DIFFUSE ENDOCRINOLOGY THE (APUD- SYSTEM) ANATOMICAL, HISTOLOGICAL AND CLINICAL PERSPECTIVES

Ghulam Hassan MS; Mohd Shafi M.S.

Abstract:
Manifestations of certain neoplasms of the body is not always typical. They can prove intriguing to the clinician. Such neoplasms can be life consuming. At times these atypical presentations have been difficult to diagnose, and difficult to treat. Due to recent advances in radiology and Histopathology, detection of these previously rare entities have become common nowadays.

The endocrine system is the most widespread and segregatted system in the human body classified as the Diffuse & the Classic Endocrine system. In The Diffuse System, the part receiving the prime focus is the APUD System, (Amine Precursor Uptake & Decarboxylation System) with the performance of specialized functions.

♦ Paracrine functions
♦ Endocrine functions
♦ Autocrine functions
♦ Circadian functions

Origin:
Pearse proposed the Unifying theory which postulates a common origin of the Apud System from Neural Crest.
Diffuse origin theory from multipotent stem cells and implantation at different sites, which is more widely accepted & in accordance with the wide distribution of the system.

Histology:
The Apud System is the most widespread in the Gut espically small intestine & a part of the large gut. There are about 28 cell types. The cells are designated as clear cells the name clear cells is given because of their special histological behaviour.
These cells don’t have sufficent RNA to import Basophilia & nor sufficient membrane to import Acidophilia to the cells. The routine Haemtoxyline & Eosin stains are ineffective for staining purposes.
The cells are Stained by Silver salts. & Silver impregnation techniques are widely used hence the name (Argyrophilic).

The cells are also characterised by their ability to take up Bichromate Salts & impart a distinctive color. (Enterochromaffin cells). The cell types involved are:

C cells in Thyroid.
Melanocytes inskin
Respiratory epithelium; Kultchitsly cells; Lungs
Gastroentero pancreatic system; GIT A, D, B, G, Non beta cells,
Gastraic glands, Pyloric glands & Ilets of Langerhans
The cells have the ability to store & release a wide variety of neuroendocrine substances withdiverse functions. The Proven & the Candidate substances.

Proven
Candidate
Serotonin                        Pancreatic Polypeptide
Histamine                        Motilin
Dopamine                        Chromagranin
Bradykinin                      Dense Core granules
Tachykinin                      ANP
VIP

The clinical importance of these diffuse cell populations stems from the fact that when these cells undergo unopposed proliferation they result in production of a number of neoplastic syndromes & Tumors which a clinician should always bear in mind while evaluating a patient with both typical as well as atypical signs & symptoms.
Tumors of APUD SYSTEM:

GIT: Carcinoid Tuomors,
Zolinger ellison Syndrome
VIPoma
WDHA Syndrome
Thyroid: Medullary Carcinoma Thyroid
Skin: Multiple Myloma
Adrenal Medulla: Phaeochromocytoma (10% Malignant,
10% in children, 10% bilateral, 10% familial, 10% calcify, 10% extra adrenal
♦ Multiple Endocrine Neoplasia 1 (Wermers Syndrome)
♦ Multiple Endocrine Neoplasialla (Sipples Syndrome)
♦ Multiple Endocrine NEoplasia IIb
♦ CNS: Chemodectoma, Paraganglionoma, Neuroblastoma

These neoplasms can present with different signs & symptoms ranging from mild diahorrea to serious synvptomology such as cardiac & cerebral damage due to malignant hypertension, cardiomyopathy, CHF & metastatic disease. Hence a need for bearing these unfortunate diverse groups of proliferations in mind which are scaterred in our bodies as stars in sky.

Further Reading:
1. Pearse AGE Polak JM, endocrine tumors of Neural Crset origin.
2. Moertel eg et al Carcinoids of GIT New Engl JM
4. Thorson et al Malignant Carcinoids of GIT.
7. Godwin GD Carcinoids AN analysis of 2837 cases.
8. Michael H. Ross Histology & Electron Micrography