

# World Journal of *Gastrointestinal Surgery*

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WJGS mainly publishes articles reporting research results and findings obtained in the field of gastrointestinal surgery and covering a wide range of topics including biliary tract surgical procedures, biliopancreatic diversion, colectomy, esophagectomy, esophagostomy, pancreas transplantation, and pancreatectomy, *etc.*

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## Overview of ectopic pancreas

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### Abstract

This editorial discusses the article written by Zheng *et al* that was published in the latest edition of the *World Journal of Gastrointestinal Surgery*. Our primary focus is on the causes, location, diagnosis, histological classification, and therapy of ectopic pancreas. Ectopic pancreas refers to the presence of pancreatic tissue that is situated in a location outside its usual anatomical placement, and is not connected to the normal pancreas in terms of blood supply or anatomical structure. Currently, the embryological origin of ectopic pancreas remains uncertain. The most prevalent form of ectopic pancreatic is gastric ectopic pancreas. Endoscopic ultrasonography examination can visualize the morphological characteristics of the ectopic pancreatic lesion and pinpoint its anatomical location. The histological categorization of ectopic pancreas evolves. Endoscopic treatment has been widely advocated in ectopic pancreas.

**Key Words:** Pancreas; Gastric ectopic pancreas; Diagnosis; Treatment; Anatomy

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**Core Tip:** Ectopic pancreas is a rare disease. At present, the study on ectopic pancreas is mostly limited to case reports. Endoscopic ultrasonography is the main examination method for the diagnosis. This editorial shed a light on the ectopic pancreas from the overview of etiology, anatomical site, diagnosis, histological type, and treatment.

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## INTRODUCTION

Congenital anomalies such as pancreatic dysplasia, which include common pancreas division, unusual annular pancreas, and ectopic pancreas, have been identified[1,2]. Ectopic pancreas refers to the presence of pancreatic tissue at a location that is not typical for the pancreas. This tissue is separated from the normal pancreas in terms of its blood supply, nerves, and anatomical connection[3]. Ectopic pancreas is a congenital anatomical abnormality that can arise in several locations within the digestive tract and other areas[4]. It is frequently located in the stomach (particularly the antrum), duodenum, jejunum, Meckel diverticulum, as well as the ileum, liver, spleen, bile duct, omentum, fallopian tube, and so on[5,6]. The incidence of ectopic pancreas ranges from 0.5% to 13% in the general population in autopsy series[7-10].

## ETIOLOGY

The process of pancreatic development is quite intricate[11]. Congenital malformations are categorized as fusion abnormalities, migration abnormalities, and replication abnormalities. Currently, the embryological origin of ectopic pancreas remains uncertain. The largely recognized idea is the dislocation theory, which proposes that pancreatic tissue deposits become detached from the primary pancreas and are then relocated to other developing organs, particularly the gastrointestinal system.

## ANATOMICAL SITE

The occurrence of ectopic pancreas in the digestive tract is most prevalent, particularly in the proximal region of the gastrointestinal tract[12]. Gastric ectopic pancreas is primarily seen in the digestive tract[13]. Gastric ectopic pancreas is most frequently found within a distance of 6 cm from the greater curvature of the stomach, namely near the pylorus[14]. It may also be present in other areas, however the occurrence is infrequent[15]. Ectopic pancreas typically resides within the submucosa or muscularis propria layer[16]. Currently, the identification of the lesion's source can be achieved using pathology or endoscopic ultrasonography, which can then be used to direct the appropriate treatment[17].

## DIAGNOSIS

Ectopic pancreas is observed as submucosal masses with intraluminal growth patterns during endoscopic examination [18,19]. Endoscopic ultrasonography examination can visualize the morphological characteristics of ectopic pancreas lesions and pinpoint the location from which the ectopic pancreas originates[20,21]. If deemed required, a fine needle puncture can be conducted with the use of endoscopic ultrasonography guidance[22,23]. Under ultrasonography gastroscopy, the stomach wall exhibits a distinct five-layer structure[24]. Common ultrasonography endoscopic findings of ectopic pancreas include submucosal masses with high echogenicity, low echogenicity, or equiechogenicity. These masses typically originate from the submucosal layer or intrinsic muscle layer[25,26]. Certain lesions exhibit a combination of echogenicity, which could be indicative of degeneration or the development of cysts[27].

## HISTOLOGICAL TYPE

When examining the ectopic pancreatic tissue under a microscope, it is observed that the ductal system is linked to the intestinal cavity. This connection may pose challenges in terms of visualization during imaging procedures. While Schultz initially documented ectopic pancreas in 1727, it was not until 1859 when Klob provided a histological confirmation of its existence[28]. Heinrich introduced the initial histological classification system in 1909, which outlined three distinct categories of ectopic pancreas[29]. The most prevalent tissue type of ectopic pancreas is the same as that found in the normal pancreas, encompassing all cellular components such as acini, ducts, and pancreatic islet cells. The second histological type primarily consists of acini, while the third kind primarily consists of ducts. In 1973, Fuentes



Table 1 Histological classification of ectopic pancreas		
Classification	Heinrich's classification	Fuentes's classification
I	All components of normal pancreatic tissue, including acini, ducts, and pancreatic islet cells	All components of normal pancreatic tissue, including acini, ducts, and pancreatic islet cells
II	Composed of acini and ducts, without pancreatic islet cells	Composed of ducts
III	Composed of ducts	Composed of acini (exocrine)
IV		Composed of pancreatic islet cells (endocrine)

made additional changes to the classification scheme. This included the addition of a fourth type of ectopic pancreatic tissue, which consisted solely of pancreatic islet cells (Table 1)[28].

## TREATMENT

With the rapid advancement of endoscopic technology in recent years, there has been widespread promotion of endoscopic treatment[30]. Nevertheless, the selection of therapeutic approaches must be dependent on the lesion's location, size, and its interaction with neighboring organs[31]. The existing techniques employed for the endoscopic treatment of ectopic pancreas encompass endoscopic submucosal dissection, submucosal tunnel endoscopic resection (STER), endoscopic high-frequency resection, mucosal resection, and endoscopic full-thickness resection[7,32,33]. Certain lesions can be eliminated with ligation[34]. If the ectopic pancreas arises from the muscular layer or grows through the entire wall of the organ, or if the growth is located outside the reach of endoscopy, it is indicated to have local surgical excision for treatment[35]. If there is a possibility of cancer, it is advisable to undertake aggressive surgery for resection[36]. Certain individuals with malignant transformation may necessitate adjuvant chemotherapy following surgical intervention. Zheng *et al*[37] reported that laparoscopic resection is better for large gastric ectopic pancreas with a deep origin, which has added new clue for the surgical treatment in the field of ectopic pancreas. Meanwhile, multicenter large-scale studies are needed to describe its characteristics and evaluate the safety due to the rarity of gastric ectopic pancreas.

## CLINICAL IMPLICATIONS

The etiology of ectopic pancreas remains uncertain and is thought to be associated with congenital anomalies. Ectopic pancreas can manifest in various locations throughout the body, with a particular predilection for the digestive tract. The stomach has the highest incidence rate. Diagnosis involves determining the location and nature of the condition, typically with the help of medical imaging. However, the findings from imaging tests do not provide particular information, and the diagnosis ultimately depends on a pathological examination. There is currently no standardized approach to treatment, and individualized diagnoses and treatment strategies must be established according to the patient's specific condition. Presently, it is advised to actively provide treatment to patients displaying symptoms, prioritize thorough postoperative monitoring, and opt for endoscopic treatment as the preferred technique of treatment. Nevertheless, for patients with the potential for malignant development, surgical intervention is the preferred course of treatment.

## CONCLUSION

Ectopic pancreas refers to the presence of pancreatic tissue at a location that is not typical for the pancreas, and it is not connected to the normal pancreas in terms of blood supply or anatomy. Currently, the embryological origin of ectopic pancreas remains uncertain. The most prevalent form of ectopic pancreatic is gastric ectopic pancreas. Endoscopic ultrasonography examination can visualize the morphological characteristics of ectopic pancreas lesions and detect the precise location of the ectopic pancreas. The histological categorization of ectopic pancreas is being developed. Many patients with ectopic pancreas remain completely asymptomatic throughout their lives and without developing any complications. Endoscopic treatment has been widely advocated in symptomatic ectopic pancreas.

## FOOTNOTES

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