

Játra, ložiskové léze 1 - hemangiom, cysta, FNH



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Játra, ložiskové léze 1



- **Benigní**

- **Cysta**

- **Hemangiom**

- **Fokální nodulární hyperplázie**

- *Fokální steatóza*
 - *Hepatocelulární adenom*
 - *Lipom*
 - *Absces*
 - *Hematom,*
 - *Pseudoléze*

- správná volba sondy
- u dospělých cca 1(2)-5 MHz, konvexní
- nastavit správně zisk (gain), fokus
- jasně zřetelná bránice, parenchym jater v celé hloubce homogenní
- přístup subkostální, interkostální
- rovina axiální, sagitální, šikmá
- manévry se zadržením dechu, polohování pac.

Hemangiom

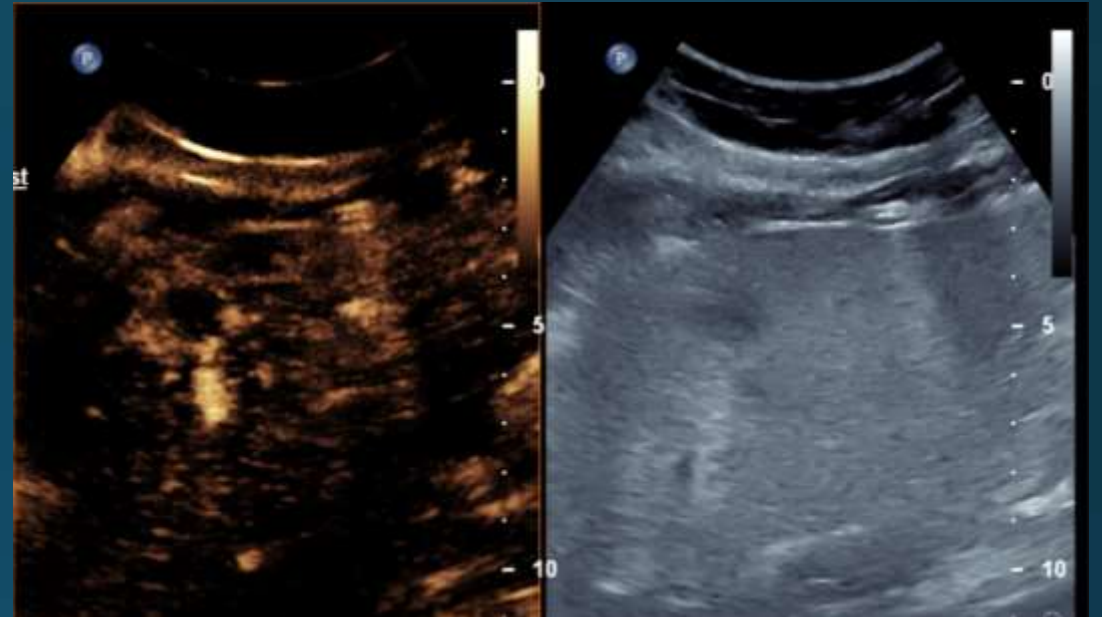
- nejčastější benigní léze jater, incidence v populaci 2%–20%
 - vychází z cév – u dospělých kavernózní, u dětí kapilární
 - B- mód, Doppler UZ
-
- hyperechogenní ostře ohraničená léze, homogenní
 - větší mohou být heterogenní s hypoechogenním centrem
 - až 10% hemangiomů hypoechogenních (v terénu steatózy)

In a patient at **risk for malignancy**, a lesion with gray-scale US imaging features suggestive of hemangioma **cannot be dismissed as such !**



Hemangiom

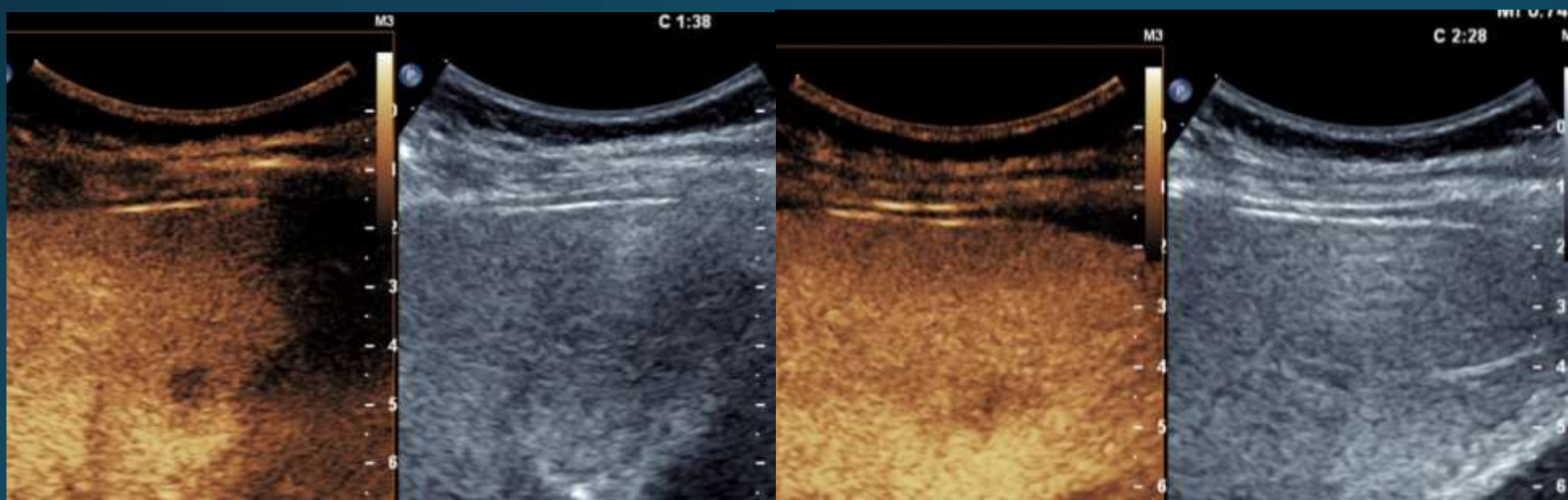
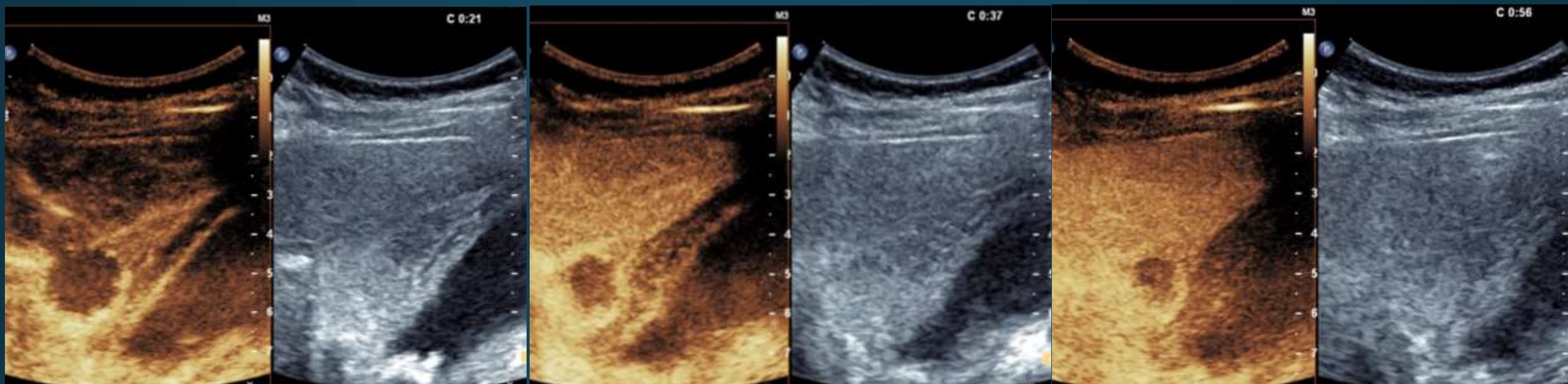
- CEUS
 - postupné uzlovité sycení z periferie,
 - rychle nebo pozvolně – v čase dosycování, kompletní / parciální
 - v pozdní fázi hyper/isoechogenní s okolním parenchymem



Peripheral enhancement

! Peripheral rim enhancement is a typical feature of malignant lesions and only **discontinuous nodular peripheral enhancement** that matches bloodpool is a typical feature of **hemangioma**.



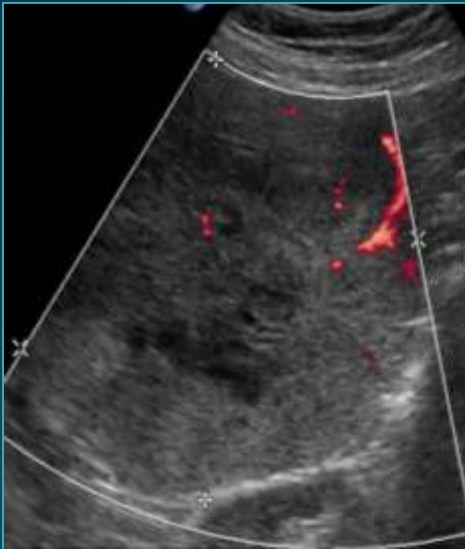


Atypický hemangiom

Real-time arterial phase imaging při CEUS - klasické periferní nodulární syčení může být taktéž pozorováno v časně art. f. - ! Malé HCC a hypervask meta!

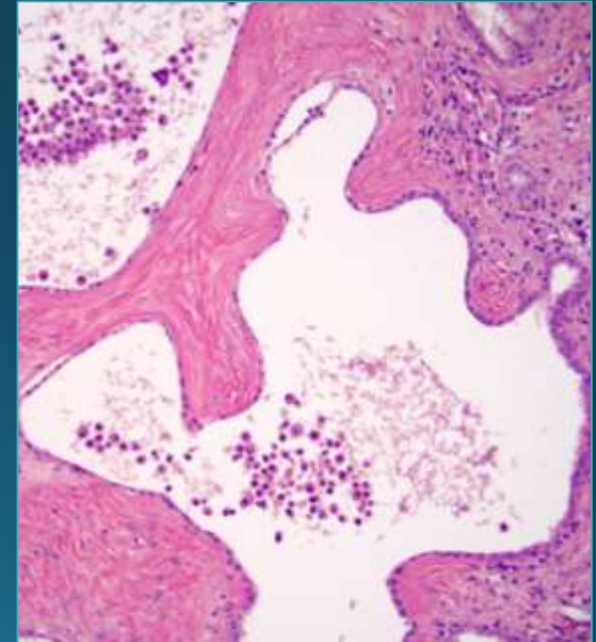
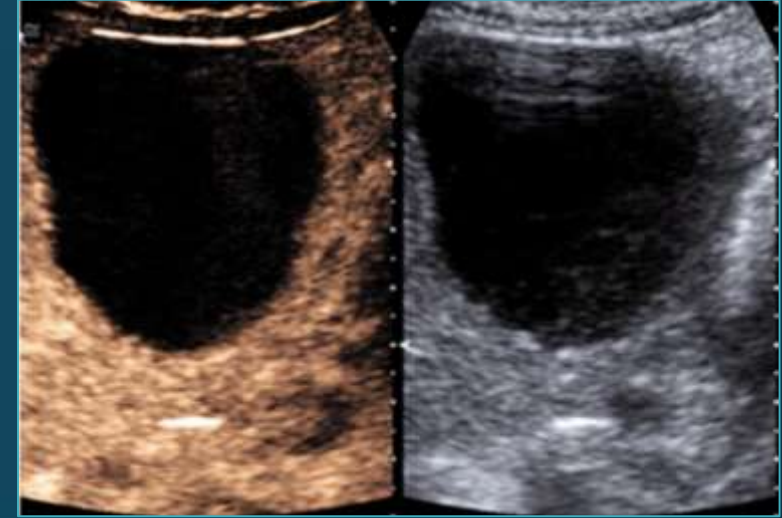
- Rychle se sytící hemangiomy, „flash-filling“, 16%, většinou malé léze (u ložisek do 1cm až 42% hemangiomů)
- Pomalu se sytící hemangiom, cca 8-16% - pomalé plnění cévních kanálků kontrastní látkou. Periferní nodulární syčení přetrvává v porotvenózní i pozdní f.
- Kalcifikovaný hemangiom
- Hyalinizovaný / sklerotický hemangiom – nekompletně se sytící hemangiomy
- Giant hemangiom

Large hemangiomas can have an atypical appearance. **Complete fill** in is sometimes **prevented** by central fibrous scarring. These lesions need to be differentiated from other lesions with a scar like FLC, FNH and Cholangiocarcinoma.



Cysta

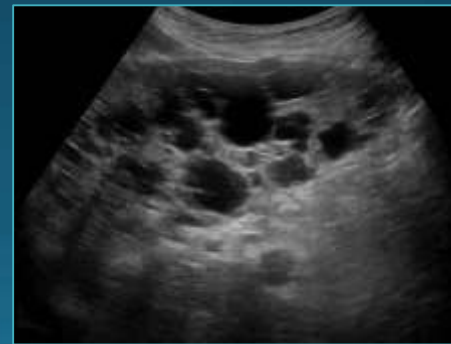
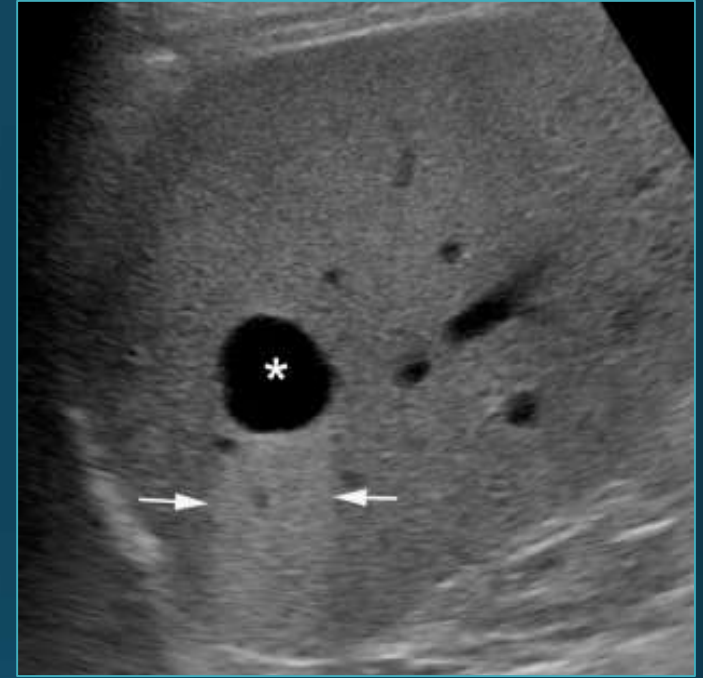
- častá (2-7% populace) benigní léze, nemá maligní potenciál
- jako incidentalom, asymptomatické
- pomalý růst
- rychlé zvětšení při prokrvácení
- solitární, mnohočetné, od několika mm do několika cm
- nekomunikuje se žlučovým stromem,
- vychází z hamartomatózní tkáně
- histologicky serózní tekutina ohraničená stěnou
- z jedné vrstvy kuboidního epitelu+jemný lem fibrózního stromatu



Cysta

- Anechogenní,
- Kulovité / ovoidní / lobulizované
- Ostře ohraničené, hladká jemná stěna
- Dorzální akustické zesílení
- Můžou být ojedinělá septa, malé množství detritu
- Color Doppler negativní

definitivní dg.
možno
stanovit
klasickým B -
módem



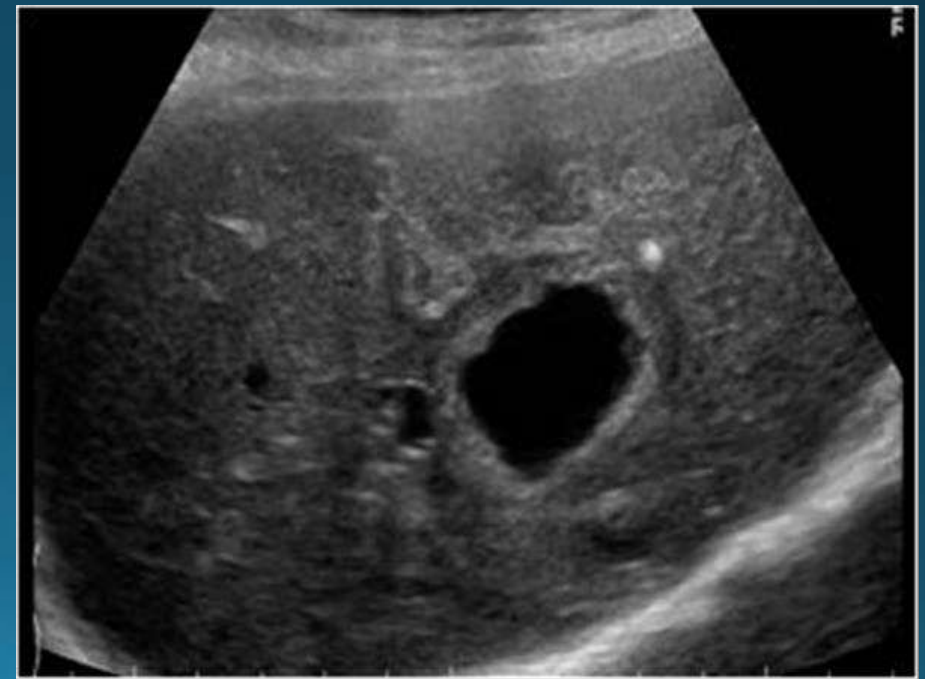
- Polycystóza - (PCLD, ADPKD, von Hippel Lindau),
- Caroli n.(Todani V – mnohočetné cysty intrahepat. žlučovodů
- Vzácně: infikované nebo zakrvácení

Strengths of various diagnostic modalities for cystic liver disease

Diagnostic modality	Sensitivity/Specificity, %	Strengths	Limitations
US	90/90 ³	• Inexpensive • Widely available • No radiation exposure	• Noncontrast • Limited evaluation of complex features
CT	>90/>70 ^{3,23,27}	• Widely available • Contrast enhancement can provide more information	• Radiation exposure • Complications from contrast agents
MRI	90–100/95–100 ³	• No radiation exposure • Contrast enhancement can provide more information	• Expensive
CEUS	79–95/83–88 ^{33,36}	• No radiation exposure • Real time imaging • Contrast enhancement can provide more information	• Limited availability, particularly in the US

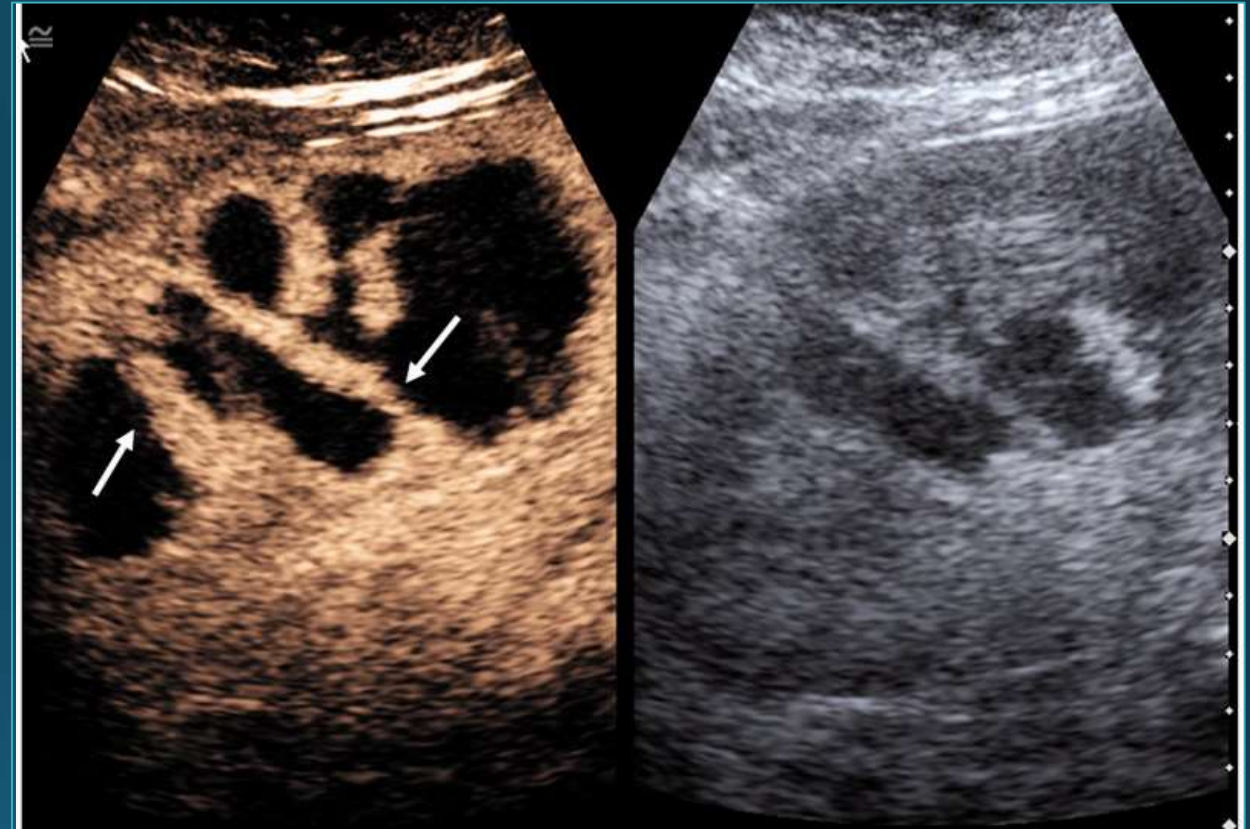
Dif. dg. cystické jaterní metastázy

- ! nové cystické léze jater
- anechogenní komponenta – nekróza / mucin
- silná septa, hypoechogenní haló, vaskularizace v color Doppler módu



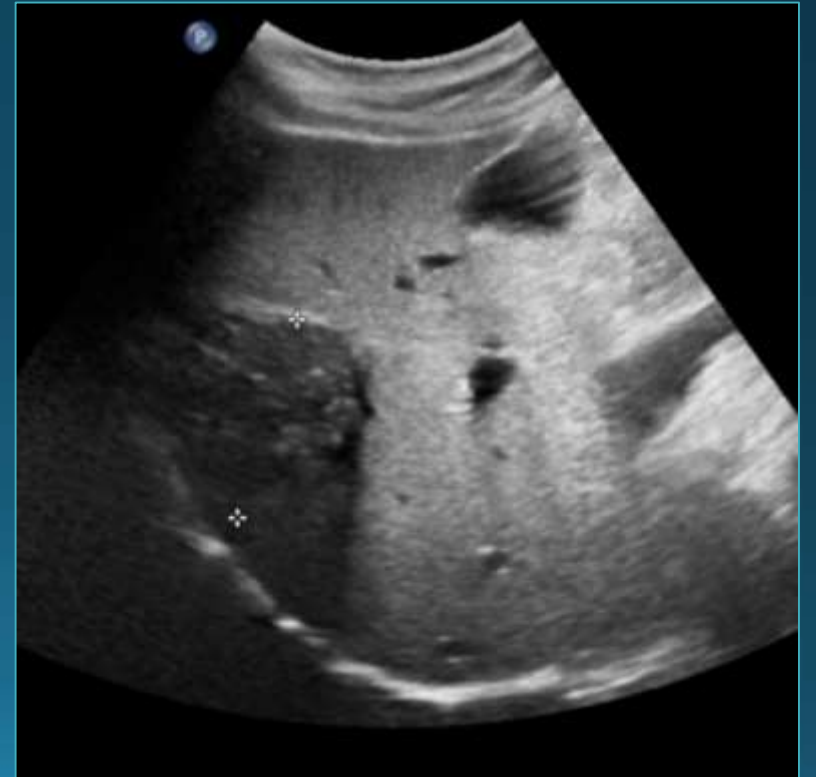
Dif. dg. jaterní absces

- Špatně ohraničený
- Variabilní echogenita
- Vnitřní echa, hyperecha plynu
- CEUS:
 - sycení stěny během art. fáze
 - washout v p-v. a pozdní fázi
 - absence perfuze v tekutinové porci
- Benefit CEUS vs UZ:
 - přesnější stanovení velikosti, přítomnost sept a podíl nekrotické porce



Dif. dg. Echinokokové hydatidové cysty

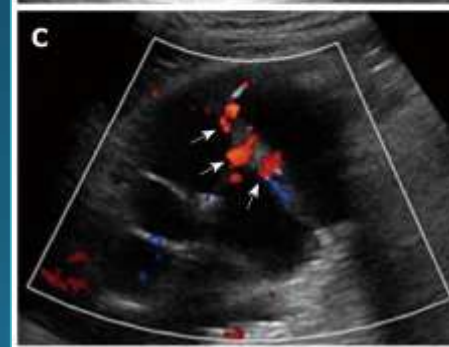
- Parazitární onemocnění
- Komplexní, septované cystické léze s dceřinými cystami
- Variabilní obraz



Cystic Liver Lesions

Simple cyst
Traumatic cyst
Biloma
Caroli's disease

Cystic Metastasis
Abscess
Ecchinococcus
Biliary cystadenoma

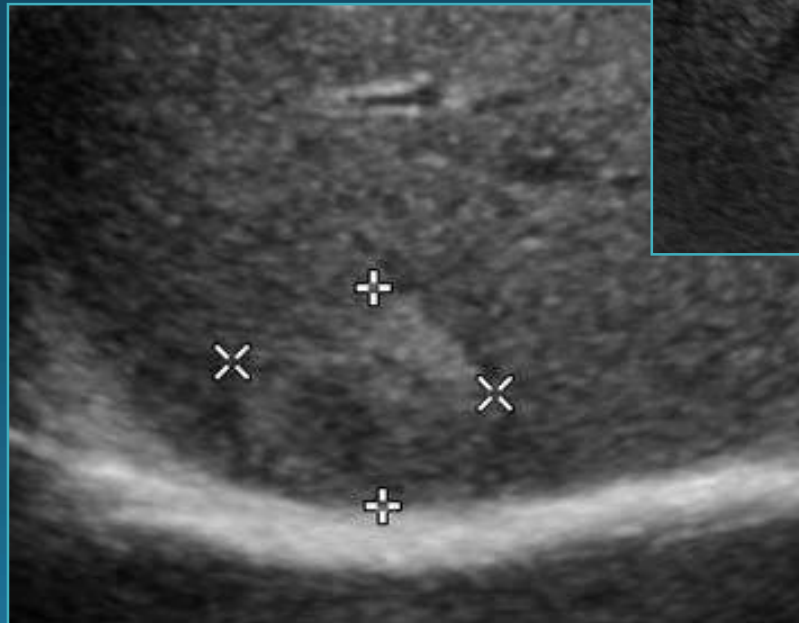


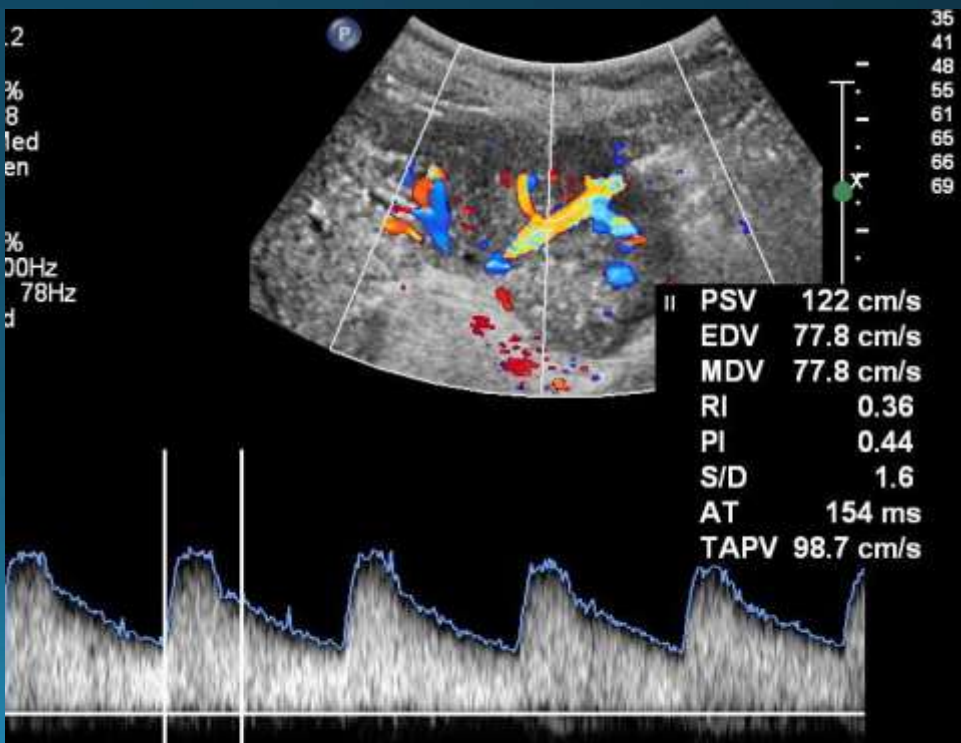
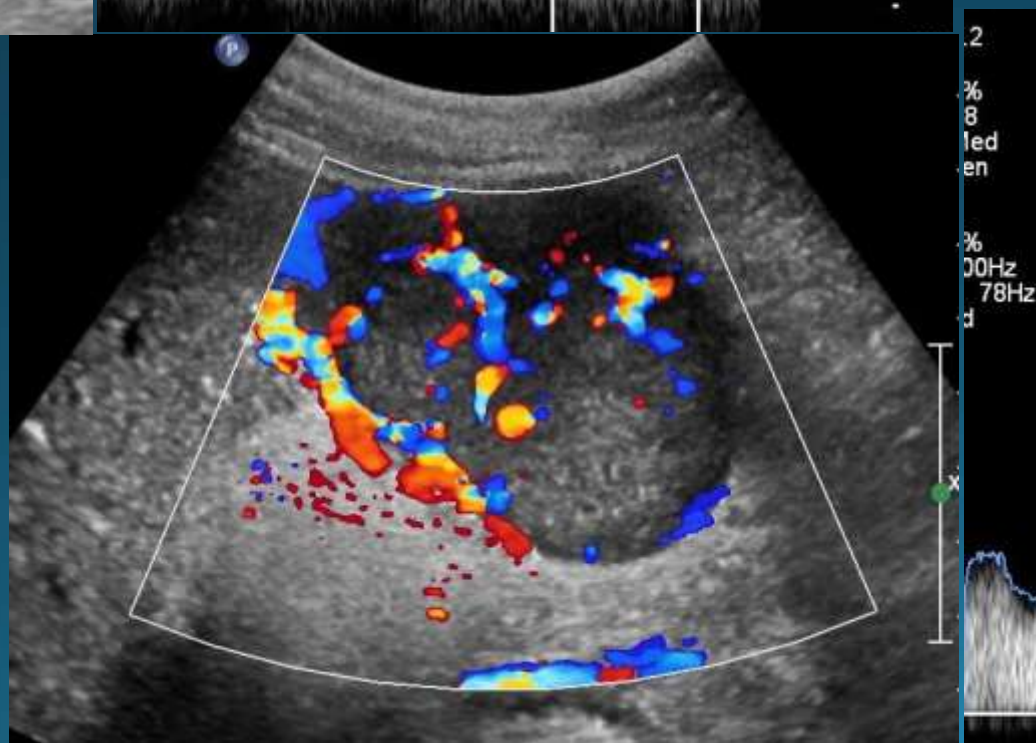
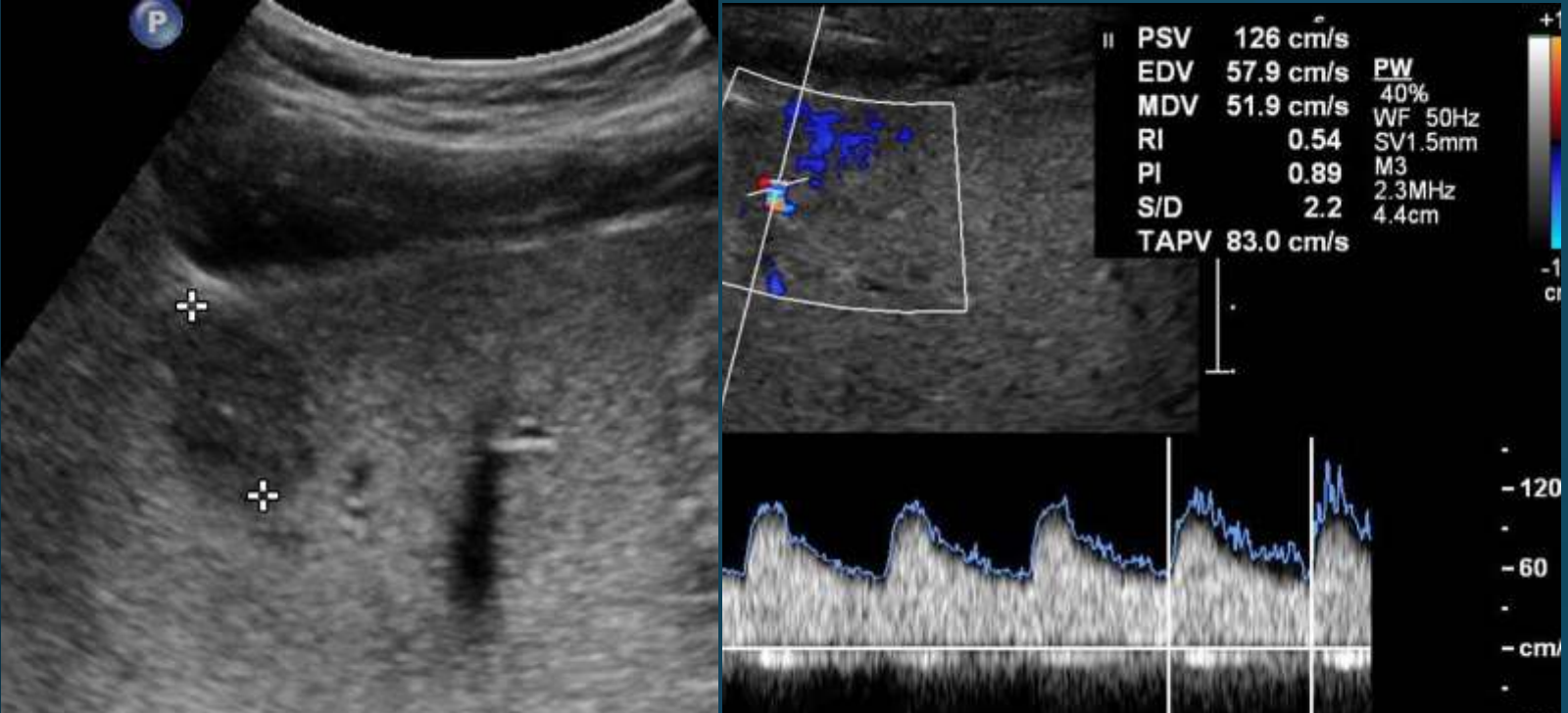
Imaging findings for various liver cysts

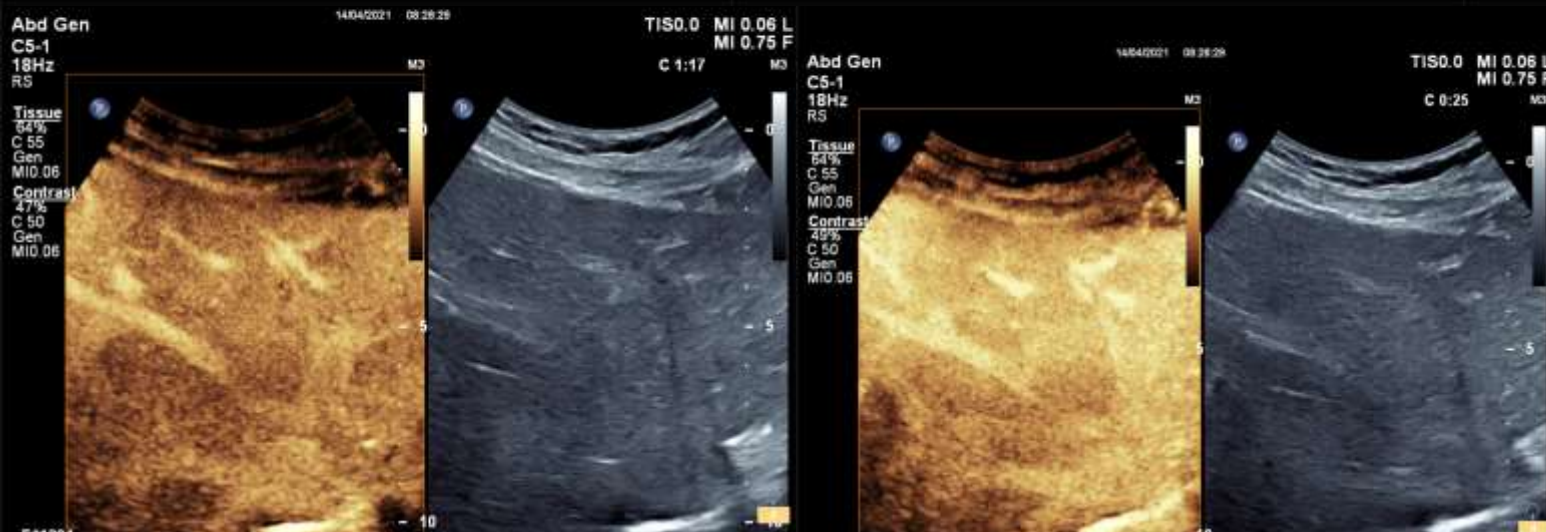
Lesion	Specific imaging findings	Appearance
PCLD	All modalities: Multiple cysts	
Mucinous cysts	All modalities: Mural or septal nodules	
EC	All modalities: Thick, calcified laminar wall, floating inclusions, peripheral daughter cysts	
Hemorrhagic cyst	CT/US: Irregularly thickened wall with "flame-like" prominences ^{10,12} MRI: T1 hyperintensity of hemorrhagic components ^{3,12,40}	
Cystic HCC	All modalities: Irregular, may have solid portion CEUS: Heterogeneous hyperenhancement during arterial phase, hypoenhancement during portal-late phase, peripheral rim enhancement ¹³	

Fokální nodulární hyperplázie

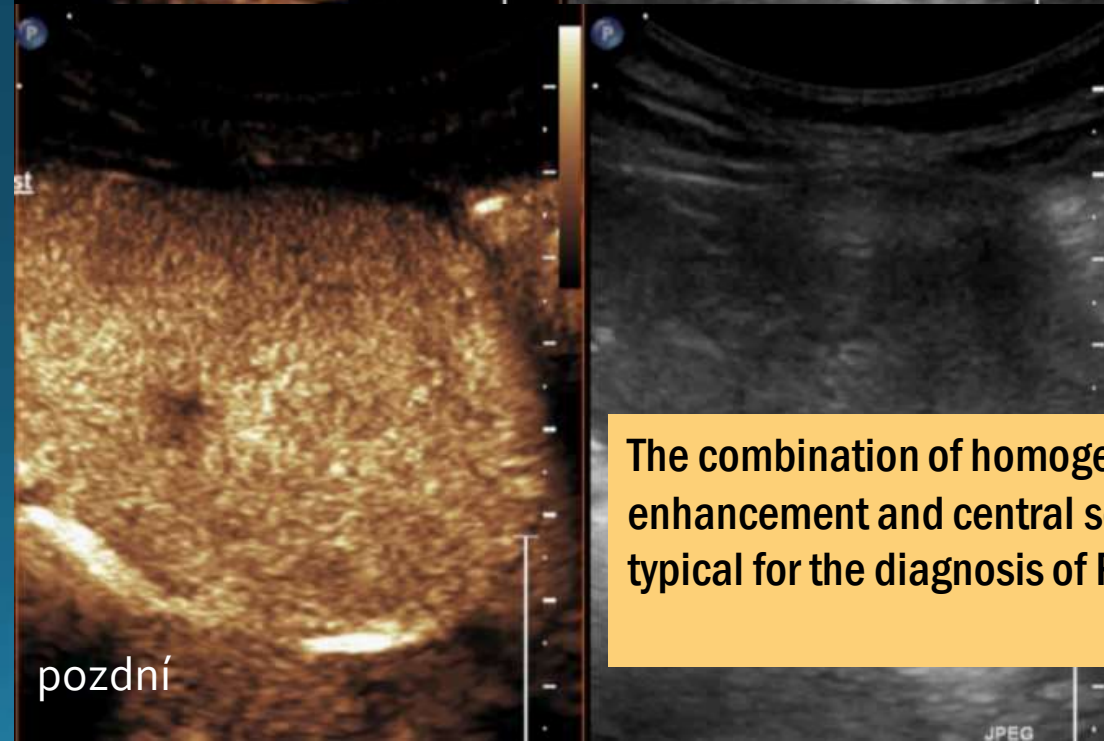
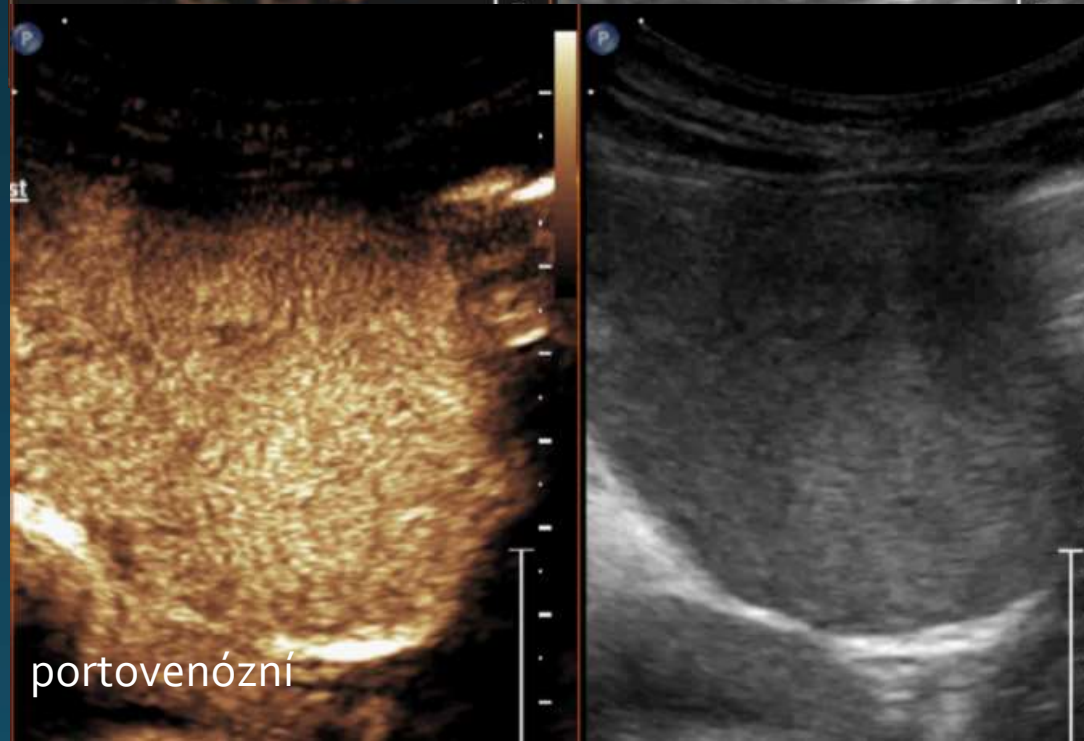
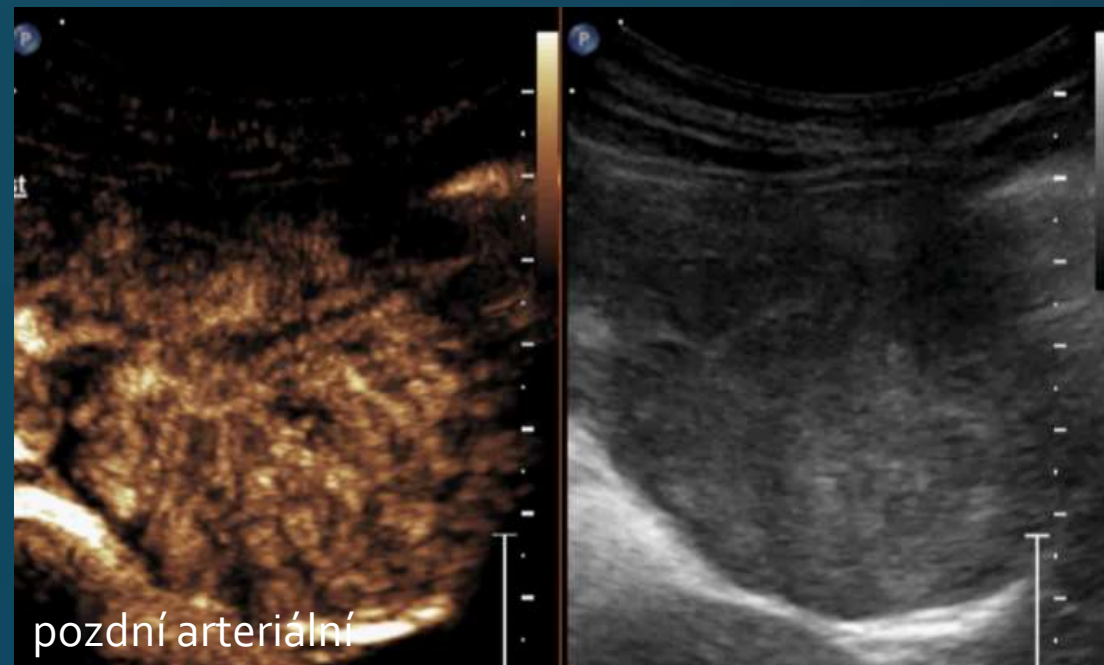
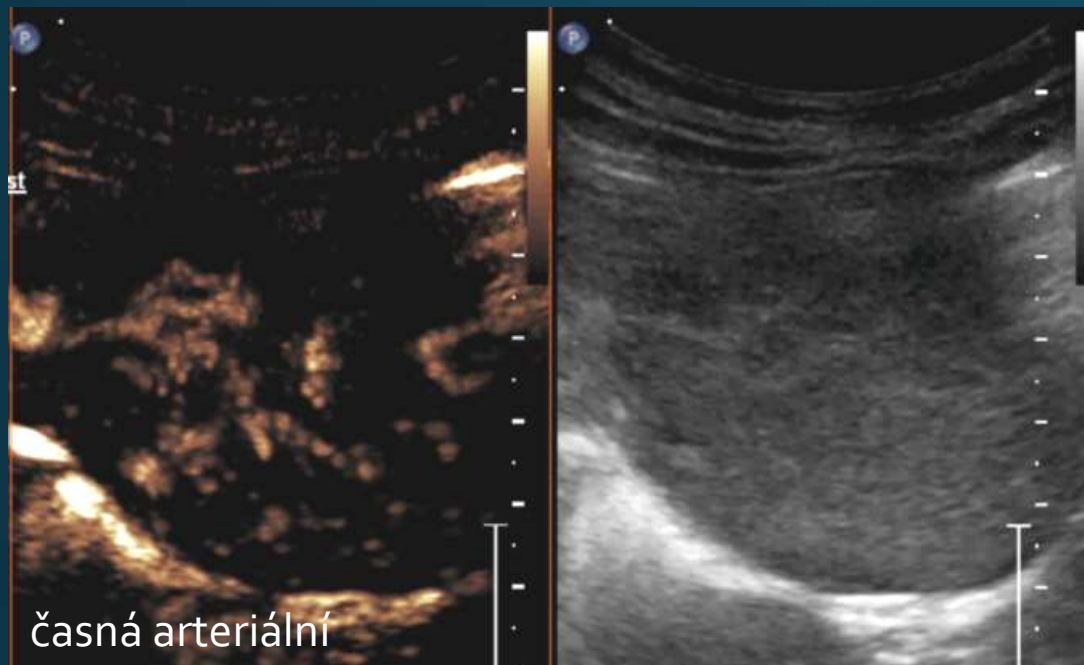
- Důsledek hyperplastické reakce hepatocytů na přítomnost preexistující vaskulární malformace
- Většinou ženy, 20-40let, jaterní testy i AFP v normě
- Centrální jizva (do 3 cm 35%, nad 3 cm 65%)
- Hypo/isoechoenní, ostře ohraničené, centrálně loukoťovitě uspořádané cévy s arteriálními toky
- Arteriální hypervaskularizace
- Není wash out





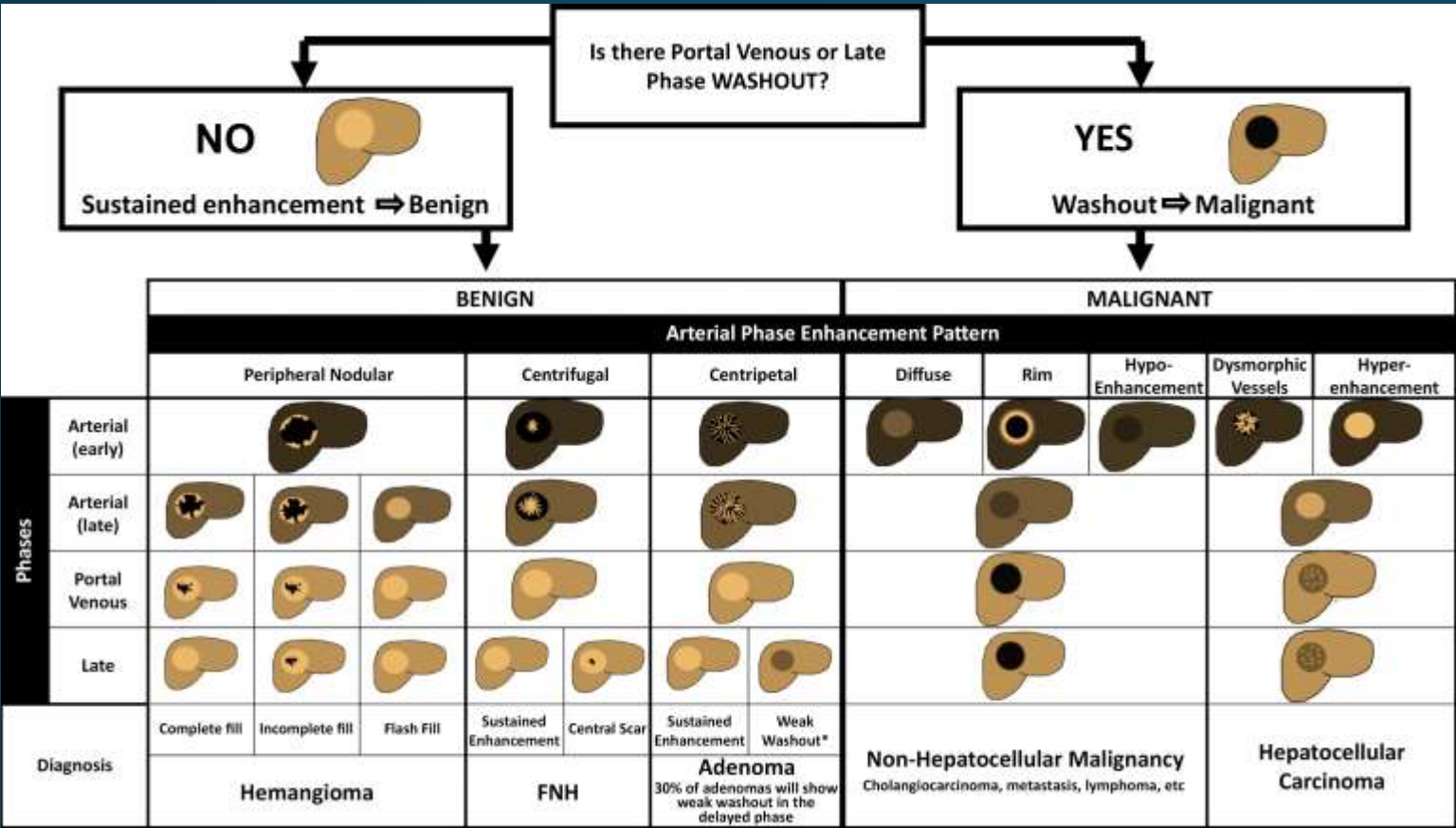


In conclusion, **CEUS** in combination with **CDUS** improve the diagnostic performance of FNH and HCA.



The combination of homogeneous enhancement and central scar is typical for the diagnosis of FNH.

Algorithm for analysis of enhancement characteristics of focal liver lesions for characterization with CEUS



Common benign hepatic lesions demonstrate typical and reproducible arterial phase enhancement patterns at CEUS. These patterns are easily recognizable and can be highly suggestive of a specific diagnosis such as cavernous hemangioma, focal nodular hyperplasia and hepatic adenoma

- Děkuji vám za pozornost!



adenom

Hepatic adenoma is a relatively uncommon benign hepatic tumor seen most commonly in women and in people using steroid-containing medication or anabolic steroids (18). The appearance of hepatic adenoma is variable and can be indeterminate with all imaging modalities. This variability in appearance relates, in part, to the presence of multiple histologic subtypes of hepatic adenomas (inflammatory, *HNF1A*-mutated, catenin-mutated, unclassified) (18,19). At , adenomas are hyperenhancing in the arterial phase. Inflammatory adenomas are the most common subtype, and their arterial phase enhancement at is best described. The classic arterial phase enhancement pattern of a hepatic adenoma begins peripherally, with rapid filling from the periphery inwards (Fig 6c, Movie 7c). This centripetal pattern of filling has been described in up to 86% of inflammatory hepatic adenomas (18). Other adenoma subtypes may demonstrate similar centripetal enhancement but are less well described. The diagnosis of adenoma at is occasionally suggested because of the presence of sustained enhancement (denoting a benign lesion) (Fig 7e) and the absence of classic arterial phase enhancement suggestive of an alternative benign lesion.

Hepatic adenoma most commonly demonstrates diffuse sustained enhancement in the portal venous phase and late phase (Fig 7e). Unfortunately, up to 30% of adenomas can demonstrate weak delayed washout in the late phase of imaging (Fig 7f) (18,23). This phenomenon is not isolated to evaluation, because it is seen with both CT and MR imaging (24). Nevertheless, washout in an adenoma can result in mislabeling of an adenoma as at imaging. This issue highlights the complexity of liver lesion evaluation and reinforces the need for a systematic approach with incorporation of patient demographics, history, and risk factors into the evaluation of all focal hepatic lesions. The observation of washout in adenoma further emphasizes that biopsy, although much less frequently used than previously, is still necessary to resolve some indeterminate results in these difficult lesions.

FNH vs adenom

- are benign, generally hormone-induced, liver tumors. The tumors are usually solitary, have a predilection for hemorrhage, and may undergo malignant transformation.
- Hepatic adenoma is traditionally considered the most frequent hepatic tumor in young women on the oral contraceptive pill.
- They are found in certain situations, including ³:
 - oral contraceptive use (especially the first generation pills which have a high concentration of estrogens), anabolic steroids: typically young men, [glycogen storage diseases](#), obesity, metabolic syndrome, [diabetes mellitus](#).
 - Hepatic adenoma (HCA) is the third most common benign hepatic neoplasm. It may undergo malignant transformation and has a marked tendency to hemorrhage (Laumonier et al. [2008](#)). The differential diagnosis with other focal liver lesions (FLLs), particularly focal nodular hyperplasia (FNH) and well-differentiated hepatocellular carcinoma (HCC), is of great significance because of the different management and outcomes for patients
 - HA showed typical perfusion characteristic of 'fast-in, slow-out', with a centripetal or mixed-filling pattern in the arterial phase, while FNH showed a centrifugal filling pattern. In conclusion, CEUS was helpful for identifying HA but it may be relatively difficult to distinguish between HA and some well-differentiated HCC or FNH.
 - On CEUS, in addition to centripetal enhancement in the arterial phase, persistent peripheral rim enhancement and delayed central washout are also reported as specific dynamic features for the characterization of HCA (Kong et al. [2015](#); Roche et al. [2015](#)).
 - A hepatic adenoma usually presents as a solitary, well-demarcated, heterogeneous mass. Echogenicity is variable ³:
 - hypoechoic: 20-40%
 - hyperechoic: up to 30%, often due to [fat](#) ^{3,8}
 - A hypoechoic halo of [focal fatty sparing](#) is also frequently seen.
- [color Doppler](#): may show perilesional sinusoids
- [contrast-enhanced ultrasound](#) ¹⁶
 - arterial phase
 - hypervascular (similar to [focal nodular hyperplasia](#) [FNH], although adenomas usually enhance to a lesser degree)
 - portal venous and delayed phases
 - centripetal filling (opposite of FNH, which shows centrifugal filling)