

Abstract no.: PR. 1-5

Outcomes of Cystic Versus Solid Renal Masses After Surgery: A Prospective Cohort Study

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Objective

To compare clinical characteristics, perioperative outcomes, histopathological features, and oncological outcomes between patients with **cystic versus solid renal masses** treated surgically.

Patients and Methods

Timeline

- January 2017 - May 2024

Inclusion

- A total of 993 patients with cT1-T2 renal masses undergoing partial or radical

Cohort grouping

- Cystic masses** (N= 128) (13%)
- Solid masses** (N=865) (87%)

Analysis

- Multivariable logistic regression assessed predictors of malignancy
- Disease-free survival (DFS) analyzed using Kaplan-Meier curves (median follow-up: 27 months)

Results

- Malignancy rates: **86% (cystic) vs 74% (solid)** ($p < 0.001$)
- Bosniak IV cysts: 96% malignancy rate vs 74% for Bosniak IIF-III ($p < 0.001$)
- Independent predictors of malignancy: **tumour diameter** (OR 1.14/cm, $p = 0.004$), **smoking** (OR 1.46, $p = 0.019$), **Tumour nature (Bosniak IV vs solid mass)** (OR 6.03, $p = 0.003$)
- DFS** at 3 and 5 years: 92% and 89% overall; **similar** between cystic and solid masses ($p = 0.7$)

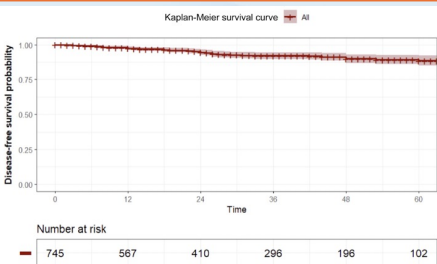


Figure 1. Kaplan-Meier plot of disease-free survival (DFS) for patients with malignant tumours in the overall cohort (n=745)

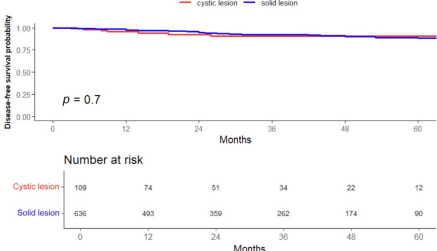


Figure 2. Kaplan-Meier plot of disease-free survival (DFS) stratified by tumour nature (solid vs cystic, $p = 0.7$)

Table 1. Preoperative characteristics of the study cohort, stratified by tumour nature

	Cystic (n=128)	Solid (n=865)	P value
Age (year), median (IQR)	64 (54–74)	67 (57–74)	0.3
Male gender, n (%)	86 (67)	590 (68)	0.8
Smoker, n (%)			0.019
Former	42 (33)	300 (35)	
Current	32 (25)	132 (15)	
Body mass index, median (IQR)	25.2 (23.2–28.7)	25.9 (23.8–28.7)	0.3
ASA ≥ 2 , n (%)	101 (79)	711 (82)	0.4
Preoperative eGFR, median 80 (65.1–95) (IQR)	81 (65–93)	81 (65–93)	0.7
Tumour diameter (cm), median (IQR)	4.0 (2.8–6)	3.2 (2.4–4.5)	<0.001
Bosniak IV, n (%)	69 (54)		
cTNM, n (%)			<0.001
cT1a	66 (52)	581 (67)	
cT1b	39 (30)	219 (25)	
cT2a	17 (13)	52 (6.0)	
cT2b	6 (4.7)	13 (1.5)	
Positive surgical margins, n (%)	3 (2.3)	138 (16)	<0.001

Table 2. Intraoperative, postoperative, and histopathological outcomes, stratified by tumour nature

	Cystic (n=128)	Solid (n=865)	P value
Partial nephrectomy, n (%)	107 (84)	724 (84)	0.2
Warm ischemic time* (min), median (IQR)	18 (14–22)	18 (14–23)	0.3
Major postoperative complications (Clavien-Dindo ≥ 3), n (%)	4 (3.1)	23 (2.7)	0.6
Length of hospital stay, median (IQR)	4 (3–5)	4 (4–5)	0.2
eGFR (ml/min/1.73 m ²), at discharge, median (IQR)	79 (56.2–92.1)	73 (55.0–89.7)	0.4
Benign tumour, n (%)	18 (14)	193 (23)	<0.001
Histotype (malignant tumours), n (%)			0.021
Clear cell RCC	46 (36)	420 (51)	
Papillary RCC	36 (28)	109 (13)	
Chromophobe RCC	1 (0.8)	67 (7.7)	
Other malignancy	26 (20)	40 (4.6)	
pT stage, n (%)			<0.001
pT1a	60 (55)	396 (62)	
pT1b	31 (28)	82 (13)	
pT2	18 (17)	158 (25)	
ISUP grade, n (%)			0.2
1–2	56 (62)	297 (55)	
3–4	34 (38)	245 (45)	
Leibovich score (in ccRCCs), n (%)			0.035
Low	39 (85)	287 (68)	
Intermediate	7 (15)	97 (23)	
High	0 (0)	36 (8.6)	

*patients undergoing on-clamp partial nephrectomy

Conclusion

- Cystic** renal masses had **higher malignancy rates** but **similar DFS** to solid masses
- Tumour size, smoking status and tumour nature** were independent predictors of malignancy
- Risk-adapted postoperative surveillance recommended