Biopsy

Definition
Retrieval of part or all of tissue or organ for histological evaluation to ascertain future management.

Indications

- Determine tissue diagnosis where clinical diagnosis is in doubt e.g. Tru-cut liver biopsy for cirrhosis of unknown etiology.
- Determine whether benign or malignant
- Ascertain the degree of differentiation (grade)
- Ascertain extent of spread of disease (stage) e.g. sentinel LN biopsy in melanoma
- Determine the tissue of origin
- Determine different therapeutic pathways e.g. LN biopsy in lymphoma
- Surgical resection margins provide critical information e.g. complete excision of the lesion (clearance of the margins)

Types of biopsy

1) **Cytological biopsy**
   - FNAC
   - Exfoliative cytology
   - Brush cytology
   - Fluid spin cytology

2) **Histological biopsy**
   - **Incisional biopsy**
     - Core biopsy
     - Curettage
     - Open incisional biopsy
     - Frozen section biopsy
   - **Excisional biopsy**

Fine needle aspiration cytology
Uses:
* Directly into a lump e.g. thyroid lump FNA
* Under U/S control e.g. breast lump FNA
* Under CT guidance e.g. liver lesion FNA

Advantages
Simple and minimally invasive
Cheap
Rapid result
Easily repeatable
Highly accurate for the diagnosis of a palpable mass or radiographically visible lesion, false positive results are rare.

Disadvantages

- Gives cytological, but not architectural histology
- Potential for spread of malignant cells
- Sample may be insufficient, or only blood may be aspirated
- May alter morphology of lesion for subsequent imaging
- Depends on expertise of cytologist- may be operator dependent

Exfoliative cytology

Cancer cells are shed from the surface of neoplasms arising in epithelial surfaces these cells can be sampled then smeared on a slide and examined for cytology, such as slide imprints from nipple in Paget's disease, cervical cytology or sputum cytology.

Brush cytology

By collecting exfoliated cells using a brush, from intraluminal lesions .

Uses

• Endoscopically for GI lesions
• At ERCP for biliary or pancreatic lesions
• Bronchoscopically for pulmonary or bronchial lesions

Fluid spin cytology

Used for pleural fluid, ascetic fluid, bronchoscopically for sputum and finally for urine, the latter is especially useful in monitoring patients with known urothelial tumors.

Core biopsy

Uses a circular cutting device to retrieve a core of tissue, either manually or with a trigger device (Tru-cut®, Bioptigun®). As FNA may be direct, U/S or CT controlled. Useful for breast, liver and LN biopsy.

Advantages

• Simple, easily repeatable
• Provides a core of tissue for architectural and cytological evaluation

Disadvantages

- Insufficient sample,
- May cause bleeding,
- May be painful or distressing to patient,
- Potential for spread of malignant cells,
- May alter morphology of lesion for subsequent imaging.

Incisional biopsy

In incisional biopsies, only a portion or wedge of the lesion is sampled, and therefore the procedure is strictly of diagnostic nature.

Advantages

- May be performed endoscopically, laparoscopically or open
- May be useful when other biopsy techniques have failed
- Performed when the lesion is too big or too fixed to allow complete excision
- Some can still be performed under local anesthesia in an out-patient setting

Frozea section

Is where fresh tissue (in *&dry* container without formalin) is sent for rapid histological assessment (in 10-15 min), during the course of an operative procedure. The tissue is frozen in liquid nitrogen then rapidly sectioned and examined, and the result ***phoned*** back to the theatre.

Uses

* Assess operability e.g. to examine LNs in pancreatico-duodenectomy
* Localize tissues e.g. parathyroid glands
* Assess tumour margins
* Assess malignant status where pre-operative diagnosis is in doubt and more radical surgery may be required.

Disadvantages

- Operator and histologist dependent
- Occasional false positive and false negatives
- May delay surgical procedure

Excisional biopsy

In *excisional* biopsies, the entire lesion is removed, usually with a rim of normal tissue (safety margin), and therefore the procedure serves both ***diagnostic*** and ***therapeutic*** *function*

The decision whether to perform an incisional or an excisional biopsy depends primarily on the *size,* of the lesion; the smaller it is, the more logical to take it out completely when first encountered. *Skin* and *superficial* lesions are usually managed by excision too.

Resectional biopsy may involve lobectomy, hemicolectomy or thytoidectomy.

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