

Imaging characteristics of metastasis in whole body diffusion weighted imaging of renal clear cell carcinoma

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Background:

Metastasis occurs in a significant percentage of patients with renal cell carcinoma (RCC) [1]. Up to 85% of these cancers are clear-cell RCC [2]. Determination of metastases is important to the management of disease, and the imaging techniques play an important role in assessing the metastatic lesions. Whole-body diffusion weighted imaging (DWI) which is able to highlight the oncological lesions throughout the entire body has become popular in clinical use [3]. In this study, we aimed to explore the role of Whole-body DWI in clear cell RCC and obtain the imaging characteristics of metastases.

Materials and methods:

Ten patients (nine men and one woman; age rang =48-78, mean age=55years) with histologically confirmed clear cell RCC and possible metastatic lesions were underwent standard Whole-body DWI, chest CT and routine magnetic resonance (MR) examinations before chemotherapy. Informed consent was obtained from all participants before experiment. This study was approved by the hospital ethics committee. Abnormal high signal intensities on DWI were considered as metastases using chest CT, conventional T1- and T2- weighted images as reference. The DWI protocol was a short T1 inversion recovery (STIR)-EPI single shot acquisition in seven-station series (head, neck, thorax, abdomen, pelvis, thighs and legs), repetition time (TR)/echo time (TE) of 4300/57.6 ms; inversion time (TI)of 160ms. Diffusion gradients with two *b* values (0 and 600 s/mm²) were applied along three directions..Whole-body T1-dual echo sequence was also acquired for each patient in order to provide an anatomical template.

Results:

In eight patients with pulmonary metastases, six patients showed positive on whole-body DWI. Pulmonary metastases usually appear as well-defined round or round-like nodules on CT and T1- weighted image and high signal intensity on DWI (fig1). They can be solitary or multiple and typically range in size from 0.5 to 2 cm in diameter. However, minority showed huge and central necrosis.

Metastases excluding the lung were detected in bone (three cases), brain (one case), cervical lymph node (two cases), muscle (one case), retroperitoneum (one case) and liver (one case) in our study. All of metastases detected by whole-body DWI were in accordance with conventional T1- and T2- weighted images. Bone is also a common site of metastasis. They always appeared as expansive lytic lesions on MR images. Organ metastasis is uncommon.

Conclusions:

This study showed that whole body DWI was very sensitive to the metastatic lesions in clear cell RCC. Although it is well known that MR techniques have limitations in the lung, DWI still showed its high rate of detection in pulmonary metastases. Whole body DWI had revealed great potential in metastatic screening [4][5] of clear cell RCC.

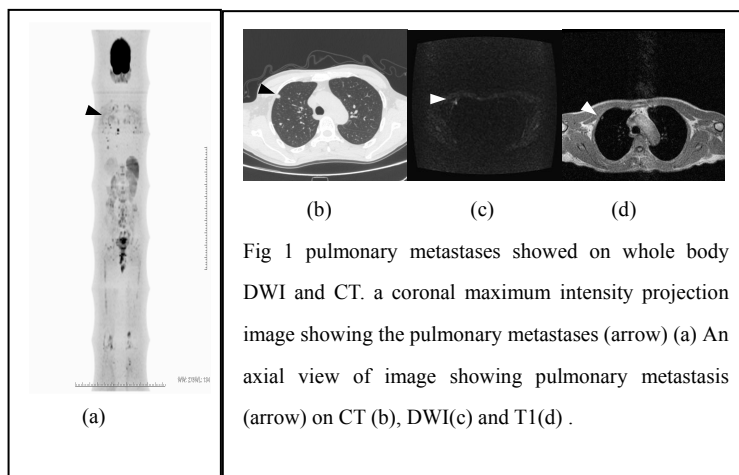


Fig 1 pulmonary metastases showed on whole body DWI and CT. a coronal maximum intensity projection image showing the pulmonary metastases (arrow) (a) An axial view of image showing pulmonary metastasis (arrow) on CT (b), DWI(c) and T1(d) .

Reference:

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