***II.*** ***Rate of growth***

***DR.AYSER HAMEED***

***LEC.2***

* **Most benign tumors grow slowly *& most of cancers grow faster*** *& eventually spread locally & to distant sites (metastasis) & causing death.*
* ***In some exception, some benign tumors grow more rapidly than some cancers e.g. leiomyoma (uterine fibroid), which is benign smooth muscle tumor influence by estrogen & so increase in size during pregnancy.***
* ***In malignant tumors, rate of growth is inversely related to degree of differentiation*** (well differentiated cancer is slowly growing while undifferentiated cancer are grow rapidly).
* ***Some of malignant tumors undergo spontaneous regression, regress the whole primary cancers & leave only their metastasis e.g. Choriocarcinoma.***
* ***Rapidly growing malignant tumors usually have central area of necrosis (ischemic) because inadequate bloods supply to provide the rapid growth of cancer.***

***III. Local invasion***:

* ***Benign tumors are:***

1. **Localized** at the site of origin.

2. **Not invade the surrounding tissue**.

3. **Not metastasized**.

4. Most of benign tumors have **surrounding capsule** (derived **from the original normal tissue)** as a result of atrophy of parenchymal cells & by the pressure of benign tumors.

**e.g. leiomyoma of uterus**.

***Important not:***

Not all benign tumors are capsulated.

* ***Malignant tumors are*:**

1. Rapid progressive growth.

2. Infiltration, invasion & penetration of the surrounding.

3. Malignant tumors not develop well defined Capsule.

4. Always metastasized.

***Local invasion is the second most reliable feature (after metastasis) that distinguishes malignant from benign tumors.***

***IV. Metastasis***:

***It means development of secondary implants discontinuous with primary tumor, possibly in remote tissues.***

**Metastasis is the most important characteristic of malignancy**.

* Not all cancers have equal ability of development metastasis, e.g. Basal cell carcinoma of skin & most of CNS malignancies are highly locally invasive but rarely metastasis.
* While osteosarcoma is usually metastasize to lung at the time of initial diagnosis.
* *In general, the more anaplastic & the larger the primary neoplasm, the more likely is metastatic spread, with some exception extremely small cancers have been known to metastasize.*

***Pathways of Metastasis***:

1. ***Seeding within body cavities***: These occur when cancers *invade the body cavities (pleura, peritoneum, pericardium & meninges in CNS tumors).*

e.g***.*** *carcinoma of colon, carcinoma of stomach invade the peritoneal cavity & in female may extend to both ovaries (Krukenberg tumors)*, *carcinoma of lung invade the pleura* & *malignancy of ovary invade the peritoneum*.

1. ***Lymphatic spread*:**

**This is characteristically seen in carcinomas, while sarcomas are more spread by vascular system.**

* There are **numerous interconnections between lymphatic & vascular systems, *so all forms of cancer may spread through either or both systems***.
* **The pattern of involvement of lymph node depends principally *on the site of the primary neoplasm & lymphatic pathways of this site e.g. lung carcinoma metastasize first to the regional bronchial lymph nodes, then to the hilar lymph nodes.***
* ***Cancer cells arranged themselves inside the lymphatics either as emboli (commonest), or as continuous growth (permeation).***
* In some cases, the **cancer cells seem to traverse the lymphatic channels within the immediately proximate nodes to be trapped in subsequent lymph nodes, this is called (*Skip lesions),e.g. cancer of stomach, cancer of prostate involve the cervical lymph nodes.***
* It should be remembered, that ***lymph nodes enlargement with cancers, not always means cancerous nodal involvement,*** *and it may be due to necrotic debris of the cancer & tumor antigens*, which may induce nodal enlargement in form of lymphadenitis & sinus histiocytosis.

1. ***Hematogenous spread****:* is the ***most feared consequence of a cancer***; it is the **favored pathway for sarcomas**.

* ***Arteries are penetrated less readily than veins***; because of the wall thickness is more in arteries.
* ***Source of these malignant cells is from emboli within the lymphatics***.
* ***The liver & lungs are the most frequently involved secondary sites in such hematogenous sprea*d** (all portal area drainage flows to the liver & all caval blood flows to the lungs).
* ***Cancers arising near the vertebral column*** often *embolize through the paravertebral venous plexus to set into vertebrae* (e.g. ***carcinoma of thyroid & prostate).***

1. ***Intraepithelial cancer spread:***

This form of spread may occur ***where cancer develop in gland or its duct*** e.g. *carcinoma of breast spread to the areolar skin (Paget’s disease of breast).*