Primary Gastrinoma of the Liver

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Extragastroenteropancreatic (EGEP) gastrinornas may not be as rare as previously believed(l-3). A recent review reported 18 documented cases of EGEP gastrinomas, the common sites being hilum of the spleen, omentum, mesentery, liver, ovary, peripancreatic lymph nodes and the parathyroid glands(3).

We report a case of a nine year old boy of Zollinger-Ellison syndrome who had a large solitary nodule (gastrinoma) in the liver.

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Case Report

A nine-year-old boy was admitted to this hospital in September 1991 with a history o£ severe epigastric pain without any relation to meals for the past six months. There was also a history of vomiting after meals, and watery diarrhea without mucus or blood and not responding to symptomatic treatment. There were five episodes of malena and he was hospitalized four times in the past six months.

During the first admission he was diagnosed to be having helminthic infestation on stool examination but treatment did not relieve his symptoms. During his second and third admission he was diagnosed to have severe esophagitis on endoscopy but no comment was made about his duodenum which was probably not evaluated by the endoscopist. During his fourth admission he was clinically diagnosed as gastric outlet obstruction and transferred to our department for further management.

At this admission his physical examination revealed a growth reatarded child (height 105 cm, weight 14 kg) who was markedly cachexic, pale, and had a scaphoid abdomen. The liver was palpable 2 cm, below the right costal margin. There were no other significant clinical findings.

The clinical diagnosis was gastric outlet obstruction probably due to a duodenal ulcer and duodenal fibrosis. Upper gastrointestinal endoscopy revealed severe esophagitis and a large circumferential duodenal ulcer with partial duodenal stenosis.

Routine investigations showed a hemoglobin level of 10.5 g/dl, white cell count of 5,100/cu mm with a normal differential

count and ESR of 10 mm in the first hour. Routine urinalysis was normal and occult blood test for stool was positive.

The serum gastrin level was 703.6 pg/ml (normal 90-180). Repeat study 4 months later, just prior to surgery, showed that the level had increaed to 1800 pg/ml. Ultrasonography of abdomen revealed a single hyperechoic nodule of the right lobe of liver. Fine needle aspiration cytology from the liver nodule showed features of an "apudoma". CT scan of the abdomen confirmed the ultrasonographic findings of a nodule in the liver with a normal pancreas and no evidence of tumor at other sites *(Fig. 1)*. Further confirmation of solitary liver nodule was made by celiac angiography which showed tumor blush in the liver nodule, but no evidence of any tumor in the pancreas *(Fig. 2)*. Hence, a diagnosis of primary liver gastrinoma was made. The levels of urinary hydroxy indole acetic acid were normal. Blood levels of T_3, T_4, TSH, prolactin and growth hormone following insulin stimulation were normal. "Cone down" view of the sella turcica was also normal.

The patient was treated with famotidine in a dose of 80 mg. daily. Vomiting and pain disappeared within a week and his nutrition was built up gradually over 2 months with high protein diet and hematinics. At surgery, four months later, selective vagotomy with wedge resection of the liver and gastro-jejunostomy was performed. Cut section of the right lobe showed a greyish mass surrounded by a thick fibrous capsule. Histology showed uniform small round cells arranged in trabecular pattern and traversed by thick fibrovascular septa.

The repeat serum gastrin immediately post-operatively and six months after surgery were 38 and 103 pg/ml, respectively (normal 90-180 pg/ml).

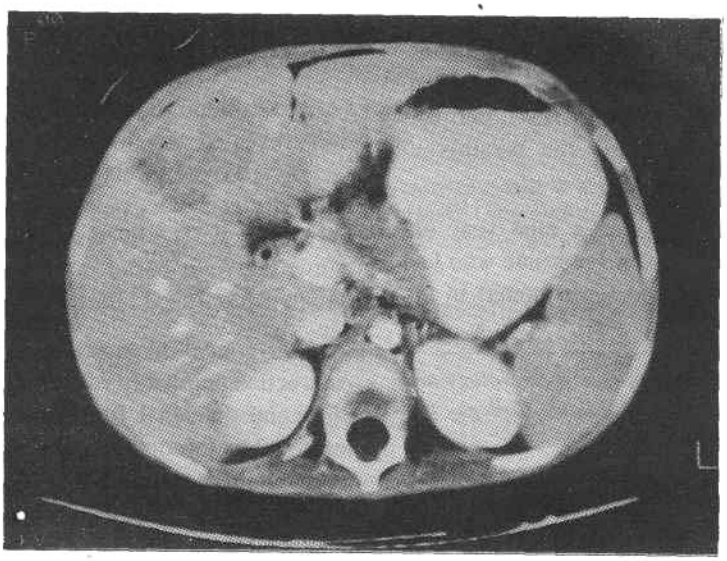

Fig. 1. Contrast CT scan of abdomen showing solitary nodule in right lobe of liver anteriorly measuring 5 cm × 4 cm.

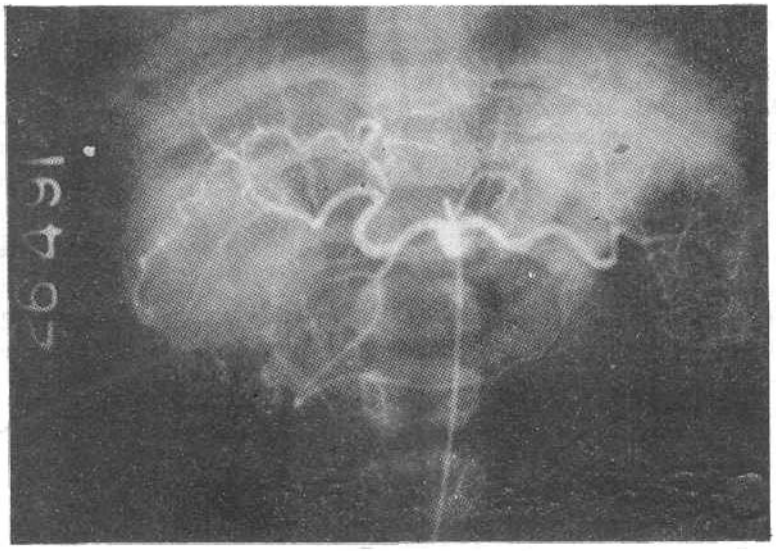

Fig. 2. Celiac axis angiogram showing large tumor blush in right lobe of liver.

Discussion

The true incidence of Zollinger-Ellison syndrome (ZES) is not known. Approxilately 0.1-1% of all patients with duodenal ulcers suffer from ZES(4). It is extremely rare in the pediatric age group and initial manifestations are usually seien in the third to fifth decade. Approximately 25% of parents with gastrinomas have solitary tumors which are potentially resectable(5,6). In 60-80% of cases gastrinomas are located in the ancreas, 10-25% in the duodenal wall and less than 5% at extragastroenteropancreatic EGEP sites. Common EGEP sites are araduodenal, peripancreatic or perigastric lymph nodes, and parathyroid glands(2,3). There is only one reported case of primary gastrinoma of the liver in an adult(2). There is no reported case in a child.

Centrifugal growth pattern characterized by a thick fibrous septa and frequently cystic degeneration changes in EGEP are said to be suggestive of primary gastrinoma(3).

Medical management of ZES consists of administration of H_2 receptor antagonists as much as 8 times the usual therapeutic dose or proton pump inhibitor such as omeprazole. Surgical intervention in the form of highly selective (parietal cell) vagotomy or total gastrectomy is carried out if the tumor cannot be localized. The tumor is resected whenever localized. Other modalities of treatment include chemotherapy and hepatic artery embolization. Hormonal therapy using octreotide and interferon is still investigational(7).

The observations suggest that the EGEP gastrinoma in the liver was primary since surgical resection provided effective therapy. There was complete resolution of symptoms and a dramatic fall in the gastrin

level after removal of the gastrinoma. The levels remained within the normal range for 6 months after surgery.

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Penile Agenesis

Penile agenesis is a rare clinical entity with a reported incidence of 1 in 10 to 1 in 30 million births(l). The prognosis depends not only on the associated cardiac or renal anomalies but also on the location of the urethral opening(2). The urethral opening is either present in front of the anal opening through a skin tag or in anterior wall of anal canal. The anomaly may be due to a deficient formation of the genital tubercle or failure of development of the upper cloacal structures at and above the level of entry of the mesonephric ducts at 6 weeks of intrauterine life. We have seen two neonates with complete absence of penis but absolutely normally developed scrotum and bilaterally descended normal sized testes *(Fig. 1)*. The babies were passing meconium through a normally located anus, and urine through a separate opening just in front of the anus in one, and in the anterior wall of the anal canal in the other. Both babies had normal intravenous urography and renal ultrasound scans. Sex identity was established by Barr body, positive Y-chromosome and normal 46 XY karyotype.

On account of the practical problems of reconstructing a normally functioning penis, one of the option is to manage such babies by rearing them as females, after performing bilateral orchidectomy and infolding the

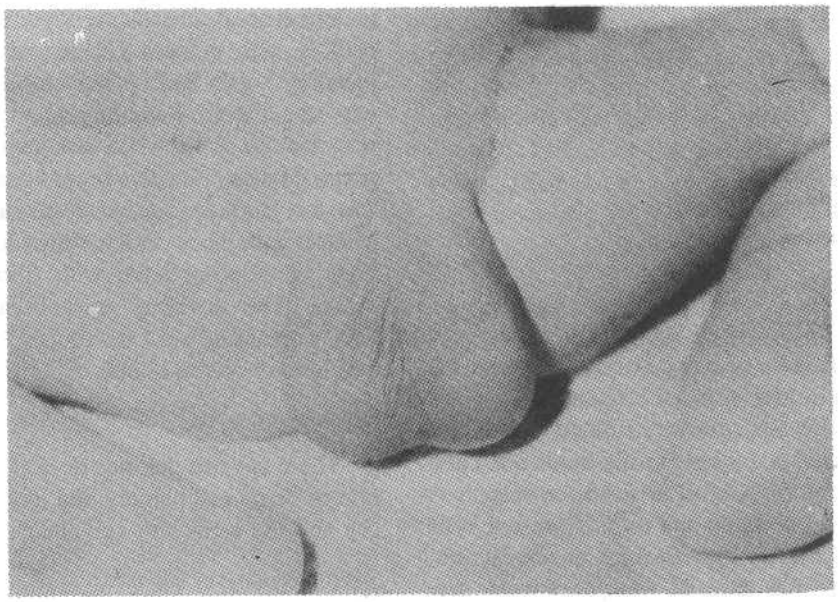

Fig. 1. Clinical photograph showing complete penile agenesis but fully developed scrotum with bilaterally descended normal size testes.

scrotal skin for labial reconstruction. Subsequently, vaginoplasty and estrogen therapy for normal feminine contour is required.

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