**Oral Medicine 7/10/2015**

Sheet # 2

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**Investigations used in diagnosis of oral diseases**

* Objective:
* To understand the principles of using investigations in clinical dentistry.
* To be familiar with relevant investigations.
* The diagnostic process:

Patient complain (chief complain)

**↓**

Collection of diagnostic information

(history, examination and clinical investigations)

**↓**

Initial diagnosis

(sometimes; the initial diagnosis is the same as the final diagnosis)

**↓**

In some cases we need reassessment of the initial diagnosis.

**↓**

Make differential diagnosis list to reach the definitive diagnosis.

**↓**

Definitive diagnosis

**↓**

Treatment plan

* Most of diseases can be correctly diagnosed by taking history and make accurate clinical examination.
* Why we do need investigations?
* To confirm the clinical diagnosis
* To exclude some diagnosis to reassure patients and/or family
* To determine the extent / severity of disease
* To monitor disease progress and response to treatment
* Principles of using investigations:
1. Investigations should be used wisely & when indicated.

“Investigations (like x-ray) are not carried out on every patient”

* Inadequate investigations could lead to: side effects, when diagnosis is incorrect the treatment will be unsuccessful
* Over investigations: excessive coast

 confusion in diagnosis

1. Some types of investigations need informed consent from the patient to do it (verbal, written,…)

“biopsy need written consent”

1. Observe cross infection prevention
2. Results of investigation should be interrupted in the light of the clinical presentation. This means that it’s wrong to diagnose a disease only by the results of investigations, instead we should have a history and clinical examination and based on these we interpret the result of the investigation.

“These investigations called additional investigations”

1. Record keeping; any investigation should be documented in the patient file, because the patient may need it in future to compare it with his new investigation
* Sometimes the clinical examinations give us 90% of the real diagnosis, and the additional investigations will complete the diagnosis.
* Application of additional investigation in oral medicine:
1. Oral mucosal diseases
2. Salivary gland diseases (xerostomia)
3. Diseases affect the tongue
4. Oral manifestation of systemic diseases

(sometimes we found oral signs & symptoms that may be a sign of systemic diseases)

1. Ulcerative lesions (red and white lesions)
2. Oral pigmentation
3. Facial pain & TMJ dysfunction
4. Skin related disease
5. Infections
6. Oral cancers & premalignant diseases
* Types of investigations:

Immunology , Radiology , Hematology , Clinical chemistry , Microbiology , Endocrinology , Molecular biology , Histopathology

* The main type of investigations that used is histopathology (biopsy), which is a microscopic examination of oral tissues.
* **Biochemical & Hematological investigations**

(it’s important to know about it, because it’s mainly used)

* Complete blood count (CBC)
* Ferritin, foliate, vitamin B12
* Blood glucose level
* Liver & kidney function test
* ESR (erythrocyte sedimentation test)
* CRP (C-reactive protein), PV (plasma viscosity)

Ex.: - for those patients that have facial pain; we can make an ESR test to diagnose Giant Cell Arteritis (Temporal Arteritis) disease.

 - for chronic inflammatory diseases that affect the oral mucosa.

All these lab tests seem to be distant from dentistry, but we use it in its applications.

* Investigation forms in JU hospital:
* Hematology 1 form

CBC: WBC, RBC, Hemoglobin, MCV (mean cell volume: the average volume of a RBC), MCH (mean cell hemoglobin), MCHC (mean cell hemoglobin concentration), HCT (Hematocrit)

…. We have to know the normal ranges, to be able to decide if the patient has a disease or not.

Differential cell count (differential WBC count): Neutrophils, Basophils, Monocytes, Lymphocytes (B cells and T cells), Eosinophils

Platelet count

ESR

PT (Prothrombin time)

PPT (partial thromboplastin time)

**….. Why do we need PT and PTT**?

From the word thrombin, which is responsible for blood clotting, so with patients who take warfarin, we have to know PTT, to decide if we can intervene or not.

* Hematology 2 form (limited uses)

Used for patients have leukemia, lymphoma & inherited bleeding diseases

* Endocrinology form

Vitamin B12, Folic acid, ferritin level, Vitamin D, function of thyroid gland

If someone had a needle stick injury and he want to test if he had hepatitis or not, he use Endocrinology form by testing hepatitis surface antibody & antigen, and hepatitis B core antibody.

* **Urine analysis:** rarely used in oral medicine. Could be used in diabetic patients, protein in urine, multiple myeloma, Amyloidosis, because of excessive production of proteins, which sometimes can be detected only in urine.
* **Microbiology:**

Very commonly used to check microorganisms related to infectious diseases.to determine sensitivity of microbes or organisms to antimicrobials. So patients with severe infections, we do culture and sensitivity (zera3et bacteria) to know the causative microorganisms and the antibiotics effectives used against.

* Culture and antibiotic sensitivity: Dr showed culture and sensitivity sample. Different bacteria and different antibiotics, according to growth of bacteria, sensitivity is determined.
* Swap test**:** diagnosis of candidal infection, swaps of oral mucosa seen under microscopes, if there is candida, there is candidiasis.
* **Immunology**
* Immunological tests: for autoimmune diseases of oral cavity like mucus membrane lymphoid.
* Skin testing: like patch test of patients allergic for amalgam or denture materials, for example PMMA.
* **Molecular tests** in molecular biology:
* PCR (polymerization chain reaction) for detection of viruses especially in immunocompromised patients with viral diseases or ulcers that it’s hard to know the cause, also in patients with hepatitis B or C to determine type of viral infection.
* ELISA (enzyme – linked immunosorbent assay)
* FISH (Fluorescence in situ hybridization) fluorescent technique for diagnosis of genetic diseases, patients with syndromes, molecular test to diagnose mutations or genetic cause.
* **Histopathology:** a key investigation in oral medicine and surgery. The most tests used. Depends on adequate and representative cell, so pathologists see what is under microscope, so if the sample isn’t adequate or representative, they will gain a wrong diagnosis.
* **Clinical applications of investigations**:
1. Diagnosis
2. Preoperative patients assessment, especially in immuno or medically compromised, to be sure of the suitability of them for procedure or dental treatment.
* Diseases with investigation: preoperative assessment of patients to be treated with GA (general anesthesia), patients with anemia and low hemoglobin can’t be given GA. Check why.
* Relevant systemic diseases, (patients with tendency to bleeding, Liver diseases, Diabetic patients,…)
* **Mucosal diseases**
* we may need a biopsy, if we aren’t sure if its cancer or its skin disease for example. Lots of patients suffer from, oral ulcers caused after skin disease especially Behcet disease, for many patients the oral ulcers to be as a 1st presentation.
* Culture and smear if the cause is infectious viral bacterial or fungal.
* Hematology or biochemistry to know if the patient has hematological deficiency that’s the cause of oral ulcers.
* Examples: \*patient with progressive massive enlargement of the tongue, the cause could be lymphangioma or hemangioma if the patient is a child, but if he is an adult, amyloidosis causing this enlargement as a first manifestation of the disease. So if we take biopsy, we will find amyloidosis.

\*Patients with small ulcers.

\*Recurrent Aphthous ulcers, caused by underlying hematological deficiency, iron, B12, folic acid deficiency, so if the deficiency treated, the patient is treated.

* **Bone diseases**:
* Radiology (CT scan, MRI, pale x-ray)
* Bone biopsy for cysts, tumors or cancers
* Aspiration biopsy, insert a needle into the lesion and see the fluid inside.
* Bone scan (differs from CT scan) to check metastasis of cancer to bone from any tumor.
* Biochemistry in bone diseases: calcium, Phosphate, alkaline phosphatase, vit D, PTH.
* **TMJ disorders**:
* x-ray
* Arthrography (photography)
* Arthroscopy (tantheer).
* Physiological evaluation is one of the investigations. Lots of patients complain of facial pain and TMJ dysfunction, and they have stress and anxiety, there are tools or tests to know if the patient has psychological cause of pain or not.
* Serology: identification of antibodies in the serum. One of the causes of joint pain is rheumatoid arthritis, osteoarthritis. To be diagnosed in serology.
* **Salivary gland diseases:** [will be discussed in another lecture].
* We use sialometry (salivary flow measurement) if the patient complains of reduced salivary flow to know if the is a disease or it is subjected feeling of patient.
* X-ray, CT scan, MRI
* Sialpgraphy: [we took it in radiology]
* Sialochemistry: to check the percentage of certain chemicals in saliva (such as ectodermal dysplasia, the patient will haves a change in sodium & chloride percentage in saliva and sweat)
* **Dental diseases** (mostly used): percussion test, vitality test, cold test, tooth slooth(crack in tooth not visible but induces pain and symptoms like in irreversible pulpitis, we place a wedge or a wooden slot, and we ask the patient to bite on, if he feels pain when its removed, then it’s a crack), x-rays (periapical, bitewing, occlusal,..).
* The most important thing to know that 90% of diseases are diagnosed and treated with history and examination without any lab tests, so investigations can’t replace history and examination.