

Letters to the Editor

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Enhancement Characteristics of Pheochromocytomas

From

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Editor:

In their article in the February 2005 issue of *Radiology* (1), Dr Szolar and colleagues stated that adrenal pheochromocytomas have a percentage enhancement loss that is similar to that in adrenal metastases but is significantly less than that in adrenal adenomas at computed tomography (CT).

A total of 17 pheochromocytomas were included in their CT study. A major limitation of this study, however, was the small number of included pheochromocytomas.

Our unpublished experience in a large group of pheochromocytomas does not fully support these data. We examined 45 patients with 48 adrenal or extraadrenal pheochromocytomas between 1995 and 2005 with magnetic resonance (MR) imaging. The protocol included transverse and coronal T2-weighted turbo spin-echo, chemical shift imaging, and T1-weighted fast low-angle shot three-dimensional sequences as a dynamic series. Until 1998, the delayed series was performed 6 minutes after application of gadolinium-based contrast material, and after 1998, the delay was about 20 minutes.

Results of our MR imaging study show various enhancement patterns and washout characteristics of pheochromocytomas. In our study, 27% of the pheochromocytomas showed the typical and often-reported strong enhancement and slow washout pattern.

A total of 16.5% of pheochromocytomas showed medium enhancement and slow washout, and 40% of pheochromocytomas demonstrated either medium or slow enhancement and rapid washout. These dynamic characteristics may also be seen in adenomas. Additionally, 16.5% had strong contrast material uptake with rapid washout.

In contrast to the study results of Dr Szolar and colleagues, in our study the majority of pheochromocytomas demonstrated rapid washout at the delayed contrast-enhanced series, similar to benign lesions.

In addition, our results also confirm the findings and statements of Blake and coworkers (2) that pheochromocytomas currently remain imaging chameleons.

References

1. Szolar DH, Korobkin M, Reittner P, et al. Adrenocortical carcinomas and adrenal pheochromocytomas: mass and enhancement loss evaluation at delayed contrast-enhanced CT. *Radiology* 2005;234:479–485.
2. Blake MA, Kalra MK, Maher MM, et al. Pheochromocytoma: an imaging chameleon. *RadioGraphics* 2004;24(suppl 1):S87–S99.

Response

From

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We thank Drs Happel and Heinz-Peer for their interest in our article and their comments. We agree that the number of pheochromocytomas was small ($n = 17$), and we acknowledged that limitation in the discussion section of our article (1).

Very few cases of contrast enhancement washout of adrenal pheochromocytomas have been documented. Caoili et al (2) reported that one patient with pheochromocytomas had a percentage enhancement washout in the range of that of adenomas. Blake et al (3) described the contrast material washout profiles in five patients and stated that the range of absolute washout percentage was 35.9%–69.2% on 10-minute delayed CT scans with a relative washout percentage ranging from 15.5% to 83.3%. Unfortunately, the data for each of the five cases were not described. Nonetheless, the washout patterns were clearly variable, with some in the adenoma range and others in the non-adenoma range.

It is difficult to assess the data described in the letter by Drs Happel and Heinz-Peer. Their studies have used gadolinium-enhanced dynamic MR imaging rather than contrast-enhanced CT. They do not define the terms “slow washout” and “rapid washout” in quantitative terms, so we cannot relate their observations to those reported in CT studies.

Krestin et al (4) first described the rapid contrast enhancement washout of adrenal nonadenomas compared with adenomas by using dynamic gadolinium-enhanced MR imaging, but authors of three separate subsequent articles could not confirm their results (5–7). The observations described in the current letter are extremely interesting, but until the specific technical details, definitions, and quantitative results are fully described in a published report, it is hard to integrate these observations with the published CT information.

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