

Spontaneous Isolated Celiac Artery Dissection (SICAD)– Imaging Findings and Therapeutic Approach

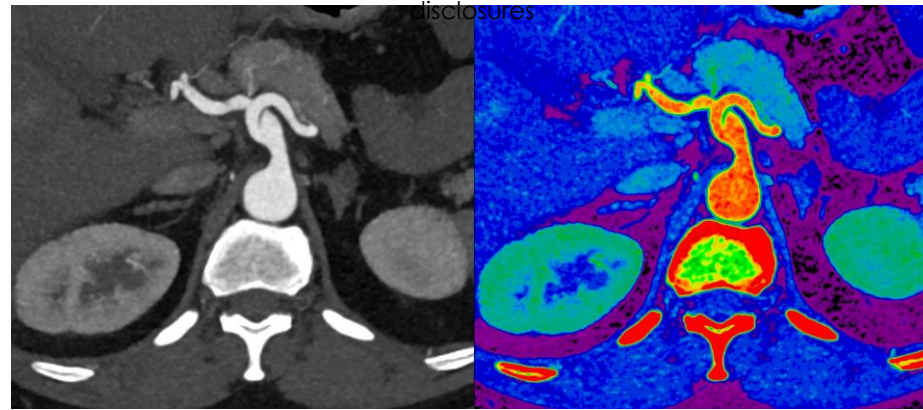
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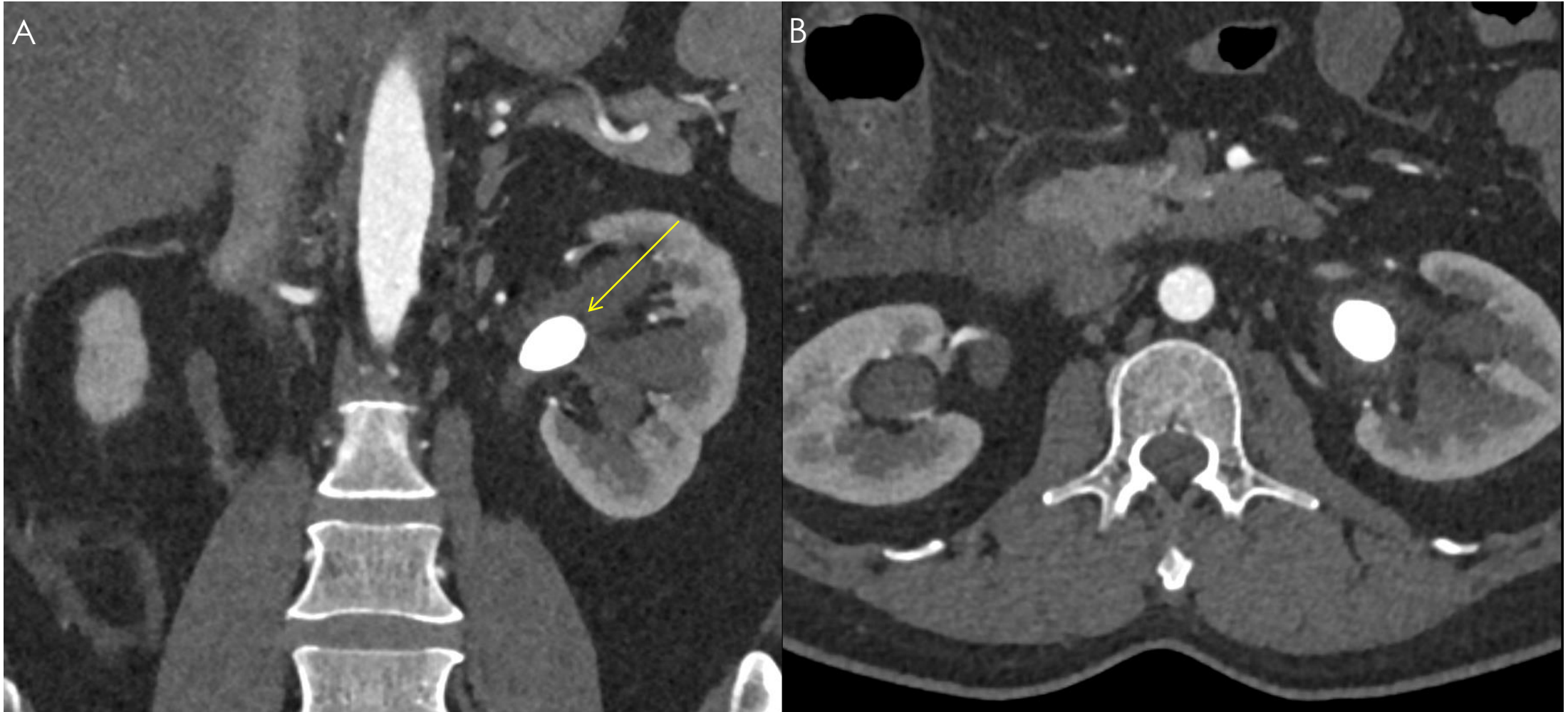
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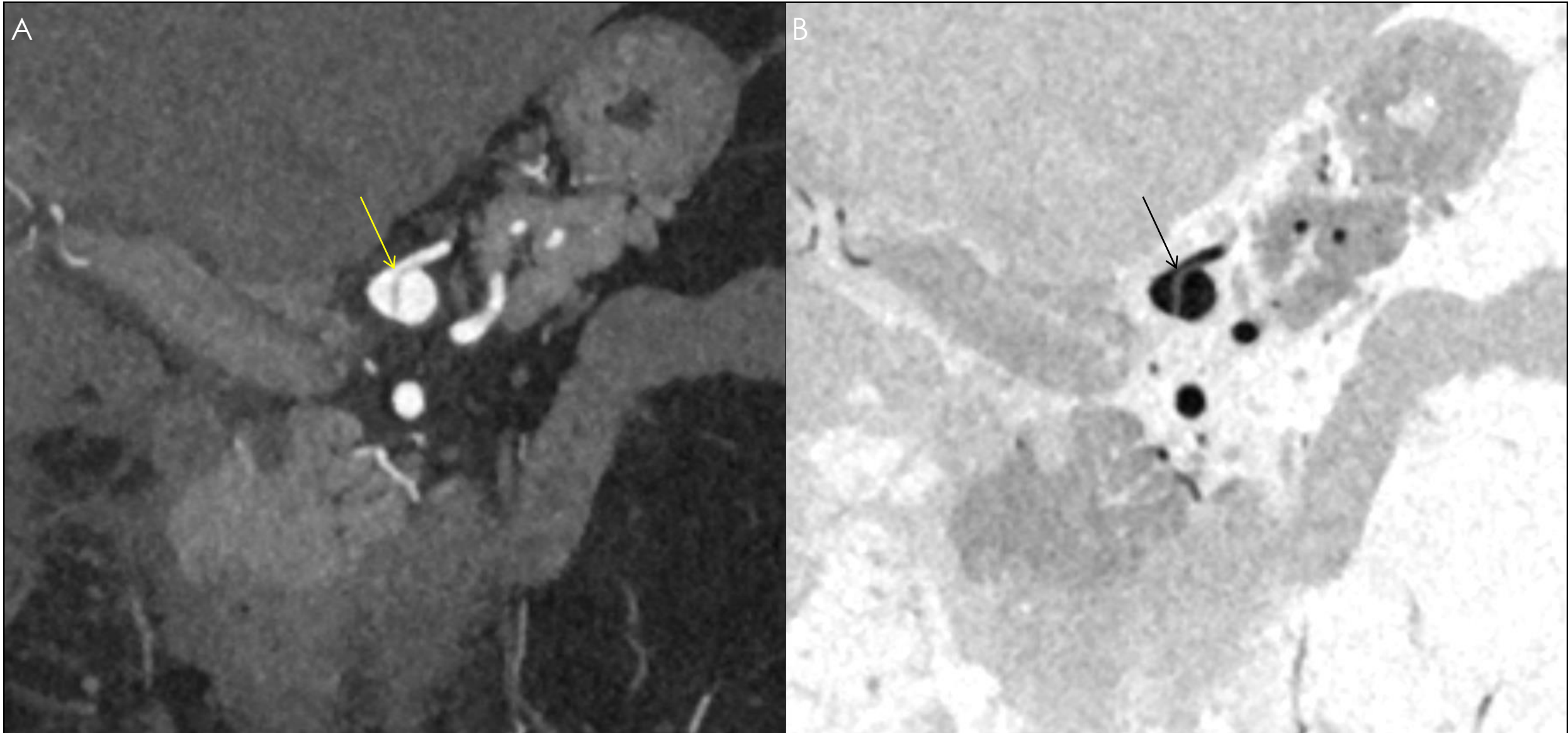
Case 1: 51/M presented with acute left flank pain and fever. CT Intravenous Urogram was performed which showed a 16mm calculus impacted in the proximal left ureter with a large calculus in the left renal pelvis with obstructive hydronephrosis [yellow arrow].



A thin low attenuation spiral flap [yellow arrow] is seen within the celiac trunk originating approximately 1.7cm distal to its ostium and to the right of the origin of the left gastric artery, with extension of the flap upto the left superolateral wall of the main trunk bifurcation resulting in a false and true lumen. Focal dilatation of the distal part [approximately 10mm] of the celiac trunk is seen. The flap does not extend beyond the the bifurcation. There is good contrastation in both lumens of the celiac trunk. **The findings are s/o spontaneous isolated celiac artery dissection [SICAD]**



Coronal Reconstructions with inverse window settings demonstrate a thin low attenuation spiral flap [yellow / black arrow] within the celiac trunk s/o spontaneous isolated celiac artery dissection [SICAD]



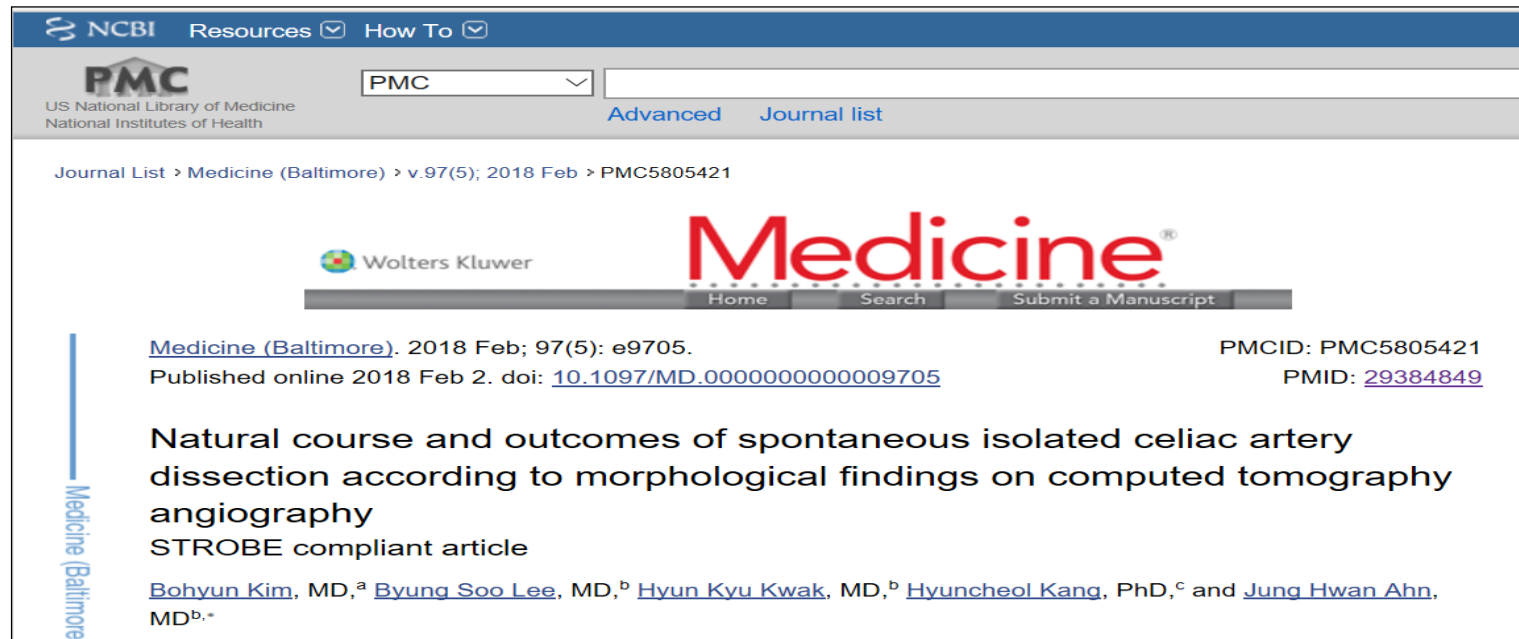
LEARNING OBJECTIVES

- Discuss about incidence, etiological and precipitating factors of SICAD.
- Discuss clinical features of SICAD.
- Discuss imaging features of SICAD.
- Discuss reporting checklist pertaining to the management of SICAD
- Discuss management options for symptomatic and asymptomatic SICAD.

SICAD

An uncommon diagnosis which requires keen eye of a radiologist

- Spontaneous isolated dissection of the celiac artery (SICAD), without aortic dissection, is a clinically uncommon entity.
- Only a small number of case series and case reports (around 160 cases) have been reported.



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Natural course and outcomes of spontaneous isolated celiac artery dissection according to morphological findings on computed tomography angiography
STROBE compliant article

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Etiological and Precipitating factors of SICAD

- Idiopathic
- Hypertension
- Mural factors: Atherosclerosis , Fibromuscular dysplasia, Medial degeneration, Vasculitides
- Trauma
- Pregnancy
- Genetic factors
- Sudden increase in abdominal pressure¹ i.e weight lifting. ?related to surge in adrenergic hormones

Most commonly,
Asymptomatic

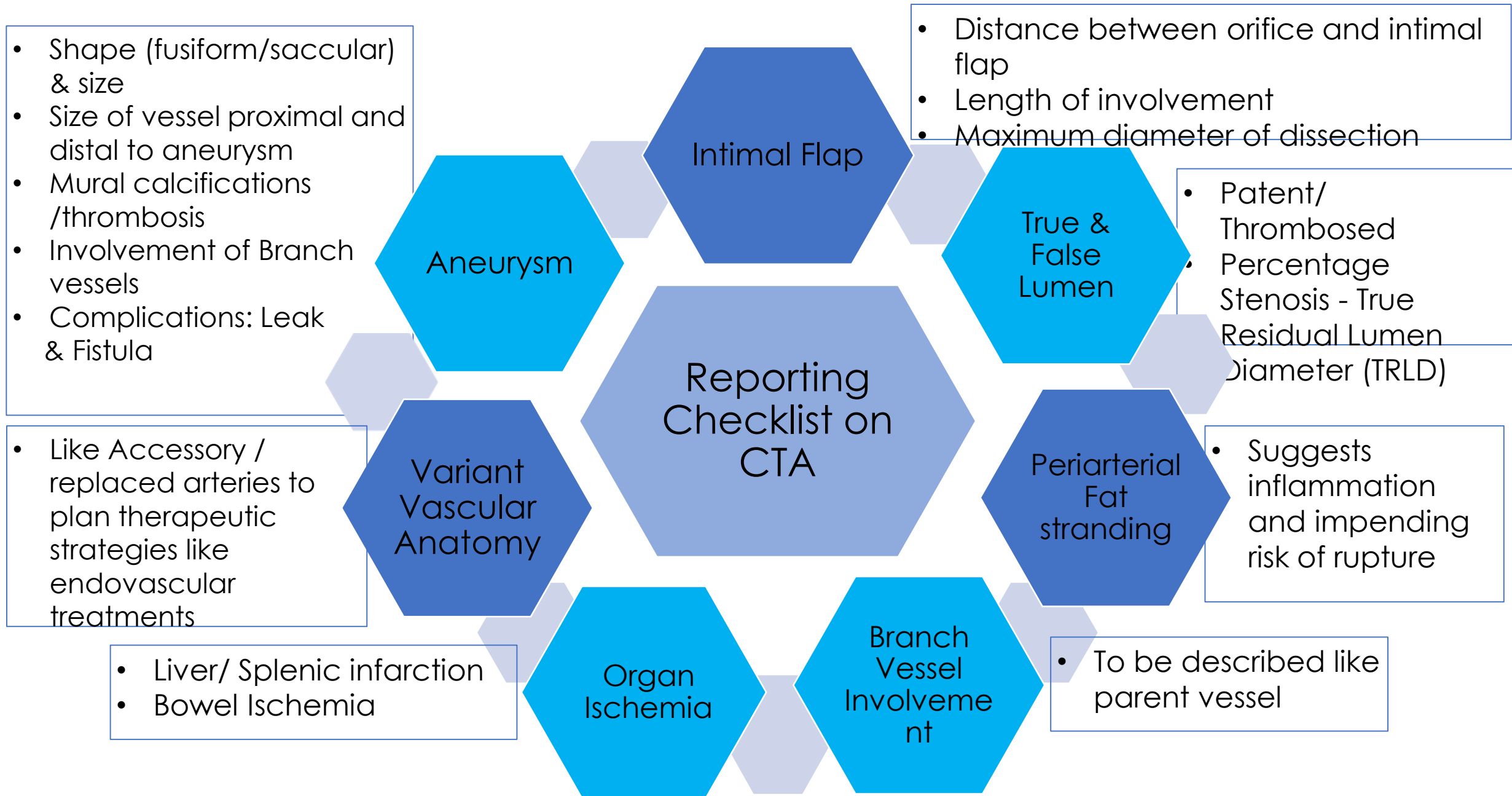
Less commonly,
Sudden epigastric pain
+/-nausea, vomiting, dizziness,

Chest pain +/-radiating pain to
back or shoulder

Uncommonly,
**Hemodynamic
instability & Shock**

-
- Due to intimal tear - Raised pressure of the false lumen of dissection
 - Simultaneous involvement of the Splenic, Renal or SMA - Infarction and bowel ischemia
 - Complicated SICAD - Aneurysmal formation with rupture, Thrombosis resulting in ischemia.

- SICAD is a DIAGNOSIS OF EXCLUSION and is purely based on IMAGING.
- Computed tomography angiography (CTA) is the modality of choice, because of its high temporal resolution, acquisition speed and accuracy.



Introduction

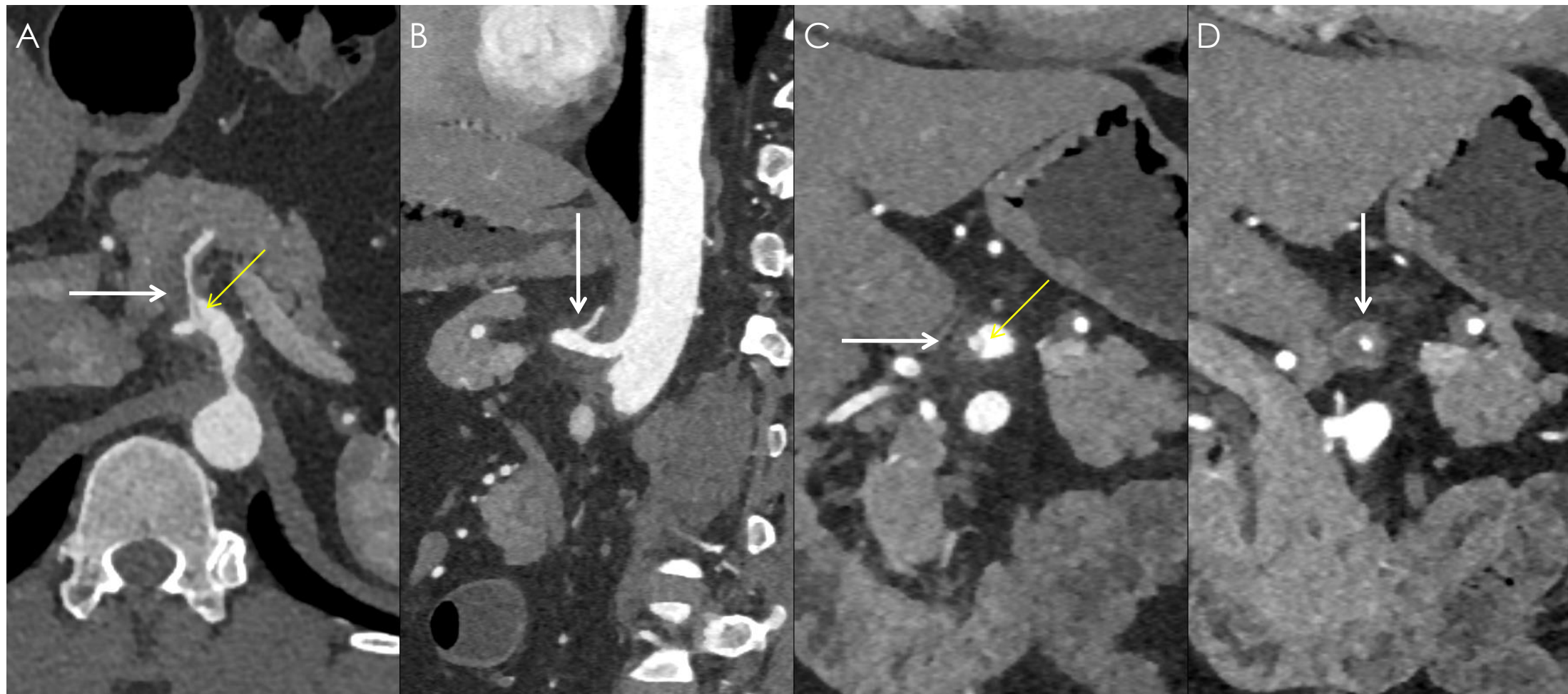
Clinical Findings

Imaging Findings

Classification

Management

Case 2 A 41 year male, presented to the ER on 6th August 2018 with Acute left sided abdominal pain with nausea [Pain score: 9/10]. BP: 200/100 mm/hg. ECG, CXR, AXR and USG abdomen were NAD. P/A: no guarding, rigidity, tenderness. S.Amylase & S.Lipase: WNL.

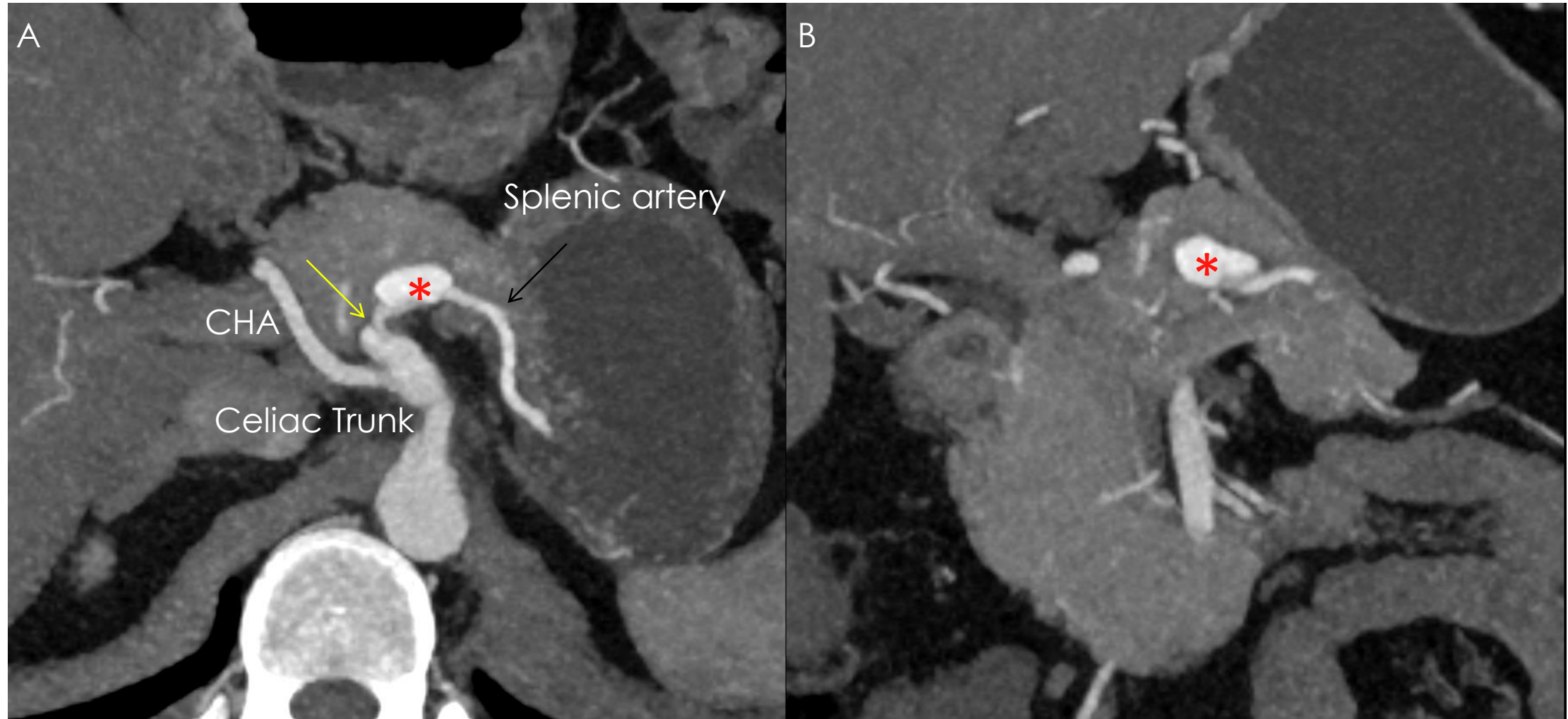


A spiral flap [yellow arrow] is seen within the celiac trunk extending beyond the bifurcation into the entire length of the splenic artery resulting in a patent false and true lumen, associated with periarterial fat stranding [white arrows] and splenic infarction [not shown]. The findings were s/o spontaneous isolated celiac artery dissection [SICAD]

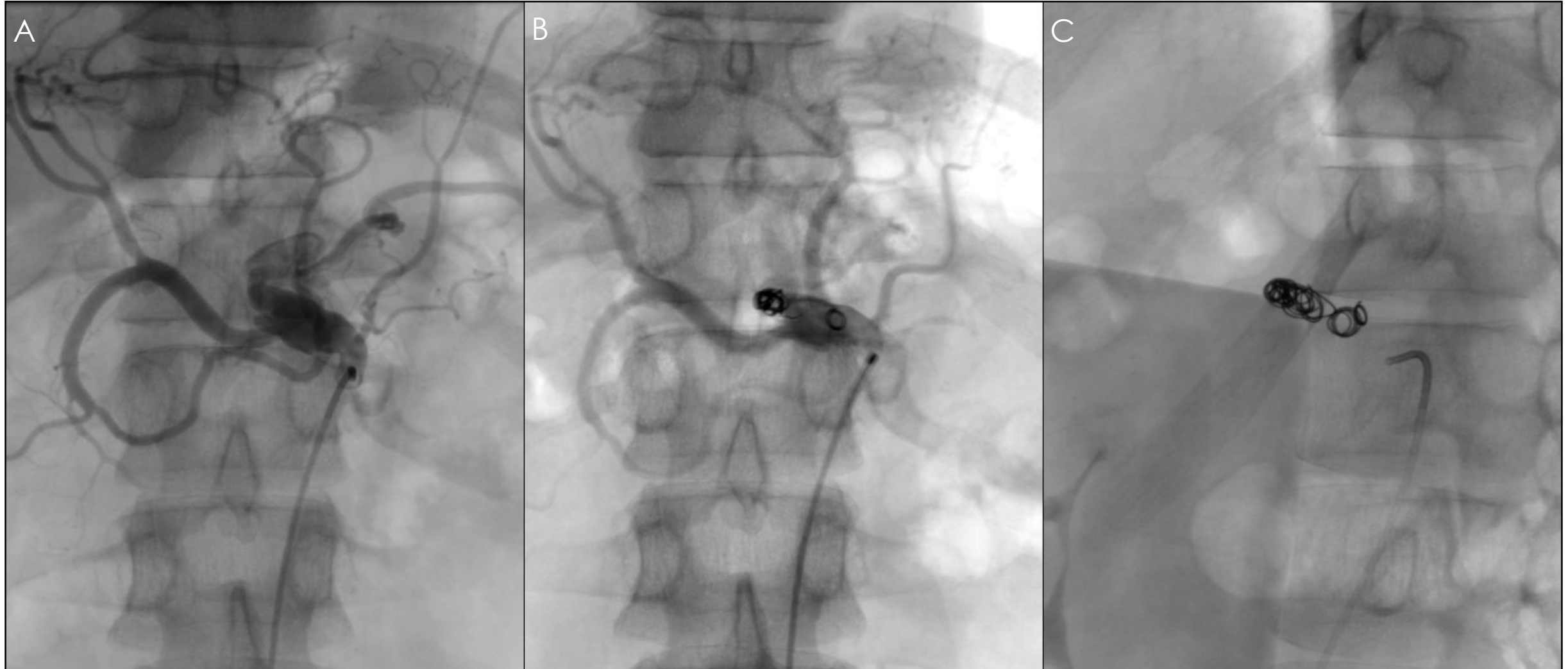
Patient was symptomatically better with Medical management. Discharged home and called back for Follow- Up CT scan

Continued

On 30th September 2018, a surveillance CT angiogram of the abdomen was performed, which showed the pre-existing stable dissecting flap along with new development in the form a pseudoaneurysm [red asterix] arising from the proximal splenic artery

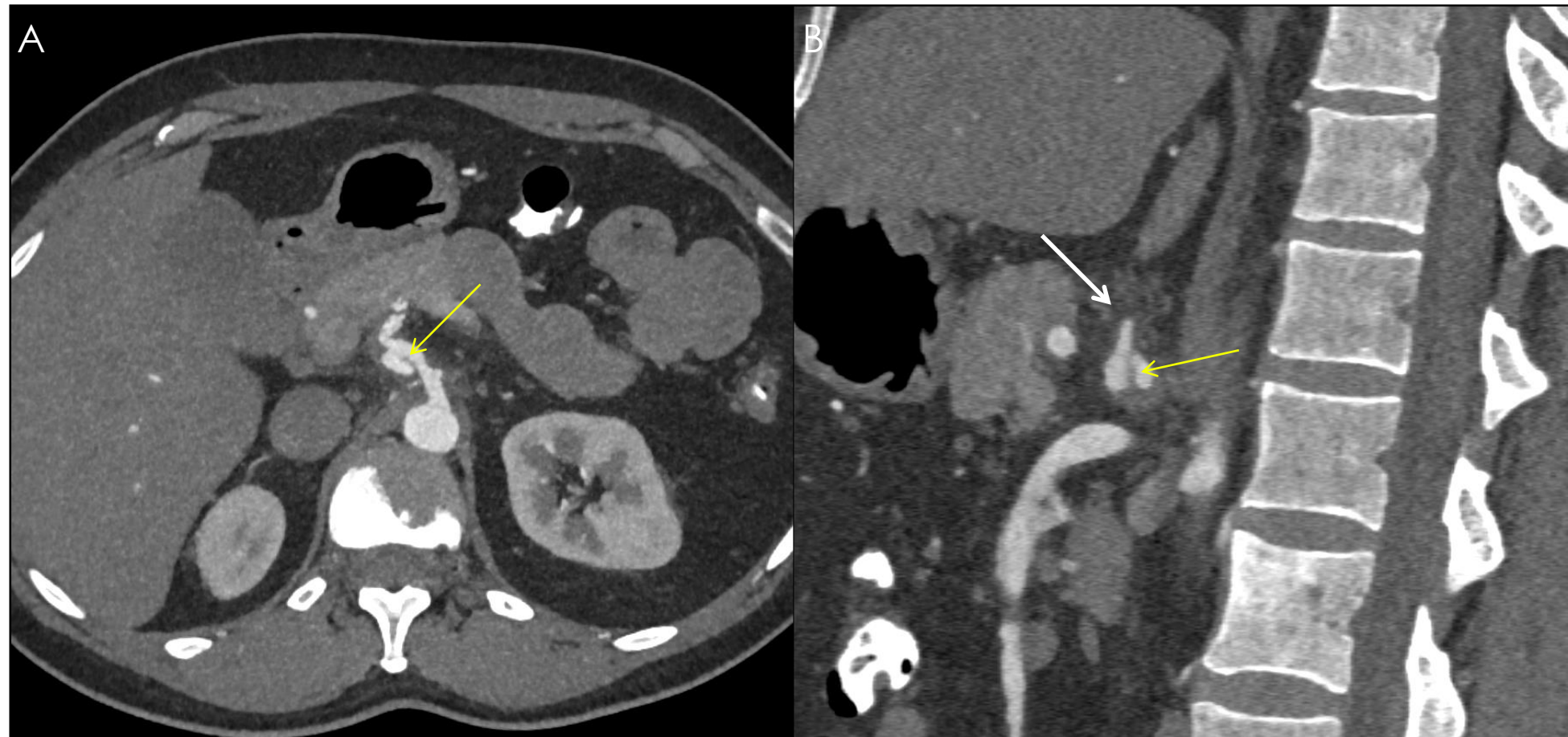


DSA performed on 24th September 2018 showed false lumen pseudoaneurysm, supplied by left gastroepiploic artery [branch of splenic artery]. Celiac artery coiling performed through microcatheter. Superselective cannulation and coiling of feeder gastroepiploic artery performed.



Case 3

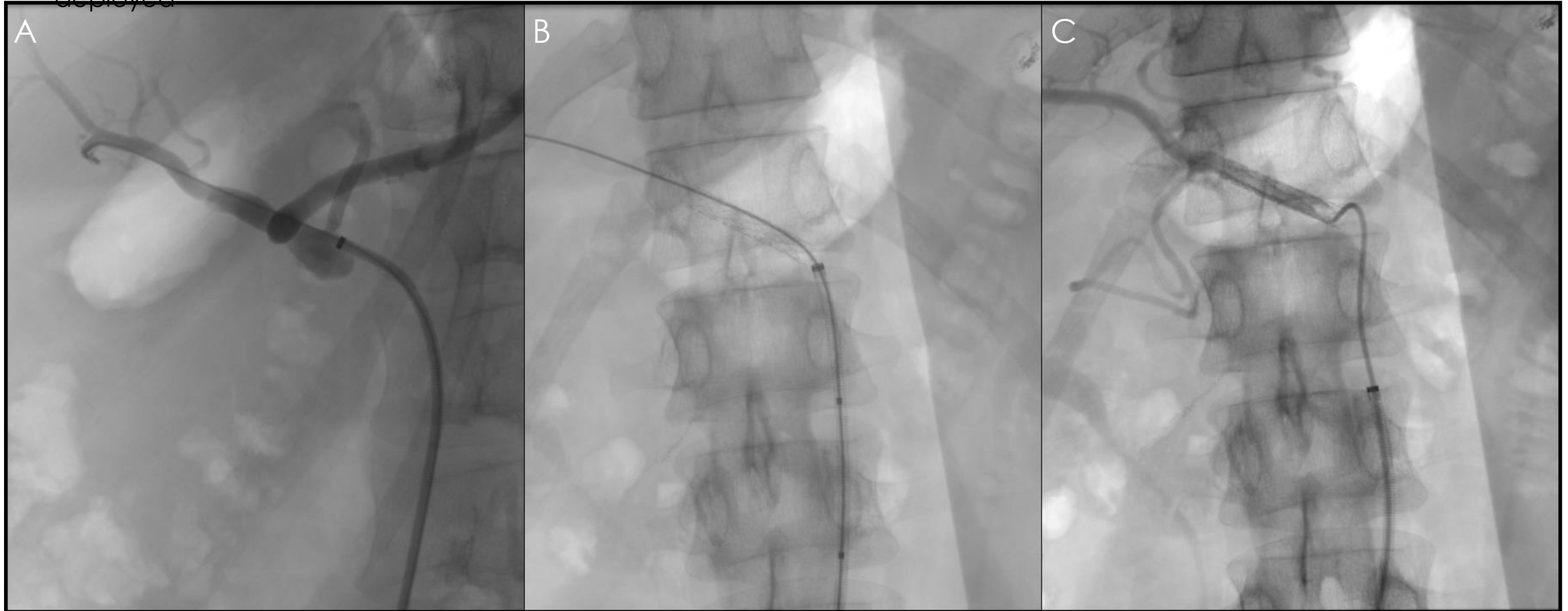
50 year male, known hypertensive, presented with Acute Abdominal Pain with vomiting. BP: 170/110 mm/hg. ECG, CXR, AXR :WNL. P/A: mild upper abdominal tenderness. No guarding, rigidity. Labs: WNL. Operated for duodenal diverticulum in August 2016. Underwent CT scan abdomen on 10th December 2016.



Approximately 11mm distal to its origin, and just proximal to the left gastric artery origin, a spiral dissection flap [yellow arrow] is seen within the celiac trunk extending beyond the bifurcation into the common hepatic artery for a length of <5mm resulting in a patent false and true lumen, associated with periarterial fat stranding [white arrows]. The length of the flap is 1.8cm. The left gastric and splenic artery arise from the true lumen and are patent. **The findings were s/o spontaneous isolated celiac artery dissection [SICAD]**

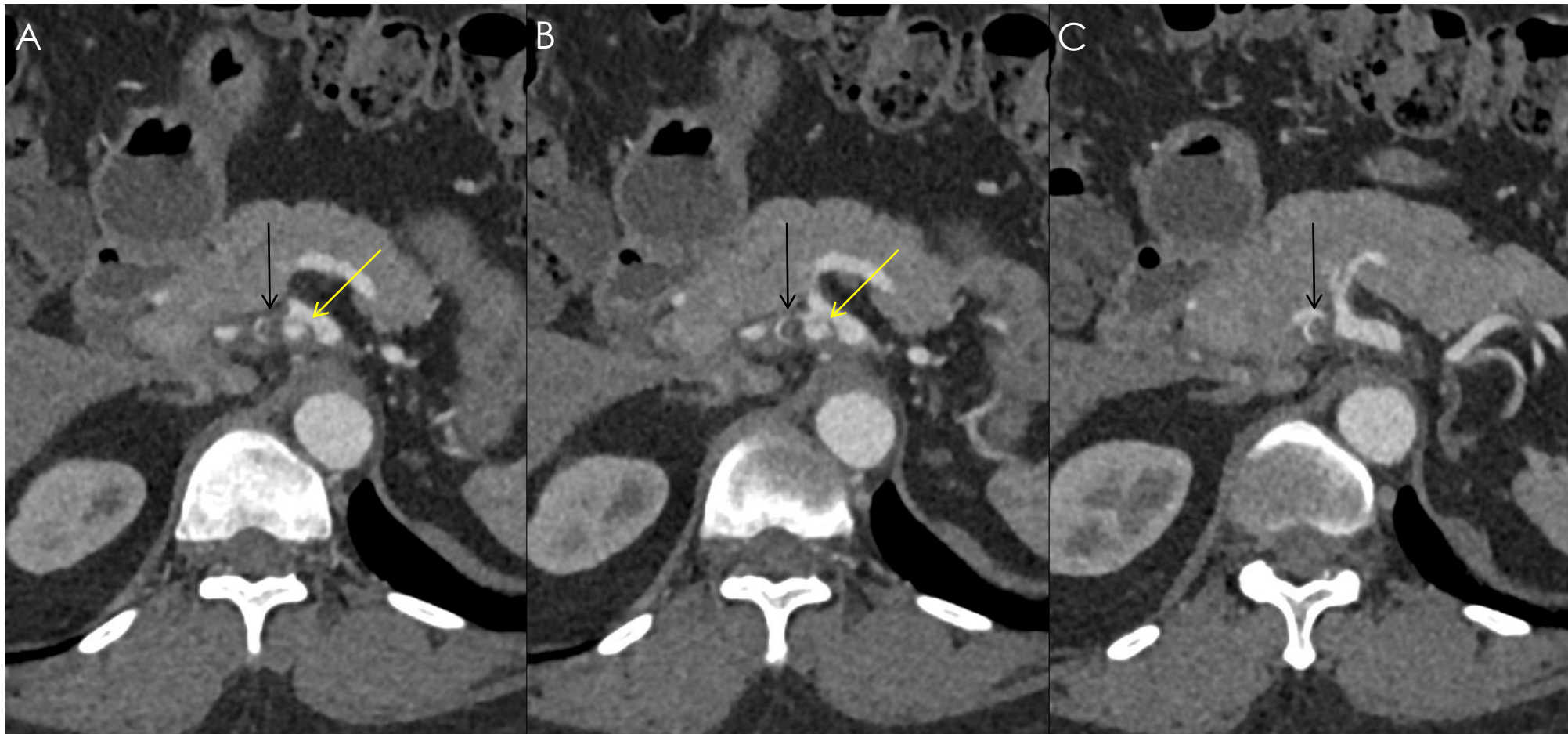
Had an episode of hypotension on 11th December 2016, not responding to fluid, requiring noradrenaline support for short time. Developed Severe abdominal pain on 12th December 2016.

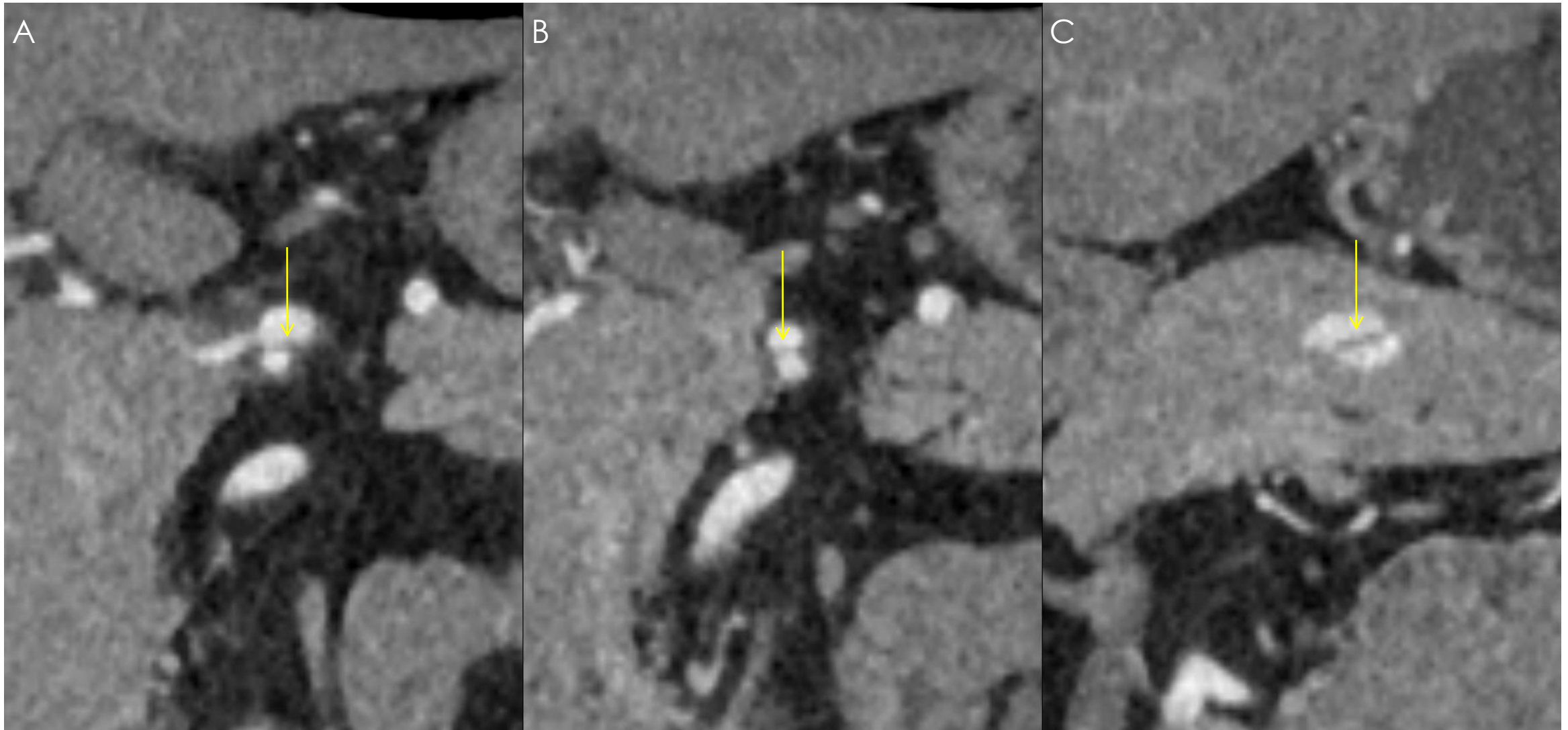
DSA performed on 14th December 2016 showed celiac artery pseudoaneurysm across which covered stent graft was deployed



Case 4

51/M with polycythemia presented with splenomegaly and low haemoglobin levels. CT scan of the Abdomen and Pelvis was performed. Distal to the origin of the left gastric artery, a thin low attenuation spiral flap [yellow arrow] is seen within the celiac trunk extending into the proximal splenic and common hepatic arteries, resulting in a false and patent lumen. The flap extends for a length of 3.9cm beyond which the false and true lumen merge to continue as a normal caliber splenic artery. The false and true lumen are patent. Saccular aneurysm [black arrow] arises from the proximal celiac trunk with calcification of its walls representing a thrombosed dissecting aneurysm.



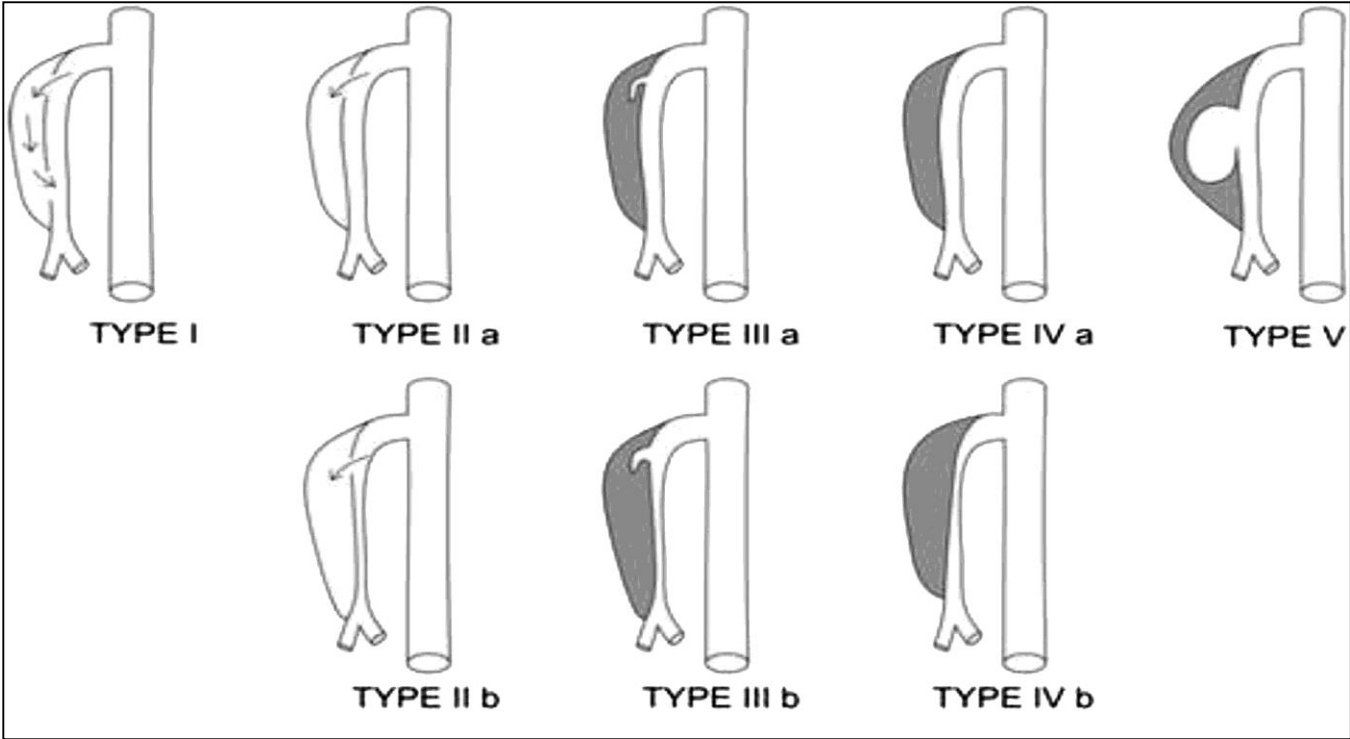


Classifying is critical to Categorize patients into treatment groups & Assist Decision Making

Various classification systems for SISMAAD [spontaneous isolated SMA dissection] have been proposed, including those by Sakamoto et al, Yun et al, Zerbib et al, Luan et al, and Li et al.

- Limitation of the original 'Sakamoto et al' classification:
 - No consideration of patency of true lumen, which is valuable for evaluation of the distal blood supply.
 - Does not establish a clear relationship between morphologic appearance and clinical course
- Li's classification scheme is more precise and complete and can be used to guide the treatment of SISMAAD (Zhongzhi et al, Korean Circ J. 2017 Jul; 47(4): 425-431)
- Derived from Li's classification for SISMAAD, Jie Sun et al proposed a New Classification system for SICAD.

Type I	Patent false lumen with both entry and re-entry
Type II	“Cul-de sac” shaped false lumen without re-entry
Type III	Thrombosed false lumen with an ulcer-like projection
Type IV	Completely thrombosed false lumen without an ulcer-like projection
Type V	Aneurysm development



Type (II,III,IV) A	True lumen residual diameter (TLRD) > 30%
Type (II,III,IV) B	True lumen residual diameter (TLRD) < 30%

- Optimal treatment of SICAD is not well established, because the natural history of this uncommon disease is poorly understood.
- The management of SICAD depends on,
 - Symptoms
 - Characteristics of the dissection
 - Visceral perfusion
- Various management algorithms have been proposed by different study groups, all of which comprise of,
 - Medical management
 - Endovascular management
 - Open surgery

Management Algorithm

Stable patients
Type I, IIa, IIIa, IVa



Medical
management
†

Recurrent symptoms
Visceral malperfusion
[Type IIb, IIIb, IVb]
or aneurysms [Type
V]

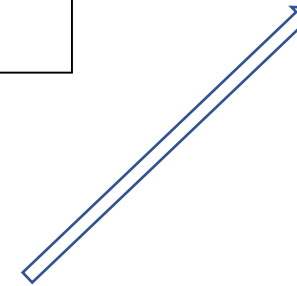


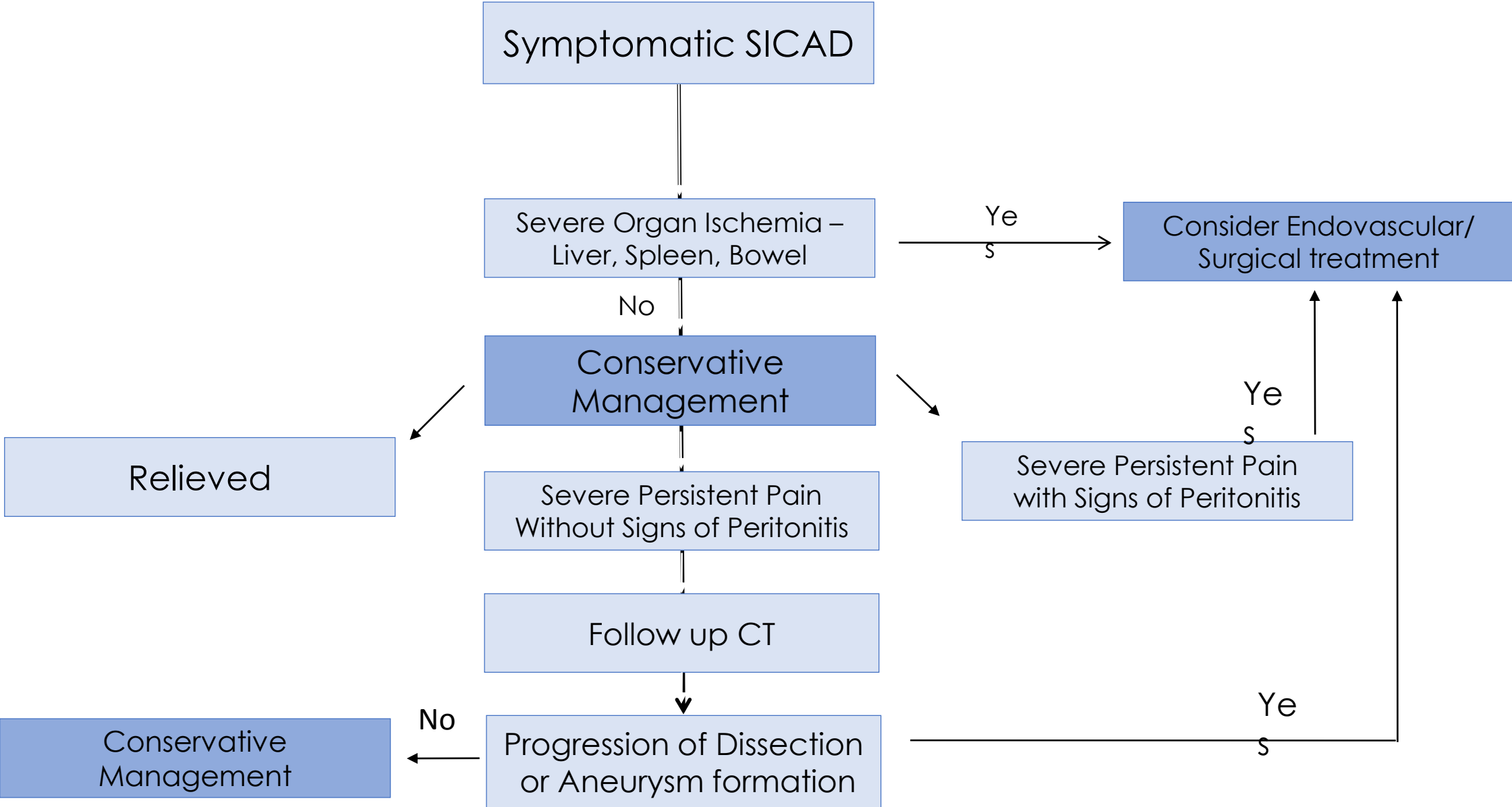
Endovascular
Rx

If, Fails
or
Contraindicated



Open
Surgery





Management Options

MEDICAL MANAGEMENT

- Risk factor (i.e HTn) assessment and control
- Steroids in case of Vasculitis.
- Antiplatelet Rx preferred in stenotic lesions.
- Anticoagulation for a minimum of 3 to 6 months is recommended [INR goal with warfarin is 2 – 3].

If need for anticoagulation exceeds 6 months, interventional measures should be considered.

ENDOVASCULAR MANAGEMENT

Advantages: Minimally invasive, higher success rate, useful for patients with high surgical risks, lesser patient morbidity.

- Covered Stent Graft: useful for preventing enlargement of aneurysms
- Bare Metal Stent
- Selective Embolization, only if good collateralization from the SMA
- Balloon Fenestration

SURGICAL MANAGEMENT

- Resection of the dissected segment with Anastomosis
- Bypass creation

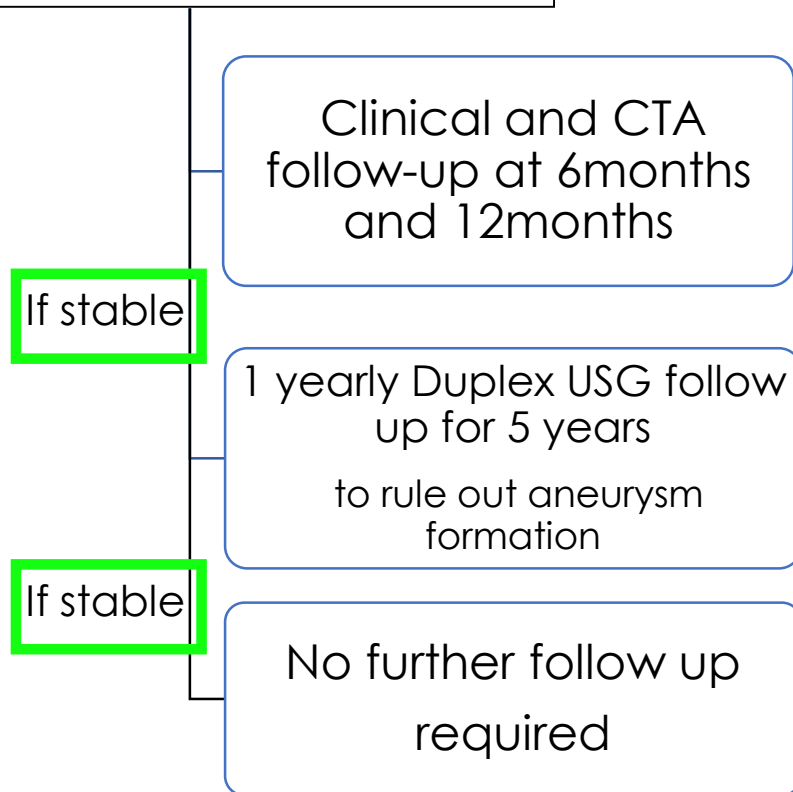
Follow up

No standardized recommendation guidelines are available regarding Follow up of SICAD

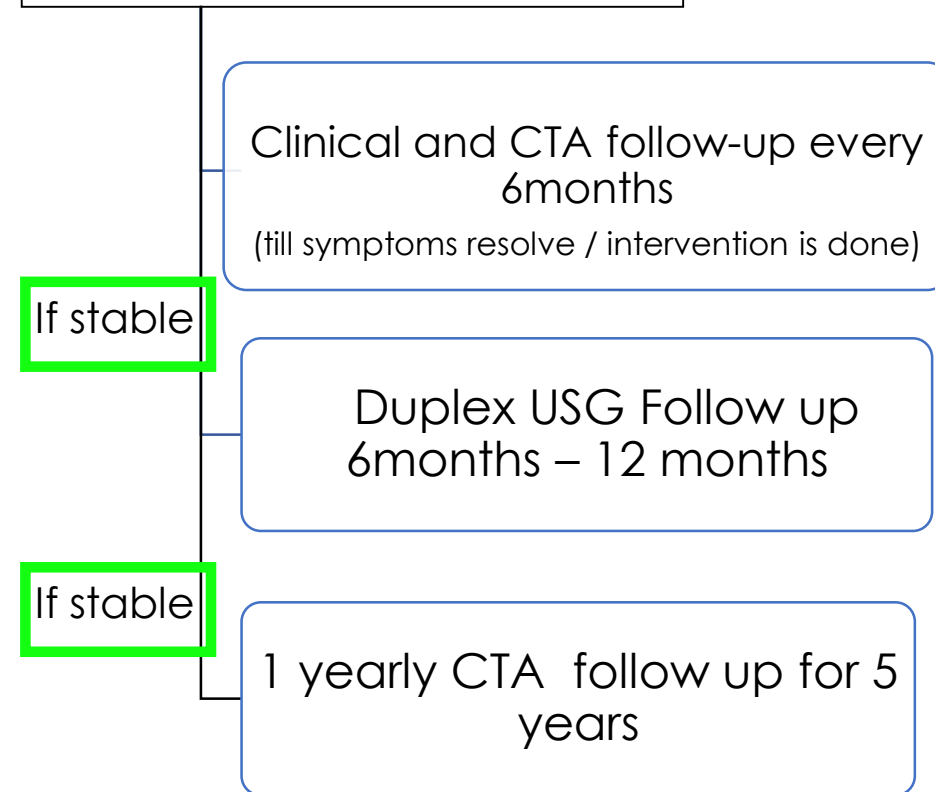
According to Won Jeong Park

- el, Follow-up computed tomography (CT) was primarily useful in the acute phase of dissection.
- Few significant radiological changes occurred between 1 week and 6 months follow-up.
- Without symptom progression, there is no rationale for routine computed tomography

Asymptomatic SICAD

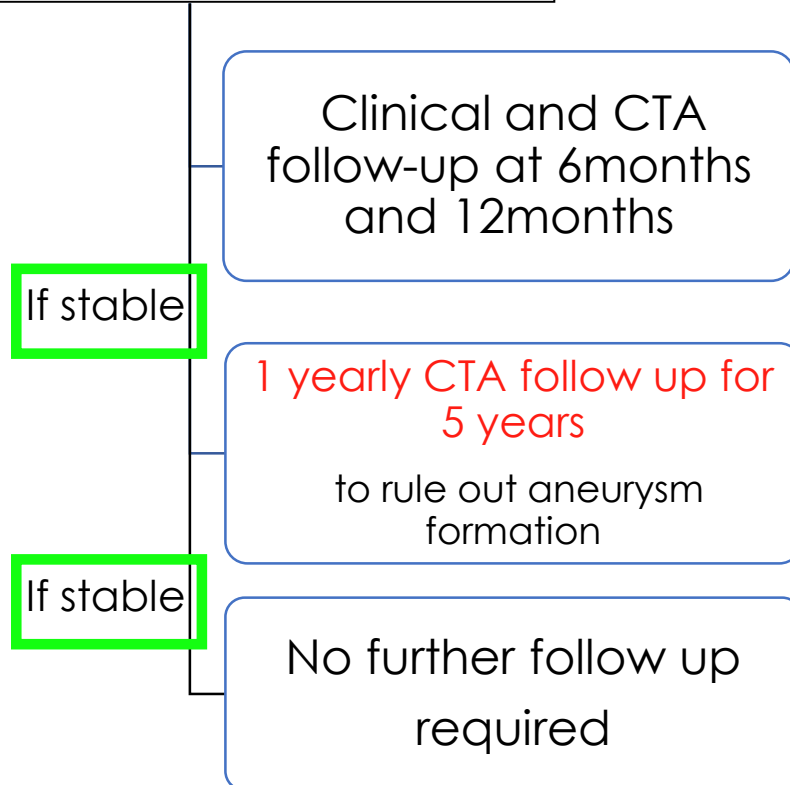


Symptomatic SICAD

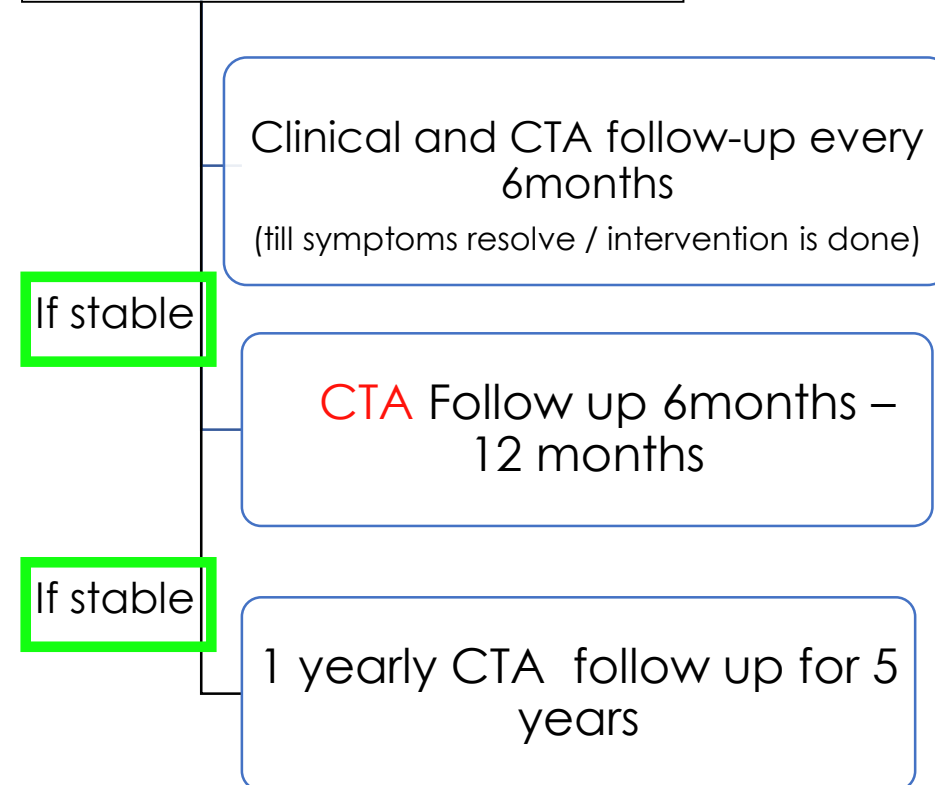


- Derived from a study⁶ published in J Vasc Surg 2015

Asymptomatic SICAD

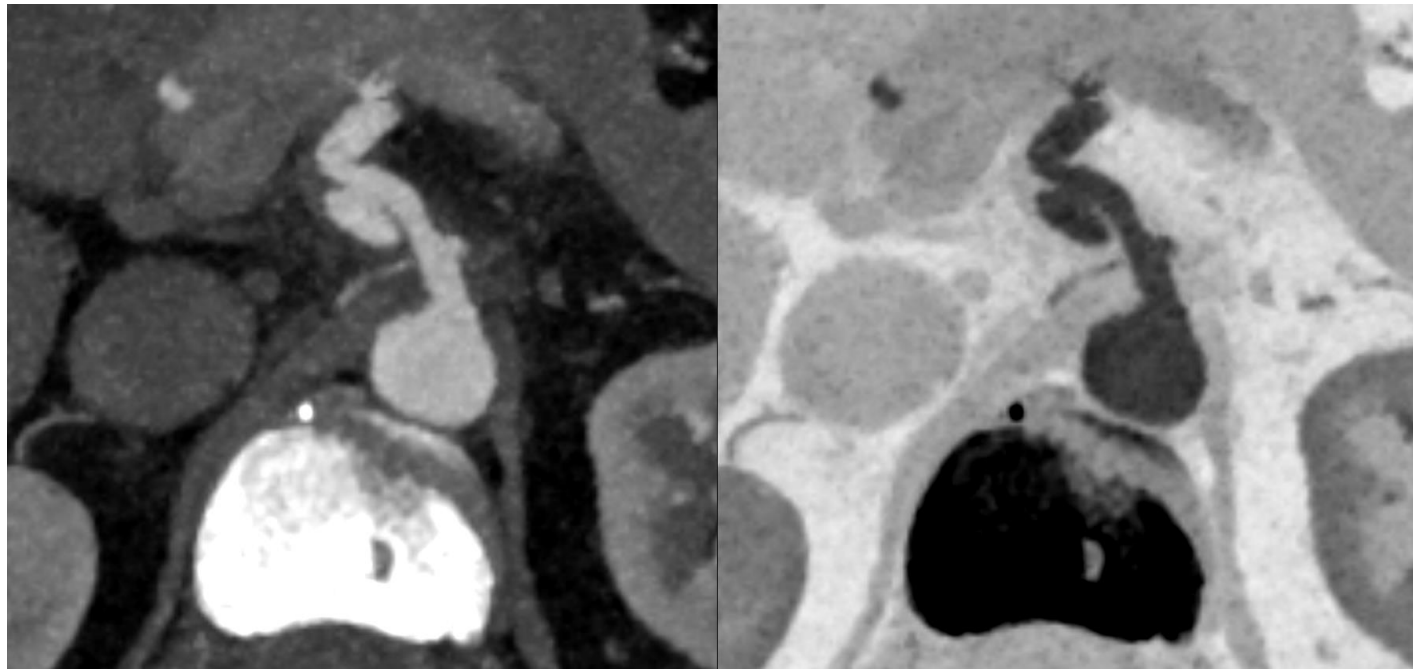


Symptomatic SICAD



- We propose a new recommendation, with 1 yearly CTA follow up for 5 years asymptomatic SICAD
- CTA follow-up 6-months - 12 months in symptomatic SICAD

SICAD - SUMMARY



- Imaging plays a vital role in the diagnosis of SICAD, in the absence of definitive clinical suspicion.
- CTA is the choice of investigation and for serial follow-up
- Abdominal radiologists should understand key imaging observations of SICAD which would help in diagnosis and planning appropriate management of these cases.