

# Nyrecyster

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# Hvordan diagnostiseres nyrecyster?

- Oftest tilfeldig – ved utredning for annen tilstand
- Sjelden pga
  - Oppfylning i buken
  - Smerter i buk eller rygg
- Ved kjente arvelig tilstand
- Gjerne en CT abdomen med kun en kontrastfase eller en ultralydundersøkelse
  - Videre henvisning til urolog

# Forekomsten av ervervede nyrecyster

- Ulike beskrivelser av forekomst
  - 50 % av 50 åringer
  - 5% av alle
  - 40 % av de som gjennomgår billediagnostikk som inkl nyrene (Sigmon et al 2022)
  - 12% av alle i et helsescreening program (Terada et al 2002)
  - Økende forekomst med økende alder
- Hos de med langkommet nyresvikt/endestadie

# Hvor mange nyrecancer er cystiske?

- 5-7 % av nyrecancere (Bielsa et al 1998)
- 15% av nyrecancer (Hartman et al 1986)
  - God prognose!!!
  - Lav gradige
  - Laverer stadium
  - Sakte vekst

*Bielsa et al O et al Cystic renal cell carcinoma: pathological features, survival and implications for treatment.  
BrJ Urol 1998, 82; 16-20*

*Hartman et al 1986*

# Medfødt cystesykdom – Potter klassifikasjon

## 1. Infantil polycystisk nyresykdom

- Autosomal recessiv (PKHD1 gen kromosom 6)
- Diagnostiseres neonatalt eller tidlig barndom avh. av alvorlighetsgrad

## 2. Multicystisk dysplastisk nyresykdom

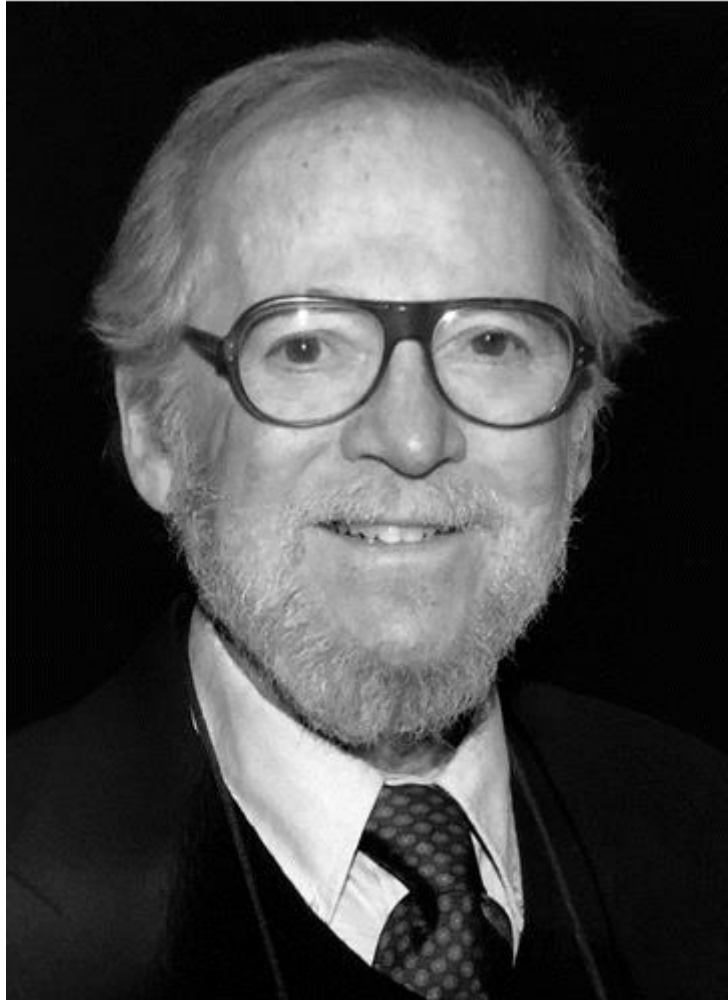
- Ikke arvelig unilateralt, venstresidig gjerne
- Diagnostiseres in utero eller neonatalt

## 3. Voksen polycystisk nyresykdom

- Normalt utseende nyrer ved fødsel, utvikler cyster i 30 års alder,
- 50% dialysekrevene i 60 års alder
- Autosomal dominant (PKD1 gen Ch16 eller PKD2 gen ch 14)

## 4. Obstruktiv cystisk renal dysplasi

- Obstruksjon under utvikling gir spredte cyster i den affiserte nyren



Morton A. Bosniak, MD 1929-2016

## Radiolog i New York

- Pioner
- Abdominal imaging
- Nyretumores og nyrereseksjon
- Observasjon av små nyresvulster
- Cyste klassifisering
  - Unngå unødvendig operasjoner av store benigne cyster
- I en tid der urografi var en vanlig us og Ct var nytt!

# Publikasjon i 1986

- Primært ikke ment som en ny nomenklatur men som en systematisk tilnærming for diagnostikk ved nyrecyster for å lette radiologens hverdag

## STATE OF THE ART

Morton A. Bosniak, MD

### **The Current Radiological Approach to Renal Cysts<sup>1</sup>**

**C**YSTS of the kidney, one of the most common conditions of the body, are usually one of the easiest conditions to diagnose accurately with imaging studies but occasionally are so complex that they defy diagnosis even by pathologic examination. The purpose of this paper is not to review and describe the myriad of renal cystic diseases or to give a new classification or a new nomenclature but, rather, to give an approach to the diagnosis of cysts of the kidney that are encountered in daily radiologic practice.

evaluate a patient for a urinary tract or other abdominal or pelvic process. Only on rare occasions does the cyst call attention to itself by producing symptoms (pain) or signs (mass). Many cysts are discovered using urography, but currently they are discovered more often by means of ultrasound (US) or computed tomography (CT). The workup of the lesion will vary, depending on how it was detected.

#### **SONOGRAPHY**

Diagnostic errors can be kept to a minimum if the following *potential pitfalls* are remembered:

1. If sonography is being performed to evaluate a mass seen on an excretory urogram (or CT scan), then the prior examination should be available for review to be certain that the mass in question is being evaluated. This will help eliminate the possibility of focusing on an adjacent cyst and not appreciating the lesion under suspicion. This will also help avoid the error of mistaking localized hydronephrosis or calyceal diverticu-

# Bosniak- klassifikasjonen (eksklusjon infeksjon, blødning, nekrose)

- I – simple cyster, ingen septa, kalk eller solide komponenter
- II – < 3 cm, hyperdense cyster, tynne septa, tynn kalk, ikke kontrast opptak
- II<sub>f</sub> - > 3 cm intrarenale, septa og kalk er mer markert, septa eller cystevegg kan være «minimalt fortykket», ikke kontrastopptak
- III - septa/vegg med kontrastopptak
- IV – bløtvevskomponenter i tillegg



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# Bosniak I

Ultralyd kan sikre denne diagnosen (glatte vegger, anekkoisk lesjon og størrelsen kan vurderes)

men ved tvil som f. Eks

- kalk
- multiple septa
- uregelmessig margin
- vaskulær malformasjon
- clustering av cyster

.....tilrådes CT med kontrast

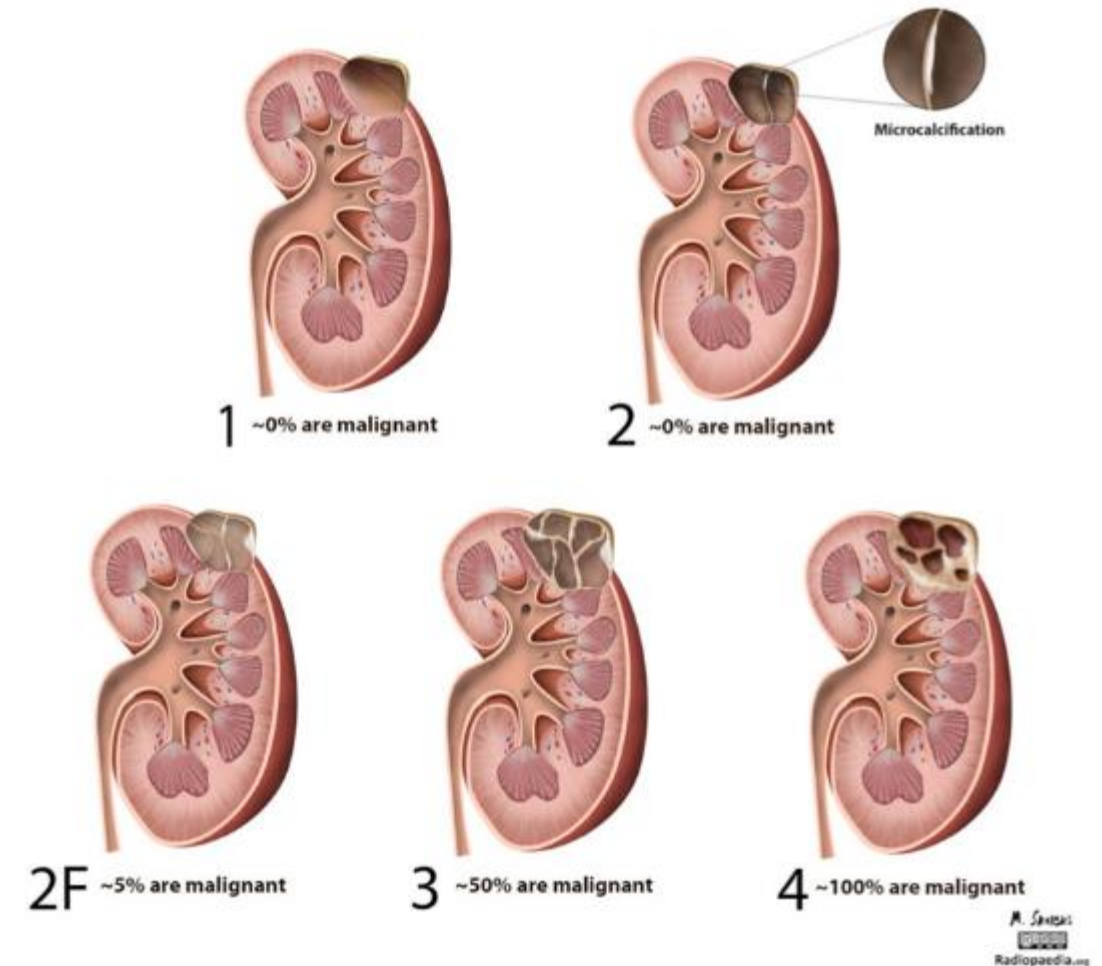
Ultralyd er også operatørvhengig

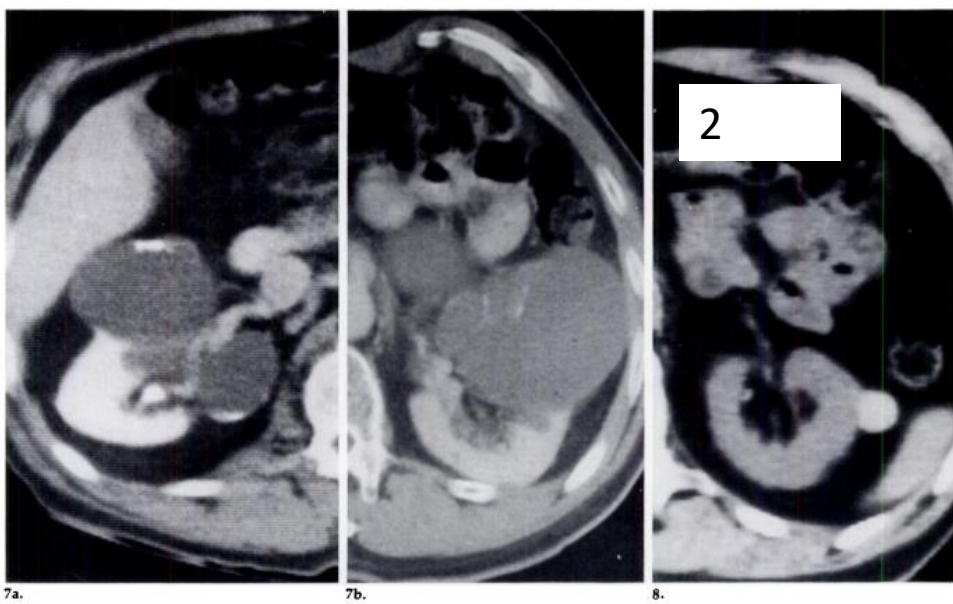
### Bosniaks klassifisering av nyrecyster basert på CT-funn, med forslag til håndtering

Bosniak 1	
<ul style="list-style-type: none"> <li>• Enkel cyste</li> <li>• Ingen septa, forklaringer eller solide elementer</li> <li>• Ikke kontrastopptak i vegg eller cyste</li> </ul>	Benign Ingen Kontroll
Bosniak 2	
<ul style="list-style-type: none"> <li>• Enkel cyste med tynne vegger</li> <li>• Hårtynne septa uten kontrastopptak</li> <li>• Forkalkninger tynne eller lett fortykket</li> <li>• Ingen solide element</li> <li>• Velavgrenset, &lt; 3 cm, uten kontrastopptak</li> </ul>	Benign Ingen kontroll
Bosniak 2f	
<ul style="list-style-type: none"> <li>• Flere tynne septa</li> <li>• Minimal kontrastopptak i septa eller cystevegg</li> <li>• Minimal fortykkelse av septa eller cystevegg</li> <li>• Forkalkninger kan være noe tykkere eller nodulære</li> <li>• Ikke kontrastladende bløtvevskomponenter i cysten</li> <li>• Velavgrenset lesjon</li> <li>• Inkluderer også komplett intrarenale lesjoner, ikke kontrastladende <math>\geq 3</math> cm</li> </ul>	Malignitet hos 2 - 10% utviklet over tid Overvåkning
Bosniak 3	
<ul style="list-style-type: none"> <li>• Fortykkede irregulære septa og cystevegger</li> <li>• Både septa og cystevegger kan være kontrastladende</li> <li>• Uregelmessige forkalkninger</li> </ul>	Malignitet hos 50% Overvåkning eller kirurgi i dnne gruppen havner også cyste med blødning og infeksjon
Bosniak 4	
<ul style="list-style-type: none"> <li>• Cystisk lesjon med kontrastladende komponenter</li> </ul>	89% er maligne Kirurgi

r

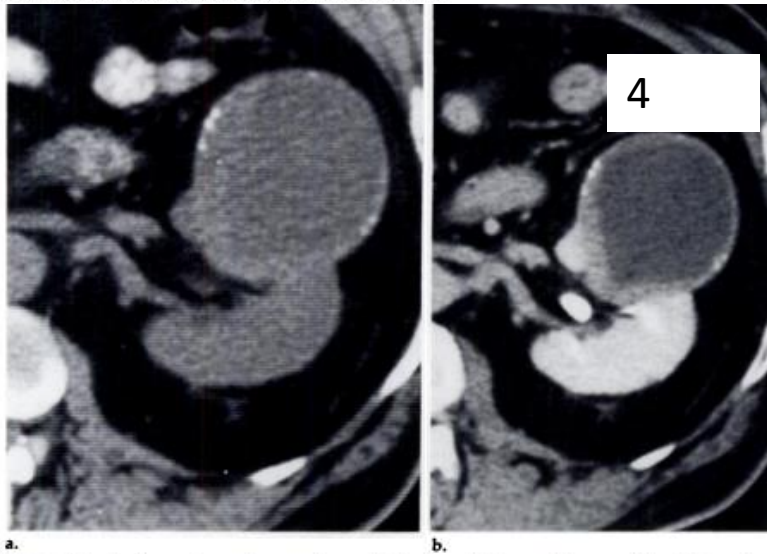
## Bosniak classification of renal cysts



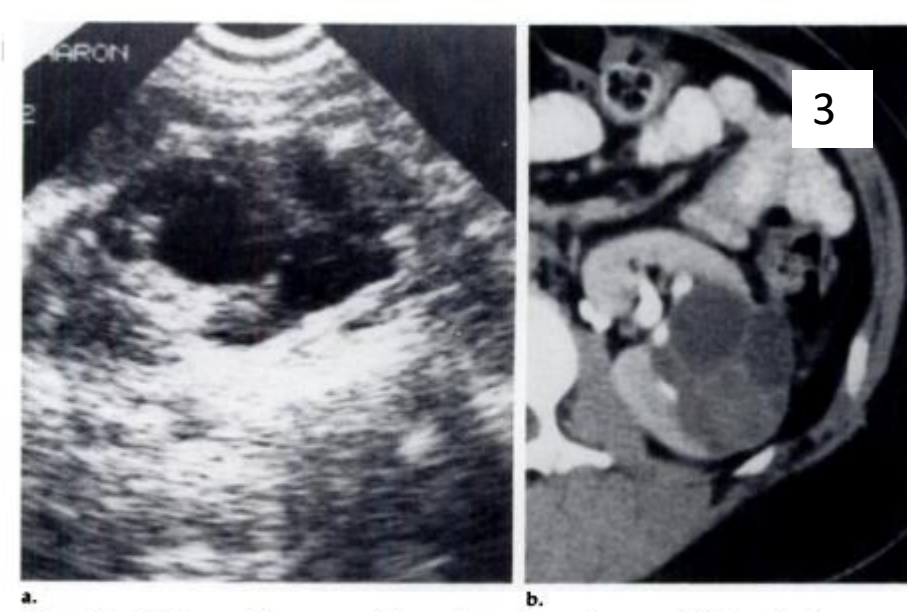


**Figure 7.** Minimally calcified benign cysts; category II lesion. (a, b) Two contrast-enhanced CT scans for two patients are shown. Both show small amounts of calcification in the wall of the cysts or in the cyst septa. There is no soft-tissue density or thickness associated with the focal calcification. Fluid in the cysts measured below 15 HU; there was no enhancement of the fluid or the walls of the lesions.

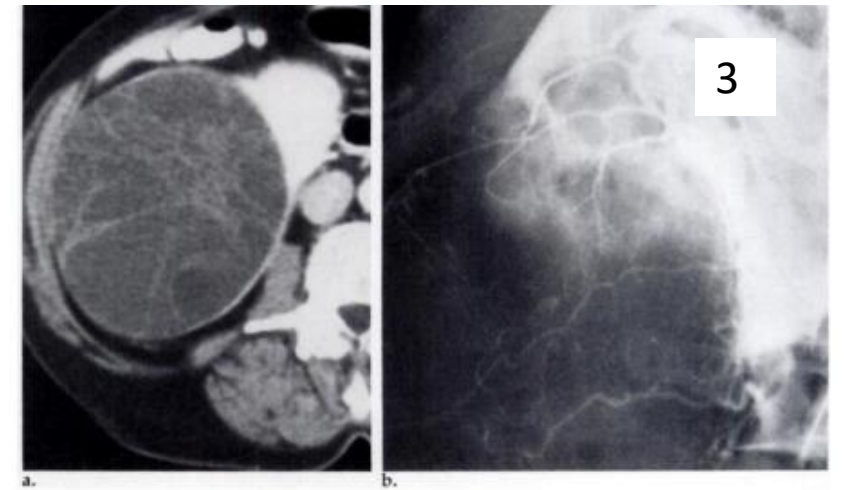
**Figure 8.** Hyperdense benign cyst; category II lesion. Contrast-enhanced CT scan shows a dense (68 HU) mass protruding from the outer margin of kidney. The lesion is homogeneous and smoothly margined and did not enhance following intravenous administration of contrast material. A follow-up scan obtained 4 years later showed no change.



**Figure 12.** Cystic renal neoplasm; category IV lesion. A 61-year-old man with a left renal mass. (a) Nonenhanced CT scan reveals a large, calcified, smoothly margined mass extending anteriorly from the left kidney. The fluid in the central portion of the mass measures 15 HU. (b) Contrast-enhanced CT scan reveals enhancement of the thickened medial wall of the lesion. No enhancement of the central portion of the mass was noted. A left nephrectomy was performed for a cystic renal cell carcinoma.

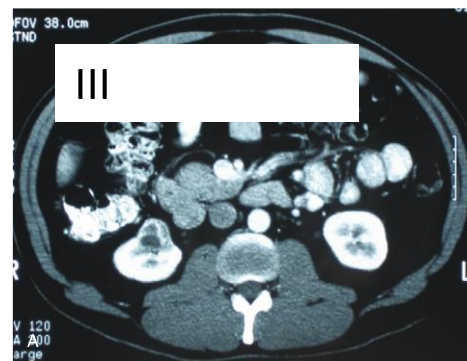
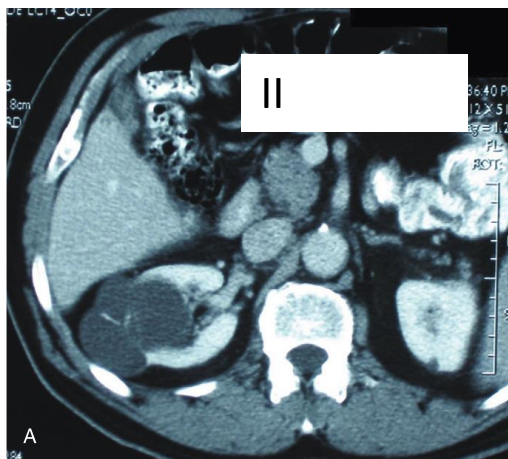


**Figure 11.** A 28-year-old woman with a cystic renal mass (category III) found using sonography during her pregnancy. (a) Sonogram demonstrates complicated cystic lesion with some solid-appearing elements among the cystic spaces. (b) CT scan reveals a conglomerate cystic mass with one solid-appearing area posteriorly with minimal enhancement. A partial nephrectomy was performed (kidney had duplicated collecting system), and a cystic renal cell carcinoma was found.



**Figure 9.** A 55-year-old woman with a large cystic lesion (category III) in right kidney. (a) Contrast-enhanced CT scan reveals mostly fluid-filled mass but multiple, minimally enhancing septa throughout. Some areas of confluence of septa, indicating solid elements, are seen. (b) Corresponding selective right renal angiogram demonstrates minimal vascularity in the lesion. While no obvious irregular "tumor vessels" are seen, vessels originating in the kidney are seen to traverse the mass. At surgery a benign multiloculated cystic nephroma was found and removed.

# Bilder av Bosniak cyster



### Bosniak Classification of Cystic Renal Masses, Version 2019: An Update Proposal and Needs Assessment

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\* S.G.S. and M.S.D. contributed equally to this work.

Conflicts of interest are listed at the end of this article.

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Cystic renal cell carcinoma (RCC) is almost certainly overdiagnosed and overtreated. Efforts to diagnose and treat RCC at a curable stage result in many benign neoplasms and indolent cancers being resected without clear benefit. This is especially true for cystic masses, which compared with solid masses are more likely to be benign and, when malignant, less aggressive. For more than 30 years, the Bosniak classification has been used to stratify the risk of malignancy in cystic renal masses. Although it is widely used and still effective, the classification does not formally incorporate masses identified at MRI or US or masses that are incompletely characterized but are highly likely to be benign, and it is affected by interreader variability and variable reported malignancy rates. The Bosniak classification system cannot fully differentiate aggressive from indolent cancers and results in many benign masses being resected. This proposed update to the Bosniak classification addresses some of these shortcomings. The primary modifications incorporate MRI, establish definitions for previously vague imaging terms, and enable a greater proportion of masses to enter lower-risk classes. Although the update will require validation, it aims to expand the number of cystic masses to which the Bosniak classification can be applied while improving its precision and accuracy for the likelihood of cancer in each class.

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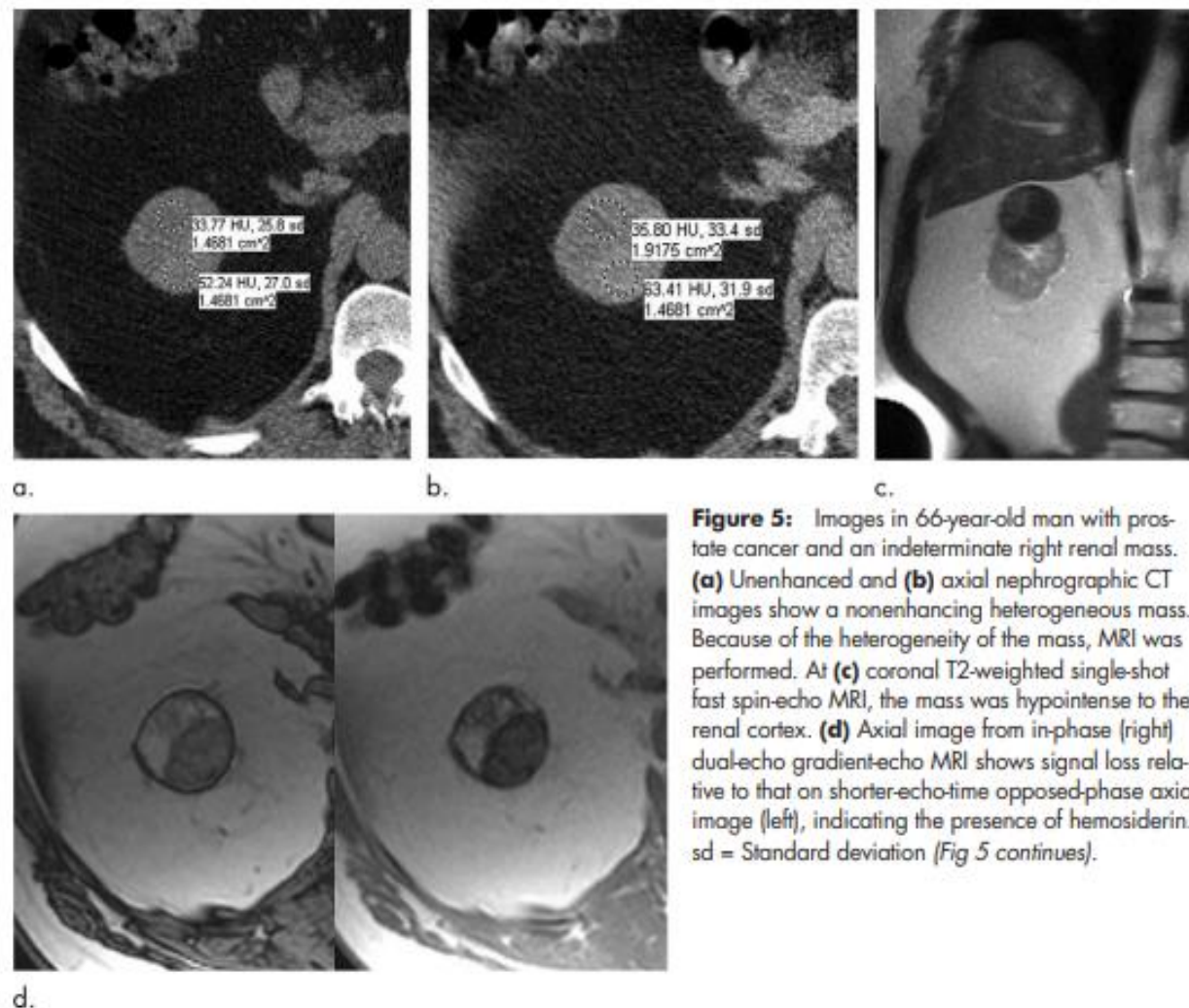
# Beskriver septa og vegger med i med mer Inkluderer MRI

Table 2: Proposed Update to the Bosniak Classification of Cystic Renal Masses		
Class	CT: Proposed Bosniak Classification, Version 2019*	MRI: Proposed Bosniak Classification, Version 2019*
I	Well-defined, <i>thin</i> ( $\leq 2$ mm) smooth wall; homogeneous simple fluid ( $-9$ to $20$ HU); no septa or calcifications; <i>the wall may enhance</i>	Well-defined, <i>thin</i> ( $\leq 2$ mm) smooth wall; homogeneous simple fluid ( <i>signal intensity similar to CSF</i> ); no septa or calcifications; <i>the wall may enhance</i>
II	Six types, all well-defined with thin ( $\leq 2$ mm) smooth walls: 1. Cystic masses with thin ( $\leq 2$ mm) and few (1–3) septa; septa and wall <i>may</i> enhance; may have calcification of any type <sup>†</sup> 2. Homogeneous hyperattenuating ( $\geq 70$ HU) masses at noncontrast CT 3. Homogeneous nonenhancing masses $> 20$ HU at renal mass protocol CT (73), may have calcification of any type <sup>†</sup> 4. Homogeneous masses $-9$ to $20$ HU at noncontrast CT 5. Homogeneous masses $21$ to $30$ HU at portal venous phase CT 6. Homogeneous low-attenuation masses that are too small to characterize	Three types, all well-defined with thin ( $\leq 2$ mm) smooth walls: 1. Cystic masses with thin ( $\leq 2$ mm) and few (1–3) enhancing septa; any nonenhancing septa; may have calcification of any type <sup>†</sup> 2. Homogeneous masses markedly hyperintense at T2-weighted imaging (similar to CSF) at noncontrast MRI 3. Homogeneous masses markedly hyperintense at T1-weighted imaging (approximately $\times 2.5$ normal parenchymal signal intensity) at noncontrast MRI
IIIF	Cystic masses with a smooth minimally thickened ( $3$ mm) enhancing wall, or smooth minimal thickening ( $3$ mm) of one or more enhancing septa, or many ( $\geq 4$ ) smooth thin ( $\leq 2$ mm) enhancing septa	Two types: 1. Cystic masses with a smooth minimally thickened ( $3$ mm) enhancing wall, or smooth minimal thickening ( $3$ mm) of one or more enhancing septa, or many ( $\geq 4$ ) smooth thin ( $\leq 2$ mm) enhancing septa 2. Cystic masses that are heterogeneously hyperintense at unenhanced fat-saturated T1-weighted imaging
III	One or more enhancing thick ( $\geq 4$ mm width) or enhancing irregular ( <i>displaying <math>\leq 3</math>-mm obtusely margined convex protrusion(s)</i> ) walls or septa	One or more enhancing thick ( $\geq 4$ mm width) or enhancing irregular ( <i>displaying <math>\leq 3</math>-mm obtusely margined convex protrusion(s)</i> ) walls or septa
IV	One or more enhancing nodule(s) ( $\geq 4$ -mm convex protrusion with obtuse margins, or a convex protrusion of any size that has acute margins)	One or more enhancing nodule(s) ( $\geq 4$ -mm convex protrusion with obtuse margins, or a convex protrusion of any size that has acute margins)

Note.—Italicized elements emphasize changes from the current Bosniak classification (10) (Table 1). For detailed definitions of terms, see Table 3. CSF = cerebrospinal fluid.

\* The Bosniak classification is intended for cystic renal masses after infectious, inflammatory, or vascular etiologies and necrotic solid masses are excluded. If a cystic mass has features described in more than one Bosniak class, the highest Bosniak class is assigned. In rare cases, a mass may have an unusual combination of features (undefined, not fitting a specific Bosniak class) that may warrant inclusion into Bosniak IIIF. Other than for the diagnosis of Bosniak I simple cysts, the role of US with or without contrast material in assigning a Bosniak class is uncertain.

† Renal masses that at CT have abundant thick or nodular calcifications; are hyperattenuating, homogeneous, nonenhancing, and larger than  $3$  cm; or are heterogeneous (including but not limited to many [four or more] nonenhancing septa or  $3$ -mm or larger nonenhancing septa or wall) might best be visualized at MRI prior to the assignment of a Bosniak class to determine if there are occult enhancing elements that might affect classification.



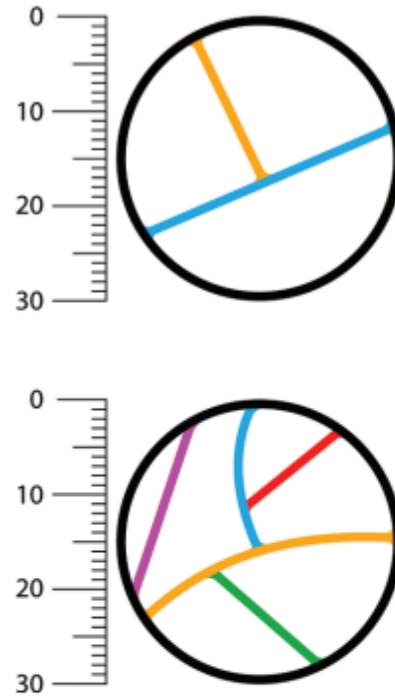
**Figure 5:** Images in 66-year-old man with prostate cancer and an indeterminate right renal mass. **(a)** Unenhanced and **(b)** axial nephrographic CT images show a nonenhancing heterogeneous mass. Because of the heterogeneity of the mass, MRI was performed. At **(c)** coronal T2-weighted single-shot fast spin-echo MRI, the mass was hypointense to the renal cortex. **(d)** Axial image from in-phase (right) dual-echo gradient-echo MRI shows signal loss relative to that on shorter-echo-time opposed-phase axial image (left), indicating the presence of hemosiderin. sd = Standard deviation (Fig 5 continues).

**Table 3 (continued): Proposed Modifications to the Definitions of Terms Used in the Bosniak Classification of Cystic Renal Masses, Version 2019**

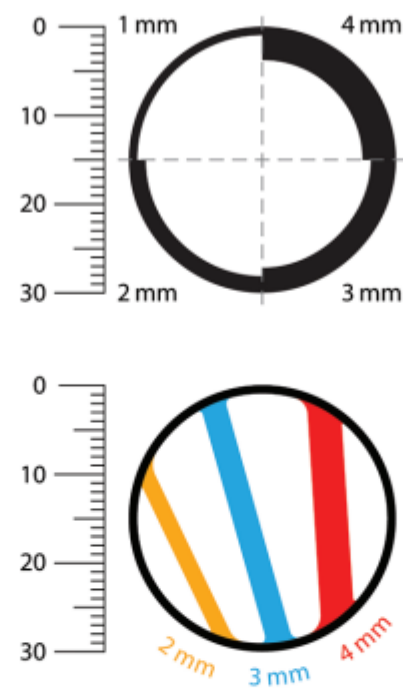
Term	Definition in the Current Bosniak Classification	Definition in the Proposed Bosniak Classification, Version 2019	Rationale for Change
Thickness (of wall or septa)			These changes are designed to optimize interreader agreement and improve the specificity of the Bosniak classification, particularly for Bosniak III masses. It is recognized that reliable measurements expressing 1-mm differences may not be feasible in clinical practice. However, radiologists are already attempting to make this determination on the basis of a subjective evaluation without clear guidance on how to define these terms. These quantitative criteria are intended to serve as guideposts rather than absolute expressions.
Hairline (or pencil) thin	Not defined, feature of the wall of a simple cyst	Not included (see "thin")	
Thin	Not defined, feature of the wall or septa of a Bosniak II cyst	≤2 mm in thickness, feature of the wall or septa of a Bosniak II cyst, or wall of a simple cyst	
Minimally thickened	Not defined, feature of the wall or septa of a Bosniak IIF mass	3 mm in thickness, feature of the enhancing wall or septa of a Bosniak IIF mass	
Thick	Not defined, feature of the wall or septa of a Bosniak III mass	≥4 mm in thickness, feature of the enhancing wall or septa of a Bosniak III mass	
Irregular thickening (wall or septa)*	Not defined, feature of a Bosniak III mass	≤3 mm focal or diffuse enhancing convex protrusion(s) that have obtuse margins with the wall or septa, feature of a Bosniak III mass	This change is designed to reduce confusion between irregular thickening (feature of Bosniak III) and nodule(s) (feature of Bosniak IV), particularly when the irregular thickening is focal.
Nodule*	Not defined	Focal enhancing convex protrusion of any size that has acute margins with the wall or septa, or a focal enhancing convex protrusion ≥ 4 mm that has obtuse margins with the wall or septa; both are features of a Bosniak IV mass	This change is designed to reduce the percentage of resected Bosniak IV masses that are benign and to differentiate a nodule from (a) irregular thickening, which has smaller obtusely marginated convex protrusion(s); and (b) focal thickening that occurs at the confluence of two or more septa.

Note.—Unless otherwise specified, features may be assessed at CT or MRI.

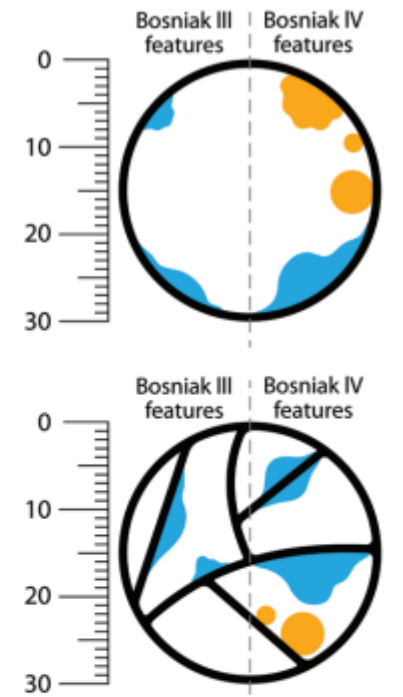
\* Convex protrusions arising from a wall or septa are either nodules (any size if acute margins with walls or septa, or ≥ 4 mm if obtuse margins with wall or septa) or irregular thickening (≤ 3 mm if obtuse margins with wall or septa). Size measurements are obtained perpendicular to the wall or septa of origin. If convex protrusion(s) are on both sides of a wall or septum, the cumulative perpendicular distance is used and excludes the thickness of the underlying wall or septum.



**Figure 1:** Determination of number of septa with the Bosniak classification of cystic renal masses, version 2019. Example of Bosniak II cyst (top) and IIF cystic mass (bottom) classified on the basis of the number of thin (≤2 mm) septa. A septum is defined as a linear or curvilinear structure that connects two surfaces. Each differently colored line indicates a unique septum (two on top, five on bottom).



**Figure 2:** Determination of wall and septa thickness by using the Bosniak classification of cystic renal masses, version 2019. Images show example thicknesses of the walls and septa within 30-mm cystic masses (measurements are to scale). A smooth, thin (≤2-mm) wall is a feature of a Bosniak I cyst, a smooth and thin (≤2-mm) wall and septa are features of a Bosniak II cyst, a smooth and minimally thickened (3-mm) wall or septa is a feature of a Bosniak IIF mass, and a thickened (≥4-mm) enhancing wall or septa is a feature of a Bosniak III mass. The wall in the bottom image is 1 mm thick.



**Figure 3:** Distinguishing wall and septa irregularity from nodules by using the Bosniak classification of cystic renal masses, version 2019. Images show examples of convex protrusions within 30-mm Bosniak III and Bosniak IV cystic masses (measurements are to scale). A smooth, thin (≤2-mm) wall and septa are features of a Bosniak I cyst, a smooth and thin (≤2-mm) wall and septa are features of a Bosniak II cyst, a smooth and minimally thickened (3-mm) wall or septa is a feature of a Bosniak IIF mass, and a thickened (≥4-mm) enhancing wall or septa is a feature of a Bosniak III mass. The wall in the bottom image is 1 mm thick.



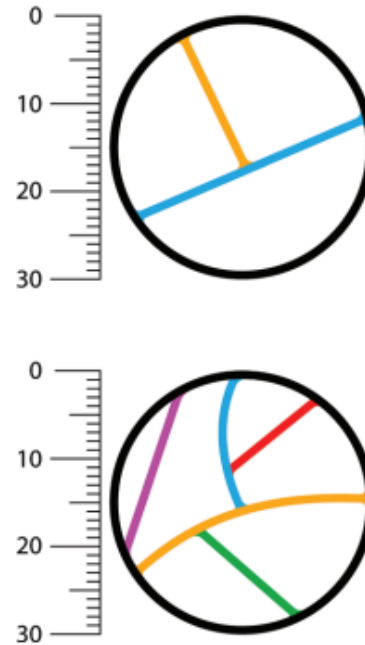
# Godt vi har radiologer 😊

**Table 3 (continued): Proposed Modifications to the Definitions of Terms Used in the Bosniak Classification of Cystic Renal Masses, Version 2019**

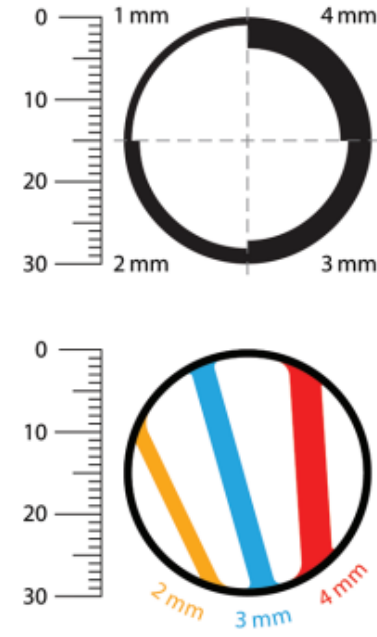
Term	Definition in the Current Bosniak Classification	Definition in the Proposed Bosniak Classification, Version 2019	Rationale for Change
Thickness (of wall or septa)			These changes are designed to optimize interreader agreement and improve the specificity of the Bosniak classification, particularly for Bosniak III masses. It is recognized that reliable measurements expressing 1-mm differences may not be feasible in clinical practice. However, radiologists are already attempting to make this determination on the basis of a subjective evaluation without clear guidance on how to define these terms. These quantitative criteria are intended to serve as guideposts rather than absolute expressions.
Hairline (or pencil) thin	Not defined, feature of the wall of a simple cyst	Not included (see "thin")	
Thin	Not defined, feature of the wall or septa of a Bosniak II cyst	≤2 mm in thickness, feature of the wall or septa of a Bosniak II cyst, or wall of a simple cyst	
Minimally thickened	Not defined, feature of the wall or septa of a Bosniak IIF mass	3 mm in thickness, feature of the enhancing wall or septa of a Bosniak IIF mass	
Thick	Not defined, feature of the wall or septa of a Bosniak III mass	≥4 mm in thickness, feature of the enhancing wall or septa of a Bosniak III mass	
Irregular thickening (wall or septa)*	Not defined, feature of a Bosniak III mass	≤3 mm focal or diffuse enhancing convex protrusion(s) that have obtuse margins with the wall or septa, feature of a Bosniak III mass	This change is designed to reduce confusion between irregular thickening (feature of Bosniak III) and nodule(s) (feature of Bosniak IV), particularly when the irregular thickening is focal.
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Note.—Unless otherwise specified, features may be assessed at CT or MRI.

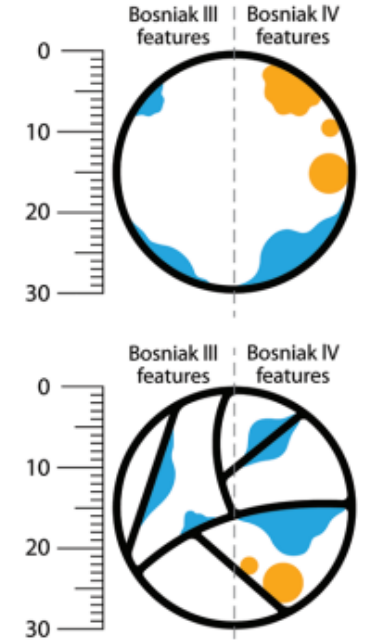
\* Convex protrusions arising from a wall or septa are either nodules (any size if acute margins with walls or septa, or ≥ 4 mm if obtuse margins with wall or septa) or irregular thickening (≤ 3 mm if obtuse margins with wall or septa). Size measurements are obtained perpendicular to the wall or septa of origin. If convex protrusion(s) are on both sides of a wall or septum, the cumulative perpendicular distance is used and excludes the thickness of the underlying wall or septum.



**Figure 1:** Determination of number of septa with the Bosniak classification of cystic renal masses, version 2019. Example of Bosniak II cyst (top) and IIF cystic mass (bottom) classified on the basis of the number of thin (≤2 mm) septa. A septum is defined as a linear or curvilinear structure that connects two surfaces. Each differently colored line indicates a unique septum (two on top, five on bottom).



**Figure 2:** Determination of wall and septa thickness by using the Bosniak classification of cystic renal masses, version 2019. Images show example thicknesses of the walls and septa within 30-mm cystic masses (measurements are to scale). A smooth, thin (≤2-mm) wall is a feature of a Bosniak II cyst, a smooth and thin (≤2-mm) wall and septa are features of a Bosniak IIF mass, and a thickened (≥4-mm) enhancing wall or septa is a feature of a Bosniak III mass. The wall in the bottom image is 1 mm thick.



**Figure 3:** Distinguishing wall and septa irregularity from nodules by using the Bosniak classification of cystic renal masses, version 2019. Images show examples of convex protrusions within 30-mm Bosniak III and Bosniak IV cystic masses (measurements are to scale). Enhancing convex protrusions that arise from a wall or septa are either nodules (any size if they have acute margins with the walls or septa, or ≥ 4 mm if they have obtuse margins with the wall or septa [a feature of Bosniak IV]) or irregular thickening (≤3 mm if they have obtuse margins with wall or septa, a feature of Bosniak III). Size measurements

# Malignitetsrate

## Metaanalyse Schoots 2017

- 6-18% B2f
- 51-55% B3
- 89-91% B4
- Metastaser kun sett hos 0.8%
- Ingen metastaser hos dem som var i AS og B3

# Studie fra Helsinki

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OPEN

## Active surveillance versus initial surgery in the long-term management of Bosniak IIF–IV cystic renal masses

Lassi Luomala<sup>1</sup>, Juhana Rautiola<sup>1</sup>, Petrus Järvinen<sup>1</sup>, Tuomas Mirtti<sup>2,3</sup> & Harry Nisén<sup>1</sup>

There may be surgical overtreatment of complex cystic renal masses (CRM). Growing evidence supports active surveillance (AS) for the management for Bosniak IIF–III CRMs. We aimed to evaluate and compare oncological and pathological outcomes of Bosniak IIF–IV CRMs treated by initial surgery (IS) or AS. We identified retrospectively 532 patients with CRM counseled during 2006–2017. IS and AS were delivered to, respectively, 1 and 286 patients in Bosniak IIF, to 54 and 85 patients in III and to 85 and 21 patients in Bosniak IV. Median follow-up was 66 months (IQR 50–96). Metastatic progression occurred for 1 (0.3%) AS patient in Bosniak IIF, 1 IS (1.8%) and 1 AS (1.2%) patient in Bosniak III and 5 IS (3.5%) patients in Bosniak IV, respectively. Overall 5-year metastasis-free survival was 98.9% and cancer-specific survival was 99.6% without statistically significant difference between IS and AS in Bosniak IIF–IV categories. AS did not increase the risk of metastatic spread or cancer-specific mortality in patients with Bosniak IIF–IV. Our data indicate AS in Bosniak IIF and III is safe. Surgery is the primary treatment for Bosniak IV due to its high malignancy rate.

# Helsinki 2022- retrospektiv 532 pasienter 2f, 3, 4

- 2f - 287 pasienter – 286 AS – 1 IS (0,3%) og 11 DS
  - 5 maligne(42%)
  - Oppgradert i 6,3% hvorav 50% maligne
  - 1 pasient med metastatisk progresjon
- 3 - 139 pasienter - 85 AS – 54 IS( 39%) og 18 DS
  - 56 maligne(78 %)
  - 2 som utviklet metastaser ( 1 på AS og 1 i IS)
- 4 - 106 pasienter – 21 As - 85 IS (80%) og 15 DS
  - 88 maligne (88%)
- Nodulære karakteristika mer maligne? (Sefik et al 2019)
- Observasjonstid 60-70 måneder

IS – immediate surgery  
DS – delayed surgery  
AS - active surveillance

# Hva gjør vi?

## KLASSIFISERING OG DIAGNOSTIKK

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- Klassifiseres som Bosniak 1-4 ved CT nyre i flere faser (må minimum ha tom- og kontrastfase)
- **Bosniak 1:** simple cyster som *ikke* trenger oppfølging
- **Bosniak 2:** komplekse cyster som *ikke* trenger oppfølging
- **Bosniak 2f - 4:** komplekse cyster som trenger oppfølging eller behandling
- Pasientens alder, funksjonsklasse og komorbiditet må implementeres i vurderingen
- Hyperdense cyster er proteinrike cyster som har homogen høy tetthet på CT tomfase (ofte > 60 HU), og uendret tetthet etter iv kontrast
- En økning i tetthet med 15 HU -20 HU på CT med kontrast indikerer en solid lesjon
- **Pseudoenhancement** innebærer et "falsk" kontrastopptak på CT, typisk ved små cyster (< 2 cm) som er omgitt av kontrastladende parenkym. Supplerende kontrastforsterket ultralyd eller MR kan være nyttig ved uklare funn
- Noen ganger er det vanskelig å skille mellom maligne cyster og cystisk nekrose i malign tumor
- Ved tvil om klassifisering/oppfølging/behandling henvises pasienter til urolog og vurdering ved MDT nyre

# Oppfølging

Metodebok.no

## OPPFØLGING OG BEHANDLING

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### Bosniak 1: Ingen kontroll, avsluttes

- Store cyster med trykksymptomer kan søkes til tapping og sklerosering ved røntgenavdelingen
- De fleste cyster oppfyller disse kriteriene og kan beskrives godt både på CT, MR og ultralyd

### Bosniak 2: Ingen kontroll, avsluttes

#### Bosniak 2F: Overvåkning

- *Billedkontroll ved 1 år, 3 år og 5-6 år*
- Nedgradering til B1 eller B2: avsluttes
- Oppgradering til B3 eller B4: se under
- Cyster uten vesentlig endring eller oppgradering etter 5 år, avsluttes
- Ved kun minimale endringer av B2f kan man i noen tilfelle avslutte ved 3 år
- Cyster kan endre seg på ulik måte;
  - Økt størrelse
  - Mer kalk
  - Flere og tykkere kontrastladende septa
  - Ved sluttkontroll vil ikke endret cystestørrelse og kalkmengde kreve videre overvåkning i motsetning til flere og tykkere kontrastladende septa
- Dersom primærbildet er CT abdomen og cysten ser ut som B2f, bestilles CT nyrer til ett-årskontrollen
- Dersom cysten ser ut som en B3, B4 eller evt en solid tumor med cystisk element bestilles CT nyrer umiddelbart

#### Bosniak 3: Overvåkning eller kirurgi

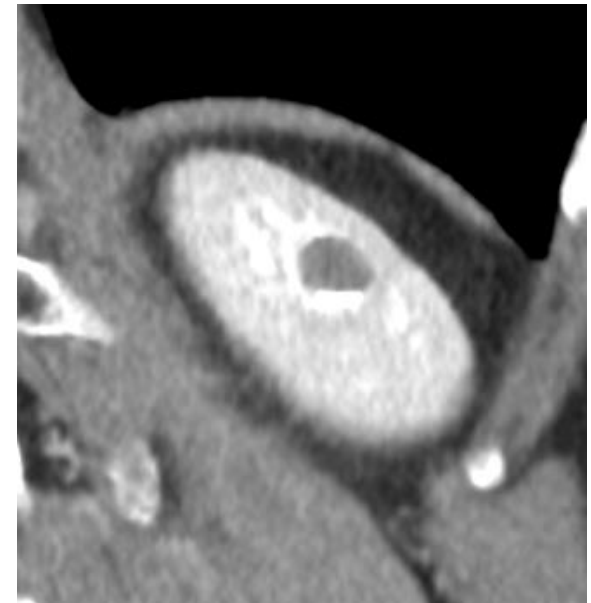
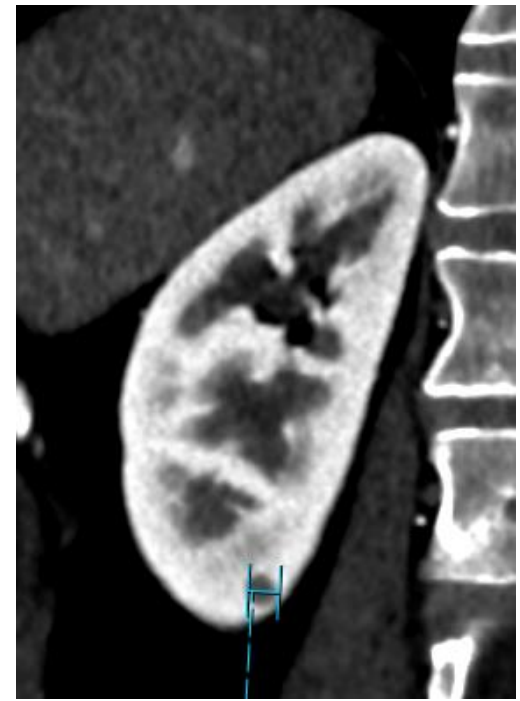
- Overvåkning med billedkontroll ved 1, 3 og 5 år
- Ved kirurgi tilrådes nyrereseksjon(NSS) om mulig, åpen eller laparoskopisk
- Biopsi er utfordrende og brukes kun om cysten **har solide elementer**

#### Bosniak 4: Kirurgi eller Surveillance

- Kirurgi i form av NSS anbefales da de fleste er maligne
- Surveillance og biopsi er aktuelt ved eldre og komorbide pasienter

# Utfordringer

- Antall henvisninger
- Forbruk av tid for leger og pasienter
- Små lesjoner
- Få Studier korrelere radiologi mot patologi
- Små studier - seleksjonbias uungåelig?
- Retrospektive studier



# Kostnader ved kontroll av cyster

Irish Journal of Medical Science (1971 -) (2022) 191:2771–2775  
<https://doi.org/10.1007/s11845-022-02919-w>

ORIGINAL ARTICLE



## Assessment of the workload and financial burden of Bosniak IIF renal cyst surveillance in a tertiary referral hospital

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### Abstract

**Background** The Bosniak classification is a CT classification which stratifies renal cysts based on imaging appearances and therefore associated risk of malignancy. Bosniak IIf cysts are renal which have complex features and therefore require surveillance.

**Aims** The aim of this study is to assess the economic and workload burden of diagnosing and following up Bosniak IIf cysts on the urology service in a tertiary hospital in the West of Ireland.

**Methods** All patients with a diagnosis of Bosniak IIf renal cysts attending our urology service between 1st of January 2012 and 31st December 2020 were analysed. The following data were collected: number and modality of follow up scans, number of MDT discussions, number and type of outpatient appointments, surgical intervention, and length of follow up. Financial data were provided by the hospital finance department.

**Results** One hundred and sixty-two patients were included. Total cost of follow up was €164,056, costing €1,012.7 per patient. Cost of outpatient visits was €77,850. Follow-up length ranged from 1 to 109 months, median follow up time 17.5 months. Overall cost of imaging was €74,518. There were a total of 80 MDT discussions at an overall cost of €11,688.

**Conclusions** This study demonstrates that surveillance of patients with Bosniak IIf renal cysts represents a significant burden upon both radiology and urology services. Surveillance for these patients could be streamlined in the future through a number of initiatives such as virtual OPDs and dedicated MDTs.

Table 2 Cost summary

Intervention	Cost per unit	Total number of units	Total cost
CT	€170	224	€38080
MRI	€180	33	€5940
USS	€102	299	€30498
OPD	€150	519	€77850
MDT	€146.1	80	€11688
Total cost			€164056
Cost per patient			€1012.7

- CT
- MRI
- Ultralyd
- Frekvens for kontroller
- Reise vei
- Fri fra jobb
- Etc.....



# Handlingsprogrammet nyrekreft

## 5.6. Atypiske cyster

Cystiske lesjoner med solid vev < 25 % av størrelsen klassifiseres etter Bosniak, mens lesjoner med > 25 % solid vev defineres som en cystisk tumor (Corica et al., 1999).

Bosniak klassifikasjonen benyttes til å stratifisere risiko for malignitet ved atypiske cyster basert på bildediagnostiske trekk og ikke malignitetsgrad. Maligne cystiske tumorer oppfører seg oftest indolent (lavgradig og tidlig stadium) og er både overdiagnostisert og overbehandlet (Jhaveri et al., 2013; Silverman et al., 2019). Særlig Bosniak III gruppen er overbehandlet, da ca. 50 % er benigne. Sett i lys av dette og at denne gruppe har en meget bra prognose, er aktiv overvåking et godt alternativ til operasjon. Klassifikasjonen har vist seg mer nøyaktig for de øvrige gruppene (Schoots et al., 2017), men kan ikke fullstendig differensiere mellom aggressive og indolente tumorer og inkorporerer verken MR eller UL. Oppdatert Bosniak versjon 2019 inkluderer nå MR og anbefales tatt i bruk (Tse et al., 2020). Bosniak klassifisering skal ikke benyttes ved genetiske tilstander forbundet med økt risiko for nyrecellekarsinom.

Den oppdaterte klassifiseringen:

- Øker spesifisiteten for malignitet.
- Øker andelen av cystiske lesjoner som observeres eller ignoreres.
- Øker samsvar mellom observatører vha. spesifikke definisjoner.
- Inkludere MR, som har høyere sensitivitet og spesifisitet enn CT.
- Standardiserer rapporteringsanbefalinger.

Bosniak kalkulator finnes som app eller på <https://bio.tools/bosniak-calculator>.

UL med kontrast (CEUS) er foreløpig ikke inkludert i Bosniak 2019-versjonen, selv om den har høyere kontrastoppløsning enn CT (og MR): CEUS gir mer detaljert informasjon om septa, vegger og oppladning som ikke fremstilles på CT. På bakgrunn av den overlegne temporospatiale oppløsningen har det medført en tendens til oppgradering når man brukte de originale Bosniak kriterier for kategorisering. En CEUS adaptert Bosniak-kategorisering som presentert av EFSUMB (European Federation of Societies for Ultrasound in Medicine and Biology), har potensiale til å forbedre karakteristikk av lesjonen (Cantisani et al., 2021). Dette vil ikke eliminere subjektiviteten i tolkningen og bør ansees som komplementært til CT og MR i utvalgte tilfeller. CEUS har et stort strålebesparende potensiale og anvendes trolig for lite dags per dato. Man oppmuntrer de sykehusene som har høy kompetanse på UL med kontrast til å fortsette med CEUS som supplerende modalitet. CEUS vil sannsynligvis bli inkludert i en senere Bosniak oppdatering.