Liver incidentaloma's

- Radiologically initiated problem
- Often defensive reading
  - "Aspecific lesion"
  - "Could be a, but b/c/d can't be excluded"
- Unnecessary unrest/exams/follow-up
  - "Spot on liver; innocent, but does require follow-up"

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Liver incidentaloma's

1. Clinical Significance small hypodens liverlesion(s) on CT
   - No known primary tumor
   - Oncology patient
2. Characterization hypervascular lesions

3.

TSTC lesions

Hypodens, to small to characterize (< 1,5cm)

- No certain cyst
  - Sharply demarcated, water density
- No certain hemangioma
  - slow, peripheral nodular enhancement
- No certain malignant lesion
  - Inhomogenous, unsharp margin, peripheral enhancement

TSTC = Subjective definition

Literature TSTC

- Jones: 1992 AJR
  - 1454 pt with CT-Abdomen
    - 254 (17%) TSTC lesions
      - 45 pt no primary tumor: never malignant
      - 209 pt with primary tumor
        - » 86 with 1 lesions: 5% malignant
        - » 74 with 2-4 lesions: 19% malignant
        - » 49 with > 5 lesions: 76% malignant

Literature TSTC

- Schwartz: 1999[Radiology]
  - 2978 cancer pt with CT-Abdomen
    - 12% TSTC lesions
      - 12% malignant
        - » Lymphoma: 4 %
        - » Colorectal: 14%
        - » Breast: 22%

Conclusion:

- Correlate with tumor metastasizing pattern

Literature TSTC

- Robinson: 2003 BJR (8–10 mm contiguous)
  - 115 pt with cancer
    - PPV size and border

	benign	
	unsharp	sharp
• <5 mm	90%	94%
• 5–10 mm	71%	81%
• 10–15 mm	62%	71%

Ratio: small metastases have no central necrosis and therefore can go undetected

Literature TSTC

- Krakora: 2004 Radiology (7 mm spiral or 5 mm contiguous)
  - 153 pt breast ca, 43 developed metastases
  - PPV of TSTC for development metastases ?

    - 54 pt: 1 or more TSTC — FU: 28% mets
    - 99 pt: no TSTC — FU: 28% mets

Conclusion:

- TSTC lesions: no PPV for development metastases
- Don't say: "Mets can't be excluded" "

Literature TSTC

- Khalil 2005 Radiology (7.5 mm spiral or 10 mm contiguous)
  - 941 breast ca pt and no clear mets on CT
    - 29% $\geq$ 1 TSTC
      - 95% Benign

Conclusion:

- In principle: no further imaging or biopsy

Conclusion TSTC lesions

- Patient without known tumor: benign
- Oncology patient:
  - Solitary: benign
  - Multiple:
    - mostly benign
    - small, sharp, hypodens: benign characteristics
    - Breast ca; no PPV for development mets
  - Don't say: "Mets can't be excluded"
  - Standard onco FU; no additional imaging

Incidental hypervascular lesions

- Prevent unnecessary diagnostic tests and treatment
  - Hemangioma
  - FNH
  - Small adenoma's (< 5 cm)
    - Follow-up
- Prevent delay in diagnosis and treatment
  - Larger adenoma's (> 5 cm)
  - HCC
  - Hypervascular metastases

Incidence hypervascular lesions
(post-mortem)

- Karhunen (n=50)
  - Hemangioma 20%
  - FNH 3%
  - Adenoma 1%

Karhunen; J Clin Path 1985

- AFIP (n=9000)
  - FNH: adenoma 8:1
  - HCC 0,1-1%

Craig; Atlas of tumor pathology; 1988

Hypervascular lesions

- Hemangioma
  - Slowly perfused vascular space
    - > 1 cm: peripheral, nodular enhancement of arterial density; slow centripetal spread
    - < 1 cm: may have direct homogeneous enhancement
- FNH, Adenoma, HCC, hypervascular mets
  - Capillairy blush
    - Entire lesion, (in)homogenous, synchronous with, but < aorta.
    - Differences in morphology, composition and enhancement

Solid hypervascular lesions

- FNH
- Adenoma
- HCC
- Hypervascular mets
- Differences in:
  - HU/SI, (in)homogeneity
  - Presence capsule, scar, Ca^{++} or fat

Fibrolamellar HCC

- Clinical signs
  - Normal liver, normal αFP, reasonable prognosis
- Difference with FNH
  - Inhomogeneous
  - Large ($>$ 5 cm)
  - Ca^{++} (70–95%)
  - Coarse central scar ($>$ 2 cm), T2 low signal
  - Lymphnode mets (65%)

Other hypervascular lesions
("non-FNH lesions")

- Adenoma
  - (Old) hemorrhage
  - Fat
  - Moderately hypervascular (<FNH)
  - Rim or border
  - Peliosis (hyperintense on T1)
- HCC
  - Cirrhosis/fibrosis
- Hypervascular metastases
  - Primary tumor
  - Multiple, some hypovascular
  - Inhomogeneous

Solid hypervascular lesions 1

- FNH (requires high specificity!)
  - Round or lobulated, homogenous
  - Thin scar, septae. Below 2 cm often no scar !
  - No border
  - T1: iso/hypo; T2: iso/hyper
  - Arterial hyper-; portal, late isodens; “stealth lesion”
  - Scar: T1 hypo; T2 hyper; late enhancement
  - No Ca^{++}, T1 hyper, inhomogeneous, capsule

Solid hypervascular lesions 2

- Adenoma
  - Hemorrhage, fat
  - Slightly hypervascularity (<FNH)
  - Border
  - T1 hyper/iso/hypo; T2 hypo/iso/hyper
  - > 3 cm: inhomogeneous
- HCC
  - In presence of cirrhosis or fibrose
  - May be hypo and hypervascular
  - Often wash-out in portal and or equilibrium phase
  - Tumor trombus and arterio-portal shunting

Conclusion incidentaloma's

"Not vague and defensive, but clear and directive"

- TSTC lesions: in principle benign
- Hypervascular lesions frequently can be characterized
  - Majority: no further tests or treatment
    - Hemangioma
      - Atypical hemangioma: MR>CT
    - FNH
      - Atypical FNH: MR>CT
  - Minority: treatment, follow-up or further examinations
    - Adenoma: MR>CT
    - HCC, FLHCC
    - Hypervascular metastases
    - Remaining "atypical hypervascular lesions": liver-specific MR?

Diagnosing liver lesions; which modality?

- Screening Abdomen incl Liver
  - Ultrasound
  - CT abdomen (cave hypervascular lesions)
- Chronic liver disease; HCC ?
  - Low index of suspicion: ultrasound
  - High index of suspicion: multi-phase CT/MRI
- Pre-operative colorectal metastases
  - Multi-phase CT abdomen (& CT thorax?)
- Characterizing incidentaloma
  - Young female, no cancer: multi-phase MRI
  - Older pts, cancer: multi-phase CT (+Abdomen)