MANAGEMENT AND MEDICOLEGAL ASPECTS OF POISONING CASES:

The principle of management of poisoned patients is careful attention and treatment to prevent cerebral anoxia, respiratory, cardiovascular, neurological and other complications. The main aim is to help the patient to stay alive. Most patients need only supportive care. The initial management should always be active until the contributions of drug induced damage and pre-existing organic disease are established.

The main objects of treatment of poisoning are

\* Removal of unabsorbed poison from the system

\* Administration of antidotes

\* Elimination of absorbed poison

\* Symptomatic treatment

\* Maintenance of the patient’s general condition.

It should always be remembered that over-treatment of the patient with large doses of antidotes, sedatives or stimulants does far more damage than the poison itself. The judicious use of drugs and necessary therapeutic measures are required.

REMOVAL OF UNABSORBED POISON:

1 Inhaled Poisons: In the cases of poisoning by inhalation, the patient should immediately be removed to fresh air. A clear airway should be ensured and artificial respiration commenced at once. In some cases the respiratory centre may be stimulated by a mixture of 95% of oxygen and 5% of carbon dioxide.

2 Injected Poisons: The use of tourniquet above the site of injection may slow the absorption. The tourniquet should be loosened every 10 min. for 2 min. suck the poison by making incisions at the site and use chemical antidotes, cold packing and vasoconstrictors. e.g. injection of epinephrine to prevent absorption. The common examples of injected poisons are hypnotics, insulin, snake or other insects bites etc.

3 Contact Poisons: If the poison is applied to eyes, skin, wound or inserted, the poison is removed with specific antidotes.

4 Ingested Poisons: Gastric lavage or emesis may be induced before gastric emptying time usually 4 to 6 hours after ingestion.

5 Emetic:

When the poison has been ingested, early vomiting (emesis) is of greater value in avoiding absorption than the most energetic gastric lavage carried out after some delay. Emetics are the substances, which produce vomiting. Most poisons are themselves emetics and may cause vomiting. However, it is advisable to give an emetic to ensure a more thorough emptying of the stomach. Emesis is easier than gastric lavage and less traumatic for the patient, if the patient is conscious and co- operative and vomiting is not contra-indicated (like corrosives, strychnine, petroleum distillates and coma). Emesis should be avoided in corrosive poisoning for fear of damage of oesophagus and stomach. It must also not be used when there is danger of aspiration into lungs, either from volatile poisons like petroleum distillates or from inhalation of gastric contents due to impaired consciousness. Emesis should be induced either by tickling the fauces or by emetics. The household emetics are:

• Copious lukewarm water.

• 15 gm of mustard powder in 200 ml of water.

• About 30 gms of common salt in 200 ml of water. Normally this emetic agent should be avoided because it is a poor emetic and excessive doses are easily given, resulting in hypernatraemia. There are many documented deaths from this cause even in recent years.

• Zinc sulphate: 1-2 gms in 200 ml of water.

• Apomorphine has a remarkable selective action on vomiting centre. It is used in a dose of 6 mg by sub-cutaneous injection for quick emesis followed by levallorphan 1-2 mg, if necessary or preferably naloxone hydrochloride 5-10 mg intramuscular or intravenous to counteract its narcotic effects. Now- a- days, it is widely accepted.

6 Gastric Aspiration and Lavage: Gastric aspiration and lavage is the only suitable method of emptying the stomach of an unconscious patient. In unconsciousness, protect airway with cuffed endotracheal tube. Place the head of the patient over the end or side of the bed so that mouth and throat are below the larynx and trachea. Use a wide bore tube lubricated with vaseline or glycerin (Jacques gauge 50cm in adults, 50 cms will reach the stomach). Ensure the tube is not in the trachea. Aspirate and save the first sample for analysis. Use 300-600 ml. of water at body temperature for washing. If the tube becomes blocked, gentle suction can be applied. Continue stomach wash with water or saturated lime or starch water or 1:5000 potassium permanganate or 4% tannic acid etc. till a clear odourless fluid comes out. Leave some amount of antidote in the stomach for neutralizing left over poison. It is best method, if undertaken early i.e. within about 4-6 hours after ingestion of poison. After then, it may not be useful.

Certain extra precautions are necessary for gastric lavage in cases of coma, petroleum distillates and strychnine poisoning. Following the ingestion of corrosive, passage of stomach tube may lead to perforation. Lavage is dangerous in cases of petroleum distillates which may be inhaled rapidly, may cause fatal results unless the glottis is sealed. In coma, there is a serious risk of aspiration pneumonia, due to depression of cough reflex, unless the airway is sealed by cuffed intubations by an anesthetist. In the cases of strychnine ingestion, a convulsion may be induced by this method unless the patient was first anaesthetized.

7 Use of Antidotes:

Antidotes are remedies to counteract the effects of poison. They are used because the poison may not have been completely removed by emesis or lavage or the poison is already absorbed or it has been administered by other route than ingestion. According to their mode of action, they are divided into the following classes:

7.1 Mechanical or Physical:

These are the substances, which tend to impede the absorption of poisons by their presence; they are:

Activated Charcoal:

It is recommended as a general-purpose oral adsorbent. Activated means the brand of charcoal which meets certain adsorbance standards. To be fully effective, a ratio of about 10 parts of charcoal to 1 part of poison is needed. It is more beneficial for adsorbance of substances which are toxic in small amounts such as tricyclic antidepressants and alkaloids like strychnine; but less effective when large amount of poison has been ingested e.g. in aspirin or paracetamol poisoning.

The treatment with charcoal is most effective during the first four to six hours after ingestion. However, some poisons are also adsorbed by oral use of activated charcoal many hours after ingestion and even after intravenous administration, presumably by back diffusion or interruption of enterohepatic circulation. Aspiration of charcoal into the lungs is a risk that should be guarded against. Normally charcoal is given in a dose of 4-8 gms.

Demulcents and Bulky Foods:

These are the substances which prevent the absorption of the poison by forming a coating on the mucous membrane of the stomach. In doing so, they act both in corrosive and irritant poisoning except in phosphorus poisoning as phosphorus is soluble in them thereby increasing the absorption. The common demulcents are fats, oils, milk and egg albumin. Bulky food like banana acts as a mechanical antidote to glass by imprisoning its particles and thus preventing its action.

7.2 Chemical:

These are the substances which act chemically to form a nontoxic compound by forming insoluble compound or by oxidizing the poison to nontoxic constituents

e.g. dilute acetic acid neutralizes alkalis. Magnesium oxide or calcium oxide will neutralize acids. Similarly, lime can be used for oxalic acid, magnesium sulphate for carbolic acid, copper sulphate for phosphorus, sulphates of alkalis for lead and freshly precipitated iron oxide for arsenic. Tannin produces insoluble compounds with most alkaloids glucosides and metals.

Potassium permanganate being oxidizing agent reacts with organic substances, a 1:1000 strength aqueous solution of potassium permanganate is effective against all oxidizable poisons like alkaloids, amidopyrin, antipyrin, barbiturates, phosphorus, cyanides etc.

7.3 Physiological or Pharmacological:

These chemicals do not enter into any chemical combination, but produce opposite effects to that of the poison. Hence, they are known as physiological antagonists

e.g. atropine for pilocarpine, chloroform for strychnine, caffeine for morphine, atropine and oximes for organophosphorous compounds. However, the antagonism is usually not complete and the remedy may itself produce most undesirable results. Nalorphine has provided itself as a very valuable specific antidote against morphine and its group.

Certain chelating agents are widely used as specific antidotes against some heavy metals. These substances produce a firm non-ionized cyclic complex (chelate) with cations. Such compounds can form stable, solutble non-toxic complexes with calcium and certain heavy metals. They are BAL (Dimercaprol), EDTA (Ethylene diamine tetra acetate), pencilamine and desferrioxamine which are used in heavy metal poisoning.

7.4 Universal Antidotes:

It is used when the identity of poison is not known or when a combination of poisons is suspected. It consists of a mixture of the following substances:

I Powdered animal charcoal (or burnt toast) 2 parts Adsorbs alkaloids

II Magnesium oxide 1 part Neutralizes acids

III Tannic acid (or strong tea) 1 part Precipitates alkaloids, certain glucosides & many metals.

The mixture is given in doses of a tablespoonful stirred up in 2 ltrs. of water. This dose may be repeated once or twice, if necessary. Besides, some household products may be used as safe antidotes which are as follows.

• Strong liquid tea precipitates many alkaloids and metal poisons.

• Milk and raw egg white, being protein rich, precipitates mercury, arsenic and other heavy metals. In addition, they have excellent demulcent properties.

• Mashed potatoes in water are also good adsorbents and can be used in place of charcoal when it is not available.

• Milk of magnesia or soap solution may be used in poisoning due to acids.

• Tinned juice or vinegar can be used in poisoning due to alkalis.

14 ELIMINATION OF ABSORBED POISONS:

After a considerable absorption of poison into the blood stream has occurred; procedures must then be employed to accelerate the excretion of the toxic agent mainly through urine. Elimination by catharsis when not contra-indicated and by sweating by means of hot packs may be encouraged. Fluid administration to maintain adequate renal function with periods of dialysis will be beneficial. In cases of aspirin and barbiturate poisoning, forced diuresis using intravenous chlorothiazide and/or mannitol infusion have been proved valuable. Peritoneal dialysis has been recommended for salicylate poisoning in children. Haemodialysis has been used for eliminating barbiturates, bromides, glutethimide, methanol, salicylates and thiocyanates for the blood. Exchange transfusion is only feasible with small children and has been applied to poisoning by salicylates, barbiturates, iron salts, carbon monoxide etc. All toxic substances are removed by this technique.

15 TREATMENT OF GENERAL SYMPTOMS:

The treatment should be applied as indicated by the symptoms. In unknown poisoning cases, the symptoms are the clues to the treatment of the case. Strong analgesic should be given for pain and oxygen for artificial respiration in respiratory failure. Antibiotics should not be given routinely, but only if infection is suggested by purulent sputum, pyrexia and leucocytosis treatment is required. Cardiac stimulants in circulatory failure and anaesthetic for convulsions should be given. The symptomatic effect of the poison should be treated by general means. Saline infusion is useful in counteracting dehydration and encouraging diuresis. However, careful attention must be paid to water metabolism as over hydration may lead to pulmonary oedema and circulatory impairment. The addition of sodium bicarbonate to the infusion may be of value when the alkali reserve is diminished. Administration of glucose will combat depletion of liver glycogen, and the restoration of potassium - sodium imbalance may be necessary.

16 MAINTENANCE OF THE PATIENT’S GENERAL CONDITION:

The patient should be kept warm and comfortable. After coming out of the effects of poison, one of the main dangers is the subsequent development of upper respiratory tract infection, this is a special hazard in elderly people, who had a respiration infection before, and who inhaled vomitus. Hence, if infection is suggested, antibiotic should be given. Good environment and nursing care should be provided to the patient (especially, if unconscious). All patients who have attempted suicide should not be allowed to leave the hospital without being interviewed by psychiatrist who can give further necessary supportive psychotherapy.