

Incidentally detected adrenal lesions

Radiological aspects

Akademisk avhandling

som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien vid Göteborgs Universitet kommer att offentligen försvaras i Aulan, Huvudingången, Sahlgrenska sjukhuset, Göteborg, fredagen den 28 oktober 2011, kl. 09:00

av

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Leg läkare

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Avhandlingen baseras på följande delarbeten:

- I. Hammarstedt L, Muth A, Wängberg B, Björnelid L, Sigurjónsdóttir H.A, Götherström G, Almqvist E, Widell H, Carlsson S, Ander S and Hellström M.: **Adrenal lesion frequency: A prospective, cross-sectional CT study in a defined region, including systematic re-evaluation.**
Acta Radiol 2010;51:1149-1156
- II. Muth A, Hammarstedt L, Hellström M, Sigurjónsdóttir H.A, Almqvist E and Wängberg B: **Cohort study of patients with adrenal lesions discovered incidentally.**
Br J Surg 2011; 98:1383-1391
- III. Hammarstedt L, Muth A, Sigurjónsdóttir H.A, Almqvist E, Wängberg B and Hellström M: **Adrenal lesions in patients with extra-adrenal malignancy – benign or malignant?**
Acta Oncol 2011 Aug 31. (e-publication ahead of print)
- IV. Hammarstedt L, Thilander-Klang A, Muth A, Wängberg B, Odén A and Hellström M: **Adrenal lesions – variability in radiological characterization**
Manuscript



ABSTRACT

Incidentally detected adrenal lesions – Radiological aspects

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Incidentally detected adrenal lesions (“adrenal incidentalomas”) have become a growing clinical problem due to increased and refined radiology methods. Autopsy studies show frequencies as high as 7-8% in the elderly. A large part of such lesions give no health problems but some can be related to hormone overproduction or malignant disease. Dedicated radiological imaging can often reveal whether the lesion is benign or malignant, based on e.g. its fat content and wash-out of contrast medium. Our first aim was to determine the frequency of adrenal lesions incidentally detected by radiological methods in a geographically defined region. Secondly, to characterize these lesions biochemically and radiologically in a 2-year follow-up study. Thirdly, the variability of adrenal lesion characterization was investigated. During 18 months all new cases of incidentally detected adrenal lesions were prospective reported from 19 radiology departments in Western Sweden. Included patients were examined with dedicated adrenal computed tomography (CT) and/or magnetic resonance imaging during 2 years follow-up. Biochemical and clinical examinations were performed at detection and after 2 years. To validate the frequency of submitted cases, a re-evaluation of 3.827 abdominal CT-examinations was performed. The characterization of adrenal lesions was validated by an interobserver analysis of 40 adrenal lesions and a phantom study of 8 different CT-machines. In total, 339 patients with adrenal lesions detected at CT were included. The re-evaluation showed that the CT frequency of adrenal lesions varied from 1.8 to 7.1% (mean 4.5%) between hospitals, while the initially reported mean frequency was 0.9%. Follow-up of patients with-out extra-adrenal malignant disease (n=226) revealed no primary adrenal malignancy. Fourteen patients (6.6%) were operated and benign hormone-producing tumours were verified in 3%. All were identified at first examination, and follow-up revealed no additional cases of hormone producing tumours. More than 80% of these patients had radiologically benign lesions. Benign adrenal lesions were found in 74% of patients with history of malignant disease, in 53% of those with concurrent malignancy and in 25% of those with metastatic disease. In patients with two or more adrenal CT-examinations performed over two years 20-25 % of adrenal lesions showed such variations in attenuation values that their classification as “benign” or “indeterminate” would change. Both interobserver analysis and phantom analysis showed some differences in attenuation measurements.

Adrenal lesions detected at radiological examinations are common and frequency figures approach those reported at autopsy. Dedicated imaging and biochemical testing is highly recommended early after detection and further follow-up is recommended for lesions that still are indeterminate after this process. Follow-up should preferably be done with the same CT equipment, including a calibration instrument and the same observer to minimize observer and inter-scanner variability.

Keywords: Incidental finding, Adrenal incidentaloma, Adrenal Gland Neoplasm, Computed Tomography, Magnetic Resonance Imaging, Follow-up Studies, Oncology, Observer Variation, Phantom Studies

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