Int J Clin Oncol (2004) 9:139–141
DOI 10.1007/s10147-003-0367-z

LETTER TO THE EDITOR

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Is higher contrast-enhancement on post-contrast CT image enough to make the differential diagnosis between AML and RCC?

Received: September 17, 2003 / Accepted: November 25, 2003

To the Editor

In the case report of Hosokawa et al.,[1] the authors stated that the difference between angiomyolipoma (AML) and tubulo-papillary renal cell carcinoma (RCC) was that AML had higher contrast-enhancement on computed tomography (CT) images after contrast injection. However, in our experience, nearly all renal tumors (including typical RCC) will show "lower" attenuation as compared to the normal renal parenchyma on contrast-enhanced CT (Figs. 1–3). The rate of enhancement may only differentiate renal tu-

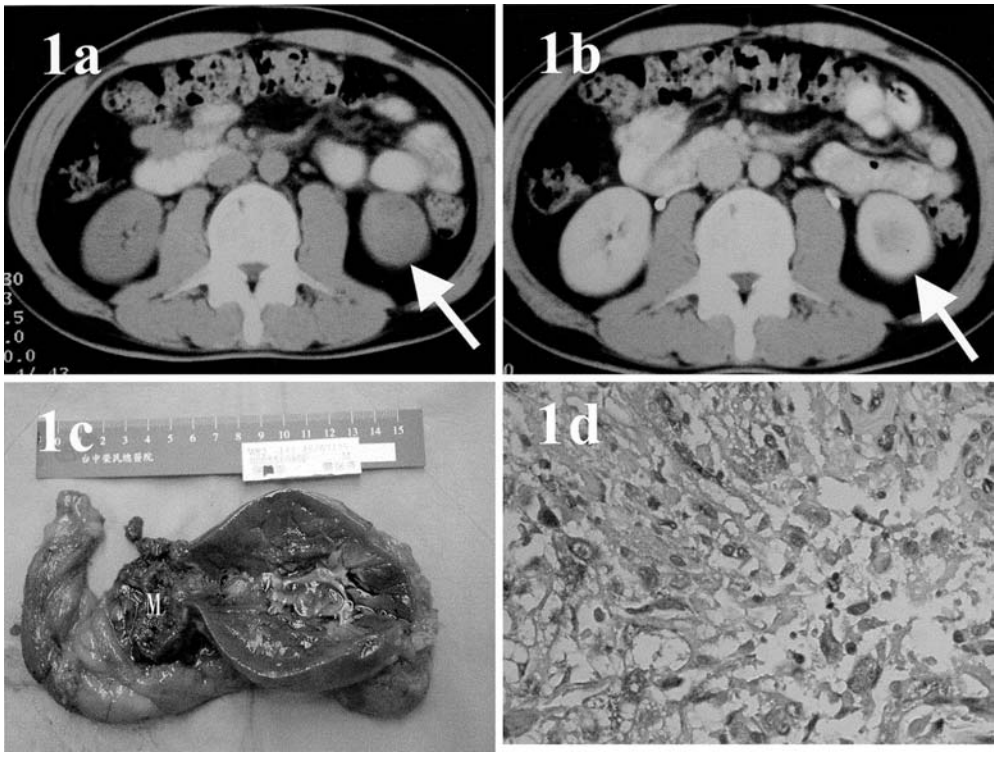

Fig. 1a–d. Findings in a 43-year-old man who had suffered from lower back pain for several weeks. **a** Computed tomography (CT) without contrast and **b** contrast CT taken at a local hospital show a tumor mass in the lower pole of the left kidney (*arrows*). **c** Gross pathology shows a mass (*M*) in the lower pole of the kidney. **d** Immunohistochemical study with HMB-45 is positive. ×100

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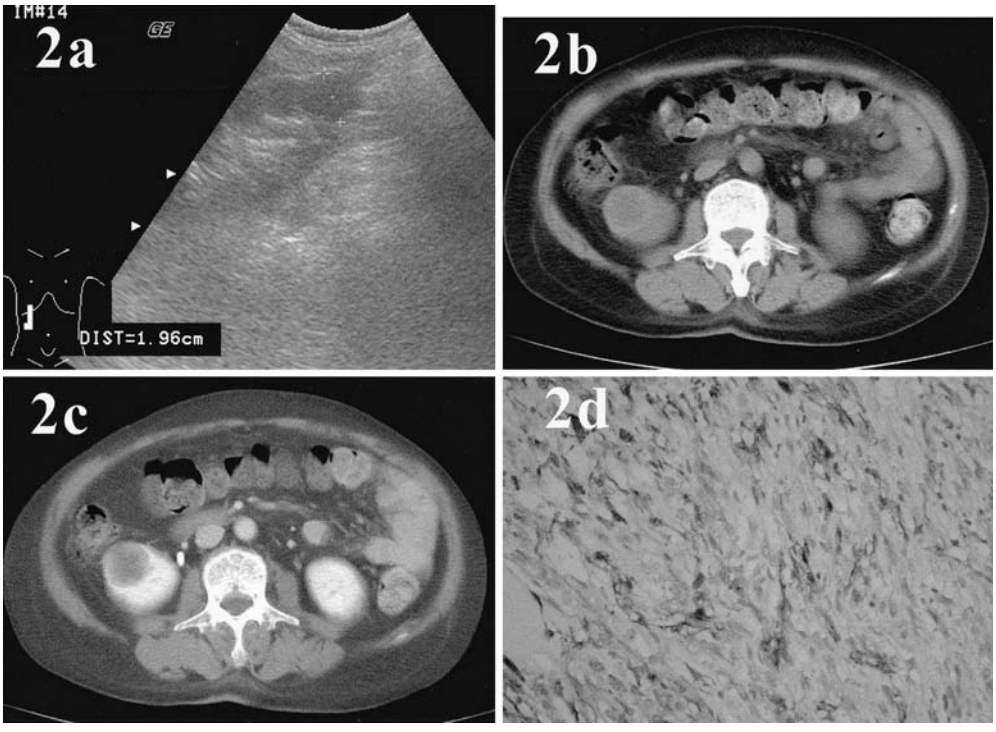

Fig. 2a–d. Findings in a 65-year-old woman, in whom there was an incidental finding of a right lower-pole renal mass. The preoperative diagnosis was renal cell carcinoma (RCC), and the final diagnosis was angiomyolipoma (AML). **a** Sonography revealed a mass in the lower pole of the right kidney (*arrowheads*). **b,c** The CT number of noncontrast CT (**b**) was 33 HU, and that with contrast CT (**c**) was 44 HU. Note that the rate of enhancement was only 11 HU. **d** Immunohistochemical study with HMB-50 is positive

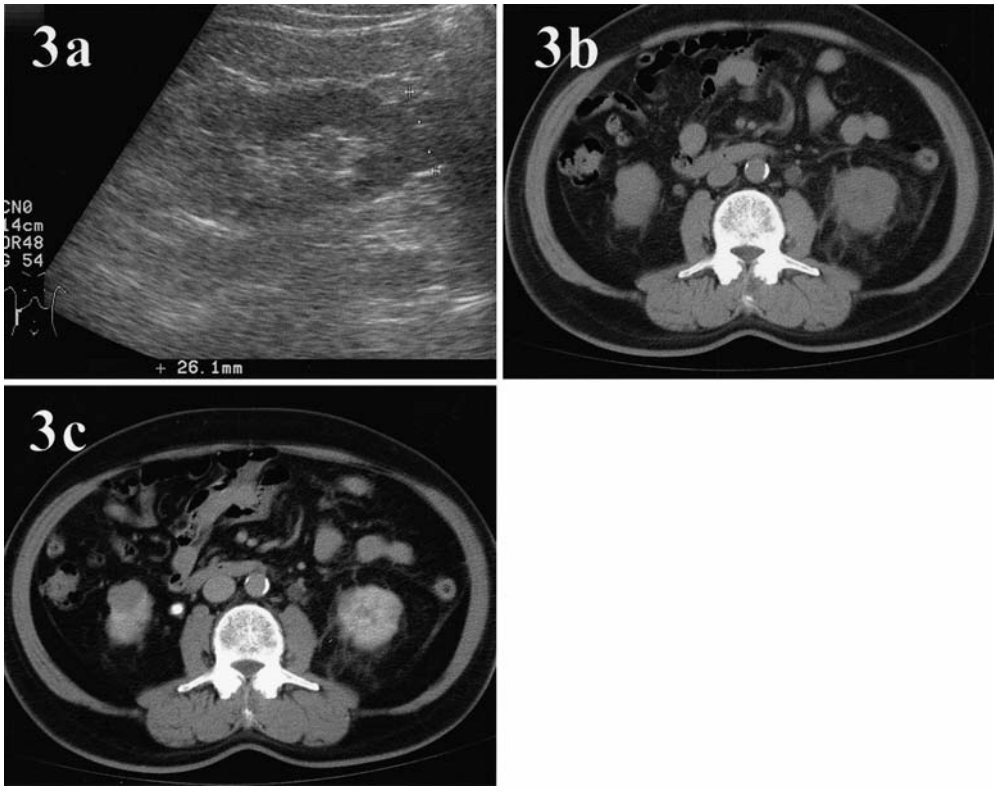

Fig. 3a–c. Findings in a 70-year-old man with right flank pain. **a** Sonography showed an iso- to hypoechoic mass lesion in the lower pole of the right kidney. **b,c** Attenuation on precontrast CT (**b**) was 42 HU, and that on postcontrast CT (**c**) was 77 HU. The difference was 35 HU. The final diagnosis was papillary-type RCC

mor from renal cyst. The degree of enhancement varies according to the vascularity of the lesion components. RCCs containing fat, mimicking AML, have been reported in some cases.[2–5] By just measuring the attenuation of the CT image, one may not really tell the true pathology of the tumor (Figs. 1–3). The pathological diagnosis of AML should include immunohistochemical studies. Positive staining for HMB-45 and HMB-50 may exclude RCC[6–8] (Figs. 1d and 2d, respectively).

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In reply

Concerning the comments about our article,[1] Yamashita et al.[2] described the characteristics of eight patients with tubulo-papillary renal cell carcinoma, and defined the tumor appearance on enhanced computed tomography CT; (nephrographic phase) in two patients as marked enhancement (more than 20 HU), and in six patients, as slight enhancement (less than 20 HU). Two of the eight patients showed an increase of CT attenuation after enhancement (nephrographic phase), with the increase in CT attenuation being 9 HU and 11 HU, respectively, however, the individual increase in CT attenuation in the other six patients with tubulo-papillary renal cell carcinoma was not described.

Double-phase enhanced CT was examined in the corticomedullary phase, and in the nephrographic phase. The CT attenuation of papillary renal cell carcinoma in the nephrographic phase was greater than that in the corticomedullary phase; however, that of clear-cell renal carcinoma, or angiomyolipoma (AML) with minimal fat in the nephrographic phase was lower than that in the corticomedullary phase.[3] We (manuscript in preparation) have also observed the same results, in seven patients with tubulo-papillary renal cell carcinoma, as those described by Jinzaki et al.[3]

In the "Discussion" in our article,[1] it was noted that the CT attenuation of tubulo-papillary renal cell carcinoma was increased by less than 10 HU in the corticomedullary phase. I now believe that the appearance on CT of papillary renal cell carcinoma is described as follows. First, double-phase CT (corticomedullary phase and nephrographic phase) is absolutely necessary. Second, CT attenuation of papillary renal cell carcinoma in the nephrographic phase was increased from that in the corticomedullary phase. The CT enhancement of tubulo-papillary renal cell carcinoma ranged from 12 HU to 41 HU in our seven patients in the corticomedullary phase, the increase of the CT value of papillary renal cell carcinoma varies with each case, and CT attenuation in the corticomedullary phase was significantly lower than that of both AML with minimal fat and clear-cell carcinoma.

I have some comments about the Figs. shown by Hung. In Fig. 2, CT values were measured on plain CT and in the nephrographic phase of AML. If the author had measured the CT value in the corticomedullary phase, the CT value may have been higher than 44 HU. In Fig. 3, the CT value was 42 HU on plain CT, and it was 77 HU in the nephrographic phase. If the CT value had been measured in the corticomedullary phase, the CT value may have been lower than 77 HU.

In conclusion, to clarify precisely the differential diagnosis of small renal tumors, double-phase CT scan is definitely important, and the pattern of the CT values in the two phases of papillary renal cell carcinoma is definitely different from that of AML with minimal fat. The absolute CT value is helpful.

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