SJIF Impact Factor: 5.464

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

ISSN: 2457-0400
Volume: 5.
Issue: 3.
Page N. 561-572
Year: 2021

Review Article www.wjahr.com

A STUDY & REVIEW ON EMERGENCY DRUG

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Received date: 24 April 2021 **Revised date:** 14 May 2021 **Accepted date:** 03 June 2021

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ABSTRACT

Emergency medicine is the medical specialty concerned with the care of illnesses or injuries requiring immediate medical attention. India is an example of how family medicine can be a foundation for emergency medicine training. Many private hospitals and institutes have been providing Emergency Medicine training for doctor nurses & paramedics since 1994, with certification programs varying from 6 months to 3 years. However, emergency medicine was only recognized as a separate specialty by the Medical Council of India in July 2009. In now days the world facing a large pandemic that is COVID-19. TheCOVID-19 pandemic has exploded since cases were first reported in China in December 2019. As per April,2021 report more than 141 million cases of COVID-19 caused by SARS-CoV-2 infection, have been reported globally, including more than 3 million deaths. All the drug use in Local Anaesthetics, Sedatives, Anticholinergics, Opioid analgesics, Anti-emetics, Corticosteroids, Anti-epileptics, Antiarrhythmics, Anti-hypertensives, Inotropic agents, Diuretics, Muscle relaxants, Neuroleptics, Anti-asthma drug, Inter-venous fluids, Tetanus prophylaxis, and Drug use in cardiac arrest, are emergency drug.

KEYWORD: Intra-venous Fluid (i.v.), Intra-muscular (i.m), LSD, Essential medicine, Emergency medicine.

INTRODUCTION

Emergency drugs means those drugs which is the most important for patient care and approved by the Institution's pharmacy and therapeutics committee or equivalent committee. The drug need for patient care include drugs requiring administration within minutes or within less time than the pharmacy can be practically expected to respond.

During the French Revolution, French military surgeon Dominique Jean Larry inculcated the idea of ambulances or the "flying carriages", to rapidly evacuated the wounded soldiers to a central place where medical aid was more accessible and effective. Hence, he was called the father of Emergency Medicine for his strategies during the French War.

Before the 1960s and 1970s, hospital emergency departments were staffed by family physicians, general surgeons, or interns on the rotating basis. In many Emergency Departments, nurses would triage that patients and physicians would call in based on the type and severity of injury or illness. In UK, in 1952, Maurice Ellis was appointed as the first "casualty consultant' at Leeds General Infirmary, and in 1967, the Casualty Surgeons Association was established with Maurice Ellis as its first President. In the US, the association was headed by Dr. James DeWitt Mills in 1961 who, along with four associate physicians, at t Alexandria Hospital in Alexandria, Virginia, established 24/7 year-round emergency care, which became known as the "Alexandria Plan".

However, in India, it took a longer period to recognize the field of emergency medicine as an independent medical speciality and finally recognized by Medical Council of India (MIC) on July 2009.

❖ Definition

The word Emergency is defined by the perception of the patient or the attenders who brig the patient to the emergency department.

And the word drug defined that a chemical which is given to people in order to treat or prevent an illness or disease.

Emergency Drug is the medical specialty concerned with the care of illnesses or injuries requiring immediate

medical attention.

❖ **Emergency Drugs**

Emergency drugs may be divided into two categories. The first category is drugs thatare essential and should be part of every emergency drug kit. The second category consists of drugs that are useful but are optional depending on the practitioner's training in emergency medical procedures and whether sedation and general anaesthesia are used for behaviour and anxiety management. Thus, emergency drug kits will vary from office to office. A Medical person as well as a dentist trained to administer general and intravenous sedation with greater proficiency in venipuncture would have a more comprehensive drug kit. For dentists not proficient in venipuncture, optional drugs that can be administered orally, intramuscularly/interlingually and intranasally will be discussed.

Table 1: Essential Emergency Drugs.

Drug	Indication	Initial Dose
Oxygen	Almost any emergency	100% inhalation
Epinephrine	Anaphylaxis Asthma unresponsive to ibuterol/salbutamol	Adult 1:1000 Child 1:2000 0.01 mg/kg IM every 15minutes as needed
Nitro-glycerine	Angina pain	0.3-0.4 mg sublingual
Antihistamine (diphenhydramine)	Allergic reactions	Adult: 25-50 IM or 25-50mg qid orally Child: 1 mg/kg orally qid *(See table 2 for dosage byage)*
Ibuterol/salbutamol	Asthmatic bronchospasm	2 sprays inhalation
Aspirin	Myocardial infarction	160-325 mg
Sugared drink, juice	Hypoglycaemia (patient conscious)	Administer until patientrecovers.
Glucagon	Hypoglycaemia (patient unconscious)	Adult: 1 mg IM Child: 0.5 mg IM stat, 0.5mg 20 minutes later
Ammonia inhalant ampules	Syncope	Crush ampule between fingers and hold under nose

Table 2: Additional Emergency Drugs.

Drug	Indication	Dose
Atropine	Clinically significantbradycardia	0.5 mg IV or IM
Ephedrine	Clinically significanthypotension	5 mg IV or IM
Hydrocortisone	Adrenal insufficiency Recurrent anaphylaxis	100 mg IV or IM100 mg IV or IM
Morphine or nitrousoxide	Angina pain unresponsive to nitro-glycerine	Titrate 2 mg IV, 5 mg IM ~ 35% N2O inhalation
Naloxone	Reversal of opioid overdose	0.1 mg/kg up to 2mg IV or IM
Lorazepam orMidazolam	Status epilepticus	4 mg IM or IV5 mg IM or IV
Flumazenil	Benzodiazepine overdose	0.01-0.02 mg/kg at 1-minute intervals up to1 mg IV or IM

❖ **List of Emergency Drug Recommend by WHO.**

- **Cardiovascular emergency drug.**

1. Adrenaline

➢ Use: - Cardice Arrest**,** dose for adult **1mg,** for poor condition 5mg, for children10 microgram.

Cardiogenic Shock, dose for adult 2 microgram.

Coronary Pain Syndromes, dose for adult 0.5-1ml (0.5-1mg). for poor condition its increase 2 to 5 ml Cardiac Arrhythmias, dose of adult 1mg.

All are intravenous

2. Atropine

➢ Use: - Cardice Arrest dose for adult 3mg, Cardiac Arrhythmias dose of adult 0.6-1.8 mg.

3. Calcium Channel Blocker

➢ Use: - Cardice Arrest dose for adult 0.1 ml/kg (maximum dose 5ml intravenous).

4. Beta – Adrenergic Antagonist

➢ Use: - Cardice Arrest glucagon 5mg inter vanes.

5. Diazepam

➢ Use: - Cardice Arrest dose for adult 0.2 mg/kg. (max 10mg).

6. Midazolam

➢ Use: - Cardice Arrest dose for adult 0.2 mg/kg. (max 10mg).

7. Thiopentone

➢ Use: - Cardice Arrest dose for adult 3-5 mg/kg. (use lowest dose).

8. Suxamethonium

➢ Use: - Cardice Arrest dose for adult 1.5mg/kg intravenous, for children 2mg/kgintravenous.

9. Vecuronium

- Use: - Cardice Arrest dose for adult 0.3mg/kg intravenous, for children 0.2mg/kg intravenous.

10. Dopamine

- Use: - Cardiogenic Shock dose for adult 2 microgram/kg per minute by i.v. increase rate 5 microgram/kg per minutes. for child dose 2 microgram/kg per minutes by i.v. increase rate max of 20 microgram/kg per minute in every 5v minutes.

11. Aspirin

- Use: - Coronary Pain Syndromes dose for oral 100 to 150mg. for increase 150to 300mg.

12. Heparin

- Use: - Coronary Pain Syndromes dose for 500 unite i.v 1000unit/hour.

13. Atenolol

- **Use: -** Coronary Pain Syndromes, dose for adult 50-100mg for oral. post infarct periods 25-100 daily Cardiac Arrhythmias**,** dose of adult 25-100 mg oral daily.

14. Morphine

- Use: - Coronary Pain Syndromes, dose for adult 2.5 – 10 mg i.v. repeated Acute pulmonary edemia doses for adult 2.5 -5mg max 15 mg.

- **Respiratory Emergency Drug**

1. OXYGEN

- USE: - Asthma, dose for adult 6-8 unit per minute Exacerbation of chronicobstructive air way discuss. Oxygen therapy.

2. Salbutamol

- Use: - Asthma, dose for 5mg by nebuliser with oxygen repeat every 30 minutes. Exacerbation of chronic obstructive air way discuss dose for adult 5mg by a Nebuliser every 2-4 hours.

3. Ipratropium Bromide

- Use: - Asthma, dose for adult 250 -500 microgram 9by nebuliser every 4 hours.

4. Hydrocortisone

- Use: - Asthma, dose for adult 200mg i.v Exacerbation of chronic obstructive air way discuss dose for adult 200 mg i.v every 6 hours.

5. Azithromycin / amoxicillin

- Use: - Exacerbation of chronic obstructive air way discuss, dose for adult500mg oral.

6. Ampicillin

- Use: - Exacerbation of chronic obstructive air way discuss, dose for adult500mg i.v.

7. Chloramphenicol

- Use: - Epiglottitis, dose for child 40 mg/kg i.v daily.

- **Poisoniong and Overdoses Emergency Drug**

1. Naloxone

- Use: - Treatment for the specific poison (heroin, morphine, codeine)
  Dose for adult 0.4mg i.v or intramuscularly and repeat 5 minutes if necessary,to max 2 mg.

2. Acetylcysteine

- Use: - over dose of paracetamol, dose for adult 150mg/kg i.v over 15 minutesthen 50 mg/kg i.v over 4 hours, 100 mg/kg i.v over 16 hours.

3. Atropine

- Use: - over dose Anticholinesterases (e.g., insecticides) dose for adult 3mg i.vevery 5 minutes, dose for child 1.5mg i.v every 5 minutes.

4. Pralidoxime

- Use: - over dose Anticholinesterases (e.g., insecticides) dose for adult 1gm i.vover 30 minutes and repeat every 12 hours. dose for child 20 mg/kg i.v over 30 minutes and repeat every 12 hours.

5. Adrenaline

- Use: - Over dose Beta-adrenergic antagonists (e.g., propranolol, atenolol), dose for adult 10 microgram per minute i.v infusion and increase by 5microgram per minute every 2 minute. Dose for child 0.5 microgram per kg per minute and increase by 5microgram per minute every 2 minute.

6. Sodium Bicarbonate and Potassium Chloride

- Use: -This commonly used drug can be highly toxic in over dose of Aspirin. The features include nausea, vomiting, confusion, Coma, fever, tachypnoea and hypokalaemia etc. Metabolic acidosis and hypoglycaemia may occur in child. The toxic dose is greater than 150 mg/kg. All symptomatic patients should be treated give 0.9% saline i.v at a rate necessary to maintain a urine output greater than 2ml/kg per hours, and give sodium bicarbonate 1 mmol/kg every 4 hours to maintain a urine pH greater than 7.5, and give potassium chloride 0.25mmol/kg i.v over at last one hours, every 4 hours to maintain serum potassium levels >4mmol/L.

- **Neurologic Emergency drug**

1. Diazepam

- Use: - Seizures, dose for adult 5mg i.v repeat every 2 min and maximum dose 20 mg. Dose for child 0.1mg/kg by i.v repeat every 2 minute, and maximum 0.4 mg/kg.

2. Phenytoin

- Use: - Seizures, dose for adult 15mg /kg by i.v infusion over 20 minutes. Dose for child 15mg /kg by i.v infusion over 20 minutes.

3. Thiopentone

- Use: - Seizures, dose for adult 5mg/kg i.v. Dose for child 5mg/kg i.v.

4. Metoclopramide

- Use: - Migraine, Dose for adult 10 mg intramuscularly.

5. Aspirin

- Use: - Migraine, Dose for adult 900mg orally.

6. Paracetamol

- Use: - migraine, Dose for adult 1.5g orally. Dose for child 20 mg/kg orally.

7. Benztropine

- Use: - Oculogyric crisis, dose for adult 40microgram/kg (max 2mg) orally or intramuscularly.

8. Benzylpenicillin

- Use: - Tetanus, dose 100000 unite /kg (max dose 2.4 million unite/kg) i.vevery 4 hours.

9. Penicillin G
- Use: - Acute Bacterial Meningitis, dose for adult 4 megaunits i.v/i.m, 6hourlies.

10. Ceftriaxone
- Use: - Acute Bacterial Meningitis, dose for adult 2mg i.v as single dose.

11. Chloramphenicol
- Use: - Acute Bacterial Meningitis, dose for adult 750mg-1g i.v ,6 hourly.

12. Dexamethasone
- Use: - Acute Bacterial Meningitis, dose for adult 10mg i.v.

❖ Essential Emergency Drug

1. Local Anaesthetic
   - Lignocaine
2. Sedatives
   - Midazolam
   - Thiopentone
3. Anticholinergic
   - Atropine
   - Benztropine
4. Opioid Analgesic
   - Morphine
   - Pethidine
5. Anti-emetics
   - Prochlorperazine
   - Promethazine
6. Corticosteroids
   - Hydrocortisone
   - Dexamethasone
   - Prednisolone
7. Anti-epileptics
   - Diazepam
   - Phenytoin
8. Antiarrhythmics
   - Quinidine
   - Phenytoin
   - Verapamil
   - Digoxin
9. Anti-hypertensives
   - Hydralazine
   - Nifedipine
   - Labetalol
10. Inotropic Agents
    - Adrenaline
    - Dopamine
    - Dobutamine
11. Diuretics
    - Frusemide
12. Muscle Relaxants
    - Suxamethonium
    - Vecuronium
13. Neuroleptics
    - Haloperidol
    - Chlorpromazine
14. Anti-asthma Drugs
    - Salbutamol
    - Corticosteroid
    - Aminophylline
15. Intravenous Fluids
    - Saline
    - Dextrose
    - Dextrose with Saline
    - Rinder's lattat
    - Plasma volume expanding solution (e.g., Haemmacel,Gelofusin).

16. Tetanus Prophylaxis
    - For Non-immune patient with tetanus prone wound give tetanus toxoid 0.5 ml i.m and give tetanus immunoglobulin 250 units i.m.
    - For Non-immune patient with clean wound give tetanustoxoid 0.5 ml i.m.
    - For Immune patient with prone wound give tetanus toxoid 0.5 ml i.m.
    - For Immune patient with clean wound give tetanus toxoid 0.5 ml i.m.

17. Drugs Used in Cardiac Arrest
    - Adrenaline
    - Sodium bicarbonate
    - Lignocaine
    - Atropine

❖ **Clinical Use And Adverse Effect of Essental Emergency Drug**

1. LOCAL ANAESTHETICS

CLINICAL USE

- Local Anaesthetics are mainly used to block transmission ofimpulses in nerve fibres, to reduce or eliminate sensation. It's may be used for neuraxial analgesia and anaesthesia, peripheral nerve blocks, subcutaneous and tissue infiltration, and topical Anaesthesia.

ADVERSE EFFECT

- dizziness.
- headaches.
- blurred vision.
- twitching muscles.
- continuing numbness, weakness or pins and needles.

2. SEDATIVES

CLINICAL USE

- These drugs are mainly used to depress the conscious state either for sedation or general anaesthesia. They should be used with great care as unconscious patients are unable to protect their airway and because of the risk of causing hypoventilation and hypotension.

Adverse Effects

- Long-term sedative use can lead to frequently forgetting or losing your memory (amnesia), symptomsof depression, such as fatigue, feelings of hopelessness, or suicidal thoughts, mental health conditions, such as anxiety. liver dysfunction or liver failure from tissue damage or overdose.
- Short-term effects: Alertness, focus, sleeplessness,

loss of appetite, increased blood pressure and heart rate, high body temperature.

3. ANTICHOLINERGICS

CLINICAL USE

- Anticholinergic drugs block the effects of acetylcholine at muscarinic receptors. The most commonly used anticholinergic agent is atropine. This drug is used for the treatment of bradycardia due to increased vagal tone, to block the cholinergic effects of drugs such as suxamethonium in children.

ADVERSE EFFECTS

- dry mouth.
- blurry vision.
- constipation.
- drowsiness.
- sedation.
- hallucinations.
- memory problems.
- trouble urinating.

4. OPIOID ANALGESICS

CLINICAL USE

- Opioid agents are mainly used for their analgesic and sedative actions. The main side effects of these drugs are respiratory depression, hypotension, nausea, vomiting, and constipation.

ADVERSE EFFECT

- All opioids share the side effects of respiratory depression, cough suppression, reduced intestinal motility, nausea, vomiting and urinary retention. Tolerance to their effects and both physical and psychological dependence may develop.

5. ANTI-EMETICS

CLINICAL USE

- Anti-emetic drugs are used for the temporary relief ofnausea and vomiting.

ADVERSE EFFECTS

- antihistamines: drowsiness, dry mouth. dopamine
- antagonists: dry mouth, fatigue, constipation, tinnitus,muscle spasms, restlessness.
- neurokinin receptor agonists: decreased urination, drymouth, heartburn.
- serotonin 5-HT3 receptor antagonists: constipation, drymouth, fatigue.

6. CORTICOSTEROIDS

CLINICAL USE

- Mainly useful in the treatment of asthma, anaphylaxis and many other conditions, the beneficial effects of these drugs are delayed for several hours at least and also used with care in patients with diabetes or peptic ulcer disease.

ADVERSE EFFECT

- All agents have similar anti-inflammatory effects but differ in their mineralocorticoid potency. Their mineralocorticoid effects may be undesirable and include sodium retention, oedema, and hypokalaemia.

7. ANTI-EPILEPTICS

CLINICAL USE

- The first line drug in the treatment of epilepsy is diazepam. Phenytoin is useful for the treatment of idiopathic epilepsy but is less effective for seizures dueto other causes.

ADVERSE EFFECT

- Drowsiness
- Lethargy
- Fatigue
- Insomnia
- Cognitive impairment. Closely related to these cognitive impairments are mood-related events such asirritability, aggressive behaviour, or depression.

8. ANTI-ARRHYTHMICS

CLINICAL USE

- Antiarrhythmic drugs preserve an important role as symptomatic therapy or to prevent the deterioration ofcardiac function by tachycardia, irregular rhythm, or desynchrony.

ADVERSE EFFECT

- possible issues with your liver, kidneys, thyroid or lungs)
- tiredness.
- nausea.
- shortness of breath.

9. ANTI-HYPERTENSIVE

CLINICAL USE

- Hydralazine is a direct acting arteriolar. It should not beused in patients with ischaemic heart disease who are not being treated with a beta-blocker.
- Labetalol, a combined alpha and beta-receptor blocking drug has been requested for the Kiribati EDL. It is for intravenous use only in hypertensive emergencies.

ADVERSE EFFECT

- Cough.
- Diarrhea or constipation.
- Dizziness or light headedness.
- Erection problems.
- Feeling nervous.
- Feeling tired, weak, drowsy, or a lack of energy.
- Headache.
- Nausea or vomiting.

10. INOTROPIC AGENTS
CLINICAL USE

- Adrenaline is an alpha and beta-adrenergic agonist. Itcauses an increase in cardiac output and heart rate plus vasoconstriction.
- Dopamine has similar effects to adrenaline but produces more tachycardia at higher doses.

ADVERSE EFFECTS

- Inotropes are a group of drugs that alter the contractility of the heart. Positive inotropes increase the force of contraction of the heart, whereas negative inotropes weaken it.

11. DIURETICS
CLINICAL USE

- Frusemide is a potent loop diuretic used in the treatment of fluid overload. Its main side effects are hypokalaemia and fluid depletion. Damage to the inner ear may occur with too rapid intravenous injection.

ADVERSE EFFECTS

- Dizziness.
- Headaches.
- Dehydration.
- Muscle cramps.
- Joint disorders (gout)
- Impotence.

12. MUSCLE RELAXANTS
CLINICAL USE

- A muscle relaxant is a drug that affects skeletal muscle function and decreases the muscle tone. It may be used to alleviate symptoms such as muscle spasms, pain, and hyperreflexia. The term "muscle relaxant" is used to refer to two major therapeutic groups: neuromuscular blockers and spasmolytics.

ADVERSE EFFECT

- Tiredness, drowsiness, or sedation effect.
- Fatigue or weakness.
- Dizziness.
- Dry mouth.
- Depression.
- Decreased blood pressure.

13. NEUROLEPTICS
CLINICAL USE

- Formerly known as major tranquilizers and neuroleptics, antipsychotic medications are the main class of drugs used to treat people with schizophrenia. They are also used to treat people with psychosis that occurs in bipolar disorder, depression and Alzheimer'sdisease.

ADVERSE EFFECT

- Stiffness and shakiness
- Uncomfortable restlessness
- Movements of the jaw, lips and
- Sexual problems due to hormonal changes.
- Sleepiness and slowness.
- Weight gain.
- A higher risk of getting diabetes.
- Constipation.

14. ANTI-ASTHMA DRUGS
CLINICAL USE

- These drugs are used mainly to relieve sudden asthmaattacks or to prevent attacks that might come on after exercise. They may be taken by mouth, injected, or inhaled. Corticosteroids block the inflammation that narrows the airways. Used regularly, these drugs help prevent asthma attacks.

ADVERSE EFFECT

- The most common side effects of preventer medication (inhaled corticosteroids) are a hoarse voice, sore mouth and throat, and fungal infections of the throat.

15. INTRAVENOUS FLUIDS
CLINICAL USE

- If a patient is ill and has fluid loss related to decreased intake, surgery, vomiting, diarrhea, or diaphoresis, the patient may require IV therapy. To administer medications, including chemotherapy, anaesthetics, and diagnostic reagents: About 40% of all antibiotics are given intravenously.

ADVERSE EFFECTS

- hypernatremia (high levels of sodium),
- fluid retention,
- high blood pressure,
- heart failure,
- intraventricular haemorrhage in neonates,
- injection site reactions,
- kidney damage,
- electrolyte abnormalities

16. TETANUS PROPHYLAXIS
CLINICAL USE

- Tetanus (tetanus toxoid) and Diphtheria Toxoids Adsorbed for Adult Use (Td) is the preferred vaccine for active tetanus (tetanus toxoid) immunization in wound management of patients ≥7 years of age. Because a large proportion of adults are susceptible to diphtheria, this vaccine enhances diphtheria protection.

ADVERSE EFFECTS

- Mild fever, joint pain, muscle aches, nausea, tiredness, or pain/itching/swelling/redness at the injection site may occur. Acetaminophen may be used to reduce these effects. If any of these effects persist or worsen, tell the doctor or pharmacist promptly.

17. DRUGS USED IN CARDIAC ARREST CLINICAL USE

- Adrenaline is a powerful endogenous catecholamine. The pharmacologic doses used in cardiac arrests far exceed the amounts usually produced by the adrenal glands. Adrenaline has both alpha and beta-adrenergic agonist effects. It stimulates myocardial contraction, increases the heart rate and raises the blood pressure.
- Atropine is used in the treatment of asystole and severe bradycardia. It acts to block the effects of the vague nerve on the heart. A dose of 3 mg in an adult produces complete atropinization, blocking all the cholinergic receptors.

ADVERSE EFFECTS

- Adrenaline most dangerous adverse effect is inductionof ventricular arrhythmias, an effect which is far more likely when the myocardium is sensitized to catecholamines. This occurs with myocardial ischaemia and with overdoses of drugs such as amphetamines and cocaine.
- Atropine is to produce a sinus tachycardia which may be harmful in the presence of ischaemic heart disease.

❖ EMERGENCY EQUIPMENT

- **Emergency oxygen** - The basic goal of nearly all emergencies in the dental office is to maintain sufficient oxygenation of the brain and heart. Thus, oxygen should be available for every emergency except hyperventilation. It should be provided with a clear face mask for patients with spontaneous breathing, and a bag-valve mask for the apnoeic patientin both adult and paediatric sizes. The oxygen should be available as a portable unit with an "E" size cylinder that is capable of delivering greater than 90% oxygen at a flow of 5 L/min for a minimum of 60 minutes
- **Suctioning equipment -** Although usually available in the treatment room, a portable suction unit is useful for suctioning fluids and vomit if the emergency occurs in another area of the office (waiting room).
- **Automated electronic defibrillator (AED) -** The AED is used during cardiac arrest to shock a defibrillating heart. Resuscitation with BLS during cardiac arrest is most successful if defibrillation is performed within 3 to 5 minutes of collapse. Manual, automatic or semiautomatic defibrillators are available. Manual defibrillators require interpretation of a monitor or cardiac rhythm strip by a trained rescuer. Automated and semi- automated AEDs analyse the patient's rhythm and advise the rescuer to defibrillate if ventricular tachycardia or ventricular fibrillation is present or to continue CPR if no pulse is present. The AED should accept adult and paediatric paddles.
- **Pulse oximeter and blood pressure monitor -** While pulse oximeters are usually found in dental offices where sedation and general anaesthesia is administered to patients, they are useful in monitoring the effectiveness of CPR efforts. The pulse oximeter monitors the patient's pulse rate and the percent oxygenation of the blood. This frees up a staff member during an emergency from manually monitoring the patient with astethoscope or digitally. More upscale models also provide blood pressure monitoring.

❖ New Emergency drug regarding covid 19

In now days the world facing a large pandemic that is COVID-19. The COVID-19pandemic has exploded since cases were first reported in China in December 2019. As per April,2021 report more than 141 million cases of COVID-19 caused by SARS-CoV-2 infection, have been reported globally, including more than 3 million deaths.

- Regarding the treatment of COVID-19 the Emergency medicine arementionbelow: -

1. Oxygenation and ventilation

- Nonmechanically Ventilated Adults with Hypoxemic Respiratory Failure
  - For adults with COVID-19 and acute hypoxemic respiratory failure despite conventional oxygen therapy, the Panel recommends high-flow nasal cannula (HFNC) oxygen over non-invasive positive pressure ventilation (NIPPV)
  - In the absence of an indication for endotracheal intubation, the Panel recommends a closely monitored trial of NIPPV for adults with COVID-19 and acute hypoxemic respiratory failure and for whom HFNC is not available.
  - For patients with persistent hypoxemia despite increasing supplemental oxygen requirements in whom endotracheal intubation is not otherwise indicated, the Panel recommends considering a trial of awake prone positioning to improve oxygenation.
  - The Panel recommends against using awake prone positioning as a rescue therapy for refractory hypoxemia to avoid intubation in patients who otherwise meet the indications for intubation and mechanical ventilation.
  - If intubation becomes necessary, the procedure should be performed by an experienced practitioner in a controlled setting due to the enhanced risk of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) exposure to health care practitioners during intubation.

- Mechanically Ventilated Adults The Panel Recommends
  - Using low tidal volume (VT) ventilation (VT 4-8 ml/kg of patient body weight) over higher VT ventilation (VT>8ml/kg)
  - Targeting plateau pressures of <30cm H_2O.
  - Against the routine use of inhaled nitric oxide.
- Goal of Oxygenation
  - The optimal oxygen saturation (SpO_2) in adults with

COVID-19 is uncertain. However, a target SpO_2 of 92% to 96% seems logical considering that indirect evidence from experience in patients without COVID-19 suggests that an SpO_2 96% may be harmful.

2. REMDESIVIR (VEKLURY)

REMDESIVIR sold in market under the brand name 'VEKLURY'. It is a broad- spectrum antiviral medication developed by the biopharmaceutical company Gilead Sciences. REMDESIVIR is approved or authorized for Emergency use to treat COVID-19 in around 50 countries. It also has been authorized for emergency use in India for people with severe symptoms. In India Cipla is manufacturing remdesivir under the brand name CIPREMI for "restricted emergency use". Hetero is launching Remdesivir under the brand COVIFOR for "suspected or confirmed Covid-19 cases in hospitalised adults and children.". REMDESIVIR is approved by the Food and Drug Administration (FDA) for the treatment of COVID-19 in hospitalized adult and Paediatric patients (aged ≥12 years and weighing ≥40 kg). It is also available through an FDA Emergency Use Authorization (EUA) for the treatment of COVID-19 in hospitalized paediatric patients weighing 3.5 kg to <40 kg or aged <12 years and weighing ≥3.5 kg. REMDESIVIR should be administered in a hospital or a health care setting that can provide a similar level of care to an inpatient hospital.

CONSIDERATION IN PATIENTS WITH RENAL INSFFICIENCY

- Each 100 mg vial of remdesivir lyophilized powder contains 3 g of Sulfobutylether beta-cyclodextrin sodium (SBECD).
- A patient with COVID-19 who receives a loading dose of remdesivir 200mg would receive 6g to 12 gm SBECD, dependingon the formulation.
- Remdesivir is not recommended for the patient with estimated glomerular filtration rate(eGFR)<30ml/min.

CONSIDERATION IN PREGNANCY

- Pregnant patients were excluded from the clinical trials that evaluated the safety and efficacy of remdesivir for the treatment of COVID-19, but preliminary reports of remdesivir use in pregnant patients from the remdesivir compassionate use program are reassuring.
- Remdesivir should not be withheld from pregnant patients if it isotherwise indicated.

CONSIARATION IN CHILDREN

- Remdesivir is available through an FDA EUA for the treatment of COVID-19 in hospitalized paediatric patients weighing 3.5 kg to<40kg or aged <12years.

ADVERSE EFFECTS

- The most common adverse effect in people whom gives remdesivir were respiratory failure and blood biomarkers of organ impairment, low albumin, low potassium, low count of RBC. Remdesivir may cause infusion-related reaction, including low blood pressure, nausea, vomiting, sweating or shivering.

3. Chloroquine Or Hydroxychloroquin With Or Without Azithromycin

Chloroquine is an antimalarial drug that was developed in 1934. Hydroxychloroquine, an analogue of chloroquine, was developed in 1946. Hydroxychloroquine is used to treat autoimmune diseases such as systemic lupus erythematosus and rheumatoid arthritis, in addition to malaria. Both chloroquine and hydroxychloroquine increase the endosomal pH, inhibiting fusion of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the host cell membranes.

Chloroquine and hydroxychloroquine, with or without azithromycin, have beenstudied in multiple clinical trials for the treatment of COVID-19. The recommendations below are based on an assessment of the collective evidence from these studies.

RCOMMENDATION

- The COVID-19 Treatment Guidelines Panel recommends against the use of chloroquine or hydroxychloroquine with orwithout azithromycin for the treatment of COVID-19 in hospitalized patients.
- For the treatment of COVID-19 high dose of chloroquine600mg BD for 10 days.

CONSIDERATION IN PREGNANCY

- Antirheumatic doses of chloroquine and hydroxychloroquine have been used safely in pregnant women with SLE.
- A lower dose of chloroquine is used for malaria prophylaxis during pregnancy is 500 mg once a week.

ADVERSE EFFECT

- Chloroquine and hydroxychloroquine have a similar toxicity profile, although hydroxychloroquine is better tolerated and has alower incidence of toxicity than chloroquine.
- Hypoglycaemia, rash, and nausea. Divided doses may reduce nausea. Bone marrow suppression may occur with long-term use but this is not likely with short-term use.

4. IVERMECTIN

Ivermectin is an oral medication and antiparasitic drug approved by FDA, is used to trat several neglected tropical diseases, including onchocerciasis, scabies.

RECOMMENDATION

- There are insufficient data for the COVID-19 Treatment Guidelines Panel (the Panel) to recommend either for or against the use of

ivermectin for the treatment of COVID-19. Results from adequately powered, well-designed, and well-conducted clinical trials are needed to provide more specific, evidence-based guidance on the role of ivermectin in the treatment of COVID-19.

CONSIDERATION IN PREGNANCY

- In animal studies, ivermectin was shown to be teratogenic when given in doses that were maternotoxic. These results raise concerns about administering ivermectin to people who are in the early stages of pregnancy (prior to 10 weeks gestation).
- the ivermectin concentrations secreted in breastmilk after a singleoral dose were relatively low.

CONSIDERATION IN CHILDREN

- Ivermectin is used in children weighing >15 kg for the treatment of helminthic infections, pediculosis, and scabies. The safety of using ivermectin in children weighing <15 kg has not been well established. Ivermectin is generally well tolerated in children, witha side effect profile similar to the one seen in adults. Currently, there are no available paediatric data from clinical trials to inform the use of ivermectin for the treatment or prevention of COVID-19in children.

ADVERSE EFFECTS

- Ivermectin is generally well tolerated. Adverse effects may include dizziness, pruritis, nausea, or diarrhea.
- Neurological adverse effects have been reported with the use of ivermectin for the treatment of onchocerciasis and other parasitic diseases, but it is not clear whether these adverse effects were caused by ivermectin or the underlying conditions.

5. LOPINAVIR/RITONAVIR AND OTHER HIV PROTEASEINHIBITORS

Kaletra is an HIV medication containing a combination of two antivirals called lopinavir and ritonavir. Lopinavir/ritonavir and darunavir/cobicistat have been studied in patients with COVID-19.

RECOMMENDATIONS

The COVID-19 treatment guidelines panel recommends

- The use of lopinavir/ritonavir and other HIV protease inhibitors forthe treatment ofCOVID-19 in hospitalized and non-hospitalized patients.

ADVERSE EFFECTS

The adverse events for lopinavir/ritonavir include.

- Nausea, vomiting, diarihea (common)
- QTc prolongation
- Hepatotoxicity

6. Convalescent Plasma

On march 24,2020, the FDA issued Emergency Investigational New Drug (eIND) application for the use of convalescent plasma to treat people with COVID-19 plasma is the liquid part of blood that carries blood cells. Plasma from donors who have recovered from COVID-19 may contain antibodies to SARS-CoV-2 that may help suppress the virus and modify the inflammatory response.

RECOMMENDATION

The COVID-19 treatment guidelines panel recommends against

- The use of low-titer COVID-19 convalescent plasma for thetreatment of COVID-19.
- For hospitalized patients with COVID-19 who do-not have impaired immunity use convalescent plasma for the treatment of COVID-19 in mechanically ventilated patient. and use high-titer convalescent plasma for the treatment of COVID-19 who do not require mechanically ventilation.
- For hospitalized patients with COVID-19 who have impaired immunity use high-titer COVID-19 convalescent plasma for treatment of COVID-19.
- For non-hospitalized patient with COVID-19 use high-titter COVID- 19 convalescent plasma for the treatment of COVID-19, except in a clinical trial.

CONSIDERATION IN PREGNANCY

The safety and efficacy of using COVID-19 convalescent plasma during pregnancy have not been evaluated. Pathogen-specific immunoglobulins are used clinically during pregnancy to prevent infection from varicella zoster virus and rabies virus and have been used in clinical trials of congenital cytomegalovirus infection.

CONSIDERATIONS IN CHILDREN

The Panel has insufficient data to recommend either against the use of convalescent plasma for the treatment of COVID-19 in hospitalized children who do not require mechanical ventilation and use of convalescent plasma for the treatment of COVID-19 in mechanically ventilated paediatric patients.

ADVERSE EFFECTS

COVID-19 convalescent plasma is infrequent and consistent with the risks associated with plasma infusions for other indications. These risks include transfusion-transmitted infections like HIV, hepatitis B, hepatitis C, and allergic reactions, anaphylactic reactions, febrile nonhemolytic reactions, transfusion-related acute lung injury, transfusion-associated circulatory overload, and haemolytic reactions. Additional risks of COVID-19 convalescent plasma transfusion include a theoretical risk of antibody-dependent enhancement of SARS-CoV-2 infection and a theoretical risk of long-term immunosuppression.

7. COLCHICINE

Colchicine is an anti-inflammatory drug, that is a medication gout, recurrent pericarditis, and familial Mediterranean fever. Researchers think that colchicine could work similarly to tocilizumab in COVID-19

patients in that it might be helpful if the immune system becomes too activated and a cytokine storm occurs. These anti-inflammatory properties have prompted investigation of colchicine for the treatment of COVID-19.

RECOMMENDATION

- A large, randomized trial in outpatients, the Colchicine Coronavirus SARS-CoV-2 Trial. However, a slight reduction in hospitalizations was observed in the subset of patients whose diagnosis was confirmed by a positive nasopharyngeal swab on a SARS-CoV-2 polymerase chain reaction test.
- The Panel recommends against the use of colchicine in hospitalized patients for the treatment of COVID-19, exceptin a clinical trial.

CONSIDERATION IN PREGNANCY

- There are limited data on the use of colchicine in pregnancy. Fatal risk cannot be ruled out based on data from animal studies and the drug's mechanism of action. Colchicine crosses the placenta and has antimitotic properties, which raises a theoretical concern for teratogenicity. A recent systematic review of the literature did not find higher rates of miscarriage or major fatal malformations in pregnant women who were exposed to colchicine than in pregnant women who were not exposed to the drug. Risks of use should be balanced against potential benefits.

CONSIDERATION IN CHILDREN

Colchicine use limited in children treatment for periodic feversyndromes, primarily familial Mediterranean fever.

ADVERSE EFFECTS

The common side effects of colchicine include diarrhea, nauseas, vomiting, cramping, abdominal pain, bloating, and loss of appetite. Inrare cases, neuro-myotoxicity and blood dyscrasias.

8. CORTICOSTEROIDS

Patients with severe COVID-19 can develop a systemic inflammatory response that can lead to lung injury and multisystem organ dysfunction. It has been proposed that the potent anti-inflammatory effects of corticosteroids might prevent or mitigate these deleterious effects. Dexamethasone is one of the common corticosteroid medication tha has been used for many years to treat various health conditions like autoimmune conditions and allergic reactions.

RECOMMENDATION

- If dexamethasone is not available, alternative glucocorticoids such as prednisone, methylprednisolone, or hydrocortisone can be used.
- For these drugs, the total daily dose equivalencies to dexamethasone 6 mg are Prednisone 40 mg, Methylprednisolone32 mg, Hydrocortisone 160 mg.
- Hydrocortisone is commonly used to manage septic shock inpatients with COVID-19.

COSIDERATIONS IN PREGNENCY

- Given the potential benefit of decreased maternal mortality andthe low risk of fatal adverse effects for a short course of dexamethasone therapy, the Panel recommends using dexamethasone in hospitalized pregnant women with COVID-19 who are mechanically ventilated or who require supplemental oxygen but who are not mechanically ventilated.

CONSIDERATION IN CHILDREN

- The safety and effectiveness of dexamethasone or other corticosteroids for COVID-19 treatment have not been sufficientlyevaluated in paediatric patients. Use of dexamethasone.
- in patients who require other forms of supplemental oxygen support should be considered on a case-by-case basis and is generally not recommended for paediatric patients who require only low levels of oxygen support.

ADVERSE EFFECT

- Clinicians should closely monitor patients with COVID-19 who are receiving dexamethasone for adverse effects like hyper-glycemia, secondary infections, psychiatric effects, avascular necrosis.
- Prolonged use of systemic corticosteroids may increase the risk of reactivation of latent infections like hepatitis B virus [HBV], herpesvirus infections, strongyloidiasis, tuberculosis.
- Dexamethasone should be continued for up to 10 days or untilhospital discharge.

9. FLUVOXAMINE

Fluvoxamine is a selective serotonin reuptake inhibitor that is approved by FDA for treatment of obsessions-compulsive disorder and use for depression.

RECOMMENDATION

- There are insufficient data for the COVID-19 Treatment GuidelinesPanel to recommend either for or against the use of fluvoxamine for the treatment of COVID-19. Results from adequately powered, well-designed, and well-conducted clinical trials are needed to provide more specific, evidence-based guidance on the role offluvoxamine for the treatment of COVID-19.

CONSIDERTION IN PREGNANCY

- Fluvoxamine is not thought to increase the risk of congenital abnormalities; however, the data on its use in pregnancy arelimited.
- A small, increased risk of primary persistent pulmonary hypertension in the new born associated with SSRI use in the latethird trimester has not been excluded, although the absolute riskis likely low.
- The risk of fluvoxamine use in pregnancy for the treatment ofCOVID-19 should be balanced with the

potential benefit.

- **CONSIDERATION IN CHILDREN**

o Fluvoxamine is approved by the FDA for the treatment of obsessive-compulsive disorder in children aged ≥8 years.

- **ADVERSE EFFECTS**

o When fluvoxamine is used to treat psychiatric conditions, the most common adverse effect is nausea, but adverse effects can include other gastrointestinal effects like indigestion, neurologic effects like insomnia, dermatologic reactions like sweating, and rarely suicidal ideation.

10. INTERLEUKIN-6 INHIBITORS

Interleukin-6(IL-6) is a pleiotropic, proinflammatory cytokine produced by a variety of cell type including lymphocytes, monocytes and fibroblasts. The FDA approved two class of IL-6 inhibitor tha is anti-IL-6 receptor monoclonal antibodies that is Tocilizumab and anti-IL-6 monoclonal antibodies that is Siltuximab.

- **RECOMMENDATION**

o The Panel recommends using tocilizumab single intravenous doseof tocilizumab 8 mg/kg actual body weight up to 800 mg in combination with dexamethasone 6 mg daily for up to 10 days in certain hospitalized patients who are exhibiting rapid respiratory decompensation due to COVID-19. These patients are recently hospitalized patients (first 3 days of admission) who have been admitted to the ICU within the prior 24 hours and who require invasive mechanical ventilation, non-invasive ventilation, or high-flow nasal canula (HFNC) oxygen >0.4 FiO2/30 L/min ofoxygen flow.

o Recently hospitalized patients (first 3 days of admission) not admitted to the ICU who have rapidly increasing oxygen needs and require non-invasive ventilation or HFNC oxygen and who have significantly increased markers of inflammation CRP ≥75 mg/L.

- **ANTI-INTERLEUKIN-6 RECEPTOR MONOCLONAL ANTIBODIES (TOCILIZUMAB)**

Tocilizumab is an IL-6 inhibitor approved by FDA for rheumatoid arthritis and juvenile idiopathic arthritis. Tocilizumab can be dosed for IV or subcutaneous injection. The IV formulation should be used to treat CRS.

- **CONSIDERATION IN PREGNANCY**

Decisions about tocilizumab administration during pregnancy must include shared decision-making between the pregnant individual and their health care provider, considering potential maternal benefit and fatal risk.

- **CONSIDERATION IN CHILDREN**

Tocilizumab has been used for children with CRS associated with CAR T-cell therapy and systemic and polyarticular juvenile idiopathic arthritis.

- **ADVERSE EFFECTS**

The adverse effects, such as risk for serious infections like tuberculosis[TB], bacterial or fungal infections and bowel perforation, have been reported only in the context of tocilizumab use for the treatment of chronic disease.

- **ANTI-INTERLEUKIN-6 MONOCLONAL ANTIBODY (SILTUXIMAB)**

Siltuximab is an FDA approved recombinant human-mouse chimeric monoclonal antibody that binds IL-6 and for use in patients with multicentric Castleman disease. Siltuximab is dosed as an IV infusion.

- **CONSIDERATION IN PREGNANCY**

siltuximab-associated risk for major birth defects or miscarriage. Monoclonal antibodies are transported across the placenta as pregnancy progresses and may affect immune responses in the exposed fetes.

- **CONSIDERATION IN CHILDREN**

The safety and efficacy of siltuximab have not been established inpaediatric patients.

- **ADVERSE EFFECTS**

The primary adverse effects reported for siltuximab have been related torash. Additional adverse effects have been reported only with long-term dosing of siltuximab once every 3 weeks.

11. SUPPLEMENTS

Some clinicians advocate for the use of vitamin and mineral supplements to treat respiratory viral infections. Ongoing studies are evaluating the use of vitamin and mineral supplements for both the treatment and prevention of severe acute respiratory syndrome coronavirus 2 infection.

- **VITAMIN C (ASCORBIC ACID)**

Ascorbic acid is a water-soluble vitamin that is thought to have beneficial effects in patients with severe and critical illnesses. It is an antioxidant and free radical scavenger that has anti-Inflammatory properties, influences cellular immunity and vascular integrity, and serves as a cofactor in the generation of endogenous catecholamines.

- **VITAMIN D.**

Vitamin D is critical for bone and mineral metabolism. Because the vitamin D receptor is expressed on immune cells such as B cells, T cells, and antigen-presenting cells, and because these cells can synthesize the active vitamin D metabolite, vitamin D also has the potential to modulate innate and adaptive immune responses.

ZINC

Increased intracellular zinc concentrations efficiently impair replicationin a number of RNA viruses. Zinc has been shown to enhance cytotoxicity and induce apoptosis when used in vitro with a zinc Ionophore Such as chloroquine.

REOMMENDATION

- The COVID-19 Treatment Guidelines Panel recommend to use Vitamin-c for treatment of COVID-19 in critically and non-critically ill patients.
- The COVID-19 Treatment Guidelines Panel recommend to use Vitamin-d for prevention or treatment of COVID-19.
- The COVID-19 Treatment Guidelines Panel recommend to use Zinc supplementation above the recommended dietary allowance for theprevention of COVID-19, except in a clinical trial.

CONSIDERATION

It is important to note that high circulating concentrations of vitamin C may affect the accuracy of point-of-care glucometers.

❖ WHY WE CALL THIS EMERGENCY DRUG AS A LIFESAVING DRUG(LSD)

Drugs are one of the most crucial pillars in the provision of healthcare services and achieving Universal Health Coverage (UHC). Life-Saving Drugs (LSDs) are the drugs that save someone's life, require immediate administration in most of the cases, as they sustain life, and prevent complications. They are top priority healthcare needs, which required to be available and affordable at all time in adequate quantities and low cost for thewhole population and thus achieving equity. All of the emergency drugs are used to treatment the patient for save their life. That's why we can call emergency drugs are life-saving drug.

ACKNOWLEDGEMENT

This dissertation work bears the imprint of many people who have contributed in many crucial ways. To begin with, I wish to give the foremost acknowledgement to my esteemed guide Mr. Ashrubindu Bhunia, Assistant professor, School of Pharmacy, Techno India University, for his support and for giving valuable comments on the earlier version of this manuscript. I also take this opportunity to express my gratitude to our Director, Dr. B. Mahanti, for providing me an opportunity to study with excellent infrastructure and catering to our needs and for providing constant encouragement to excel in our education and career.

❖ CONCLUSION

After careful study of all emergency drugs it is to be concluded that Adrenalin, Atropine, Aspirin, Salbutamol, I.v fluid, Hydrocortisone, insulin, and medical oxygen are the most essential-drugs which are used as emergency drug. And now to combat the covid-19 pandemic situation, oxygen, Remdesivir, Chloroquine, Azithromycin, Ivermectin, Lopinavir, convalescent plasma, Corticosteroids, and some other medicine recommended by WHO are mainly used as emergency drug. However, in India, very recent the plasma therapy has been dropped from the recommended treatment guidelines for COVID-19.

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