**Iatrogenic Disorders**

 Iatrogenic disease is the result of diagnostic and therapeutic procedures undertaken o a patient.

Iatrogenic (of a disease or symptoms) included in a patient by the treatment or comments of a physician.

 One of the basic principles in treatment stated by Hippocratess is ‘First do no harm’.

 An iatrogenic disorder occurs when the deleterious effects of the therapeutic or diagnostic regimen causes pathology independent of the condition for which the regimen is advisee.

 Diagnostic procedures (mechanical and radiological), therapeutic regimen (drugs, surgery, other invasive procedures). Hospitalization and treating doctor himself can bring about iatrogenic disorders.

**Adverse effect of diagnostic procedures**

**Mechanical procedures**

* Diagnostic aspiration- hemorrhage, secondary infection.
* Peritoneal fluid aspiration, Rapid pleural and needle biopsies - shock and even death.
* Endoscopic procedure - perforation of hollow viscus.
* **Diagnostic radiology - cont**rast media injected intravenously or intra-arterially may cause-nephrotoxic reaction and transient or permanent neurological deficits.

## Hazards of blood transfusion

* a.Immunological reaction : Allergic-anaphylaxis, fever, haemolysis, non cardiac pulmonary oedema.

b.Non immunological : Circulatory overload, thrombophlebitis and embolism, bacterial contamination, transmission of diseases like malaria, hepatitis, syphilis and AIDS and transfusion siderosis in multiple transfusion.

### Adverse drug reactions (ADR)

### ADR is defined by World Health Organization as any response for a drug which is noxious, unintended and which occurs at doses normally used for prophylaxis, diagnosis and therapy of disease [[3](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4923397/#bib3)]. ADR can be classified as predictable (side effects, toxicity, super infection, drug interactions) and unpredictable (intolerance, idiosyncrasy, allergy or pseudo allergy)

## Drug induced cutaneous manifestations

 1.Alopaecia Cytotoxic agents

2. Erythema multiforme Chlorpropamide, Sulphonamides

3. Exanthematous eruptions Allopurinol, Anti convulsants

4. Exfoliative dermatitis Gold, streptomycin

5. Fixed drug eruptions Barbiturates, Tetracyclines

6. Photosensitivity Griseofulvin, Indomethacin

7. Toxic epidermal necrolysis Barbiturates, Sulphonamides

8.Anaphylaxis -Penicillin other Beta-lactum antibiotics,vaccines and sera, and human insulin,

## Drug induced haematological disorders

### A) Megaloblastic Anaemia Oral contraceptives, phenytoin, phenobarbitone and primidone, colchicines, neomycin, paramino salicylic acid (PAS) due to vitamin B12 deficiency and 6-mercaptopurine, 5 fluro-uracil, hydroxy-urea, acyclovir and zidovudine by interfering with DNA metabolism.

### B) Hemolytic anemia- phenacetin, PAS, sulphonamide, aminopyrine, chlorpromazine, quinine and tetracycline: and in G-6 PD deficient patients, antimalarials (primaquine) and antibiotics (nitrofurantoin)

### C) Aplastic anaemia- Busulphan, cyclophosphamide, chlorambucil, vinblastine, and 6 mercaptopurine. Drugs which rarely produce bone marrow depression: chloramphenicol, penicillamine, sulphonamides, isoniazid, NSAIDSs, analgin, thiouracil, anticonvulsants, anti diabetics, cimetidine, tranquilizers etc

## Drug induced gastro-intestinal diseases

* + Lichen planus like lesions : methyldopa, chloroquine and propranolol.
* Lupus erythematosis like lesions : hydralazine, gold. Acid peptic disease : acetyl salicylic acid, NSAIDs, corticosteroids etc
* Pancreatitis : azathioprine, glucocorticoids and oral contraceptives.
* Malabsorption : broad-spectrum antibiotics, cholestyramine and neomycin.
* Hepatic damage: acetaminophen, halothane,nitrofurantoin, methyldopa, cyclophosphamide

## Respiratory disorders due to drugs

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| 1. Airway obstruction (Bronchospasm) | Beta-Blockers, Adenosine, NSAIDs |
| 2.Cough | ACE inhibitors |
| 3.Nasal congestion | Oral contraceptives, Reserpine, Guanithidine |
| 4.Pulmonary oedema | Contrast media, Methadone, Interleukin 2 |
| 5. Pulmonary hypertension | Fenfluramine |
| 6. Pulmonary infiltration | Anticancer agents, Acyclovir, Amiodarone |
| 7. Pleural disease | Hydralazine, Methysergide |
| 8. Pulmonary thromboembolism | Oral contraceptives |

## Drug induced cardiovascular diseases

* angina -(alpha blockers),
* arrhythmias- (digitals, beta-adrenergic agents, tricyclic anti-depressants and quinine),
* cardiomyopathy- (daunorubicin, emetine and lithium),
* hypo or hypertension- (glucocorticoids and sympathomimetics),
* pericardial disease- (emetine, procainamide and minoxidil),

## Drug-induced kidney disease

Common risk factors which precipitate adverse effects include old age, volume-depleted state, pre-existing renal dysfunction and co-existing use of other nephrotoxins.

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| 1. Pre-renal failure/functional renal failure | NSAIDs, ACE-inhibitors, Diuretics, Interleukin-2, Amphotericin-B. |
| 2. Acute tubular necrosis | Aminoglycosides, Rifampicin, NSAIDs, Cyclosporine, Cisplatin |
| 3. Acute Interstitial nephritis | Penicillins, NSAIDs, Allopurinol, Thiazides, Sulfonamides. |
| 4. Thrombotic microangiopathy/hemolytic uremic syndrome | Mitomycin-C, Cyclosporine, Quinine, Cocaine, Clopidogrel. |
| 5. Isolated proteinuria with nephritic syndrome | Gold, heroin, Captopril, NSAIDs, IFN-alpha, D-penicillamine. |
| 6. Chronic tubulointerstitial disease | NSAIDs, Thiazides, Lithium, Chinese herb nephropathy, Germanium. |
| 7. Retroperitoneal fibrosis | Methysergide, Hydralazine, Methyldopa. |

## Hazards due to sudden stoppage of drug

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a “rebound phenomenon” : relapse with or without exacerbation of the basic disease

a “withdrawal phenomenon” : a new clinical syndrome unrelated to the original disease

* Antihypertensive drugs: Sudden stoppage (clonidine and alpha methyldopa) - pheochromocytoma.
* Beta-blockers: Sudden stoppage- infarction, aggravation of angina or rhythm disorders.
* Corticosteroids: Sudden stoppage- Withdrawal accidents are seen after prolonged treatment,
* Barbiturates: Sudden stoppage - induce status epilepticus,acute insomnia, confusion, agitation, hallucinations and convulsions.

## Drugs causing malignant diseases

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| 1. Leukemia (esp. acute myeloid leukemia) | − Anti cancer agent, Radiotherapy, rarely Chloramphenicol and Phenyl-butazone |
| 2. Cancer of breast and endometrium | − Estrogens, Tamoxifen |
| 3. Cancer of vagina | − Diethyl stilbesterol |
| 4. Liver cancer | − Anabolic steroids, Oral contraceptives |

## Physician induce disease

* Is not limited to the imprudent use of medicine or procedure,
* unjustified remarks and misinterpretation of investigational data.
* The physician should be aware of the properties of drugs that he prescribes and their potential dangers.
* Ignorance of the possibility of a reaction is a clear evidence of negligence.
* The physician should warn the patient of the likely side effects