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Case Report

Hamartoma of the Stomach in Childhood

Case Report and Review of the Literature

W. V. Bogomoletz and J. N. Cox

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Summary. The clinical symptoms, x-ray appearances, and anatomical description of a large gastric hamartoma in an 8-year-old girl are presented. The literature of this condition in childhood is reviewed. The differentiation between true genuine hamartomas of the gastric wall and heterotopic (ectopic)tissues is stressed.

Key words: Hamartoma—Adenomyoma—Heterotopia—Stomach.

Introduction

Hamartomas of the gastro-intestinal tract are not uncommon but are often confused with heterotopic tissue deposits and reported as such in the literature. The predominantly epithelial variety of these hamartomata is observed more frequently in the stomach and duodenum (Dawson, 1969) and has been described principally under the two names "myoepithelial hamartoma" and "adenomyoma".

These lesions are rare in childhood and for this reason we are presenting a further case in an 8 year old girl, who presented with an extensive lesion showing unusual histological features.

Furthermore, an attempt is made to review the literature of this abnormality in infancy and childhood.

Case Report

The patient, an eight year old cypriot girl, was originally admitted to Nicosia General Hospital, Cyprus, on September 30th 1971, with a two week's history of fatigue, pallor, loss of appetite and lack of interest in playing. On examination, she was found to be very pale, febrile and underweight. A barium meal revealed a large calcified opacity causing an extensive pressure defect of the posterior and middle portions of the gastric fundus and lying close to the splenic flexure of the colon, the latter being deviated downwards. A left pleural effusion, gradually increasing in size, was tapped; this grew coliforms. *Laboratory tests* revealed an anaemia with a 31% haematocrit, an elevated sedimentation rate of 58 mm/hr and total proteins at 8.2 g/dl. There was a leucocytosis at 10,000 WBC/ml. A Mantoux test, and Casoni and hydatid complement fixation tests were negative. Liver function tests were within normal limits.

The child was referred to Paddington Green Children's Hospital, London, on January 31, 1972. Various laboratory examinations and radiological investigations (Fig. 1) confirmed the main findings of her first hospital admission.

Laparotomy performed on March 21 revealed a craggy and hard mass which seemed to be adherent to and part of the stomach, attached to the spleen, the splenic flexure, the pancreas and the left lobe of the liver. Resection of the mass involved an upper partial gastrectomy, the fundus being divided a short distance below the cardia, as well as a splenectomy with removal of the tail of the pancreas.

The patient was fed by gastrostomy for three weeks. Post-operative progress was marked by an episode of jaundice beginning on the first day but regressing rapidly. She was discharged on April 25th and was seen two weeks later in the out-patients department having gained 3 kgs.

Eighteen months later, she was seen at the Nicosia General Hospital, Cyprus, where she was found to be in good health, had gained weight and achieved normal stature.

Pathology

Gross Specimen. The specimen consisted of a portion of the stomach occupied for the most part by a mass adherent to the spleen and the tail of the pancreas. This mass measured $10 \times 7 \times 5.5$ cm. and involved the greater curvature and both anterior and posterior walls, leaving the lesser curvature and a margin of approximately 1–2 cms on either side free. The mucosa appeared intact but seemed to form a part of the lesion. The cut surface was greyish-white and glistening and the consistency was hard. Scattered throughout this tissue were numerous large calcified areas. The muscularis mucosae was displaced downwards but did not seem to be interrupted. The muscular coats were hypertrophied in parts and somewhat irregular while the serosa was thickened and blended with the splenic capsule. The proximal and distal margins of excisions were through normal gastric tissue.

Histology. In whole mounted sections the gastric wall was abnormally thickened. It was possible to identify, to some extent, portions of the various layers; mucosa, muscularis mucosae and muscularis propria which were in some way all involved in the thickening (Fig. 2a). In all sections, this was due to an excessive amount of dense connective tissue composed of fibroblasts, cytologically benign, embedded in dense interwoven collagen bundles, sometimes interrupted by large hyaline zones and heavily calcified areas (Fig. 2b). There were few elastic fibrils. In places, scattered smooth muscle fibres were identified. In the predominantly cellular areas, this fibroblastic tissue was overshadowed by foci of chronic inflammatory cells, principally lymphocytes, plasma cells and occasional eosinophils. Nests of Russell bodies were observed. Here and there were lymphoid follicular formations without germinal centres and in some places there were small abscesses. This mixed fibroblastic and chronic inflammatory tissue was responsible for the overall thickening of the gastric wall and was both infiltrating and blending with the hypertrophied muscularis mucosae and muscularis propria. Between the thickened and somewhat disorganized external muscle layers, there were hypertrophied nerve fibres but no myenteric ganglion cells. The mucosal lamina propria and the serosa were particularly involved in the process. The arteries in the tissue were normal in appearance, but the veins were often dilated and in a few instances were partially obliterated by organized thrombus.

At the proximal and distal edges of the resected specimen the mucosa was identifiable as body type and this, for some distance, covered the mass. However, the glands became progressively longer toward the middle portion where there were some superficial ulcers. Here the lamina propria was replaced by the fibroblastic tissue described above, heavily infiltrated by chronic inflammatory cells (Fig. 3a). In these areas the gastric glands were devoid of parietal and chief cells and were lined by a layer of mucus-secreting cells (Fig. 3b). These cells resembled the surface epithelium in some respects. They were PAS positive particularly in

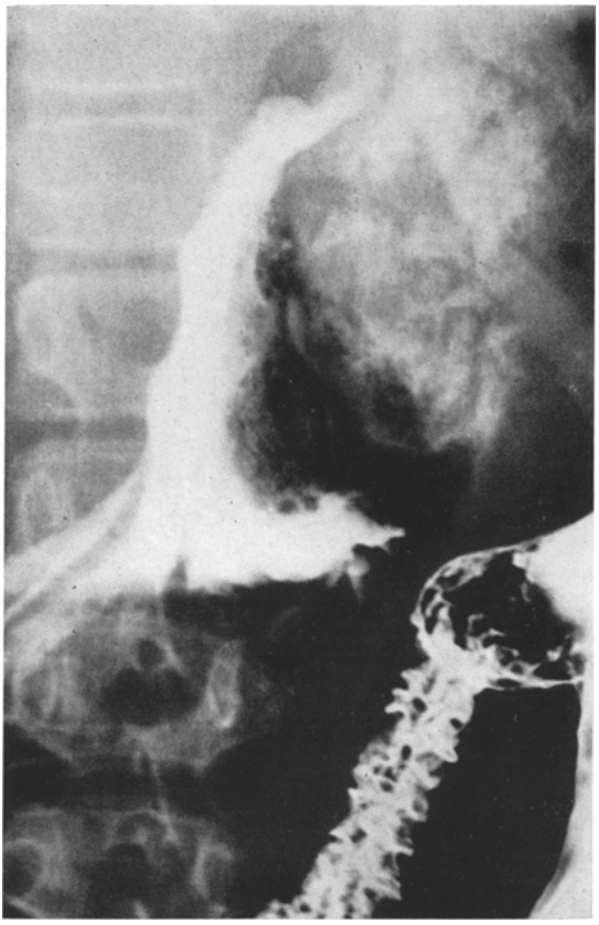
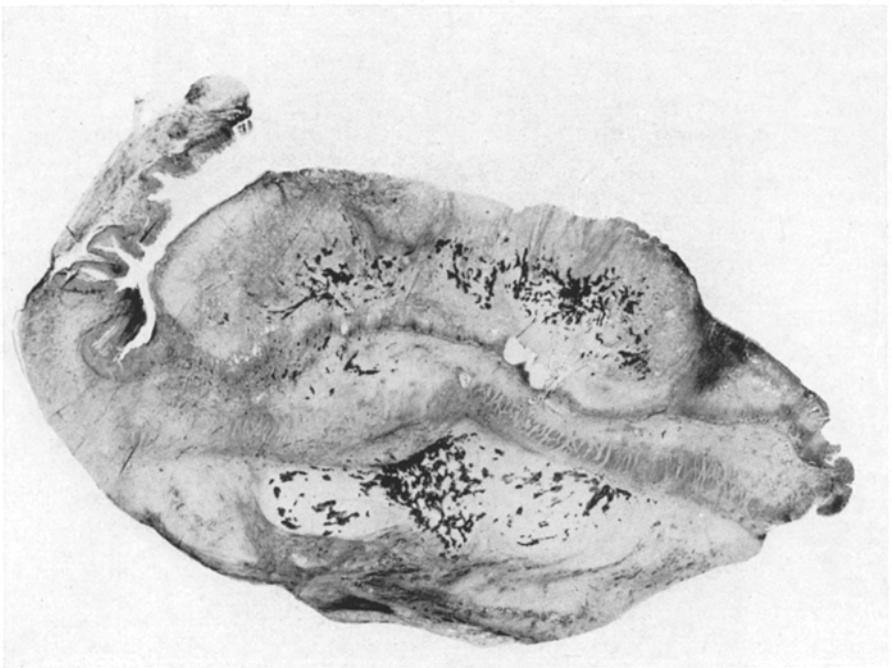
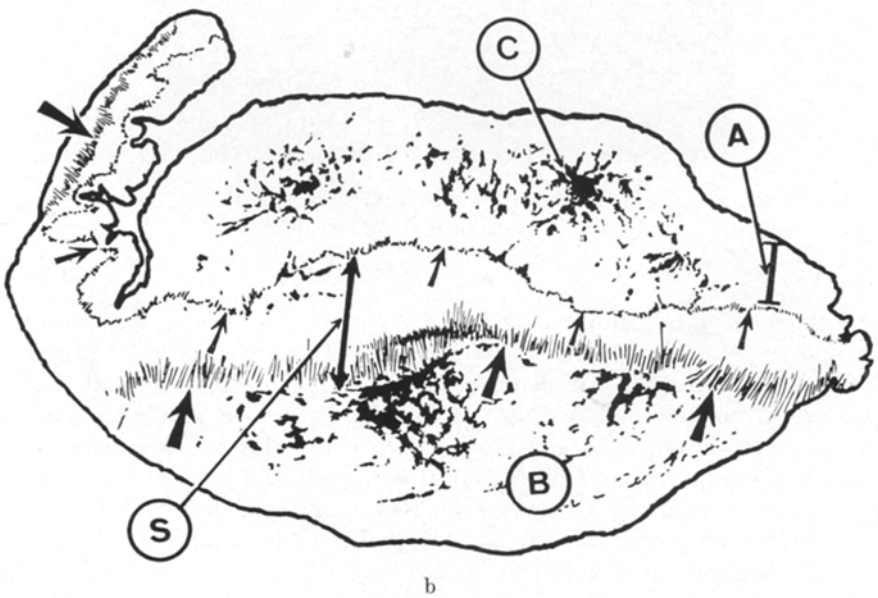


Fig. 1. Barium meal showing the reduced stomach cavity as if it were pushed and compressed by an oval, calcified mass from the left

the neck region of the glands, but were alcian blue negative throughout. The glands were extremely long, predominantly straight, and extended deep into the fibroblastic tissue beyond the muscularis mucosa through breaches within the latter, to reach the completely modified sub-mucosa. In places, the glands were dilated, forming cystic cavities in both the superficial and deep layers. They were lined by a flattened epithelium and occasionally contained PAS-positive material (Fig. 4a + b). The cytoplasm of these cells was scanty and faintly PAS-positive. Their nuclei were prominent, strongly basophilic and lay against the basal membrane. Such glandular structures were not observed in the thickened serosa. Intestinal metaplasia was absent. No pancreatic tissue or Brunner's glands were observed in the sections. The spleen and resected portion of the pancreas were not involved in the process but there were adhesions between these organs and the gastric serosa with absence of any inflammatory reaction.



a



b

Fig. 2 (a) Whole-mounted section. The lamina propria and serosa are quite thickened. The muscularis mucosae is thickened and appears to be pushed downwards. The muscularis propria is hypertrophied. PAS. (b) Diagram. A Mucosa with greathly modified lamina propria; *B* serosa; *C* calcification; *S* sub-mucosa; ↑ muscularis mucosae; ↑ muscularis propria

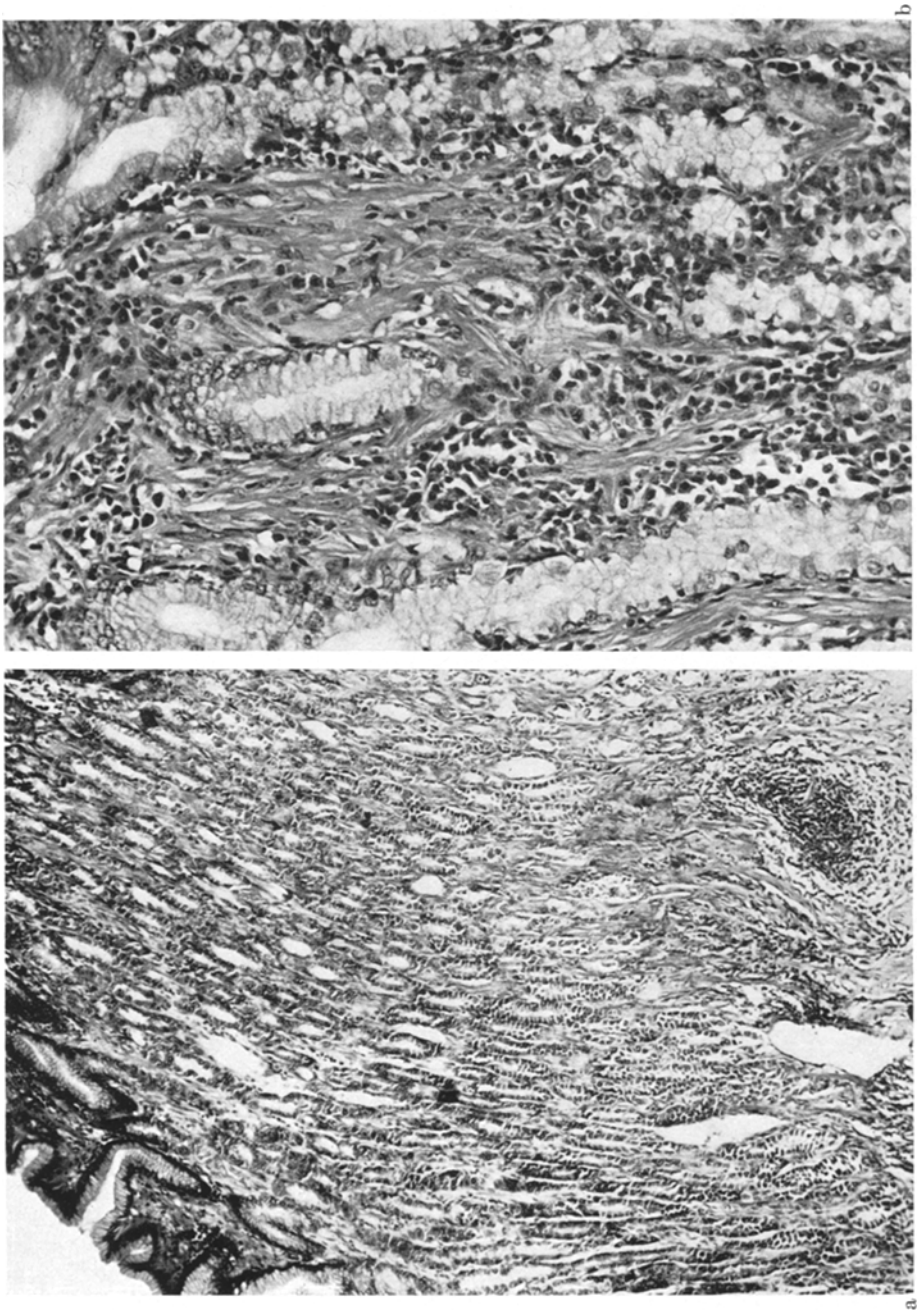


Fig. 3 (a) Greatly thickened gastric mucosa (HE, ×60) (b) Modified lamina propria. Dense fibroblastic tissue separating the glands. Note the chronic inflammatory reaction. (HE, ×120)

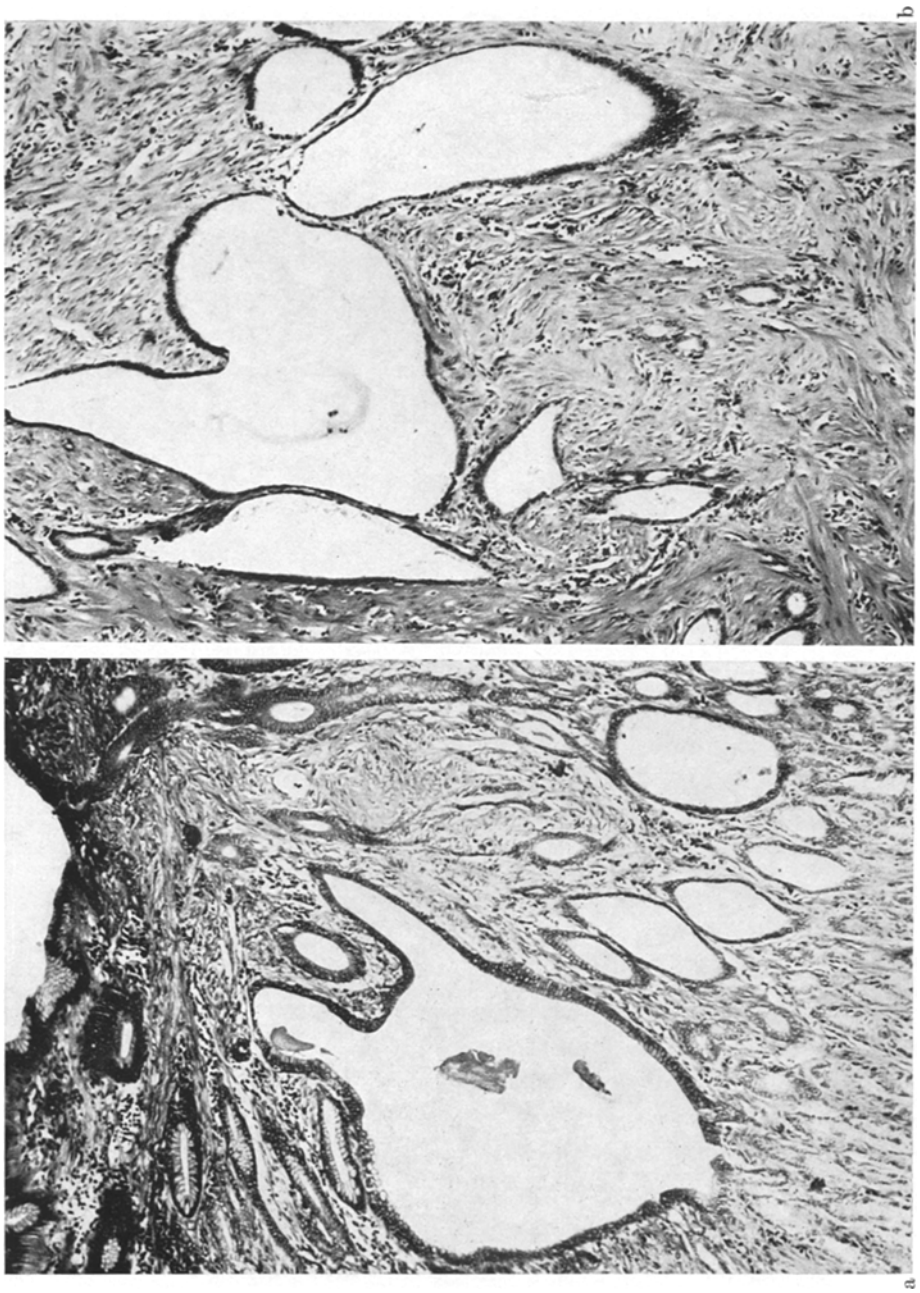


Fig. 4a and b. Cystic dilatation of the glands (a) within the mucosa, (b) in the sub-mucosa where they are surrounded by fibrous tissue and few smooth muscle fibre. (HE, ×60)

Discussion

Hamartoma of the gastric wall is a rare abnormality and may be difficult to differentiate from, and may be confused with heterotopic Brunner's glands or aberrant pancreatic tissue. Albrecht (1904) coined the term *hamartoma* to imply an inborn error in tissue development, characterized by an abnormal admixture of tissues indigenous to the organ or tissue involved. Willis (1962) restricts the term "hamartoma" to a lesion showing definite evidence of an underlying developmental abnormality. This definition has been widely accepted for the hamartomas of the alimentary tract (Dawson, 1969; Morson and Dawson, 1972). Heterotopias, however, are epithelial misplacements, where as a result of developmental error the epithelium appears in a situation to which it does not properly belong (Morson and Dawson, 1972; Taylor, 1927).

Hamartomas show a variety of histological patterns which leads to considerable difficulty in their classification. Clarke (1940) in his study of these abnormalities suggested an all-inclusive or unified concept whereby, heterotopic pancreatic or Brunner's gland in the stomach be considered as an hamartoma. He adhered to this definition whether the glandular elements were completely or incompletely differentiated, and finally proposed the combined descriptive term of myoepithelial hamartoma to designate the entire group. Some authors (Bush *et al.*, 1974; Janota and Smith, 1966; Remine *et al.*, 1970) have adopted this definition and thus include aberrant pancreatic tissue or Brunner's gland rests in the stomach wall as hamartomas.

On the other hand Lauche (1924), considered the well defined ectopic glandular structures to be heterotopias, whereas those tissues composed essentially of undifferentiated ducts partly surrounded by smooth muscle within the gut, were adenomyomas. He considered that these had a dysontogenetic origin, arising from an embryonic epithelial bud, and thus represented a developmental abnormality. This view is fully supported by most authors (Albot *et al.*, 1966; Delavierre *et al.*, 1973; Goldberg and Margulis, 1966; Stewart and Taylor, 1925; Taylor, 1927).

In the case presented here the mucosa of the stomach wall is made up of normal gastric glands intermingling with Lieberkühn-like crypts. These are extremely elongated pushing the hypertrophied muscularis mucosae downwards in some places and breaching it in others. However, no goblet cells were observed. Within the modified lamina propria and in particular deep within the hypertrophied submucosa were undifferentiated ducts and glands of variable diameters, sometimes cystic, surrounded in places by small bundles of smooth muscle not forming part of either the muscularis mucosae or muscularis propria. No Brunner-like glands or aberrant pancreatic tissue were observed. This histological picture is consistent with that of an hamartomatous adenomyoma, or myoepithelial hamartoma, as defined by Lauche (1924) and supported by others (Albot *et al.*, 1966; Taylor, 1927). This lesion however, presented some special characteristics in that its stroma was quite abundant, fibroblastic in areas, fibrocytic in others, or simply hyaline. It is possible that some of the unusual features observed in this case are related to a superadded inflammatory or infectious component. Several aspects of the clinical presentation, particularly the presence of coliforms grown from the pleural effusion, are highly suggestive of an infection, but the portal of entry is more difficult to assess. In this respect, the superficial mucosal ulcers noted on the

Table 1

Authors (years)	Age	Sex	Size	Location	Histological description
1.[a] Bush *et al.* (1974)	2 mths	Male	1 cm diam.	Greater curvature of antrum	Aberrant pancreatic tissue
2. idem	$8^{5}/_{12}$ years	Female	3 cm, ovoid	Prepyloric antrum	Mixed tumour of indeterminate type
3. idem	$6^{1}/_{2}$ years	Male	1.5 cm diam.	Prepyloric antrum	Adenomyosis
4. Clarke (1940)	18 years	Male	$2 \times 2 \times 1.5$ cm	Antrum	Undifferentiated ducts lying in an interlacing bundle of smooth muscle
5. Magnus-Alsleben (1903)	10 mths	Male	pea-sized	Pyloric	Cylindrical glands within the mucosa attaining the muscle layers
6.[a] Rodgers (1934)	10 years	Female	—	Pyloric	Ducts lined by cells similar to Brunner glands in collagenous zone
7.[a] Rutledge *et al.* (1962)	2 years	Male	1 cm diam.	Prepyloric	Nests of pancreatic glands in submucosa and muscularis of stomach wall
8. Torkel (1905)	4 weeks	?	$2.5 \times 2.7 \times 0.5$ cm	Pyloric	Muscular hypertrophy englobing complex glandular structures
9.[a] Waas *et al.* (1951)	2 years	Female	2 cm diam.	Greater curvature side of pylorus	Circular pyloric muscular hypertrophy containing Brunner's type glands

[a] Cannot be considered as true genuine hamartomas.

specimen could be significant, although gastric ulcers in general do not become infected.

Nine cases (Table) listed as adenomyomas of the stomach wall in infancy and young adults below 20 years have been found in the literature. Some of these, from their histological description, appear to be aberrant pancreatic tissue or heterotopic Brunner's glands. Only five can be retained as genuine hamartoma or adenomyoma. Thus we agree with Wanke (1971) that a great number of the so-called adenomyomas of the gastric submucosa are congenital heterotopias. This illustrates the rarity of this lesion within the gastric wall recorded in infancy and childhood. Andersen (1951) in a review of 768 benign tumours in infancy and childhood listed two cases of adenomyoma in the small intestine but none in the gastric wall. Albot *et al.* (1966) could only find two such cases in a review of their material, both in adults. Veyne-Solodilov (1962) found one case among 33 benign tumours of the stomach and Delavierre *et al.* (1973) two cases among 35 benign gastric tumours. These lesions are usually noted as curiosities at post-mortem. Their true nature can only be determined by histology. They are often small and do not produce sympoms, but when they are large enough to provoke clinical manifestations these

are similar to those observed in cases of other benign lesions of the stomach (Albot *et al.*, 1966; Marche *et al.*, 1966; Roberts, 1974; Rutledge and Neil, 1962).

The radiological appearances are not specific for the condition but have been reported by some authors (Bush *et al.*, 1974; Littner and Kirsch, 1952). In the present case the calcification was most striking, as was the deformity of the stomach which looked as though it was compressed by an extrinsic mass.

On morphological grounds, the gross specimen must be differentiated from the heterotopias, chiefly pancreatic and Brunner-like glands (Albot *et al.*, 1966; Silverman *et al.*, 1961), duplications or cysts (von Maess and Wendt, 1972), gastric teratoma (Matias and Huang, 1973), pseudo-inflammatory reactions or eosinophilic infiltration of the stomach (Salm, 1965; Warmington and Rippey, 1974) other more common benign tumours of the gastric wall, derived from the various tissue components present, and from their malignant soft tissue conterparts (Morson and Dawson, 1972; Stout, 1953). Histochemistry seems to be of very little assistance in differentiating the various types of mucins secreted by the various glands, since Roberts (1974) has shown that there is no difference histochemically between the glands of the region.

The connective tissue stroma, with its varied aspects which formed the greater part of the mass is of particular interest. In places it was actively proliferating with zones of bizarre cells. These did not show atypical mitotic figures. Some of this peculiar behaviour of the stroma was due to the active chronic inflammatory reaction with its major fibroblastic component, and this is responsible for a proportion of the total mass of "soft tissue" making up the specimen. This may also give it the appearance of those lesions referred to as "inflammatory pseudotumour". Chronic inflammation could also explain adhesions to the spleen and pancreas. The calcification was dystrophic and could be a further part of this process. Furthermore, there was an interweaving of the stroma with the glandular structures or cysts and with normal structures, in particular, with the markedly hypertrophied muscularis propria in areas. Sometimes the muscle bundles were simply pushed aside or atrophied, leaving scar tissue.

In summary, when dealing with benign lesions of the gastric wall, one must consider the myoepithelial hamartoma or adenomyoma among the differential diagnoses.

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Present address:
Dr. W. V. Bogomoletz
Consultant Pathologist
Queen Mary's Hospital
Roehampton, London, SW15-5PN, England

Dr. J. N. Cox
Department of Pathology
University of Geneva
40, Boulevard de la Cluse
1205 Geneva, Switzerland