

# The 'Silent' Organ: Exploring Rare and Unusual Entities involving the Spleen through Sonography

Tan W.T.C.<sup>1</sup>, Teo S.M.<sup>1</sup>, Ma V.C.<sup>1</sup>, Guo S.Y.<sup>2</sup>

<sup>1</sup>Radiography Department, Allied Health Division, Singapore General Hospital, Singapore

<sup>2</sup>Diagnostic Radiology Department, Division of Radiological Sciences, Singapore General Hospital, Singapore

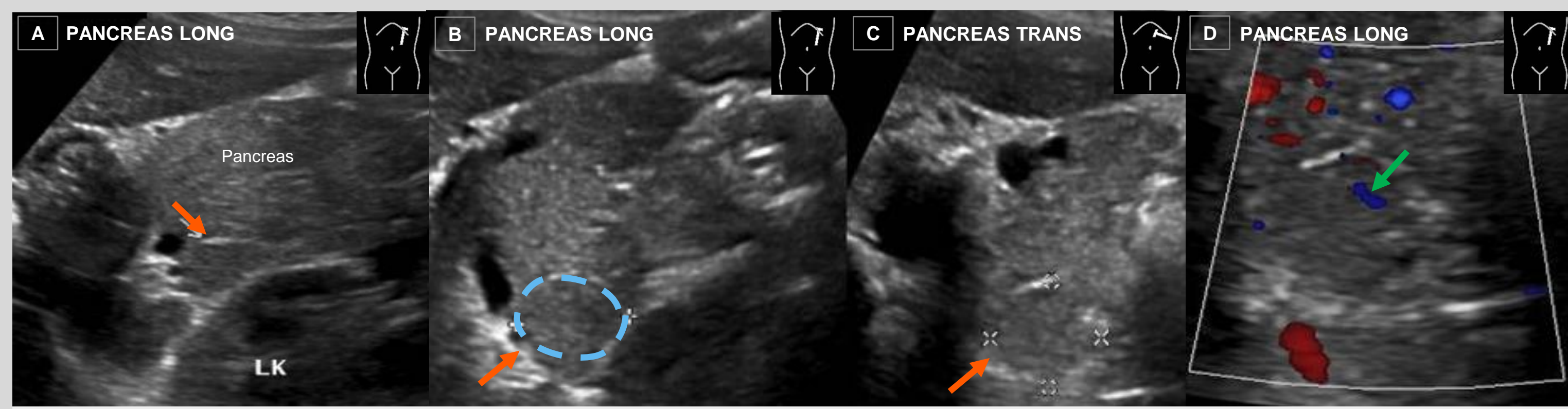
Corresponding author: catherine.tan.w.t@sgh.com.sg

## Background

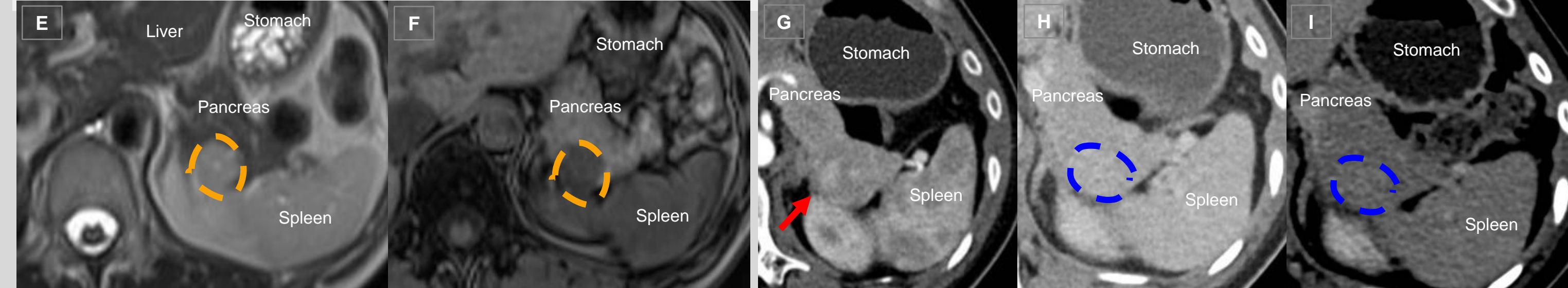
The spleen, often deemed as the "silent" organ due to its infrequent presentation of symptoms, plays a vital role in immune and hematologic functions. Anomalies in shape, location, number or size are usually asymptomatic but can mimic pathologies, leading to misinterpretation and impacting management. A thorough understanding of splenic sonography is therefore crucial for accurate diagnosis and informed clinical decisions. This exhibit presents uncommon splenic entities through a case-based approach, emphasizing their key sonographic features.

### Case 1. Intra-pancreatic accessory spleen

A benign lesion arising from an embryological variation in splenic development (Prevalence: 1.1 - 3.4%)<sup>2</sup>



**Key imaging findings:** (A & B) **Echogenicity** follows native spleen; appearance varies with pancreatic fatty change across age. (D) **Mild internal vascularity**, typically observed in splenic tissue.



**MRI axial:** Similar (E) T2W and (F) T1 signal / texture and **enhances in tandem** over multiple phases with adjacent spleen.

**CT axial:** **Striated (zebra-stripped) appearance** on (G) arterial phase and appears **homogeneous** in the (H) portal venous and (I) delayed phases.

#### Pitfalls

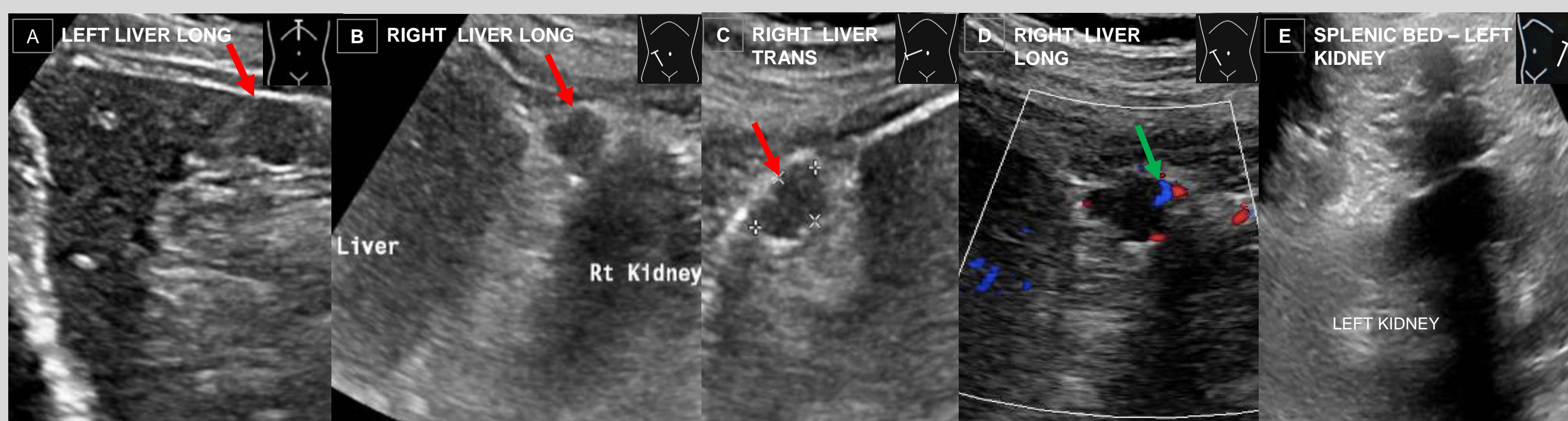
May be missed if it is isoechoic to pancreas or mimic a pancreatic neoplasm<sup>2</sup> → Recognition of the varied locations of splenule, meticulous scanning in multiple planes, and correlation with cross-sectional imaging using anatomical landmarks are essential to avoid misdiagnosis.

#### Learning points

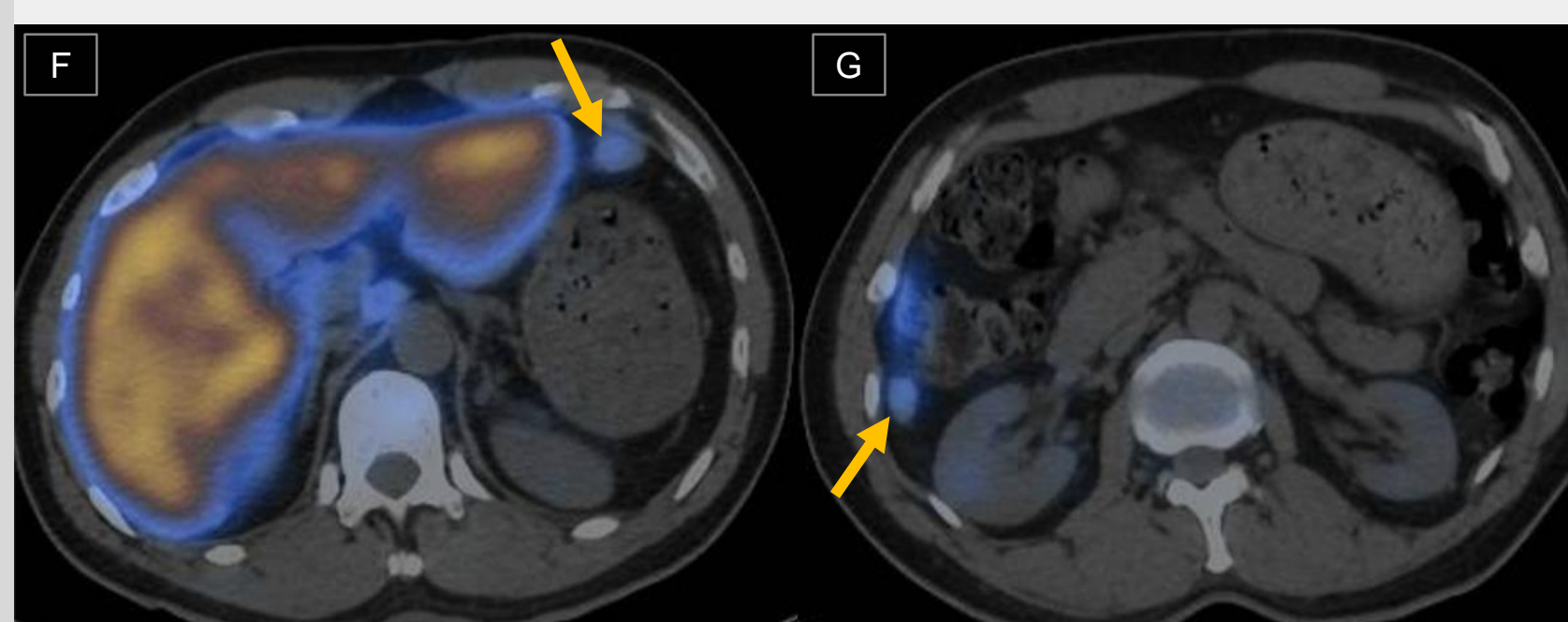
Intrapancreatic splenule should always be considered as a differential if enhancement matches spleen on cross-sectional imaging. Cross-modality correlation is crucial to avoid unnecessary surgical intervention as the condition does not require treatment.

### Case 2. Splenosis

A benign acquired condition characterised by ectopic implantation of viable splenic tissue within the peritoneum, retroperitoneum, or thorax, following splenic trauma or surgery (Prevalence : 16 - 67%)<sup>3</sup>



**Key imaging findings:** Few **ovoid isoechoic nodules** seen adjacent to the (A) left hepatic lobe, (B & C) right hepatic lobe and right kidney with (D) **mild vascularity**. (E) Splenic absence due to prior splenectomy, following a road traffic accident.



**Nuclear medicine SPECT/CT (TC-99m sulfur colloid):** Well-circumscribed **abdominal nodules** (F & G) demonstrating radiotracer uptake indicate the presence of reticuloendothelial cells, confirming splenic tissue.

#### Key differences

Splenosis	Splenule
Acquired (after trauma or surgery)	Congenital
Draws blood from adjacent tissues	Fed by the splenic artery
Typically multiple	Usually single (occasionally a few)

#### Pitfalls

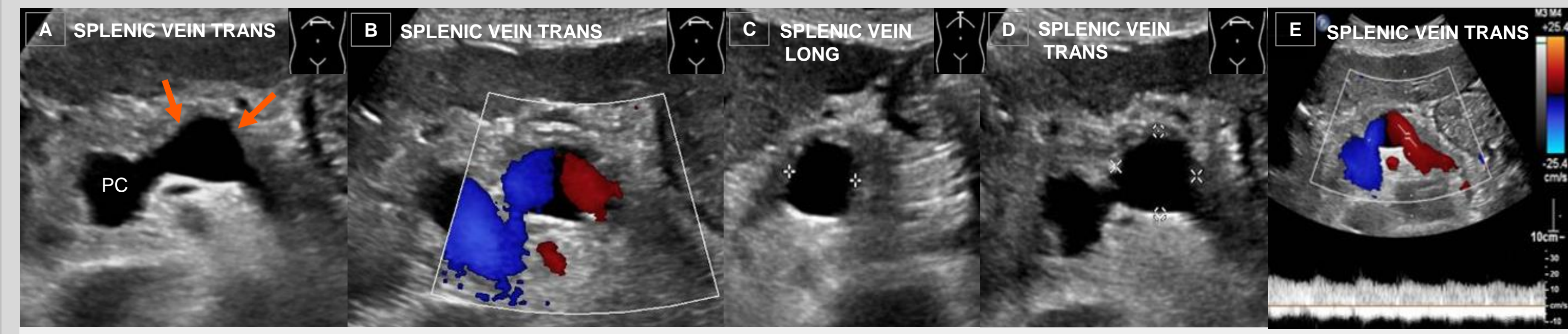
- Ectopic splenic tissue are not routinely sought → May be misidentified as incidental lesions or malignancies when located away from the primary spleen region<sup>3</sup>.
- Mimics a splenule as it is isoechoic to the spleen → Consider the location, number of nodules, and clinical history.

#### Learning points

- Ectopic splenic tissue can manifest as congenital splenule or acquired splenosis.
- Accurate diagnosis, particularly in patients with history of splenic trauma or surgery, is essential to avoid unnecessary interventions.

### Case 3. Atypical splenic varix

A focal abnormal dilatation of the splenic vein (Prevalence: 0.43%)<sup>8</sup>



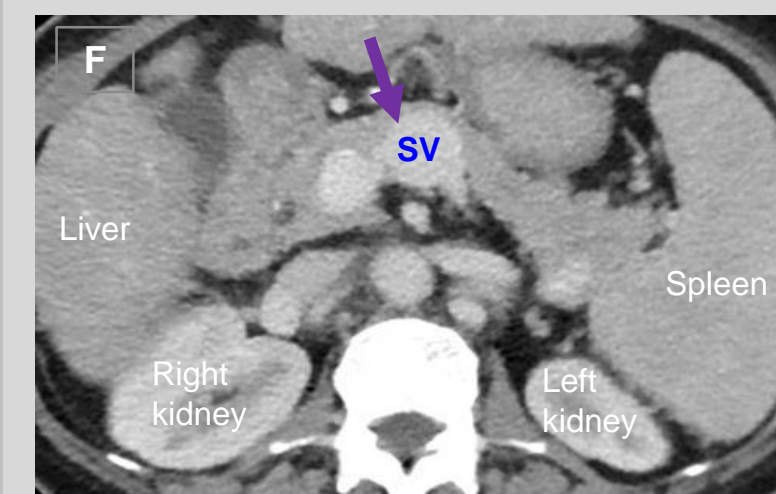
**Key imaging findings:** An (A, C & D) **anechoic focal dilatation of the splenic vein** is visualised adjacent to the portal confluence (PC) and (B) vascular continuity with the splenic vein seen on colour Doppler. (E) Normal phasic venous waveform of the splenic vein demonstrated on spectral Doppler.

#### Pitfalls

May be misinterpreted as aneurysm if continuity with splenic vein is not demonstrated → Meticulous evaluation with spectral Doppler is essential for accurate diagnosis.

#### Learning points

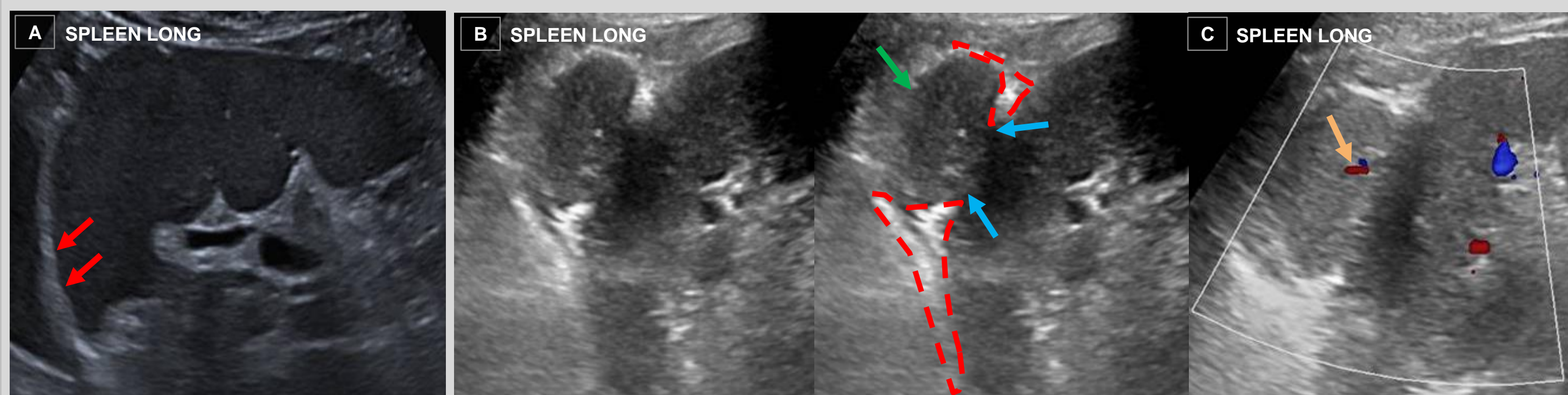
- Possible etiologies: portal hypertension or congenital venous wall weakness.
- Meticulous grayscale and color Doppler are crucial in identifying pathology's origin, distinguishing it from non-vascular lesions.
- In vascular lesions, spectral Doppler waveform analysis is essential in distinguishing between venous and arterial malformations.



**CT axial venous phase (F):** The **focal dilatation** demonstrates **simultaneous enhancement** with the **splenic vein (SV)**

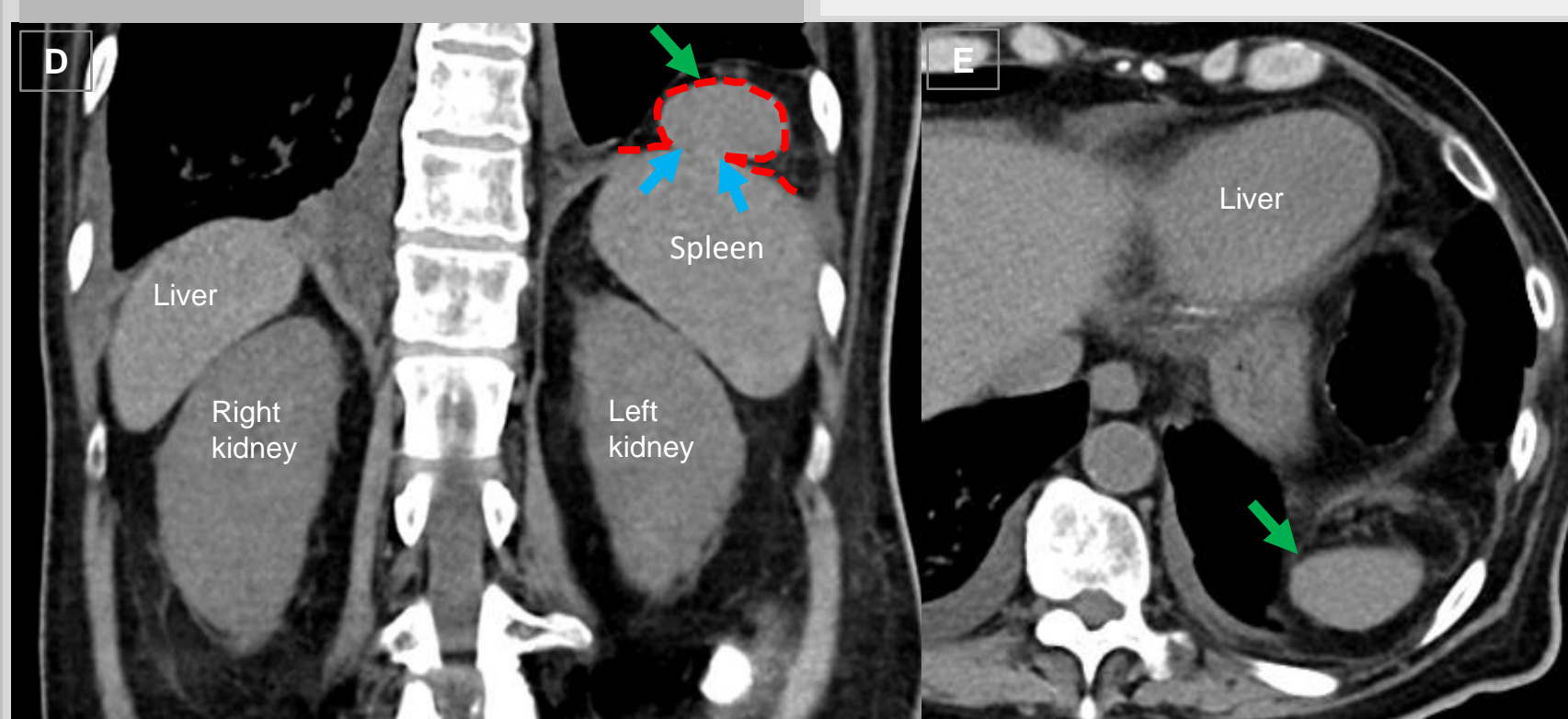
### Case 4. Bochdalek hernia involving the spleen

A congenital hernia due to developmental defect in the posterolateral aspect of the diaphragm, commonly left-sided (Prevalence: 0.17 - 6%)<sup>1</sup>



**Normal spleen (A) :** Smooth contour, no protrusion. **Diaphragm** intact, no defect.

**Key imaging findings:** (B) A **soft tissue structure** (isoechoic to spleen) in continuation with the spleen, protruding through a **defect** in the **diaphragm**. (C) **Mild internal vascularity**, typically observed in splenic tissue.



**CT coronal (D) and axial (E):** **Left Bochdalek diaphragmatic hernia** containing fat and the superior aspect of the spleen, protruding through a **defect** in the **diaphragm**.

#### Scanning Tips

- Elevate the left arm to spread the ribs apart when scanning the spleen intercostally.
- Optimise acoustic window by scanning at end expiration or during slow expiration.
- Scan in different patient positions.

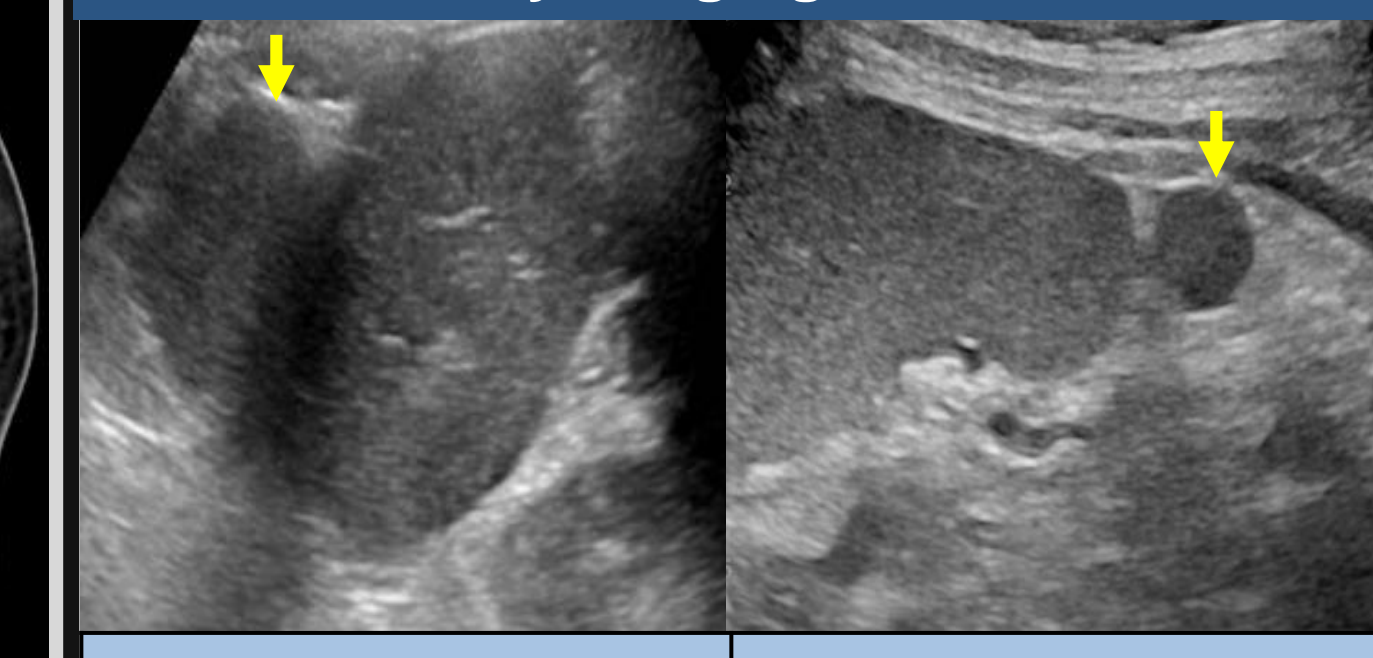
#### Pitfalls

- Potentially missed splenic pathology due to its subphrenic location and overlying air in the costodiaphragmatic recess<sup>4</sup>.
- Mimics thoracoabdominal pathologies and conditions such as splenule, pulmonary sequestration, and diaphragmatic eventration.

#### Learning points

- Spleen should be evaluated entirely to avoid missing pathologies or morphological anomalies beneath the left hemidiaphragm.
- Mass superior to spleen, suspicious for Bochdalek hernia, warrants extended imaging to evaluate for diaphragm continuity, cross-modality correlation if available.

#### Key imaging clues



Bochdalek hernia	Splenule (companion case)
Communication exists between spleen and the structure	Separated entirely from the primary spleen
Located within the thoracic cavity	Often found within the abdominal cavity (location is variable)

## Conclusion

Meticulous sonographic evaluation beyond routine splenic measurement, coupled with awareness of rare pathologies involving spleen and careful interpretation, enhances diagnostic accuracy, mitigates pitfalls, and ensures timely, optimal patient care.

## References

- Chandrasekharan, P. K., Rawat, M., Madappa, R., Rothstein, D. H., & Lakshminrusimha, S. (2017, March 11). Congenital Diaphragmatic hernia - a review. *Maternal Health, Neonatology and Perinatology*, 3(1). <https://doi.org/10.1186/s40748-017-0065-1>
- Filardi, K. F., X. C., De Mota Junior, J. D., Costa, T. N., Montagnini, A., Dominguez-Rosado, I., Chan, C., Jukemura, J., & Herman, P. (2025). Intrapancreatic accessory spleen mimicking a pancreatic neuroendocrine tumour - An important but almost forgotten differential diagnosis. *Journal of Minimal Access Surgery*. [https://doi.org/10.4103/jmas.jmas\\_246\\_24](https://doi.org/10.4103/jmas.jmas_246_24)
- Kb, S., & Pk, H. (2022). Hepatic splenosis: a rare entity and great mimicker. *DeLated Journal*, 06(01), 067-070. <https://doi.org/10.1055/s-0042-1758123>
- Khan LA, Al-Nearani AM, Soliman AF, Khaled AAM, Tawhian MH, Athiway YA. Bochdalek hernia with retrocardiac spleen - Diagnostic dilemma for emergency care physicians-A case report. *Int J Surg Case Rep*. 2020;71:364-366. doi: 10.1016/j.ijscr.2020.03.051.
- Kumarasamy, S., Sekhar, K. S., Vaidyanathan, M., Sengottayan, S., & Shanmugasundaram, S. T. (2018). A Rare Intrasplenic Varix in a Patient with Chronic Liver Disease and Portal Hypertension. *DeLated Journal*, 01(01), 060-064. <https://doi.org/10.1055/s-0038-1673318>
- Leroij, O., Bernard, P., & Vanhoenacker, F. (2022). Calcified aneurysm of the splenic vein. *Journal of the Belgian Society of Radiology*, 106(1). <https://doi.org/10.5334/bsr.3003>
- Sothilingam, N., Leedahl, T., Knieger, S., Kanthan, R., & Moser, M. A. (2011). Intrapancreatic accessory spleen: A case report and review of the literature. *International Journal of Surgery Case Reports*, 2(6), 128-130. <https://doi.org/10.1016/j.ijscr.2011.02.013>
- Uy, P. P. D., Francisco, D. M., Trivedi, A., O'Loughlin, M., & Wu, G. Y. (2017). Vascular Diseases of the spleen: A review. *Journal of Clinical and Translational Hepatology*, XX(XX), 1-13. <https://doi.org/10.14218/jcth.2016.00062>