

# History and importance of the Bosniak classification for complex renal cysts

*Histórico e importância da classificação de Bosniak para cistos renais complexos*

Rafael Moreira Cobo<sup>1</sup>, Leonardo Kayat Bittencourt<sup>2</sup>

The study of the urogenital system has been subject of interest amongst the Brazilian radiological community<sup>(1-7)</sup>. In the context of this subspecialty, renal cystic lesions constitute an extremely frequent finding (in 50% of the population above the age of 50)<sup>(8)</sup>, sometimes representing a great challenge in daily radiological practice. This theme of high relevance is constantly object of debate among surgeons and medical imaging professionals, since the differentiation between benign complex cysts and renal cystic carcinomas is of paramount relevance for the choice of the therapeutic approach<sup>(3,9-11)</sup>.

Considering the importance and complexity of renal cysts presentation, Morton A. Bosniak, in 1986, published a study proposing a categorization of such lesions in order to standardize the description of such lesions and their approach based on findings at intravenous contrast-enhanced computed tomography<sup>(9)</sup>. The original description proposed by Bosniak for 28 years ago is widely used nowadays with few changes, corroborating the relevance of a full command of the classification of these lesions by radiologists and urologists in their daily practices<sup>(3,12,13)</sup>.

Initially, the cysts were classified from I to IV, where I corresponded to a simple cyst; II, a minimally complex cyst with low malignancy probability; III, a complex cyst with moderate malignancy probability; and IV, a cyst with a frankly solid component and high malignancy probability<sup>(9)</sup>. The categories I and IV have always presented a great interobserver agreement in relation to their descriptions and approach, but, at the first years, there was a great interobserver disagreement in relation to the categories II and III. As a cyst was not sufficiently complex to fulfill the characteristics to be included in category III, but presented with somewhat complex characteristics to be classified as II, questionings were raised as regards the approach to be adopted, i.e., surgical approach for category III and finishing investigation for category II<sup>(12,14)</sup>. Then, the category IIF was created, suggesting serial imaging follow-up for cysts with those characteristics<sup>(3,12-15)</sup>.

Over almost 30 years of the Bosniak classification, several studies have been published with numbers which corroborate the efficacy and reproducibility of such classification in the radiologists' daily practice<sup>(11,12,16)</sup>. For this reason, the review article published by Muglia and Westphalen in the present issue of **Radiologia Brasileira**<sup>(17)</sup> is extremely important as the authors make a historical review of the main publications approaching the theme, with an overview of the classification in the current days, focusing on

the most complex and controversial elements such as the differentiation of categories II, IIF and III<sup>(15)</sup>, the impact of the utilization of the category IIF on the clinical practice, and the follow-up of cysts IIF<sup>(8,10,13)</sup>. The article also approaches the utilization of other imaging methods (ultrasonography and magnetic resonance imaging) in comparison with computed tomography in the diagnosis and clinical management of these cysts<sup>(18)</sup>, besides indicating future and promising prospects with the use of intravenous contrast-enhanced ultrasonography<sup>(19)</sup> and diffusion-weighted magnetic resonance imaging.

## REFERENCES

1. Resende DAQ, Souza LRMF, Monteiro IO, et al. Scrotal collections: pictorial essay correlating sonographic with magnetic resonance imaging findings. *Radiol Bras.* 2014;47:43-8.
2. Pereira-Silva RR, Esperancini-Tebar D. Lithium nephropathy: a case report. *Radiol Bras.* 2014;47:57-9.
3. Miranda CMNR, Maranhão CPM, Santos CJJ, et al. Bosniak classification of renal cystic lesions according to multidetector computed tomography findings. *Radiol Bras.* 2014;47:115-21.
4. Maranhão CPM, Miranda CMNR, Santos CJJ, et al. Congenital upper urinary tract abnormalities: new images of the same diseases. *Radiol Bras.* 2013;46:43-50.
5. Gonçalves E, Maia BT, Versiani CM, et al. Unilateral emphysematous pyelitis: case report. *Radiol Bras.* 2013;46:56-8.
6. Franca CAS, Vieira SL, Carvalho ACP, et al. Relationship between two year PSA nadir and biochemical recurrence in prostate cancer patients treated with iodine-125 brachytherapy. *Radiol Bras.* 2014;47:89-93.
7. Bittencourt LK, Hausmann D, Sabaneef N, et al. Multiparametric magnetic resonance imaging of the prostate: current concepts. *Radiol Bras.* 2014;47:292-300.
8. Hwang JH, Lee CK, Yu HS, et al. Clinical outcomes of Bosniak category IIF complex renal cysts in Korean patients. *Korean J Urol.* 2012;53:386-90.
9. Bosniak MA. The current radiological approach to renal cysts. *Radiology.* 1986;158:1-10.
10. El-Mokadem I, Budak M, Pillai S, et al. Progression, interobserver agreement, and malignancy rate in complex renal cysts (≥ Bosniak category IIF). *Urol Oncol.* 2014;32:24.e21-7.
11. Hartman DS, Choyke PL, Hartman MS. From the RSNA refresher courses: a practical approach to the cystic renal mass. *Radiographics.* 2004;24 Suppl 1:S101-15.
12. Bosniak MA. The Bosniak renal cyst classification: 25 years later. *Radiology.* 2012;262:781-5.
13. Graumann O, Osther SS, Osther PJS. Characterization of complex renal cysts: a critical evaluation of the Bosniak classification. *Scand J Urol Nephrol.* 2011;45:84-90.
14. Bosniak MA. Diagnosis and management of patients with complicated cystic lesions of the kidney. *AJR Am J Roentgenol.* 1997;169:819-21.
15. Smith AD, Remer EM, Cox KL, et al. Bosniak category IIF and III cystic renal lesions: outcomes and associations. *Radiology.* 2012;262:152-60.
16. Israel GM, Bosniak MA. Pitfalls in renal mass evaluation and how to avoid them. *Radiographics.* 2008;28:1325-38.
17. Muglia VF, Westphalen AC. Classificação de Bosniak para cistos renais complexos: histórico e análise crítica. *Radiol Bras.* 2014;47:368-73.
18. Israel GM, Hindman N, Bosniak MA. Evaluation of cystic renal masses: comparison of CT and MR imaging by using the Bosniak classification system. *Radiology.* 2004;231:365-71.
19. Quail E, Bertolotto M, Cioffi V, et al. Comparison of contrast-enhanced sonography with unenhanced sonography and contrast-enhanced CT in the diagnosis of malignancy in complex cystic renal masses. *AJR Am J Roentgenol.* 2008;191:1239-49.

1. MD, Radiologist, Unit of Internal Medicine at Clínica CDPI, Rio de Janeiro, RJ, Brazil. E-mail: rafaelmoreiracobocob@gmail.com.

2. PhD, Associate Professor, Department of Radiology, Universidade Federal Fluminense (UFF), Niterói, RJ, MD, Radiologist, Unit of Internal Medicine at Clínica CDPI, Rio de Janeiro, RJ, Brazil. E-mail: lkayat@gmail.com.