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Eosinophilic Granuloma of the Stomach Similar to That of Bone

Light and Electron Microscopic Study*

J. J. Vazquez and J. R. Ayestaran

Department of Pathology, University of Navarra, Pamplona, Spain

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Summary. A case is presented of an eosinophilic granuloma of the stomach in a 59-year-old female, which was studied by light and electron microscopy and shown to belong to the same group of lesions as eosinophilic granuloma of the lung and bone (histiocytosis X).

Key words: Eosinophilic Granuloma — Histiocytosis X — Stomach.

In this work we present the light and electron microscopic features of a solitary ulcerated tumor of the stomach, which in the radiographic and gross anatomic study resembled a carcinoma. On microscopic examination the basic cells of the lesion were found to be histiocytes similar to those in eosinophilic granuloma of bone or lung.

Case Report

A 59-year-old female was admitted to the hospital on April 8, 1973 with acute appendicitis. An appendectomy was carried out and a phlegmonous appendicitis was found. One day later the patient developed a shock state — drop in the blood pressure (80/50 mm of mercury), pallor and coldness of the skin, sweating and rapid pulse — coinciding with "coffee grounds" vomit and tarry stools. The administration of blood and fluids reversed the state of shock. She then complained of epigastric pain. Eight days later roentgenograms revealed a large deep ulcer in the lesser curvature of the stomach at the level of the *incissura angularis*. On April 22, a gastric resection was performed.

On *gross examination* of the surgical specimen (20452) a deep ulcer, 1,5 cm in diameter, was found in the lesser curvature, about 6 cms proximal to the pylorus. The base of the ulcer was formed by a hard nodular mass of yellowish tumor-like tissue to a depth of 8 mm. The muscle coat was partly destroyed by the growth. The edge of the ulcer was elevated due to tumor beneath the mucosa.

Samples of the ulcer and neighbouring wall of stomach were embedded for light and electron microscopy.

Microscopically. The bulk of the tumor was composed of compact aggregates of cells with abundant pale cytoplasm and a large, eccentric, often indented, hyperchromatic nucleus with a prominent nucleolus. Mitotic figures were occasionally seen. There were numerous lymphocytes amongst the tumor cells, particularly at the periphery. In a few fields there were numerous eosinophil leucocytes. PAS staining showed fine strands of diastase-resistant mucopolysaccharides in the cytoplasm of the "tumor" cells.

Reticulin staining showed a delicate mesh of argyrophil fibres and a rich capillary network.

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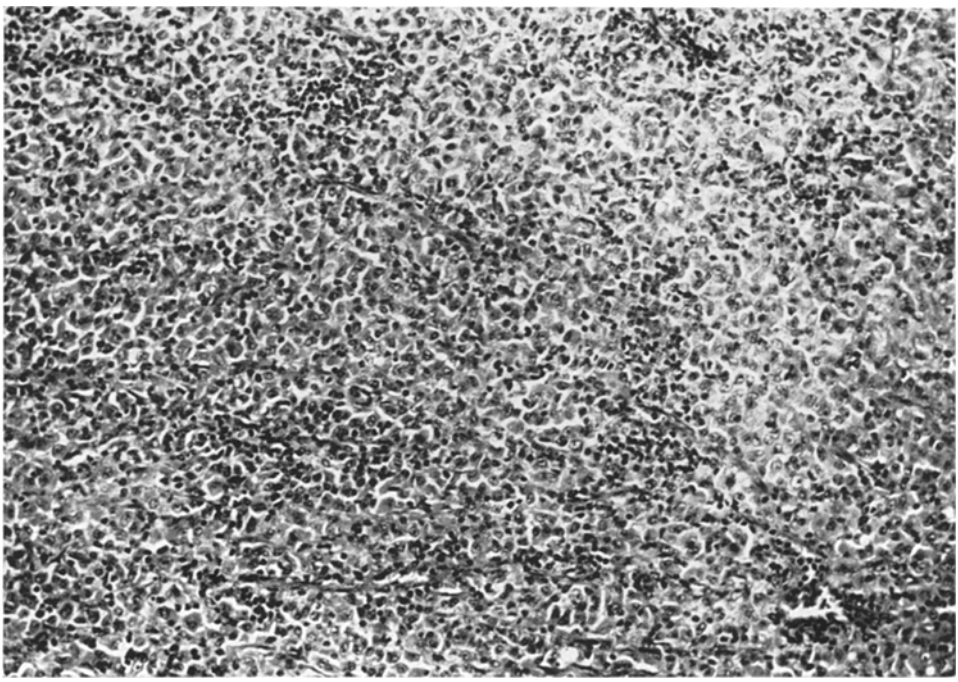

Fig. 1. Panoramic view of the tumor composed of large cells with admixed lymphocytes and eosinophils. HE ×50

Electron Microscopy. The tumor cells had a irregularly shaped nucleus with abundant deep folds and a prominent nucleolus. There were large numbers of rod-shaped electron-dense profiles in the cytoplasm, of the type which characterizes the histiocytes of eosinophilic granuloma (Friedman and Hanaoka, 1969; Morales *et al.*, 1969). These bodies have a complex 3-dimensional structure similar to those described by Sagebiel and Reed (1968) in Langerhans cells of the skin. They varied in length, according to the plane of sectioning, and their width ranged from 30 to 80 mμ. They appeared in profiles made of two parallel membranes, which were very often continuous with the plasma membranes. The space between the two membranes of the profiles was occupied by electron-dense material. Frequently one end of the profiles was distended into a sac-like structure.

The cytoplasm contained mitochondria, lysosomes and rather abundant rough endoplasmic reticulum. Often two of the reticulum profiles were found parallel to one another, their ribosomes had disappeared and there was an electron dense material with a periodic structure separating them. The outer membranes of the opposed profiles retained their ribosomes resulting in the unusual appearances of paired confronting cisternae (Fig. 3).

The cytoplasmic matrix contained fine filaments. Lipid inclusions were not present.

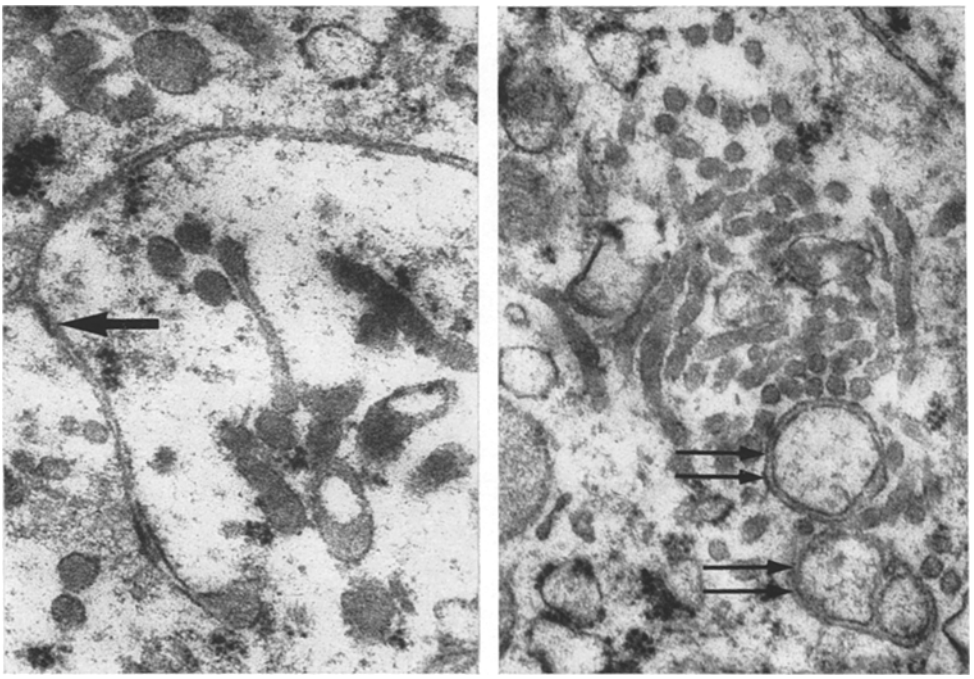

Fig. 2. Many rod-shaped, electron-dense profiles corresponding to granules; arrow = profile attached to the plasma membrane. Double arrows = cup-shaped granules. ×40000

Discussion

The usual eosinophilic granuloma of the stomach has been described as being composed, histologically, of a background of fibroblasts and collagen with an infiltration of eosinophils (Wanke, 1970), whereas in the eosinophilic granuloma of lung and bone the basic cell is the histiocyte or reticulum cell. It has been emphasized by a number of authors (Bolck *et al.*, 1972; Culver *et al.*, 1967; Thomford and Beman, 1970 and Vaněk, 1949) that these two types of eosinophilic granuloma are quite unrelated. However, in our case histiocytes constituted the basic cellular component of the lesion, with eosinophils present in dense focal aggregations, features which Vaněk (1949) regards as also characteristic of eosinophilic granuloma of bone. From the purely histological viewpoint, this tumor is more similar to eosinophilic granuloma of bone than to eosinophilic granuloma of the alimentary tract. Furthermore, the ultrastructure of the tumor cells is similar to that described for the histiocytes in eosinophilic granuloma of soft tissues (Morales *et al.*, 1969) and histiocytosis X (Cancilla *et al.*, 1967; Carrington and Winkelmann, 1972; Kaplan *et al.*, 1972; Laurent *et al.*, 1971 and Tarnowski and Hashimoto, 1967). The rodshaped profiles described as characteristic of these histiocytes have their origin in foldings of the plasma membrane (Cancilla *et al.*, 1967; Morales *et al.*, 1969 and Tarnowski and Hashimoto, 1967) and contain an extramembranous, polysacharide-rich component (the glycocalix). For that reason they probably account for the P.A.S. positive reaction.

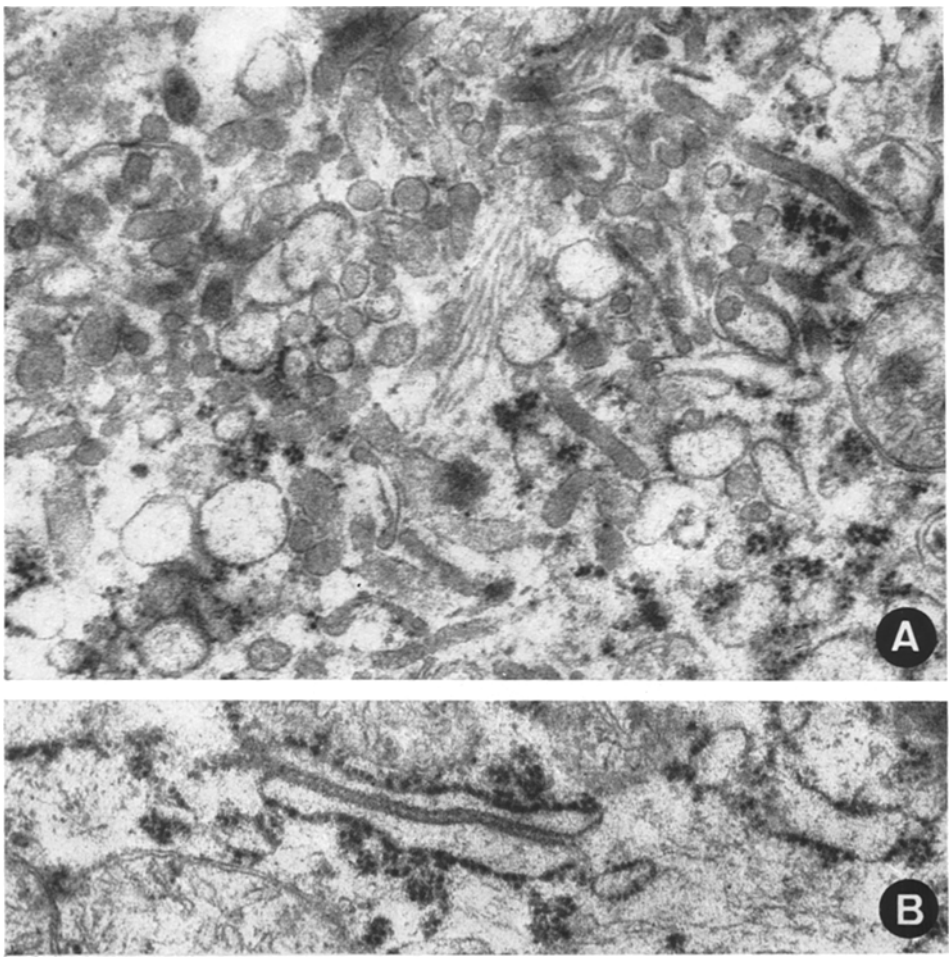

Fig. 3. (A) Field with rod-shaped granules and filaments. ×38000. (B) Two rough endoplasmic reticulum profiles from a figure of paired confronting cisternae. The confronting membranes are connected with dense material showing a periodic structure. ×46000

Besides these profiles in association with the plasma membranes, we find another type of profile developed by close apposition of two reticulum membranes. It appears that in this cell type not only the plasma membrane, but also the endoplasmic reticulum, has the peculiar property of forming a bicontoured structure enclosing a periodic material.

Our conclusion is that the gastric lesion in this case is related to eosinophilic granuloma of bone and lung (histiocytosis X) and not to the usual type of eosinophilic granuloma of the alimentary tract.

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Prof. Dr. J. J. Vázquez
Departamento de Anatomía Patológica
Universidad de Navarra
Pamplona, Spain