



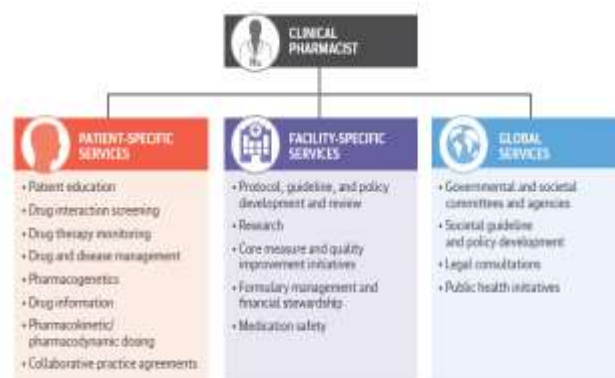
## *Outlines*

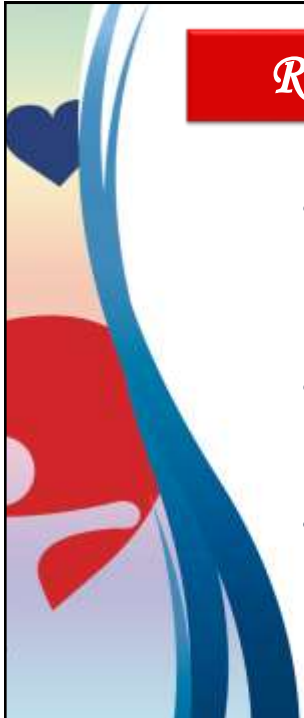
- Definition of clinical pharmacy
- Role of clinical pharmacist
- Settings for Cardiology clinical pharmacist
- Role of Clinical Pharmacist in cardiology with evidence
- Case

## *Clinical Pharmacy*

- Area of pharmacy concerned with the science and practice of rational medication use.
- A health science discipline in which pharmacists provide patient care that optimizes medication therapy and promotes health, and disease prevention.

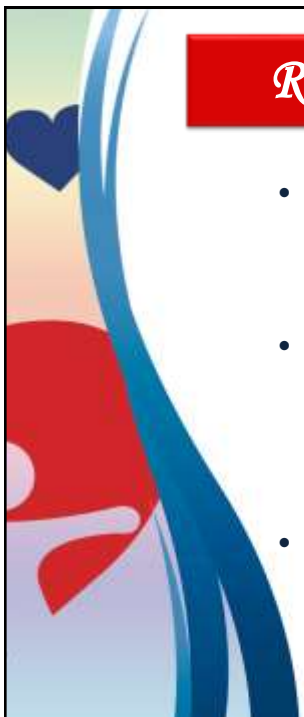
## *Role of Clinical Pharmacist*





## *Role of Clinical Pharmacist*

- **Develop effective medication plans that minimize the risk of adverse drug reactions.**
- **Consult on dosages, medication substances etc.**
- **Advise on the correct administration of drugs**



## *Role of Clinical Pharmacist*

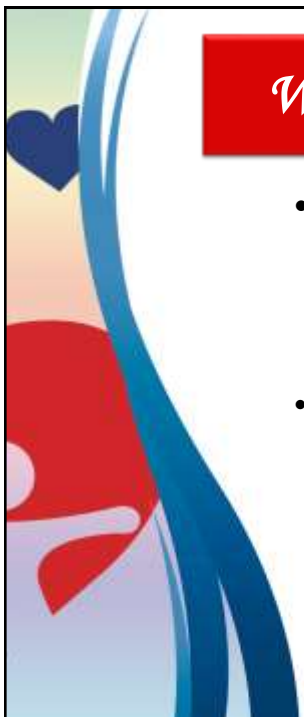
- **Assess the results of pharmaceutical treatments**
- **Collaborate with healthcare professionals to ensure optimal patient care**
- **Keep accurate documentation of medication plans and patient progress**



## *Role of clinical Pharmacist in cardiology*



**Does it differ?**



## *Why Specifically Cardiology*

- Cardiovascular medications are the class with the most severe untoward events.
- The predominance of errors in cardiovascular medications due to the number and complexity of options in this therapeutic class continue to rise.



## *Setting for Cardiology Clinical Pharmacist*

- Coronary care units (CCU)
- Medical wards
- Emergency departments (ED)
- Medical intensive care units (ICU)
- Surgical intensive care units (SICU)
- cardiovascular intensive care units (CVICU)
- **Specialty outpatient clinics :**
  - ▶ Dyslipidemia
  - ▶ Hypertension
  - ▶ Cardiac transplant
  - ▶ Heart failure
  - ▶ Anticoagulation
  - ▶ Arrhythmias.



## *Role of Clinical Pharmacist in cardiology with evidence*

- **Prevention and Reduction of Episodes of Drug-Related Problems**
- **Management of Cardiovascular Risk Factors:**
  - ✓ Diabetes
  - ✓ Hypertension
  - ✓ Dyslipidemia
- **Management of Patients with Heart Failure**
- **Anticoagulants Clinic**

## *Prevention and Reduction of Episodes of Drug-Related Problems*

### **Helping physicians by providing them with detailed information on :**

- ✓ Pharmacokinetic and pharmacodynamic characteristics of medications
- ✓ Dosing
- ✓ Interactions
- ✓ Indications
- ✓ Alternatives

Based on the patient's situation

### **Outcome:**

Reducing the number of preventable adverse events and Medication errors leading to reduced morbidity, mortality, hospital stay, and cost

## *Management of Cardiovascular Risk Factors*

### **Diabetes:**

- ✓ Elaboration and implementation of the protocols for glycemic control
- ✓ Calculation of required insulin dose
- ✓ Monitoring of patients' blood glucose level
- ✓ Reconciliation of discharge medication.

### **Outcome :**

- ✓ Reduced length of hospital stay
- ✓ Decrease rate of hyperglycemia
- ✓ Reduction of No. of hypoglycemic events



## *Management of Cardiovascular Risk Factors*

### **Hypertension:**

- ✓ Enhance the rate of blood pressure control
- ✓ Lessen drug interactions
- ✓ Reduce costs for both patients and health care systems.



## *Management of Cardiovascular Risk Factors*

### **Dyslipidemia:**

#### ❖ Play a significant role in:

- ✓ Making effective drug-therapy selection
- ✓ Educating patients regarding dyslipidemia and prescribed medications

### **Outcome:**

- ✓ Enhance control
- ✓ Improve adherence in the long term



## *Management of Patients with Heart Failure*

### **□ Role:**

- ✓ Optimizing the pharmacological therapy
- ✓ Encouraging patients' adherence

### **□ Outcome:**

- ✓ Improving disease management
- ✓ Reducing rate of hospitalization



## *Anticoagulant Clinics*

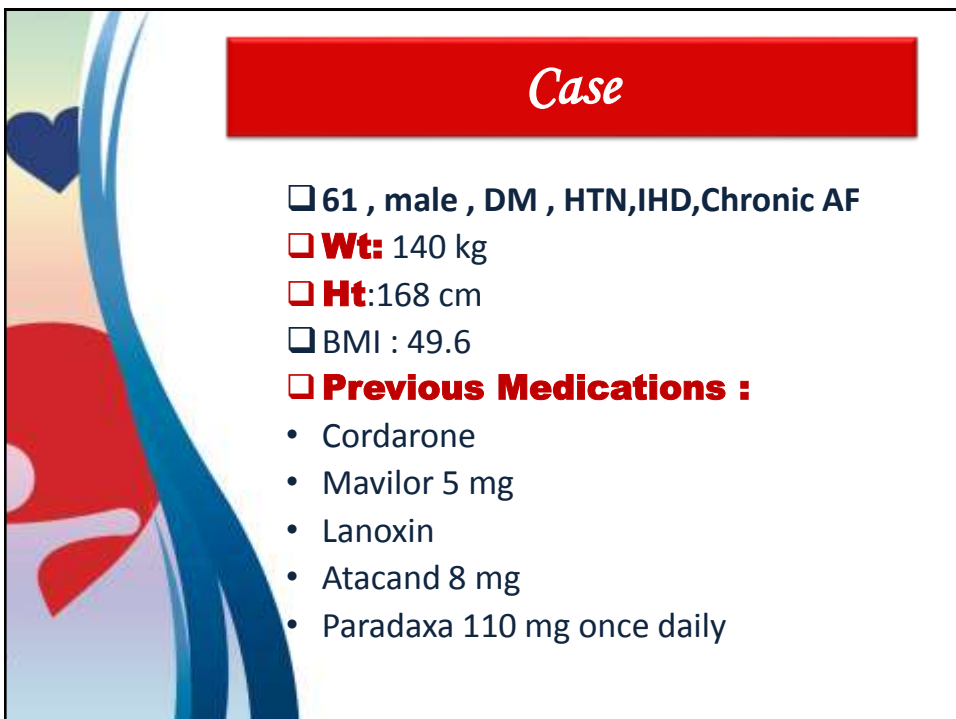
### **□ Role:**

- ✓ Boost the control of patients with respect to therapeutic goals
- ✓ Management of anticoagulants adverse effects
- ✓ Management of anticoagulant therapy in patients before any kind of surgery
- ✓ Change in the anticoagulant management where necessary

### **□ Outcome:**

- ✓ Reduce the rate of adverse effects of anticoagulants
- ✓ Reduce occurrence of thromboembolic events
- ✓ Reduction of health care expenditure



A decorative graphic on the left side of the slide features a blue heart, a red heart, and a blue wavy line. A red banner with the text "Case" is positioned at the top center. Below the banner, patient details and previous medications are listed.

## Case

- ❑ 61 , male , DM , HTN,IHD,Chronic AF
- ❑ **Wt:** 140 kg
- ❑ **Ht:**168 cm
- ❑ BMI : 49.6
- ❑ **Previous Medications :**
  - Cordarone
  - Mavilor 5 mg
  - Lanoxin
  - Atacand 8 mg
  - Paradaxa 110 mg once daily

## Case

### □ **CC:**

Dizziness, dyspnea

### • **Diagnosis:**

Complete Heart Block

### • **Vital signs :**

B.P:181/98

## Lab. tests

	Baseline	Day 1	Day 2	Day 3
Scr	1.6	1.8	1.77	1.4
Crcl	64.5	57.3	58.3	73.9
WBcs		26.3	14.2	12.4
Hgb		9.4	8.7	9.4
Plt		126	103	112
INR			1.42	1.6
AST				44
ALT				213
K+				4.4

## *Medications*

Medication	Dose & Frequency
Unictam 1.5 Gram vial	1 vial every 6 hr
Paradaxa 110 mg tab.	1 tab. every 24 hr
Zantac 50 mg amp.	1 amp. Every 8 hr
Insulin	Every 6 hr
Aspocid 75 mg tab.	2 Tab. every 24 hr
Ator 40 mg tab.	1 tab. every 24 hr
Dalacin 600 mg	Every 12 hr
Clexane 40 mg	Every 24 hr
Capoten 25 mg tab.	½ tab. every 8 hr
Bivacyn spray	Every 8 hr
Fucidine Cream	Every 8 hr
Acetyl cysteine 200 mg sachet	1 sachet every 8 hr

## *Patient Problem List*

- AF
- IHD
- Hypertension
- DM
- Diabetic Foot
- Assessment for Stress Ulcer Prophylaxis
- Assessment for DVT Prophylaxis



## *DTPs & Clinical Pharmacist Interventions*

### **□ A F**

- CHA2DS2-VASc Score :2
- Parodaxa Dose : 150 mg twice daily
- BMI > 40 ....Morbid obesity  
.....Warfarin?



## *DTPs & Clinical Pharmacist Interventions*

### **□ I H D**

- Aspirin 150 mg
  - Ator 40 mg
- ALT > 3 ULN , but only one reading

## *DTPs & Clinical Pharmacist Interventions*

### **□ HTN**

- Bp 181/98
- Patient was on Atacand 8 mg & Mavilor
- Hypertensive Urgency
- Increase Capoten to 25 mg every 8 hr
- Add Amlodipine 5 mg

## *DTPs & Clinical Pharmacist Interventions*

### **□ DM**

#### *Critical Care Setting*

In the critical care setting, continuous intravenous insulin infusion has been

shown to be the best method for achieving glycemic targets. Intravenous insulin infu-

mouth (NPO). An insulin regimen with basal, prandial, and correction components is the preferred treatment for noncritically ill hospitalized patients with good nutritional intake.

If the patient is eating, insulin injections should align with meals. In such

**ADA 2019**

## DTPs & Clinical Pharmacist Interventions

### Diabetic Foot

Clinical Manifestation of Infection	PEDIS Grade	IDSA Infection Severity
No symptoms or signs of infection	1	Uninfected
Infection present, as defined by the presence of at least 2 of the following items: <ul style="list-style-type: none"> <li>• Local swelling or induration</li> <li>• Erythema</li> <li>• Local tenderness or pain</li> <li>• Local warmth</li> <li>• Purulent discharge (thick, opaque to white or sanguineous secretions)</li> </ul>	2	Mild
Local infection (involving only the skin and the subcutaneous tissue [without involvement of deeper tissues and without systemic signs as described below]). If erythema, must be >0.5 cm to ≤2 cm around the ulcer. Exclude other causes of an inflammatory response of the skin (eg, trauma, gout, acute Charcot neuro-osteopathy, fracture, thrombosis, venous stasis)	3	Moderate
Local infection (as described above) with erythema > 2 cm, or involving structures deeper than skin and subcutaneous tissues (eg, abscess, osteomyelitis, septic arthritis, fasciitis), <b>and</b> No systemic inflammatory response signs (as described below)	4	Severe*
Local infection (as described above) with the signs of SIRS, as manifested by ≥3 of the following: <ul style="list-style-type: none"> <li>• Temperature &gt;38°C or &lt;36°C</li> <li>• Heart rate &gt;90 beats/min</li> <li>• Respiratory rate &gt;20 breaths/min or PaCO<sub>2</sub> &lt;32 mm Hg</li> <li>• White blood cell count &gt;12,000 or &lt;4,000 cells/mL or ≥10% immature (band) forms</li> </ul>		

### IDSA Diabetic Foot Infection 2012

## DTPs & Clinical Pharmacist Interventions

### Diabetic Foot

24. We suggest continuing antibiotic therapy until, but not beyond, resolution of findings of infection, but not through complete healing of the wound (weak, low). We suggest an initial antibiotic course for a soft tissue infection of about 1-2 weeks for mild infections and 2-3 weeks for moderate to severe infections (weak, low).

43. We do not advocate using topical antimicrobials for treating most clinically uninfected wounds.

**Patient has diabetic foot since 7 months , used many antibiotics , on Bivacyn and topical antibiotics**

## DTPs & Clinical Pharmacist Interventions

### □ Assessment for stress Ulcer prophylaxis

#### Strongly Recommended: Very High Risk

➤ Patients having one or more of the following risk factors :

- 1- Likely to require mechanical ventilation for > 48 hours
- 2- Non-intentional coagulopathy, i.e. not on warfarin, heparin, or other anticoagulants resulting in an INR > 1.5, platelets < 50,000 or therapeutic aPTT
- 3- Acute Coronary Syndrome Patients on Dual Antiplatelet Therapy (DAPT).

#### Moderately Recommended: High Risk

➤ Patients having 2 or more of the following risk factors :

- 1- Sepsis
- 2- Renal Failure
- 3- Hepatic failure
- 4- Hypotension
- 5- Anticoagulation
- 6- History of GI bleeding or ulceration ≤ 1 year of admission
- 7- Glasgow Coma Score (GCS) < 10
- 8- Hepatic or renal transplant
- 9- High dose corticosteroids

## DTPs & Clinical Pharmacist Interventions

### □ Assessment for DVT Prophylaxis

#### Padua Score

TABLE 1. Risk assessment model (high risk of VTE) (24)

Baseline features	Score
Active cancer*	3
Previous VTE (with the exclusion of superficial vein thrombosis)	3
Reduced mobility†	3
Already known thrombophilic condition‡	3
Recent (≤1 month) trauma and/or surgery	2
Elderly age (≥70 years)	1
Heart and/or respiratory failure	1
Acute myocardial infarction or ischemic stroke	1
Acute infection and/or rheumatologic disorder	1
Obesity (BMI ≥30)	1
Ongoing hormonal treatment	1

Or NICE tool 2018

But already on Paradaxa ? Subtherapeutic?



## *DTPs & Clinical Pharmacist Interventions*

### **Drug interaction**

- Enoxaparin+ Dabigatran ----Category X
- Dabigatran + Aspirin ...Category D ...Limit dose to 100 mg or lower....81 mg , 75 mg



## *DTPs & Clinical Pharmacist Interventions*

### **Other DTPs**

- Acetyl Cysteine....Medication without indication
- Follow Up ALT, Order Echo, Investigate for Anaemia





## *Take Home Message*

- Role of clinical pharmacist in DTP reduction and management, CVD risk factors, HF and anticoagulation
- Role of Clinical Pharmacist in Cardiology is crucial
- Physician, Pharmacist, Nurse and other health care providers are one team aiming at optimal patient care




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