Impact of different initial systemic staging imaging strategies on metastasis detection in uveal melanoma patients: The Melanoma of the Uvea Staging Imaging Consortium (MUSIC) Study

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Purpose:
To determine the necessary fields to image (chest, abdomen, and/or pelvis), and the most appropriate modality (X-ray, CT, MRI, ultrasound, or PET/CT) for initial staging to most effectively detect synchronous metastases of uveal melanoma (UM) present at the time of diagnosis of the ocular primary.

Methods:
Multi-institutional retrospective study of patients diagnosed with UM at 5 large referral ocular oncology practices over a 5 year period. Initial imaging modality, field of imaging, radiographic findings, follow-up studies recommended and/or performed and their results, and final diagnoses were obtained for each patient from their medical record. Sensitivity and specificity were calculated, and factors impacting correct (or incorrect) radiographic diagnosis, were identified. The "number needed to screen" to identify a true metastasis within various fields or with various modalities was calculated.

Results:
1000 patients were included. 95% had abdominal imaging (5% had LFTs only), and 91% had chest imaging. The majority (62%) had imaging of the chest/abdomen/pelvis, including whole body imaging (12%). 26 patients (2.6%) had UM metastases. 13 patients had another biopsy-proven primary malignancy found. In 418 patients, a lesion was found in the abdomen. Out of these, 124 went on to have additional imaging, and of these, 25 were found to be metastatic disease. The sensitivity of radiologists’ calls of benign vs. malignant findings on CT of the abdomen was 35%, while the specificity was 85%. Sensitivity and specificity of MRI, US, and PET were better, but were used less frequently. 20 incidental pelvic lesions were found, but none were UM. Of the 373 patients in whom a chest lesion was found, 63 had additional imaging and 11 were confirmed to have metastasis in the chest. However, all-but-one of these patients also had metastases found in the liver. Chest imaging only identified 1 additional patient with metastases.

Conclusions:
Pelvic imaging was not shown to be beneficial in this study. Liver imaging is the most beneficial for initial UM staging, and MRI or ultrasound may be preferable to CT. CT chest imaging identifies many incidental findings necessitating additional imaging studies, but identifies very few additional metastatic patients beyond liver imaging.