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Course : B.Sc. Nursing

Subject : Mental Health Nursing

Unit :III (4)

Unit Title : Assessment of mental health status

Topic : Investigations: Related Blood chemistry,
EEG,CT & MRI

Central Objective:

The students will acquire knowledge on investigations in psychiatry and will develop desirable skill and attitude in applying the same at psychiatric and clinical settings

Specific Objective: At the end of the teaching session the students will be able to

- explain investigations in psychiatry
- list the types of investigations carried out in the field of psychiatry
- enlist the routine investigations in psychiatry
- elaborate electrophysiological test involved in psychiatry
- discuss about the brain imaging studies in psychiatry
- review on neuroendocrine tests in psychiatry

- describe genetic test done in psychiatry
- elucidate the other investigations in psychiatry
- explore the nurses role in caring out the investigations in psychiatry

Overview/ Introduction

- This unit focuses on the investigations carried out in the field of psychiatry. Knowledge on these investigations will enable to deliver need based care and prevent further complications.

Meaning / Definition

- **Investigations in psychiatry** : Investigation in psychiatry are useful to detect alteration in biologic function & to screen for medical disorders causing psychiatric symptoms.

Subheading and the sub content

Investigations: related blood chemistry, EEG,CT and MRI

❖ Definition

❖ Types of investigation

- Routine investigations
- Electrophysiological tests
- Brain imaging studies
- Neuro endocrine tests
- Genetic tests

❖ Other investigations in psychiatry

❖ Role of nurse

Laboratory Tests in Psychiatry

- Laboratory Services include testing of materials, tissues or fluids obtained from a patient or clinical studies to determine the cause and nature of disease
- Laboratory Services play a critical role in the detection, diagnosis and treatment of disease.
- However no laboratory tests in psychiatry can confirm or rule out diagnoses such as schizophrenia, bipolar disorder, and major depressive disorder.

Investigations

- Investigation are useful to detect alteration in biologic function & to screen for medical disorders causing psychiatric symptoms.
- They can be I. Routine Investigation II. Electrophysiological Tests III. Brain Imaging Tests IV. Neuro-endocrine Tests and V. Genetic Test

I. Routine Investigations

Medical Screen

- Haemoglobin: Routine screen.
- Total and differential leucocyte counts: Routine screen,
- Treatment with antipsychotics (e.g. clozapine), lithium, and carbamazepine.
- Mean Corpuscular Volume (MCV): Alcohol dependence (increased).
- Urinalysis: Routine screen; Drug screening.
- Peripheral smear: Anaemia.

Renal function tests: early kidney damage and treatment with lithium.

Liver function tests: Impaired hepatic function and treatment with carbamazepine, valproate, benzodiazepines. Alcohol dependence.

Serum electrolytes: Dehydration, SIADH, Treatment with carbamazepine, antipsychotics, lithium.

Blood glucose: Routine screen (age>35 years), treatment with antipsychotics

- **Thyroid function tests:** Refractory depression, rapid cycling mood disorder. Treatment with lithium, carbamazepine.
- **Electrocardiogram (ECG):** Age>35 years, Treatment with lithium, antidepressants, ECT, antipsychotics.
- **HIV testing:** Intravenous drug users, suggestive sexual history, AIDS dementia.
- **VDRL:** Suggestive sexual history.
- **Chest X-ray:** Age>35 years, Treatment with ECT.
- **Skull X-ray:** History of head Injury.
- **Serum CK:** Neuroleptic malignant syndrome (markedly increased levels).

Toxicology Screen

Useful for substance suspected,

- alcohol, cocaine, opiates, cannabis, phencyclidine, benzodiazepines, barbiturates; remember that certain medications can cause false positive results (for example, quetiapine for methadone).

Drug Levels

Drug levels are indicated to test for therapeutic blood levels, for toxic blood levels, and for testing drug compliance.

- ❖ lithium (0.6-1.0 meq/L),
- ❖ carbamazepine (4-12 mg/ml),
- ❖ valproate (50-100 mg/ml),
- ❖ haloperidol (8-18 ng/ml),
- ❖ tricyclic antidepressants
- ❖ (nortriptyline 50-150 ng/ml;
- ❖ imipramine 200-250 ng/
- ❖ ml), benzodiazepines,
- ❖ barbiturates and clozapine (350- 500 µg/L).

II. Electrophysiological Tests

EEG (Electroencephalogram): Measures brain electrical activity, identifies dysrhythmias & asymmetric, used in the diagnosis of seizures, dementia, neoplasm, stroke, metabolic or degenerative disease.

BEAM (Brain electrical activity mapping): Provides topographic imaging of EEG data by generating computerized maps of brain electrical to produce images; permits visualization of the brain performing tasks or specific functions. Useful in children.

Polysomnography/sleep studies: Measures electrical brain activity data during all-night sleep. Used in the diagnosis of sleep disorders & seizures.

Video-Telemetry EEG: Pseudo seizures vs. seizures.

III. Brain Imaging Tests

Computed Tomography (CT) Scan:

- Computed tomography is a procedure in which a precise x-ray beam takes cross-sectional images (slices) layer by layer.
- A computer reconstructs the images on a monitor and also stores the images on magnetic tape or film
- Measures accuracy of brain structure to detect possible lesions, abscesses, areas of infarction or aneurysm.
- CT scan also identifies various anatomic differences in patients with schizophrenia, organic mental disorder & bipolar disorder.

Magnetic Resonance Imaging (MRI) Scan:

- In MRI an energy field is created with a huge magnet and radio waves. The energy field is converted to a visual image or scan.
- MRI can show blood flow patterns and tissue changes
- Measures the anatomic & biochemical status of various segments of the brain; detects brain edema, ischemia, infection, neoplasm, trauma & other changes such as demyelination used in the diagnosis of dementia, to detect morphological changes in schizophrenia patients

**Positron Emission Tomography (PET) Scan,
Single Photon Emission Computed Tomography
(SPECT), Magnetic Resonance (MR) Angiography
and Magnetic Resonance Spectroscopy (MRS):**

These are used to examine the function of the brain where radioactive substances are injected into the blood; the flow of those substances in the brain is monitored.

IV. Neuroendocrine Tests

- ❑ Dexamethasone Suppression Test (DST): Research tool in depression (response to antidepressants or ECT). If plasma cortisol is >5 mg/100 ml following administration of dexamethasone (1 mg, given at 11 PM the night before and plasma cortisol taken at 4 PM and 11 PM the next day), it indicates non-suppression.
- ❑ TRH Stimulation Test: Lithium-induced hypothyroidism, refractory depression. If the serum TSH is >35 mIU/ml (following 500 mg of TRH given IV), the test is positive.

- ❑ Serum Prolactin Levels: Seizures vs. pseudo seizures, galactorrhoea with antipsychotics.
- ❑ Serum 17-hydroxycorticosteroid: Organic mood (depression) disorder.
- ❑ Serum Melatonin Levels: Seasonal mood disorders.

V. Genetic Tests

- ❑ Genetic testing is a type of medical test that identifies changes in chromosomes, genes, or proteins.
- ❑ The results of a genetic test can confirm or rule out a suspected genetic condition or help determine a person's chance of developing or passing on a genetic disorder
- ❑ Cytogenetic work-up is useful in some cases of mental retardation.

VI. Other investigations

- Lactate provocation test: Panic disorders (In about 70% of patients with panic disorders, sodium lactate infusion can provoke a panic attack).
- Drug assisted interview (Amytal interview): Useful in catatonia, unexplained mutism, and dissociative stupor.
- CSF examination: Meningitis.

Biochemical Tests

5-HIAA: Research tool (depression, suicidal and/or aggressive behaviour).

MHPG: Research tool (depression).

Platelet MAO: Research tool (depression).

Catecholamine levels: Organic anxiety disorder (e.g. pheochromocytoma).

Sexual Disorder Investigations

Papaverine test: Male erectile disorder (intracavernosal injection of papaverine is sometimes used to differentiate organic from non-organic male erectile disorder).

Nocturnal penile tumescence: Male erectile disorder. Serum testosterone: Sexual desire disorders, Male erectile disorder.

Penile Doppler: Male erectile disorder.

Nurses role

- Nurse must possess knowledge about all the tests, which will enable to clarify the patient's & relative's doubts regarding the tests
- Nurses must educate client about the purpose and procedure of prescribed laboratory tests
- Nurses must ensure complete and accurate labeling of all specimens that are obtained
- Care must be taken in case of endocrine tests where timing of measurement may be required.

- Nurses must help position patients properly in order to complete the necessary diagnostic testing.
- Prolactin studies may need blood sample to be taken at least one hour after waking or eating
- Certain diagnostic tests may require the administration of medications before the test.
- Computed topography scan (CT scan) may require intravenous access to be placed for dye
- Consent form should be explained and signed by the patient before certain diagnostic investigations

Content summary

The slides have highlighted the different investigations in the field of psychiatry. It helped us to learn routine investigations, electrophysiological tests, brain imaging studies, neuroendocrine tests, genetic tests and other investigations.

References

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THANK YOU