Reviewer's report

Title: Standard b-Value Versus Low b-Value Diffusion-Weighted MRI in Renal Cell Carcinoma: a Systematic Review and Meta-Analysis

Version: 2
Date: 12 October 2014
Reviewer: Brian Allen

Reviewer's report:

General Comments:

This is a systematic review and meta-analysis of the literature, comparing intermediate and high b-value diffusion weighted imaging (DWI) for the diagnosis of renal cell carcinoma. The authors included four manuscripts for review and found a pooled sensitivity of 59% and specificity of 50% for high b-value DWI compared to a sensitivity of 58% and specificity of 23% for intermediate b-value DWI. Based on receiver operator characteristics analysis, the calculated area under the curve was 0.61 for high b-value and 0.68 for intermediate b-value DWI. The authors conclude that high b-value DWI has superior specificity, but equivalent sensitivity for renal cell carcinoma, but that intermediate b-value DWI has superior overall accuracy.

A previous meta-analysis has suggested that apparent diffusion coefficient (ADC) analysis from DWI could differentiate malignant from benign renal masses, but did not evaluate the strength of diffusion imaging (European Radiology 2014; 24:241-49). Another recent manuscript has suggested that in-phase signal loss, likely related to hemosiderin deposition, is present in nearly 21% of renal masses and up to 42% of papillary renal cell carcinomas (AJR Am J Roentgenol 2014; 203: W421-28). The presence of hemosiderin within renal masses has the potential to affect DWI, which is sensitive to local magnetic susceptibility-induced intravoxel dephasing, and may in part explain the limited sensitivity of DWI for the diagnosis of malignant renal masses seen in this meta-analysis. Also, one cannot rely on a single MRI sequence to differentiate benign from malignant masses, and when intravenous contrast cannot be administered, such as in patients with end-stage renal disease, T1 and T2 heterogeneity can be very important.

Major comments that need to be addressed in a revision:

1. Please comment on recent literature that describes hemosiderin within many renal masses and how hemosiderin may affect DWI in the discussion section.

Other comments that should be addressed:

1. Page 3, line 56: Should read "as follows".

Level of interest: An article of importance in its field
Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests.