Hepatic 'pseudo lesions' — still an unrecognised pitfall

I C Duncan
FFRad(D)SA
P A Fourie
MMed(Rad)D(Pret)

Unitas Interventional Unit
PO Box 14031
Lyttleton
0140

In recent months we have had two referrals for biopsies of 'multiple hepatic lesions' in known cancer patients. Both patients were referred from distant practices and both presented with CT examinations which included a pre-contrast series and a single helical post-contrast series. On the post-contrast scans a number of unenhanced low density lesions were noticed in the liver. In neither case was a dual phase or a delayed scan series performed.

Upon review we noticed that each post-contrast scan had been performed during the early hepatic contrast enhancement stage and that the 'lesions' were normal unenhanced hepatic veins. To confirm this we then repeated the scans with pre-contrast, helical and delayed post-contrast phases. No other hepatic abnormalities were found.

Discussion

The advent of helical scanning of the liver has led to enhanced lesion detection, including the more ready differentiation between hypervascular and hypovascular lesions.[1,2] In general, post-contrast helical scans are considered to be 'early' or 'arterial' phase scans when done during the hepatic arterial enhancement stage, roughly between 20 and 40 seconds after administering an IV contrast bolus, and 'late' or 'venous' phase scans are obtained during the peak of portal vein enhancement at approximately 60 - 90 seconds post bolus. A delayed scan done 3 - 5 minutes or later after the bolus shows the 'interstitial' or 'equilibrium' phase during which some focal liver lesions may not be seen becoming isodense with normal parenchyma.[3]

Although helical scanning has led to increased lesion detectability it has also produced some artifacts unique to this technique. One of these is the production of hepatic 'pseudo-lesions' during the early arterial phase scans due to non-enhancement of the hepatic veins (Fig. 1).[4] These are then seen to enhance on later (venous) phase scanning (Fig. 2). Another feature that helps to distinguish these 'pseudo lesions' as hepatic veins is that they can be followed sequentially on adjacent slices in keeping with tubular structures.

Many South African radiologists are aware of this phenomenon with the current widespread usage of helical scanning, but as has been shown here there are still those who are unaware of this pitfall. To avoid this our recommendation is to perform at least a three-phase scan (pre-contrast, late phase helical post-contrast and delayed post-contrast series) of the liver in all cases of suspected focal hepatic abnormalities. In some cases an additional early arterial phase scan may also be useful in identifying hypervascular lesions.

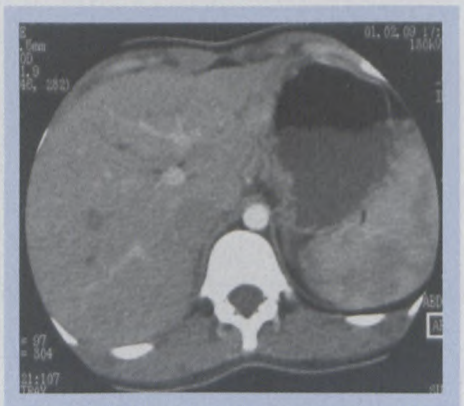

Fig. 1. Early (arterial) phase contrast-enhanced CT image showing unenhanced hepatic veins.

Fig. 2. Late (venous) phase seen at the same level now showing hepatic vein enhancement.

References

1. Heiken JP, Brink JA, Vannier MW. Spiral (helical) CT. *Radiology* 1993; **189:** 647-656.
2. Zeman RK, Fox SH, Silverman PM, *et al.* Helical (spiral) CT of the abdomen. *AJR* 1993; **160:** 719-725.
3. Heiken JP. Liver. In: Lee JKT, Sagel SS, Stanley RJ, Heiken JP, eds. *Computed Body Tomography With MRI Correlation.* 3rd ed. Lippincott-Raven, 1998: 707-714.
4. Herts BR, Einstein DM, Paushter DM. Spiral CT of the abdomen: Artifacts and potential pitfalls. *AJR* 1993; **161:** 1185-1190.