

DILEK ALTINSOY, MD

FOUNDER OF RADIOLOGY CASE DISCUSSION (RCD)

**STOMACH
NEUROENDOCRINE
NEOPLASMS: THE
UMBRELLA CONCEPT AND
SUBGROUPS**



STOMACH NEUROENDOCRINE NEOPLASMS: THE UMBRELLA CONCEPT AND SUBGROUPS

The fundamental and most accurate way to understand the neuroendocrine pathologies we encounter in the stomach and gastrointestinal system is to address the matter as "A Broad Umbrella" and its "Subgroups."

Achieving an accurate diagnosis in masses located in the gastrointestinal tract is possible through the use of a common terminology language among clinicians, radiologists, and pathologists. One of the greatest conceptual confusions in this field is the random, interchangeable use of the terms "carcinoid," "gastrinoma," and "neuroendocrine tumor." However, this terminology relies on a hierarchical umbrella structure.

1. The Broad Umbrella: Neuroendocrine Neoplasms (NEN)

Our bodies contain specialized cells that can receive stimuli like a nerve cell (neuro) and secrete hormones and peptides into the bloodstream like an endocrine gland. All tumors originating from these cells are gathered under the main umbrella of Neuroendocrine Neoplasms (NEN).

This vast umbrella is initially divided into two main branches according to the biological behavior and microscopic (histological) structure of the tumor:

- **Neuroendocrine Tumors (NET):** The group with well-differentiated cell structure (resembling the original tissue), generally with a slower course and limited aggressiveness.
- **Neuroendocrine Carcinomas (NEC):** The group with poorly differentiated cell structure (having lost the characteristics of the original tissue), extremely fast-growing, and highly aggressive.

2. Subgroups Under the Umbrella and Their Functional Characteristics

The most characteristic feature of neuroendocrine tumors (NET) is their specialization according to the hormones they secrete and the resulting clinical presentations (syndromes) they create in the body. At this stage, two fundamental clinical concepts emerge:

A. Carcinoid Tumors (Serotonin and Histamine-Secreting Group)

- **Concept:** The term "carcinoid," historically used to describe tumors that "resemble carcinoma but grow more slowly," is nowadays frequently used in medical literature for well-differentiated G1 and G2 neuroendocrine tumors.
- **Clinical Effect (Carcinoid Syndrome):** These tumors secrete excessive amounts of Serotonin, Histamine, and Vasoactive Peptides into the bloodstream. These hormones excessively increase intestinal motility and fluid secretion, leading to refractory/persistent secretory diarrhea, nausea-vomiting, facial flushing, and bronchospasm in the patient.
- **Relationship with Liver Metastasis:** When the tumor is confined to the stomach, the secreted Serotonin is metabolized in the liver, so diarrhea may not be prominent. However, when the tumor metastasizes to the liver (showing hypervascular character in the arterial phase), hormones pass directly into the systemic circulation, causing a severe diarrhea/vomiting clinical picture to erupt.

B. Gastrinomas (Gastrin-Secreting Group / Zollinger-Ellison Syndrome)

- **Concept:** The specific subgroup of the neuroendocrine tumor family specialized exclusively in secreting the Gastrin hormone. It is frequently located in the "Gastrinoma Triangle" within the pancreatic head, duodenum, or around the stomach.
- **Clinical Effect:** Excessive gastrin hormone relentlessly stimulates parietal cells in the stomach, causing the production of massive amounts of gastric acid.
- **Manifestation:** This massive acid load leads to giant rugal thickenings in the stomach, severe peptic esophagitis and edema in the esophagus, burning of

the small intestinal mucosa to inactivate pancreatic enzymes, and ultimately severe acid-induced diarrhea.

3. Fundamental Distinction from Classical Gastric Cancer (Adenocarcinoma)

The most critical points distinguishing classical epithelial-origin Gastric Adenocarcinoma from Neuroendocrine Tumors when evaluating gastric masses are as follows:

- **Symptomatology:** While classical adenocarcinoma presents with obstruction due to mass effect and weight loss, Neuroendocrine Tumors create systemic hormonal clinical pictures like refractory diarrhea and vomiting (Carcinoid or Zollinger-Ellison Syndrome) through the hormones they secrete.
- **Imaging (Vascularity):** Metastases of classical gastric adenocarcinoma (especially in the liver) are hypovascular (appear dim/dark). In contrast, liver metastases of Neuroendocrine Tumors are typically intensely hypervascular in the arterial phase (show bright enhancement).
- **Biomarkers:** While CEA and CA 19-9 are prominent in adenocarcinoma, Chromogranin A (CgA), Fasting Gastrin Level, and urinary 5-HIAA are the diagnostic keys in Neuroendocrine Tumors.