

## Case report

# Lipid-rich cell adenoma of the thyroid gland

## Report of a peculiar thyroid tumour \*

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**Summary.** A thyroid adenoma consisting of lipid-rich follicle cells is presented which has not previously been described in this organ. The discussion focuses on the possibility of its metaplastic origin and on its histological analogy to lipid-rich carcinoma of the breast.

**Key words:** Thyroid – Lipid-rich cell adenoma – Lipid droplets – Thyrolipoma

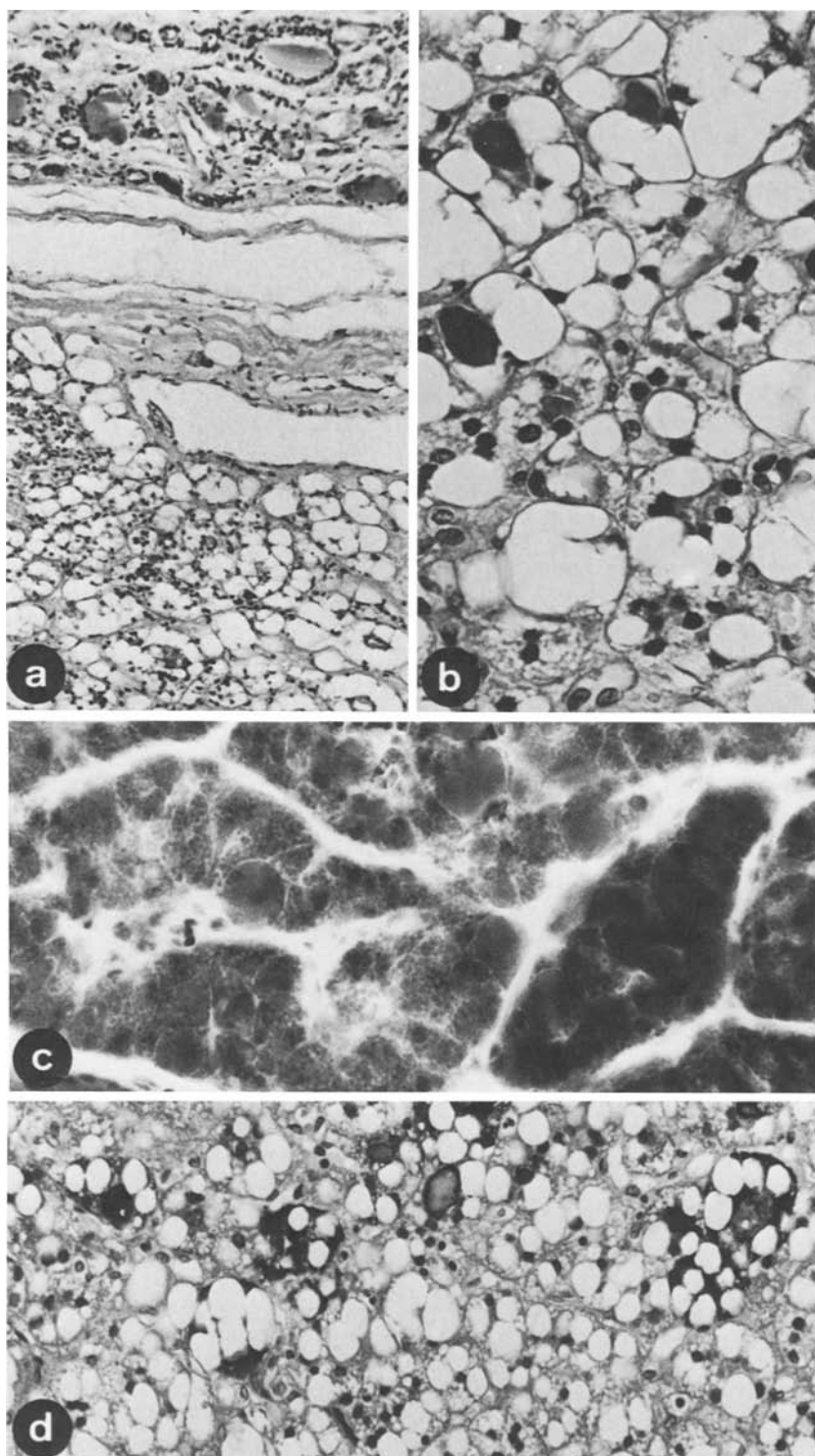
Intracellular accumulation of lipids (fatty change) in organs is frequently a phenomenon associated with parenchymal atrophy. In the thyroid, ageing of follicle cells is evidenced by the appearance of small amounts of fat droplets (Erdheim 1903). In the present paper we describe a peculiar thyroid adenoma characterized by excessive steatosis of the follicle cells.

## Case report

A.R., a 64 year old man, was admitted to the General Hospital Hamburg-Harburg in a state of cachexia due to extensive metastasis of rectal adenocarcinoma. The patient died 9 days after admission. Autopsy was performed which revealed metastases of adenocarcinoma in abdominal lymph nodes, parietal peritoneum, liver, and lungs. On cross section, the right lobe of the otherwise inconspicuous thyroid gland showed a solitary rounded pale gray nodule 2 cm in diameter. Tumours or tumour-like lesions others than above mentioned were not seen.

Histologically, the thyroid nodule proved to consist of clear cells arranged in a solid pattern including small foci of microfollicular differentiation. The tumour periphery was delineated by a delicate fibrous capsule (Fig. 1a). The tumour cells were characterized by small rounded nuclei without significant pleomorphism and by an abundant foamy or grossly vacuolated cytoplasm (Fig. 1b). PAS and Congo red staining were negative, whereas a positive reaction was found for fat (Fig. 1c). Mature fat cells could not be demonstrated. The follicle-cell origin of the tumour cells became evident by focal cytoplasmic and generally positive thyroglobulin-immunostaining of the colloid stored in the follicular lumina (Böcker et al. 1981)

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**Fig. 1 a-d.** Lipid-rich cell adenoma of the thyroid. **a** Low power magnification of the tumour consisting of clear cells. Normally structured follicles can be seen outside the capsule in the adjacent thyroid parenchyma (H & E,  $\times 115$ ). **b** Foci of microfollicular differentiation. Cytoplasm is either foamy or grossly vacuolated (PAS,  $\times 460$ ). **c** Neoplastic cells are almost totally obscured by neutral lipid (Sudan IV,  $\times 360$ ). **d** Focal diffuse cytoplasmic and general intraluminal TG-positivity of tumour cells (Thyroglobulin,  $\times 288$ )

(Fig. 1 d). The adjacent thyroid parenchyma showed follicles of normal size lined by epithelial cells containing small to moderate amounts of thyroglobulin and sparse Sudan IV-positive droplets.

## Discussion

From histological studies it has long been known that sparse neutral lipid droplets occur intracellularly in the human thyroid. Their degenerative origin is strongly favoured by an increasing rate of accumulation during ageing (Sata 1900; Erdheim 1903; Arndt 1924; Goßmann 1927). Conversely, as far as we have been able to ascertain, no single instance of as excessive intracellular fat accumulation of follicle cells as observed in this tumour has as yet been reported.

We termed this lesion adenoma according to the following criteria laid down by the WHO (Hedinger and Sobin 1974):

- follicle-cell origin (as definitely pin-pointed by positive cytoplasmic and intraluminal TG-immunohistochemistry),
- uniformity in structure,
- distinct encapsulation,
- solitary tumour in an otherwise normal gland.

Histologically, the appearance was identical to clear cell adenoma as described by Stoll and Lietz (1973) except that steatosis of tumour cells is not evident within the latter. Moreover, the tumour could readily be distinguished from thyrolipoma by its lack of mature adipocytes (Schröder et al. 1984).

The abundant foamy or grossly vacuolated cytoplasm of the tumour cells containing large amounts of neutral lipid bore a striking resemblance to the histiocytoid type of lipid-rich breast cancer (van Bogaert and Maldague 1977). The almost total obscuration of neoplastic cells by neutral lipids in contrast to the sparse lipid globules commonly seen in normal and hyperplastic follicle cells (Heimann 1966) thus spoke in favour of a true synthetic capacity rather than of a degenerative origin of lipid deposits. The former has been demonstrated for lipids in lipid-secreting breast carcinoma (Ramos and Taylor 1974). Since normal follicle cells – as opposed to mammary cells capable of synthesizing proteins, carbohydrates, and lipids – do not secrete neutral lipids, the lipid-rich follicle cell is the most likely to be seen as a result of metaplastic transformation.

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