Drug Information Service and Drug Information Bulletins

8 CHAPTER

Nowadays a hospital pharmacist is in a position to alert the physician of any untoward reactions encountered within the hospital from the use of a particular drug. All such informations can be provided to physician by the hospital pharmacist through the pharmacy library. This is possible because in addition to the latest texts and journals, the hospital pharmacist can remain in daily touch with the medical service representative of various drug manufacturers. Much vital literature and information can be gathered from various sources, if the hospital pharmacist will only avail himself of it. Information should be properly catalogued and filed in such a manner so as to make it readily available to all those desirous of making use of it.

Large hospitals have developed and staffed a new division of the department of pharmacy which is commonly referred to as **'Drug Information Centre'.** This new concept in hospital pharmacy operation is usually located in a separate section of pharmacy, containing large number of reference texts, journals, reprints and brochures. Sometimes, they are also equipped with electronic data processing equipments and have a full time director and adequate secretarial assistance. Now computers have made possible networking of regional drug information centres located in different hospitals. Even in a single hospital LAN (Local Area Networking) provides pool of information on the main computer for several users at any time. Networking on regional, national, sub-continental and inter-continental levels will place DIS at a global level. Fax service, and E-mail is of great

help to these DIC.

The Drug Information Centre may also assume the responsibility of gathering information on all investigations of drugs which are in current use in the hospital. These centres record all data on drug reactions in the institution. DIC can provide information regarding poisons, their toxicity and treatment round the clock. In absence of any available treatment, the centres give only first aid advice and recommend symptomatic treatment.

The need for a reliable local source of drug information within a hospital is of utmost importance in rendering effective clinical care to the patient. The main aim of this centre should be to provide drug information when it is needed.

The concept of drug information service (DIS) or drug information centre (DIC) is an attempt to document drugs by abstracting information about them. The information about drugs is collected from various sources which are available, can be categorised as under :

1. **Primary Sources** — It is the original informations presented by the author without any evaluation by the second party eg., articles published in journals, dissertations, conferences etc.
2. **Secondary Sources** — In this original information is modified, condensed, commented upon by other persons like review articles, Abstracts, text books etc.
3. **Tertiary Sources** — In this information is gathered from primary and secondary sources and arranged in such a manner to give coupled information.

The compiled information is available for reference purposes and it helps in answering specific queries regarding both old and new drugs from doctors and patients. The information can also be compiled to meet the needs of the deliberations at the PTC or the training programmes arranged or research projects undertaken. The compiled information also contributes to the overall functioning of the pharmacy department especially in its clinical role.

GUIDELINES FOR SETTING UP A DIC

As DIC is a valuable source of information pertaining to drugs. It is therefore the duty of hospital pharmacist to make

the necessary arrangements for its proper functioning and enable it to function as a vibrant centre. As the other health professionals are already over-burdened and hence the pharmacy profession can well accept the challenge of setting up a drug information centre (DIC). The following guidelines may be useful :

1. Professional and technical competence in the evaluation of critical selection and utilisation of the drug literature will be a prerequisite. The information with a minimum volume of pertinent supporting documentation so as to permit independent, informed conclusions and decisions, should be made available.
2. The knowledge of institutional and library facilities, literature utilisation and library services will help in taking full advantage of all the resources available for this purpose.
3. Written and verbal communication skills which enable to contribute effectively to intra and inter institutional dialogue regarding pharmaco-therapeutic information, are very important.
4. The capacity to contribute in education to all health professionals will be duty of DIC incharge.
5. The DIC is involved directly and indirectly in patient care and act as a monitor of its characteristics.
6. The DIC incharge should be familiar with electronics, basic computer literacy, data processing methodology to the extent necessary for him to make use of its services to other health professionals.
7. The DIC should provide professional services to support the Pharmacy and Therapeutics Committee.

Although regional drug information services or networks are not very common, some of the goals of the regional network could be the development of a reproducible, standardised reporting system for auditing drug therapy, supplying of information to all hospitals. This facility could be the responsibility of Govt. of India and have following objectives :

1. An analysis of drug information and drug therapy for critical ailments like heart disease, cancer, stroke and related diseases and provision of supply of this information

to the physician.

2. A drug information abstract service to physician in the region regarding new development in drug therapy in different diseases.

3. An analysis and evaluation of the regional utilisation of drugs in the institutions served by the network and dissemination of this information to the respective medical staffs.

DIC—Its Location

This centre or service should be located in a separate section of pharmacy.

It contains medical texts, journals. and large number of reference texts, photocopying facilities and audio visual arrangements.

FUNCTIONS OF DIC

The Drug Information Centre is primarily concerned with pharmaceutical advice and consultation regarding drug therapy and is involved in the following activities :

1. Establishing and maintaining;
   (*a*) A system for providing information for drug literature.
   (*b*) A system for providing information for the use of drugs in the hospital, including patient drug histories and profiles and reporting adverse drug reactions.
   (*c*) A panel of drug consultants.
2. Answering requests for specific items of drug information for the drug therapy of the individual patients.
3. Offering unsolicited drug information for the drug therapy of individual patients.
4. Answering requests for providing information on various complications like :
   (*a*) Poison control information centres.
   (*b*) Pharmacy research projects.
   (*c*) Pharmacy and Therapeutics Committee — literature, researches and background papers on drug problems.
   (*d*) Other pharmacy functions such as manufacturing control, research and clinical pharmacy.
5. Producing and distributing periodic compilation of drug

information directed towards special audiences such as drug information bulletins for medical and paramedical staff.

6. Maintaining the drug formulary list.

QUALIFICATION OF THE PHARMACIST TO RUN DIS

1. To critically evaluate the drug literature.
2. To edit the information to facilitate decision-making.
3. He should be aware of the sources of information to enable him to collect secondary data.
4. He should have good communication skills.
5. He should be computer literate.
6. He should be member of PTC.
7. He should redefine his role and become an expert drug counsellor from a mere drug dispenser.
8. He should have knowledge of research methodology.

DRUG INFORMATION BULLETIN

As communication of information to medical and paramedical staff is very essential. A Drug Information Centre should produce a bulletin and distribute it. The bulletin should provide new advancement in medicines, new researches, detailed analytical procedures, abstracts for new developments, etc. It forms a bridge between the information and application in clinical practice. It is the duty of the clinical pharmacist to provide information about drugs to all members of "Patient Care Team". The Bulletin should be updated with the latest developments from time to time.

REVISION EXERCISE

Short Answer Questions :

1. Write notes on Drug Information Service.
2. What is drug information bulletin ?
3. What is qualification of Pharmacist to run DIS?

Long Answer Question :

1. Discuss in detail functions of DIS in hospital pharmacy. (1996)
2. Write guidelines used for setting up a DIC.
3. Discuss functions of DIC.

Very Short Answer Questions :

1. What is DIC ?
2. Define Primary and Secondary Sources of drug information.

Diseases Manifestations and Pathophysiology

4 CHAPTER

Definitions :

1. **Etiology :** Etiology of a disease includes identification of those secondary causes that provoke a particular disease.

2. **Manifestations :** They are the changes observed during disease process like :

1. Signs and symptoms
2. Lesions (structural changes)
3. Sequel (Outcome of disease like inflammation)

3. **Pathogenesis :** It refers to the development and evolutions of disease.

DISEASES

1. HEPATITIS (Jaundice)

Water-borne disease caused by hepatitis virus (type A).

Initial Symptoms

Fever, chills, headache, fatigue, generalised weakness, aches, pains, specially on right side of abdomen followed by loss of appetite, nausea, vomiting alongwith passage of dark yellow urine. Patient develops jaundice. After a few days fever comes down but other symptoms continue. After 3rd week, patient starts improving and recovers in 4-6th week. However, damage to the liver takes long time to heal in a few cases (5-10%). Liver does not get repaired and causes excessive degeneration of parenchymatic cells of liver leading to hepatic encephalopathy. In such cases 75% liver gets damaged resulting in kidney damage, hepatic coma and ultimately death.

SGOT and SGPT may get elevated 7-14 days prior to onset of jaundice.

There are four different type of viruses causing different type of hepatitis :

(*i*) Hepatitis A virus causes Hepatitis A;

(*ii*) Hepatitis B virus causes Hepatitis B (serum hepatitis);

(*iii*) Delta virus;

(*iv*) Non A—non B virus.

Hepatitis A virus is an RNA virus whereas, hepatitis B is a DNA virus. Delta virus is a defective RNA virus.

Mode of transmission

1. It is transmitted mainly through contaminated water and food.
2. It gets transmitted from person to person through contacts, because the carriers are the main source of infection.
3. Germs are also transmitted indirectly through flies, by coming in contact with stool, vomit and urine of patient.
4. Transmission may also occur through blood transfusion and use of contaminated syringe or needle.

Pathophysiology

Hepatitis B virus replicates in the liver cells and virus cells get incorporated in the liver cell membrane. Antibodies are formed against these viruses. These antibodies attack the foreign plasma membrane. The immune system damages the liver.

CARDIO-VASCULAR DISEASES

1. HYPERTENSION

Hypertension is an abnormal elevation of arterial blood pressure. If blood pressure is above 140/90 it is declared as Hypertension. It can be classified into two types :

1. Primary/essential hypertension

It is characterised by elevation of diastolic blood pressure and increase in peripheral resistance. There are several factors which are responsible for primary hypertension :

(*a*) Genetics (hereditary)

(*b*) Obesity

(c) Endocrine disorders
(d) High salt intake
(e) Cigrette smoking
(f) Increase in blood cholesterol
(g) Toxaemia of pregnancy
(h) Increase in serum—renin levels
(i) Hypersensitivity of sympathetic system
(j) Stress.

2. Secondary hypertension

It is due to some disorders like cushing's syndrome, hyper thyroidism or due to kidney impairment.

Signs and Symptoms

Although headache is very common but constant headache, dizziness occurs when diastolic blood pressure exceeds 110 mm. Occipetal headache in the morning is associated with severe hypertension. If renal failure occurs, heart problems become severe.

Pathophysiology

Hypertension may cause damage of kidneys, eyes, heart and brain. Hypertension leads to deposition of fibrin in the glomerulus, which may lead to renal failure. Similarly it leads to visual disturbances. In hypertension, work imposed on the heart is increased and due to this load, left ventricle deteriorates leading to left ventricular failure.

(ii) ANGINA

Sudden, severe, substernal (chest pain) which radiates to left shoulder and then goes to the left arm. This syndrome is due to induction of an adverse oxygen supply demand situation, in a portion of myocardium as a result of imbalance in oxygen supply and oxygen demand. There are two principle forms of angina :

1. Classical angina (common form)

In this attacks are provoked by exercise and emotion.

2. Variant angina (uncommon form)

In this attacks occurs at rest or during sleep and are unpredictable. The goal in the management of angina pectoris is

to improve the quality of life, to prevent sudden death and myocardial infarction.

Pathophysiology

Coronary blood flow increases five times to meet the demand but in angina this capacity is very limited. It may also result from reduced oxygen content of the coronary blood as in case of anaemia, anorexia or smoking. It may be due to increased demands in fever and *thyro-toxicosis.*

Symptoms

The discomfort of angina pectoris may radiate to neck, lower jaw or sometimes it may occur in the arms or wrist. The duration of angina attack varies from 30 sec to 30 min. This attack reaches to its peak within minutes and then gradually decreases.

(iii) CONGESTIVE HEART FAILURE

Heart failure occurs when the heart cannot work as a pumping station to meet the metabolic demands of the tissues. Due to decreased blood flow, salt and water are retained by kidneys and fluid accumulates in the interstitial spaces, leading to *congestive heart failure.* (CHF)

Pathophysiology

There are certain conditions which may lead to the heart failure :

1. Essential hypertension.
2. Coronary artery disease.
3. Hyperthyroidism.
4. Rheumatic heart disease.

In this capacity to develop force during systole is reduced and thus greater end-diastolic volume is required to perform any level of work.

Signs and Symptoms : Common symptoms are dyspnoea, orthopnea, increase in extracellular and plasma volume which may cause congestion of pulmonary circulation. This pulmonary congestion leads to breathlessness. Other symptoms are, fatigue, weakness, confusion, insomnia, anxiety, hyponatremia, nausea, proteinurea and anorexia. Odema is very common in such patients.

(iv) MYOICARDIAL INFARCTION

It is a common manifestation of ischaemic heart disease. results when there is imbalance between the supply and deman of oxygen to myocardium.

Pathophysiology

Ischaemic necrosis of a portion of myocardium occurs due t sudden occlusion of coronary artery by a blood clot. Narrowin of coronary artery reduces the myocardial blood supply an ultimately the blood flow which results in ischaemic injury. I may occur in any location (left or right ventricle) depending o which coronary artery is occluded. It can be fatal and can lea to variety of complications.

Signs and Symptoms

Symptoms can be described as a feeling of burning sensation, squeezing, choking, and indigestion. In many individuals pain radiates to neck, throat, shoulders and arms. It lasts for 20 minutes to many hours. *Other symptoms* are weakness, fatigue, nausea, vomiting, etc.

(v) ARRHYTHMIA

It is due to irregularities in the heart beat and results from disturbances in the conduction or rate of impulses. It may develop due to electrolyte imbalance and acidosis.

Pathophysiology

Arrhythmia imbalances the automation of heart and depends upon the different velocities alongwith adjacent fibers and unidirectional block in electrical conduction. There are several reasons for increase or decrease in automacity of heart.

1. High rate of depolarisation.
2. More negative threshold potential.

Signs and Symptoms

1. Heart rate is less than 60 beats/minutes.
2. Anxiety, fever, anaemia, blood loss and thyrotoxicosis.
3. Sometimes, tachycardia occurs, when the heart rate is 100-140 beats/min.

TUBERCULOSIS

Tuberculosis is caused by rod shaped mycobacterium

tuberculosis. There are three types of tubercle bacilli pathogenic to humans viz.:

(*a*) bovine
(*b*) human
(*c*) avian

Mycobacterium tuberculosis is a strict aerobe and requires high oxygen tension for optimum growth. Mode of transmission among individuals is by coughing and squeezing. These droplets are inhaled by other persons and people may develop tuberculosis infection. Though the lungs are more prone for infection but lesions may occur in kidney, bones and lymph nodes.

Pathophysiology

As the bacillus in an aerobe and requires high oxygen tension for its optimum growth, the infecting organism enter into the body via lungs. This is the **Primary Tuberculosis**. From the lungs, it further spreads to various organs of lymphatic system and the blood stream called **Pulmonary Tuberculosis.** After several weeks cellular immunity develops which prevents the spread of disease. The organism may remain inactive for the whole life of host or may get reactivated at any time. Reactivation leads to **Miliary Tuberculosis.**

Manifestations

1. **Primary Tuberculosis** : In most of cases it is without symptoms. Incubation period is 4 to 8 weeks. Only mild fever, malaise is observed ofter 4 weeks.
2. **Pulmonary Tuberculosis** : Fever, irritability weight loss, malaise is observed. Excessive fatigue in the evening and sweat during sleep. Cough early in the morning green or yellow sputum with blood spots are the common symptoms..
3. **Miliary Tuberculosis** : Weight loss, fatigue, weakness, fever, night sweats, GIT disturbances are very common. Lesions are found at lymph nodes, kidney and spleen.

RHEUMATOID ARTHRITIS

It is a chronic disease manifested by inflammation of joints. It may occur at any age, affecting either sex.

Pathophysiology

It is an autoimmune disease. It is influenced by body immune

system reaction towards certain body proteins. As they are foreign substances (antigens) and produce antibodies. It has been observed that patient's body considers human gamma globulin (IgG) as the antigen and produces antibodies for that rheumatoid factor. Ig M Ig A, IgG are called as IgM rheumatoid factor, IgA rheumatoid factor, IghG rheumatiod factor respectively.

Antigen reacts with antibody to form an immune complex which then reacts with complement (proteins) and leads to inflammation.

Manifestations

A feeling of fatigue, weakness anorexia (loss of appetite) weight loss, fever, inflammation of joints, hands, feet, wrists, occurs initially. Morning stiffness in joints which lasts for more than 30 min to many hours is observed.

EPILEPSY

It is a disorder of brain function usually associated with a disturbance of consciousness due to sudden and excessive electrical discharge from the brain cells.These seizures have a definite onset and ending and usually do not last longer than 10 minutes. A seizure is episodic and is measured by the electro-encephalogram (EEG)

Pathophysiology

Epilepsy comprises sudden excessive discharge of cerebral neurones in the brain leading to body movements. Any process which damages the grey matter of brain may result in the activation or inactivation of neurons by unknown mechanism. If the discharge remains localized (focal epilepsy) or which may spread to cause a generalized seizure. Metabolic events in the brain may contribute to the development of an epileptic focus, and the transition of seizures e.g. There is an observed increase in extra cellular K^+ and decrease in extracellular Ca^{+2} concentration.

These ionic changes ultimately affect neuronal excitability.

Manifestations

The signs and symptoms of epilepsy depend upon the type of epilepsy.

A. Generalised seizure

Generalised seizures are of two types :

1. Grand mal type

These seizures are characterised by a sudden loss of consciousness, a cry **tonic** and then **clonic** movements of muscles. After this patient may remain unconscious for as long as 30 minutes. On awakening the patient may complain of headache.

2. Petit mal (also known as absence seizures)

It is characterised by momentary loss of consciousness. The patient has a blank facial expression and may blink the eyelids or jerk the arm. It is mostly prevalent in children.

B. Partial seizures (Psychomotor)

It involves localised convulsion of voluntary muscles, usually clonic in nature. Generally it lasts for only few minutes. There are partial seizure with twitching of the fingers of one hand, face or one foot. It is called **"Jacksonian Epilepsy".** Although it is uncommon but shows confused behaviour and emotional changes. Consciousness get impaired sometimes.

DIABETES

Diabetes mellitus is a disorder characterized by hyperglycemia due to deficiency of insulin and possibly high amounts of glucagon. It can be classified into following categories.

1. Juvenile onset type
2. Adult or maturity onset type

Pathophysiology :

Insulin deficiency is the main cause of diabetes which may be due to diseases of pancreas, defective production of insulin, destruction of beta cells, and genetic disorder. In diabetic patients, blood glucose concentration remain high after a meal because the uptake, utilization and storage of glucose by adipose tissue and musle are diminished due to the absence of insulin. Glucose is not available to cells inspite of high blood glucose concentration and on fasting it further increases blood glucose concentration through glycogenolysis and gluconeogensis. Hyperglycemia results in glucosuria when serum levels of glucose exceeds the renal threshold for reabsorption of glucose. Due to

the loss of the calories and water, patients experience symptoms of polyuria, polydipsia, fatigue, and weight loss despite normal or excessive food intake. Excess ketones are also excreted in the urine as strong acids. This results in urinary loss of bicarbonate and potassium.

High glucose levels provide an excellent medium for bacterial growth and in this phagocytes do not function properly. Hence diabetic patients frequently suffer from recurrent respiratory, vaginal and other infections.

Signs and Symptoms

Onset of *juvenile*, diabetes is sudden and characterised by polyuria, polydipsia, weight loss, decreased muscle strength, irritability.

Adult onset diabetes may show weight loss, nocturia, blurred vision, anaemia, fatigue.

Other symptoms include tingling, numbness in the feet, slow healing skin functions.

Complications of diabetes mellitus

1. Ketoacidosis

It occurs in diabetic patients who develop high level of glucose and ketones plus metabolic acidosis showing severe dehydration, nausea, vomiting and hypotension.

2. Retinopathy

It occurs after 15-20 years of disease. Diabetes is the second leading cause of blindness. Glaucoma and cataracts are associated with diabetes.

3. Neuropathy

Symptoms include sexual dysfunction in the male, nocturnal diarrhoea, hypotension and loss of sensation.

PEPTIC ULCER

It can be defined as an acute or chronic disorder characterized by ulceration of the digestive tract which is accessible to gastric secretions. This disorder commonly occurs due to too much acid secretion and pepsin activity for the degree of local tissue resistance. Ulcers most commonly occur between the ages of 20 to 50 years.

Pathophysiology :

1. Duodenal Ulcers. Patients with these ulcers have excessive secretion of hydrochloric acid. It also occurs more frequently in patients with hyperparathyroidism and rheumatoid arthritis. They may have high vagal tone and excessive humoral stimulation to gastric acid.

2. Gastric Ulcers. Although some patients of gastric ulcers are hypersecretors of hydrochloric acid, but most of them secrete either normal or less than normal quantity. Hence it is more important to pay more attention towards gastric mucosal resistance than on acid and pepsin secretion. It may also result from poor gastric emptying. It is less common than duodenal ulcer. Gastric ulcer is more prevalent in men than women and occurs after fifty years of age.

Manifestations :

(*i*) **Duodenal Ulcers.** The main symptom is a steady or burning pain in upper central region of abdomen which is relieved by ingestion of food, antacid or cold milk. This pain generally begins about 2 hours after the meal and may awaken the patient during midnight. As the pain is relieved by eating, and patients often gain weight.

(*ii*) **Gastric Ulcer.** It includes symptoms like burning sensation but is less localised than duodenal ulcer and generally does not occur at night. Complications like vomiting, sepsis, pancreatitis may occur in extreme cases.

REVISION EXERCISE

Short Answer Questions :

1. Differentiate between grandmal and petilmal epilepsy.
2. Differentiate between primary and pulmonary tuberculosis.

Long Answer Question :

1. Write manifestation and pathophysiology of Hepatitis, Congestire Heart Failure and Diabetes.

Very Short Answer Questions :

1. What is essential hypertension?
2. What is Peptic Ulcer?
3. What is jacksonian epilepsy?