

Role of Contrast Enhanced Ultrasound in Surveillance for Hepatocellular Carcinoma: a Pictorial Review

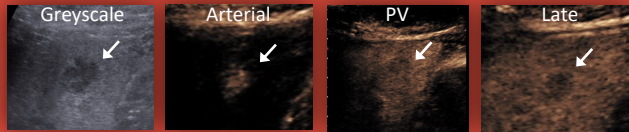
Stefanie W.Y. Yip, Carmen C.M. Cho, Stella S. Y. Ho, Brian T.Y. Yuen, Esther H.Y. Hung

Contrast enhanced ultrasound (CEUS) provides dynamic real-time assessment of focal liver lesions and can resolve indeterminate nodules identified on routine B mode ultrasound surveillance of hepatocellular carcinoma (HCC), through its unique advantages of:

- Superior sensitivity for detection of arterial hypervascularity
- Distinctive use of washout timing to differentiate among lesions.
- Continuous real-time depiction of arterial phase filling pattern

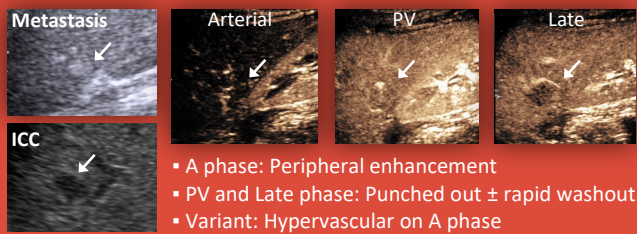
MALIGNANT LIVER LESIONS

Hepatocellular Carcinoma (HCC)



- A phase: Hypervascular
- PV and Late phase: Late and weak washout
- Variant: Iso/Hypervascular with dysmorphic vessels on A phase, No washout on PV or Late phases.

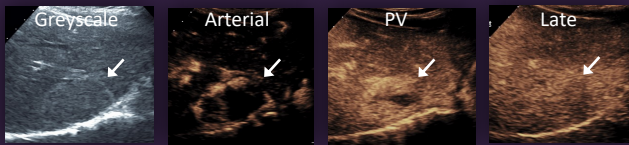
Metastasis / Intrahepatic Cholangiocarcinoma (ICC)



- A phase: Peripheral enhancement
- PV and Late phase: Punched out ± rapid washout
- Variant: Hypervascular on A phase

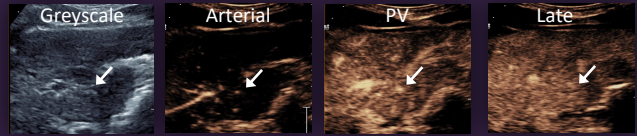
BENIGN LIVER LESIONS

Haemangioma



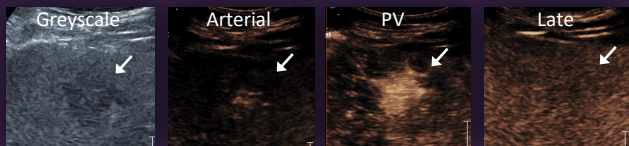
- A phase: Peripheral nodular enhancement, centripetal progression
- PV and Late phase: Sustained enhancement
- Variant: Flash filling in A phase, followed by washout

Regenerative Nodule (RN)



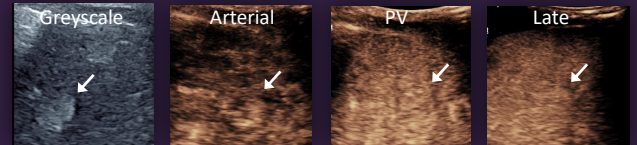
- Isovascular on all phases

Focal Nodular Hyperplasia (FNH) - like nodule



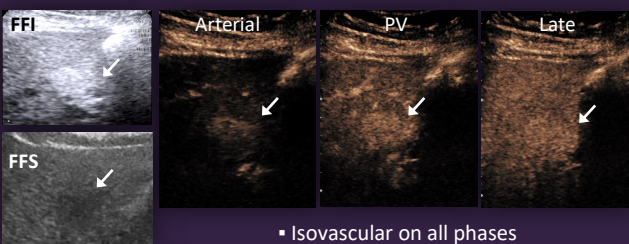
- A phase: Central eccentric centrifugal progression of enhancement
- PV and Late phase: Sustained enhancement
- Variant: Isovascular on Late phase

Dysplastic nodule (DN)



- DN (high & low grade) & HCC represent a spectrum of vascular changes
- DN has variable appearance, but commonly isovascular on all phases

Focal Fatty Infiltration (FFI)/Focal Fatty Sparring (FFS)



- Isovascular on all phases

CONCLUSION

Through its unique properties, CEUS adds value in characterizing focal liver lesions during ultrasound surveillance for HCC. As such, CEUS can offer a one-stop exclusion of typical benign liver lesions, precluding the need for subsequent more costly investigations.

	Arterial (AP)	PVP	Late (LP)	VARIATIONS
HCC				AP vs PVP/LP
Metastasis or ICC				AP
Haemangioma				Early AP vs Late AP
FNH-like nodule				LP
RN / FFS / FFI				
DN				