

## Cardiovascular drugs in practice part I

1	2	3
<p>الدكتور احمد اياد حازم اسم المريض هدى جبار العمر: ٥٩ سنة</p> <p><b>Hypertension</b></p> <p>Rx Chlortalidone (Hygroton®) 50mg tab. 1 tab daily.</p> <p>٢٠١٥/ / التاريخ</p> <p>Q1-To which <b>type</b> of diuretics, Hygroton belong? Is it has a shorter or longer duration than other thiazide? [                    ]</p> <p>Q2-What is the <b>optimum time</b> of the day (morning, night...) for administration? [                    ] See supplement B also</p> <p>Q3-What are the side effects of thiazides and loop diuretics on serum (<b>potassium, glucose, uric acid, and lipids</b>)? [                    ]. Can we use Thiazides and related diuretics in patients with severe renal impairment? [                    ].</p> <p>Q4- 6 months later the patient develops <b>Type II diabetes mellitus</b> and the physician decide to replace Hygroton by <b>Indapamide</b> (NatriliX®) 2.5 mg tab. Once daily).what is the idea behind this choice? [                    ]</p>	<p>الدكتورة يسرى حسن اسم المريض: هند باسم العمر: ٤٠ سنة</p> <p><b>Oliguria</b></p> <p>Rx Furosemide ( lasix®) injection 250mg to be given slowly with i.v fluid</p> <p>٢٠١٥/ / التاريخ</p> <p>Q5 -To which type of diuretics, <b>furosemide</b> belong?</p> <p>Q6-With which of the following <b>IV fluid</b> you can mix furosemide injection (sodium chloride sol., ringer's sol., glucose sol.) Hint: see appendix of <b>Intravenous additives</b> under furosemide.[                    ]</p> <p>Q7-Does the <b>hypokalemia</b> greater with thiazide or with loop diuretics and why?[                    ]</p> <p>Q8-If the nurse administered it <b>rapidly</b>? What <b>side effects</b> can occur due to this <b>rapid administration</b>? [                    ]</p>	<p>الدكتورة ميادة صباح اسم المريض: نايري جنان العمر: ٥٥ سنة</p> <p><b>Ascites due to liver cirrhosis</b></p> <p>Rx spironolactone (Aldactone®) 100mg tablet 1 tablet daily after food Lactulose solution 30ml 3 times daily</p> <p>٢٠١٥/ / التاريخ</p> <p>Q9-To which class of diuretics, <b>spironolactone</b> belong, is it indicated for the above condition?[                    ] Why it is given after food? (see supplement C)</p> <p>Q10-What are the <b>side effects</b> of spironolactone on breast in men. [                    ]</p> <p>Q11-The Dr. want to prescribed 10mg spironolactone once daily for the patient's newborn baby who has congenital heart disease. How you can give him an accurate dose if the available dosage form of spironolactone in Iraq are only tablets of (25 mg,50mg,and 100mg) (see supplement D)</p>

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الدكتورة عبير عبدالرحمن

اسم المريض: عبير عصام العمر:

: سنة ٥٠

**Angina**

Rx

Atenolol (Tenormin®) 50 mg  
tab

1 x1

التاريخ / / ٢٠١٥

Q12-What is **atenolol** (selectivity and Solubility). **What advisory label** should be given to patient taking atenolol (and *B*-blockers in general)?

[ ]

Q13- After the use of Tenormin, the patient begin to have a new complaint of **bradycardia, cold extremities and difficulties in walking (intermittent claudication)**. Rationalize? Would switching to pindolol or oxprenolol (Trasicor®) may alleviate these troublesome side effects? Why?

[ ]

Q14-However, the Dr. decides to stop Tenormin and use calcium channel blockers. **How would the Tenormin be stopped?** Why? (see Beta-adrenoceptor blocking drugs In BNF (under Angina )

[ ]

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الدكتور علي جبار

اسم المريض: عامر جاسم العمر: ٣٠ سنة

**thyrotoxicosis**

Rx

Propranolol (Inderal®)

40mg tab.

1 tab T.i.d

التاريخ / / ٢٠١٥

Q15-What is **Propranolol** (selectivity and Solubility)

[ ]

Q16-Knowing that the patient is intended for **thyroidectomy**. What is the idea behind the use of Inderal? In this condition

[ ]

Q17- 2 days later, the patient has new complaint of **awakening many times during the night, nightmares, and fatigue**. Rationalize? Would switching to Nadolol (Corgard®) may alleviate these troublesome side effects? Why? [ ]

Q18-Could we used BBs safely if the patient has history of **asthma and bronchospasm**? [ ]

Q19-What are the **other uses** of beta blockers?

[ ]

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الدكتورة طييه حمزة

اسم المريض: علي طالب العمر: ٦٦ سنة

**Stable heart failure**

Rx

Lisinopril 5mg tab

1x1

Carvedilol 3.125 mg tab

1 tab B.i.d after food.

Spironolactone 25 mg tab

1x1

التاريخ / / ٢٠١٥

Q20-Is it recommended to use **B-blockers for heart failure**?

What B-Blockers are currently recommended for this indication?

[ see supplement E ]

Q21-What is the **initial** and **maximum** dose of Carvedilol in CHF and how we can reach it (see the dosing regimen only)?

الجرعة ليست للحفظ

[ ]

Q22- Why it is given with food (supplement F ).

Q23-What are the benefits of using **low doses** of spironolactone in patient with **moderate to severe heart failure** ? (see section 2.5.5 heart failure)

[ ]

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الدكتور محمد عبد الرضا  
اسم المريض: عزيزة ياسر  
العمر: ٣٥ سنة

### CHF and pulmonary edema

Rx  
Captopril (capoten®) tab.

التاريخ / / ٢٠١٥

Q24-Does ACE inhibitors valuable in CHF, What is usual **starting** dose, and **maximum** dose of captopril in CHF. [ ]

الجرعة ليست للحفظ

Q25-At what **time of the day** (morning, or bedtime) the first dose of ACE inhibitors is usually given? Why?

[ ]

Q26-Can we use ACE inhibitors safely in **pregnancy**? [ ]

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الدكتور مصطفى محمد رزوقي  
اسم المريض: مروة سلمان العمر: ٥٣ سنة

Rx

### Hypertension and type I diabetes

Lisinopril(Zestril®) 5mg tab.  
One tablet daily

التاريخ / / ٢٠١٥

Q27-Why does ACE inhibitors and angiotensin-II receptor blockers (ARBs) considered the drug of choice for **hypertension in diabetic patient** (see supplement G)

Q28- What is **the target BP** for patient with hypertension and DM? (see supplement H)

[ ]

Q29- 2 months later the patient develops **persistent dry cough** that persist throughout the day and also made it difficult for him fall asleep at night? Do you suggest to use one of the (ARBs) as an alternative? (give an examples)

[ ]

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الدكتورة لمى مجيد  
اسم المريض: علي علاء الدين  
العمر: ٣٧ سنة

Rx

### Glaucoma and

Timlol 0.5% eye drop  
Apply one drop twice daily  
Acetazolamide 250mg tab.

التاريخ / / ٢٠١٥

Q30-What is the main indication of **timolol** eye drop and acetazolamide (carbonic anhydrase inhibitors diuretic) in such patient.

Q31-Knowing that the patient is an **asthmatic patient** on Salbutamol 100 mcg inhaler taken as required since 2 years. But recently he noticed a significant increase in his need to use the inhaler. ?what is the most likely cause? (see section 11.6 treatment of glaucoma: beta blockers: caution: important)

[ ]

Q32-Can we use **acetazolamide** safely if the patient is **allergic to sulfonamide**?

[ ]

### Q 33-Educate the patient about the following prescription

<p>اسم المريض: سيف حسن العمر: ٥٣ سنة</p> <p>Hypertension , and iron deficiency anemia.</p> <p>Rx</p> <p>Hygroton 50 mg tab 1x1</p> <p>Capoten 25 mg tab. 1/2 tab. X 2</p> <p>Tenormin 100 mg tab. 1 x 1</p> <p>Aspirin 100 mg enteric coated tab. 1 x 1</p> <p>Ferrosam tab. 1 x 3 for 2 months</p> <p>Note : the patient will take these drugs for the first time .</p>	<p>اسم المريض: حسن هادي العمر: ٥٣ سنة</p> <p>CHF and hypertension</p> <p>Rx</p> <p>Metoprolol 25 mg m/r tab. 1 x 1</p> <p>Aspirin 100 mg enteric coated tab. 1 x 1</p> <p>Furosemide 40 mg tab. 1 x 2</p> <p>Enalapril maleate 5mg tablet. 2.5 mg daily.</p>
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Note the patient education must include: drug **name**, **strength** , **purpose** (indication ) , **dose** , **duration** of therapy , **common side effects** , **drug -food interactions** , -----etc

ملاحظة مهمة :

١ - هذه النقاط وغيرها يجب ان تتضمنها عملية patient education ويجب ذكرها عند كل سؤال عن ال patient education طيلة هذا الفصل .

## Supplement Diuretics

A-

Diuretic type	examples
Thiazide and related diuretics	Hydrochlorothiazide, Chlortalidone, Xipamide, Indapamide...
Loop Diuretics	Furosemide, Bumetanide, Torasemide
K-sparing diuretics	Amiloride, Triamterene
Aldosterone antagonist	Spironolactone
Carbonic anhydrase inhibitors	Acetazolamide(mainly for glaucoma)
Osmotic diuretics	Mannitol (used in cerebral edema)

B-Diuretics ideally should be dosed in the **morning** if given once daily and in the **morning and afternoon** if dosed twice daily to minimize the risk of nocturnal diuresis <sup>(1)</sup>.

(However, with chronic use thiazides, potassium-sparing diuretics, and aldosterone antagonists rarely cause a pronounced diuresis.) <sup>(1)</sup>

C-It is usually given **with food** to increase bioavailability and decrease the GIT disturbances <sup>(3)</sup>.

D-( قراءة فهم بدون حفظ )

A simple syrup suspension can be made by crushing 8 of 25 mg spironolactone tablet and suspending the powder in 50 ml of simple syrup (final conc. Is 4 mg/ml) suspension is stable for about 1 month refrigerated. <sup>(4)</sup> . This process is called: **Extemporaneous preparation**: (preparation of liquid dosage form from solid dosage form).

## Beta blockers

\*The most commonly available BBs in Iraq now are :Atenolol (Tenormin®), Oxprenolol(Trasicor®), Nadolol (Corgard®), Pindolol(Visken®),Metoprolol, Propranolol(Inderal®), Carvedilol ,and Bisoprolol(Concor®),

Criteria	Beta blockers
Water solubility	Atenolol , Nadolol ,bisoprolol
Lipid soluble	Oxprenolol, Metoprolol, Propranolol, Carvedilol
Intrinsic sympathomimetic activity(ISA)	Oxprenolol, Pindolol
B1-Selectivity	Atenolol , Metoprolol, Bisoprolol
nonselective	Oxprenolol, Nadolol, Pindolol , Propranolol
Mixed alpha and beta blocker	Carvedilol

E- The current guidelines recommend use of  $\beta$ -blockers in all stable patients with HF and a reduced left ventricular ejection fraction (LVEF) in the absence of contraindications <sup>(1)</sup>.

**Carvedilol, Bisoprolol, Nebivolol , and metoprolol controlled released/extended release (CR/XL)** are currently recommended for use as an adjunctive therapy for patients with heart failure<sup>(1)</sup> [neбиволol is licensed for stable mild to moderate heart failure in the elderly patients over 70 years]<sup>(5)</sup>.

F-In **heart failure**, it should be taken with food to reduce the risk of hypotension <sup>(6)</sup>

## ACE inhibitors

G-All patients with diabetes and hypertension should be treated with either an **ACE inhibitor or an ARB**. Both classes provide nephroprotection (against diabetic nephropathy) and reduced CV risk <sup>(1)</sup>.

H- Goal blood pressure values are **less than 140/90 for uncomplicated hypertension and less than 130/80** for patients with **diabetes mellitus, chronic kidney disease, coronary artery disease** (myocardial infarction [MI] or angina), or **stroke** <sup>(1)</sup>.

## Further reading

### A-Monitoring the hypokalemic effect of loop and thiazide diuretics:

The maximum hypokalemic effect is seen within the **first month**, therefore we should monitor serum potassium at; **Baseline** (i.e. Before starting diuretic), **after 2 weeks**, and at the **end of 1 month**.

After that repeat measurement only if a disease state or dosage change occurs.

K-supplement or K-sparing diuretics should be initiated if serum K below 3.5 mEq/L <sup>(2)</sup>

**B-\*\*\***Diuretic-induced **hyperuricemia** can precipitate gout. This side effect may be especially problematic in patients **with a previous history of gout**. However, attacks **are unlikely in patients with no previous history of gout**. If gout does occur in a patient who requires diuretic therapy, allopurinol can be given to prevent gout and will not compromise the antihypertensive effects of the diuretic <sup>(1)</sup>.

**\*\*\*\*\***High doses of thiazides and loop diuretics may increase fasting glucose and serum cholesterol values. These effects, however, usually are **transient and often inconsequential**.<sup>(1)</sup>

### C-Rate of administration of I.V furoesimide

When administering IV dose, toxicity is **rates related, and therefore, max. rate** is:

20mg /min if the dose is less than 100mg or:

4mg / min if the dose is greater than 100mg (mix with 50-100ml IV fluid)<sup>(3)</sup>

### References:

1-Pharmacotherapy. A pathophysiological approach. 2011

2-Applied therapeutics. The clinical use of drugs.

3-Drug therapy decision making guide.

4-Neofax 1994.

5-BNF 54.

6- Martindale 36.

7-AHFS 2008