Neoplasia II: Benign and malignant neoplasms in squamous epithelium and haematopietic tissue

Answers:

Q1 Can you think of some? (Think about the Gastro-Intestinal & Reproductive Tracts).

A1 In the gastrointestinal tract: mouth, pharynx, larynx to oesophagus, anal canal and anus. In the female reproductive tract: vulva, vagina & ectocervix.

Q2 Squamous metaplasia is common in the cervix uteri and in the respiratory tract. What is the most likely irritative cause in the bronchial tree?

A2 Cigarette smoke.

Q3 Can you see evidence of loss of normal proliferative controls in CIN 3?

A3 You should be able to see mitotic figures in cells above the basal layer (it is normal to see mitotic figures in the basal layer where the stem cells reside, but not above the basal layer).

Q4a Can you see evidence of invasion into the cervical stroma?

A4a Yes, invasion through the basement membrane into the underlying stroma.

Q4b Is there a host response to invasion?

A4b Yes, inflammatory cells (mostly lymphoid cells and other chronic inflammatory cells) can be seen around the invasive cancer edges and some within the carcinoma.

Q4c Why does this host response occur?

A4c Invasion involves tissue destruction, which excites an inflammatory response. There is also an immune response against the cancer cells.

Q5 What features can you recognise to determine the pattern of differentiation of this neoplasm (and therefore its histogenesis)?

A5 Squamous differentiation can be seen in places (mostly as prickle cell formation in some areas, however there is very little keratinisation in this cancer. Keratinisation with formation of “keratin pearls” of pink whorled keratin may be much better seen in skin cancers).

Q6 What are some possible sites of origin of squamous cell carcinomas?

A6 skin, oesophagus, anal canal, pharynx, larynx, cervix (following metaplasia), bronchus (following metaplasia). (This follows on from the answers to questions 1 and 2.)

Q7a What is meant by CIN?

A7a Cervical Intraepithelial Neoplasia

Q7b Is it non-invasive or invasive?

A7b It is a neoplasm which is non-invasive (hence benign). Benign neoplastic changes in epithelium are often referred to as dysplasia.

Q7c How would you recognize it histologically?

A7c Dysplastic cells within the squamous epithelium (occupying up to one third (CIN 1), two thirds (CIN 2), or three thirds of the epithelial layer (CIN 3)) with disorganised orientation of nuclei that show features of nuclear enlargement, pleomorphism and hyperchromatism, with increased mitotic figures (some abnormal) above the basal layer.

Q8 How do you define metaplasia?

A8 Metaplasia is a change from one adult fully differentiated cell type to another adult fully differentiated cell type (e.g. glandular to squamous in the cervix). It is not neoplastic, but may later develop into a neoplasm in some patients (e.g. metaplasia to CIN in the cervix).

Q9a What type of vessel do carcinomas usually invade earliest?

A9a Lymphatics.

Q9b What type of vessel do sarcomas usually invade earliest?

A9b Blood vessels. (But this is a general rule of thumb only, with some exceptions).

Q10 Try to classify these leukaemias using the degree of differentiation of the cells [large undifferentiated blast cells (acute) OR well differentiated cells similar to normal leucocytes (chronic)] and the cell types [lymphocytic or myeloid]?

A10 All three slides show a higher ratio of white blood cells to red blood cells (leucocytosis) compared with normal. In some you may even be able to convince yourself that the red blood cells show signs of anaemia, such as reduced haemoglobin content (hypochromasia).

24.10: 96.346: acute leukaemia: cells are large undifferentiated blast cells (undifferentiated meaning that it is not possible to reliably distinguish myeloid blasts from lymphoid blasts in terms of the morphological patterns of differentiation – antibody staining for markers of lymphocytic / lymphoid or myeloid differentiation can be used with a flow cytometer to do this).

24.11: 96.357: chronic lymphocytic leukaemia: most of the white blood cells look like mature lymphocytes (some immature larger lymphocytes / lymphoid cells may also be seen).

24.12: 68.138: chronic myeloid leukaemia: cells are a mixture of mature polymorph granulocytes and monocytes, including mostly neutrophils with some basophils and eosinophils, along with immature white blood cell precursors (‘band forms’ with poorly segmented nuclei) (release of immature forms is sometimes called a “left shift”). Some erythroid precursors, erythoblasts, which have dense, round nuclei, may also be identified.

Chronic myeloid leukaemia (or chronic myelogenous leukemia) (CML), also known as chronic granulocytic leukemia, is a cancer of the stem cell precursors of white

blood cells. It is a form of leukemia characterized by the increased and unregulated growth of predominantly myeloid stem cells or precursor cells in the bone marrow and the accumulation of mature and immature white blood cells in the blood. CML is a clonal bone marrow stem cell disorder in which proliferation of mature granulocytes (neutrophils, eosinophils and basophils) and their precursors is the main finding in the blood. It is associated with a characteristic chromosomal translocation called the Philadelphia chromosome [t(9;22)].

Unknown slide

Q11 Describe the slide, identify the pathological process and give a diagnosis.

Stomach – NDP Image: 24.13: 84.313
Glass slide: 24.13: 84.313

This section of stomach shows an invasive adenocarcinoma, with irregular glands and tubules formed from neoplastic cells (with enlarged nuclei showing marked pleomorphism and hyperchromatism with some mitotic figures) invading into the main layers of the stomach wall including the mucosa, submucosa and muscularis propria, with invasion through the muscular wall into the serosa. There is reasonably close resemblance to the parent gastric glandular epithelium, so this is graded as a well to moderately differentiated adenocarcinoma. The process is malignant neoplasia of the gastric glandular epithelium and the diagnosis is:

Stomach: well-to-moderately differentiated adenocarcinoma

Q12 Why might this disease often be fatal?

A12 This disease is often fatal because gastric cancers tend to be diagnosed at an advanced stage and have already spread beyond the stomach to form peritoneal metastases, lymph node metastases and spread to other organs (e.g. liver, lung, ovary) and are difficult to treat successfully.