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Incidental Renal Lesions on Lumbar Spine MRI: Who Needs Follow-up?

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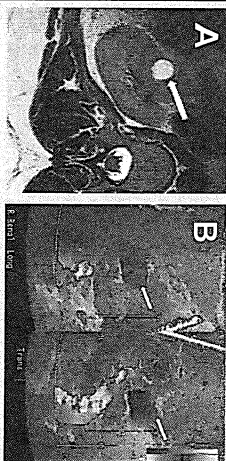
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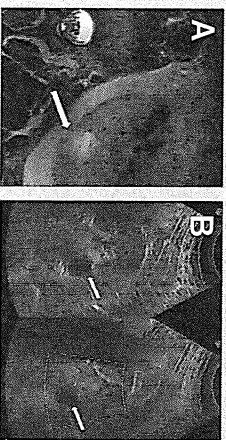
Results

Figure 1 - 41-year-old male with chronic low back pain.



A, T2WI demonstrates an incidental 1.2cm right renal lesion (arrow) with similar signal to CSF, and no evidence of internal septations or nodularity. In this case, the readers determined lesion represented a simple cyst based on the T2WI features.
 B, Renal ultrasound confirms a well circumscribed anechoic renal lesion (arrow) without internal vascularity and consistent with a simple cyst.

Figure 3 - 48-year-old female with right L5 radiculopathy.



A, T2WI demonstrates an incidental 1.5cm left renal lesion (arrow) with internal signal lower than CSF, in setting of surrounding motion artifact and decreased signal to noise ratio. In this case, the readers determined that the findings on T2WI were suspicious for underlying complex renal lesion, and recommended dedicated renal imaging for further evaluation.
 B, Renal ultrasound confirms a well circumscribed anechoic renal lesion (arrow) without internal vascularity and consistent with a simple cyst. This case proved to represent a false positive.

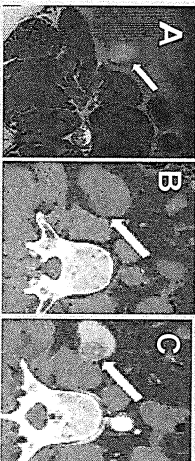
Purpose

- Incidentally discovered renal lesions on lumbar spine MRI are a common occurrence, and encountered in up to one third of lumbar spine MRI examinations.
- There is a paucity of data with regards to the imaging management of incidental renal lesions on unenhanced MRI.
- Follow-up recommendations are often generated by radiologists encountering renal lesions on lumbar spine MRI to help characterize the finding as a benign cyst, or more complex, potentially malignant lesion.
- We hypothesized that analysis of T2 weighted imaging (T2WI) features of incidentally discovered renal lesions could reliably distinguish complex renal lesions from simple cysts.

Methods

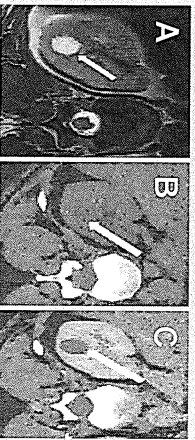
- Two independent readers retrospectively evaluated 149 renal lesions identified on noncontrast MR lumbar spine examinations in a consecutive patient population of 116 patients.
- Presence or absence of a complex renal lesion was determined using T2WI alone.
- Imaging features considered positive for a complex renal lesion were nodularity/heterogeneity, septations, or T2 signal intensity darker than CSF.
- Using dedicated renal imaging cross sectional examinations as the reference standard, statistical analysis was performed to determine the accuracy of lumbar spine MRI in predicting a complex and potentially neoplastic renal lesion.

Figure 2 - 37-year-old male with low back pain radiating to bilateral hips.



A, T2WI demonstrates an incidental 1.2cm right renal lesion (arrow) which demonstrates signal lower than CSF, with more focal regions of decreased nodular T2-weighted signal along lesion periphery. In this case, the readers determined that the findings on T2WI were suspicious for underlying complex renal lesion, and recommended dedicated renal imaging for further evaluation.
 B, Pre-contrast CT of the kidneys demonstrates low attenuation lesion in the right inferior renal pole (arrow).
 C, Post contrast CT of the kidneys demonstrates regions of internal enhancement within right inferior renal pole lesion (arrow). Subsequent biopsy confirmed renal cell carcinoma.

Figure 4 - 54-year-old female with chronic non-radiating low back pain.



A, T2WI demonstrates an incidental 1.6cm right renal lesion (arrow) with similar signal to CSF, and no evidence of internal septations or nodularity. In this case, the readers determined lesion represented a simple cyst based on the T2WI features.
 B, Pre-contrast CT of the kidneys demonstrates low attenuation lesion in the right kidney (arrow) with thin linear calcification along the posterior wall.
 C, Post contrast CT of the kidneys demonstrates no evidence of internal enhancement within right renal lesion (arrow), and lesion was determined to be a Bosniak 2 cyst. This case represents one of the two false negative reads in this study, both of which were determined to be benign. Bosniak 2 cysts on follow-up.

Results

- Of 149 renal lesions, there were 115 simple cysts, and 34 complex renal lesions (20 Bosniak II cysts, 9 renal cell carcinomas, 3 BosniakIII cysts, and 2 angomyolipomas).
- Lumbar spine MR readers determined there was a simple cyst in 72/149 lesions, and complex renal lesion in 77/149.
- Reader sensitivity for detection of complex renal lesion on lumbar spine MR was 94% (95%CI: 80%-99%), specificity 63% (95%CI: 53%-72%), PPV 43% (95%CI: 37%-49%), and NPV 97% (95%CI: 90%-99%).
- Readers identified all neoplastic & potentially neoplastic lesions (ZbosniakIII).
- Inter-reader agreement was excellent, kappa = 0.84.

Conclusion

- Follow-up imaging may not be required in all cases of incidentally discovered renal lesions on lumbar spine MRI, as analysis of T2WI alone appears to reliably rule out neoplastic and potentially neoplastic complex renal lesions.
- More judicious patient selection for follow-up renal imaging recommendations on lumbar spine MRI may ultimately decrease the number of low diagnostic yielding follow-up examinations and lower associated healthcare costs.

