overall scene conveys a sense of scale and the power of the dam in a natural setting.

KEEP CALM

STOP BLEEDING