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Gross Pathology: Why Important?

"**Gross pathology"** refers to the appearance of a diseased organ: includes clinical, radiological appearance as well (in a deep seated organ, radiologic scans help us appreciate the gross morphology of an organ).

Importance of gross pathology
Subcellular changes → abnormal appearance of cells → grossly abnormal appearance. The appearance of a diseased organ (the gross pathology), tells the story of the disease – behaviour, progression, how it gives rise to clinical signs and symptoms.

Example: a patient presenting with growth in foot: it could be tumour, infection (fungal/wart), or something else.

Helps us in clinching the diagnosis. Is it tumour? Infection? Or something else?
Thereby guiding us to order correct investigations, instituting appropriate treatment.

Approach to Describing Gross Pathology

Steps:

1. Describe the organ and plane of resection.
Sagittal: Plane that runs down through the body, dividing the body into left and right portions. Subsections of the sagittal plane include:

- **Midsagittal** runs through the median plane and divides along the line of symmetry
- **Parasagittal** is parallel to midline but does not divide into equal left and right portions.

Coronal (frontal): Plane that runs perpendicular to the sagittal plane and divides the body into anterior and posterior (front and back) portions.
Transverse: Horizontal plane that divides the body into upper and lower portions; also called cross-section.

POTS and planes:
https://medicine.nus.edu.sg/pathweb/pathology-demystified/approach-to-gross-pathology/where-to-start/

2. Describe the distribution of the lesion: localized vs diffuse. The differential diagnoses (ddx) are quite distinct

Localized/focal process	Diffuse process
The pathology is seen as one or several discrete lesions, while the rest of the organ appears grossly normal. Eg. Mass, cyst, cavity, ulcer etc. DDx: Neoplasms, cysts, abscesses, infarction etc.	The pathology affects the whole organ uniformly. E.g. Enlargement, change in colour oe texture, shrinkage/atrophy Fatty change in the liver, chronic venous congestion in the lung, diffuse hyperplasia in the thyroid gland DDx: Metabolic diseases, autoimmune conditions, haemodynamic disorders, sometimes infections etc.

3. State the nature and location of the lesion.
Nature**:** mass, nodule, cyst, cavity, scar, focus of discoloration, ulcer, polyp, etc.
Examples:
"There is a wedge –shaped, well demarcated area of pallor within the renal cortex in the upper pole of the kidney."
"The thyroid gland is diffusely enlarged and dark brownish in colour."
"There is a nodule in the upper lobe of the right lung."
**Try avoid the word "lesion". Non specific and non descriptive.*

4. Describe the characteristics of the main pathology (i.e. size, colour, cut surface, edges of ulcer or mass, cavity contents etc.)

Location – middle lobe of right lung; upper pole of right thyroid lobe, colonic mucosa, subcapsular region of kidney etc.
Size
Shape – rounded (eg. benign neoplasms), ovoid, irregular, wedge-shaped (eg. infarcts)
Number of lesions – solitary, multiple
Cut surface – texture (solid/cystic/friable), colour (tan, pale, blackish, greenish, variegated), presence of necrosis (paler areas) or haemorrhage
Edges/ margins of lesion – well defined vs ill-defined, infiltrative, encapsulated

Ulcer (for organs lined by epithelium eg. Skin, GIT) – regular, punched out, flat edges, heaped edges, overhanging edges
5. Describe any visible cause or effects of the disease, i.e. cause or complication of the disease if shown in the pot – eg. myocardial infarction with coronary artery thrombus).

In some specimen pots, you may be able to see not only the main pathology but also its cause or complications.
Spot the cause in this POT:
https://medicine.nus.edu.sg/pathweb/wp-content/uploads/2016/08/Heart-fresh-infarct-close-up-1gojgd6.jpg

Video for description:
https://medicine.nus.edu.sg/pathweb/pathology-demystified/approach-to-gross-pathology/where-to-start/

Glossary of Descriptive Terms

A. Colours

Tan – Many solid tumours are tan (beige to pale brown). This term is often used to describe the cut surface appearance of a solid tumour. (In most specimens, you will be describing 50 shades of tan!)

Pale – An area of lighter colour on a slightly darker background eg. areas of pallor superimposed on a tan tumour often indicate coagulative necrosis. Areas of infarction in solid organs are often pale – eg. wedge shaped pale infarct in the kidney. In a malignant tumour that grows rapidly and outstrips its blood supply, pale areas of necrosis may be seen within the tumour.

Black

– Endogenous substances – eg. blood – haemorrhagic areas are often dark brown to blackish. Melanin pigment is dark brown to blackish (hence a tumour mass that is blackish may represent a melanin-producing tumour, i.e. melanoma).

– Exogenous substances – carbon (eg, in the lung, or in hilar lymph nodes), tattoo pigment

– Gangrene

Green

– Processes involving bile accumulation eg. biliary cirrhosis, biliary obstruction, bile in the gallbladder

Yellowish green

– Purulent material eg. abscess fluid, fibrinopurulent serosal exudates in acute appendicitis

White

– Fibrosis eg. fibrous scar

– Cartilage (gray-white translucent)

– Fibrin eg. pale whitish areas in an arterial thrombus – lines of Zahn – whitish layers are platelets and fibrin

– Chalky whitish deposits – calcifications eg. pancreatic fat necrosis

Bright yellow

– Fat necrosis

B. Nature of localized lesions

Describing localized lesions depends on the organ that you are examining.

Solid organs (eg. liver, spleen, lung)

- Nodule – Space occupying condensation of tissue , often rounded and well circumscribed.
- Mass – Space occupying growth, can be well circumscribed or irregular. Nodule (more rounded, well circumscribed mass)
- Cyst – A usually rounded cavity with a smooth inner lining (cysts are lined by epithelium on their luminal surfaces), containing fluid
- Cavity – A hollow space within an organ eg. abscess cavity
- Area of discoloration – eg. wedge shaped area of pallor (infarct)

Organs with an epithelial lining, with underlying layers of tissue
Eg. Skin, gastrointestinal tract, bladder

- Ulcer – A break in skin or mucous membrane with loss of surface tissue, disintegration and necrosis of epithelial tissue, and often pus.
- Describing an ulcer:- Edges – Fungating (raised fleshy irregular edges) /punched out /rounded / irregular- Base – smooth / necrotic
- Polypoid growth
- Scar
- Plaque
- Area of discoloration eg. bruise, haemorrhage

C. Describing texture:

- Friable – Easily torn apart or crumbled (used to describe areas of necrosis or tumours)
- Fleshy – Solid, dense appearing
- Spongy – Full of small holes, eg. haemangioma
- Solid

Important Practice

Practice **Examples** and **Videos** at:
https://medicine.nus.edu.sg/pathweb/pathology-demystified/approach-to-gross-pathology/practice/
(model descriptions)