مقدمة الكتاب

زملائي الأخوة...

فكرة هذا الكتاب الهمي بيا مكان مميز جداً كله اللهم كابن جعفي سيما في يوم من الأيام كي يستمر

هذا الكتاب يعتمد بعضاً من الدواء المغناطيس الذي يكتسبه الطبيب من وقوفه بحيثية لتعلم الأدوية التجارية والدراس على أسعار الدواء ببطريقة مناسبة بالرغم من الرسوم المثيرة للمرض المقبول بالطبع.

وقد استخدام هذا الكتاب في معاينة وتكول مفتوحة من حيث علوم الله عز وجل في مساعدة المرضى كي فيك الدواء المغناطيس مع استخدام كل ما يكون الدواء الأشهر استناداً على معلومات

بدون ضغوط أو تعقيدات

واستخدمت فيه اسلوب مجرد مبسط مع تزويده ببعض طرق العلاج المثلى عليها غالباً لأعتش الأعراض

وهو يعتبر بداية مبسطة لدخول عالم الدواء وتعامل معه بطريقة مبسطة بكل سريرية

انتهى أن ينال هذا العمل المبارك وان تستفيدوا منه الاستفادة الكاملة

وفي النهاية أتوجه بالشكر للله عز وجل الذي أعانني على اتمام هذا العمل واسأل الله ان يقبل منه خالصاً لوجهه الكريم.

كما لا أستثنى إباداً كل من ساهم في هذا العمل من قريب أو من بعيد أسل الله ان ينالهم جميعاً خير النعمة

محمد دعماً عبد المعال

أكتوبر 2013
ABOUT US

ماهو بنك الدواء المجاني؟
- هو مشروع تطوعي لا يهدف للربح المادي والنهج يهدف إلى توفير الدواء للمحتاجين في مصر والدائنين من مرضى مستشفى الباطنة.
- بعض الأقسام الأخرى في مستشفى قصر العيني.
- يقوم بنك الدواء المجاني في مصادر الأدوية على تبرعات الأدوية سواء من الأطباء أو غيرهم من يعرفون بشأن البنك.
- ويعتبر بنك الدواء المجاني في مصادر الأدوية على تبرعات الأدوية سواء من الأطباء أو غيرهم من يعرفون بشأن البنك.
- ويقوم بإدارة هذا المشروع بعض المتطوعين من أطباء الامطار كل عام وتعاونهم كلية طب قصر العيني ومتطوعين آخرين من داخل وخارج المجال الطبي.

قصة بنك الدواء المجاني:
- بدأ بنك الدواء المجاني في دجنبر 2004 ببناية من طبيبة ابتداء تدفع شرين.
- كانت البداية ببناية عامة أدوية قابلة في استقبال مستشفى الباطنة.
- مع أن هذه البداية تطورت الفكرة وتطور معاها عند أطباء الامطار البارزين وكليات الأدوية للكلية.
- أصبح الآن بنك الدواء المجاني يفضل كل مريض متخصص في خدمة المرضى خدمة مجانية بكتابة عالية.

المستفيدين من الخدمة:
- يخدم بنك الدواء المجاني يوميا مابين 70 إلى 100 مريض على النحو التالي:
  1. المرضى المحجورين لدى جميع الأدوية في مستشفى الباطنة.
  2. مرضى مستشفى آخر رعايا.
  3. مرضى الأطفال الذين اعتقوا الأدوية.
  4. المرضى غير المصابين بمرض العين.
  5. بعض المرضى العاديين يتغذوا عن المكوّنات الغذائية والذكية والنفسية والرعاية.
  6. يتم تجهيز بعض مركزات الصحية بالدواء للازمة.

مصادر الأدوية:
  1. الأطباء سواء على باقي العيني أو خارجها.
  2. طب كلية الطب والصيدلة.
  3. الإفراد العاملين بقصر العيني.
  4. المعالجات العاملات في شركات الأدوية ومدن وهمي.
  5. بعض الجمعيات الخيرية.
  6. الأفراد الذين يعرفون عن المشروع من خلال فريق الدعاية لدينا.
• انجازات بنك الدواء المجاني

1. تقديم الجملة بمستقبل دون انقطاع وعلى مدى 8 سنوات
2. خدمة قطاع كبير من المرضى بكفاءة كما تم ذكره سابقاً
3. تجهيز الفوائد الطبية الحيوية
4. تقديم مثال رائع للعمل التطوعي المتواصل
5. نشر الفكرة في أماكن عديدة داخل مصر وخارجها

• ازاي نشاركنا:

1. الدعاية لهذا المشروع والالتزام عليه
2. تبرعات الأدوية سواء المستعمرة أو بشراء الأدوية التي يحتاجها بنك الدواء المجاني
3. يوفرنا ممكن تشارك سواء في صرف الأدوية أو آليات الفرز للأدوية وغيرها من انشطة الصيدلية
4. بافكارك لتطوير المكان وتنميه
5. نشر النكرة وعمل الدعاية لها

• هتسنفيد ايه من مشاركتك:

1. تواجد عظيم بنادي الله لمساعدة المحتاجين وعُبى من النوايا التي يمكن تحميضها وتثجرب بها ان شاء الله
2. تستفيد من التدريب الذي يتم إعطاؤه للمتطوعين الجديد
3. معرفة الأساسي التحريكي وإسعار الدواء وجميع الدواء وكل المعلومات عنها
4. تعرف على كيفية قراءة الروشتات والتعامل معها
5. علاقات قوية وثيقة لمهارات العلامة والذكاء ومهارات في التواصل مع المرضى والتمريض والعمل ومع زملائهم في العمل
6. عمل صدقات مع افراد كل ما يجمعهم هو خبر وعمل لوجه الله تعالى

• ازاي نتواصل معنا:

1. عن طريق التليفون 01129222159
2. عن طريق صفحتنا على الفيس بوك

Free Drug Bank

تقبل الله منا ومنكم صالح الأعمال...
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</table>
1. Hints on Vascular Drugs

Management of essential hypertension

1. Naturally, treating hypertension with ocular health requires attention, and it's essential to confirm if the patient's hypertension is high in two or three measurements within three days.

2. It's crucial to check for reasons of hypertension, even if the increase is over 9% or more, which is not easily explainable. However, if the patient has a reason for the hypertension, it could be a controllable disease.

**Classification:**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Systolic Blood Pressure (mm Hg)</th>
<th>Diastolic Blood Pressure (mm Hg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>and</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120–139</td>
<td>or</td>
</tr>
<tr>
<td>Stage 1 hypertension</td>
<td>140–159</td>
<td>or</td>
</tr>
<tr>
<td>Stage 2 hypertension</td>
<td>≥160</td>
<td>or</td>
</tr>
</tbody>
</table>

*Classification determined based on the average of two or more properly measured seated blood pressure measurements from two or more clinical encounters. If systolic and diastolic blood pressure values yield different classifications, the highest category is used for the purpose of determining a classification.

*For patients with diabetes mellitus, significant chronic kidney disease, known coronary artery disease (myocardial infarction, stable angina, unstable angina), noncoronary atherosclerotic vascular disease (ischemic stroke, transient ischemic attack, peripheral arterial disease, abdominal aortic aneurism), or a Framingham risk score of 10% or greater, values ≥130/80 mm Hg are considered above goal; patients with left ventricular dysfunction have a blood pressure goal of less than 120/80 mm Hg.
• **Laboratory tests:**
  - Baseline blood tests are recommended by JNC 7 to identify those at risk for future events (Box 1).

**Box 1: Baseline Blood Tests Recommended by JNC 7**

<table>
<thead>
<tr>
<th>Routine tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrocardiogram</td>
</tr>
<tr>
<td>Urinalysis</td>
</tr>
<tr>
<td>Blood glucose, and hematocrit</td>
</tr>
<tr>
<td>Serum potassium, creatinine, or the corresponding estimated glomerular filtration rate, and calcium</td>
</tr>
<tr>
<td>Lipid profile, after 9- to 12-hour fast, that includes high-density and low-density lipoprotein cholesterol, and triglycerides</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Optional test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement of urinary albumin excretion or albumin/creatinine ratio</td>
</tr>
</tbody>
</table>

More extensive testing for identifiable causes is not generally indicated unless blood pressure control is not achieved.

- In addition, these tests can provide clues to the etiology in those with resistant or secondary hypertension (Table 1).

<table>
<thead>
<tr>
<th>Laboratory Test</th>
<th>Possible Clinical Implication</th>
<th>Change in Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal urinalysis</td>
<td>Renal disease</td>
<td>Lower blood pressure goal</td>
</tr>
<tr>
<td>Low serum potassium</td>
<td>Primary aldosteronism/Cushing's syndrome</td>
<td>Further evaluation for secondary hypertension</td>
</tr>
<tr>
<td>Serum creatinine concentration</td>
<td>Renal disease and renovascular disease</td>
<td>Further evaluation and more aggressive therapy</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>Polycythemia</td>
<td>Further evaluation</td>
</tr>
<tr>
<td>Electrocardiogram</td>
<td>Left ventricular hypertrophy</td>
<td>More aggressive therapy</td>
</tr>
<tr>
<td>Fasting lipid profile</td>
<td>Elevated risk for cardiovascular events</td>
<td>Aggressive lifestyle modifications</td>
</tr>
</tbody>
</table>
- **Life style modification:**
  - Low sodium intake and weight reduction
  - Stop smoking and regular physical activity

<table>
<thead>
<tr>
<th>Modification</th>
<th>Recommendation</th>
<th>Approximate SBP Reduction Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight reduction</td>
<td>Maintain normal body weight (body mass index, 18.4-24.9 kg/m²)</td>
<td>5-20 mm Hg, 10-kg weight loss</td>
</tr>
<tr>
<td>Adopt DASH eating plan</td>
<td>Consume diet rich in fruits, vegetables, low-fat dairy products, with reduced content of saturated and total fats</td>
<td>8-14 mm Hg</td>
</tr>
<tr>
<td>Dietary sodium reduction</td>
<td>Reduce dietary sodium intake to no more than 100 mmol/day (2.4 g sodium or 6 g sodium chloride)</td>
<td>2-8 mm Hg</td>
</tr>
<tr>
<td>Physical activity</td>
<td>Engage in regular aerobic physical activity (e.g., brisk walking) at least 30 min/day, most days of the week</td>
<td>4-9 mm Hg</td>
</tr>
<tr>
<td>Moderation of alcohol consumption</td>
<td>Most men: limit consumption to no more than two drinks/day; Most women and those who weigh less than normal: no more than one drink/day</td>
<td>2-4 mm Hg</td>
</tr>
</tbody>
</table>

For overall cardiovascular risk reduction: stop smoking. The effects of implementing these modifications are dose- and time-dependent and could be more effective for some patients. 1 oz or 30 mL: 12 oz beer; 5 oz wine; 1.5 oz of 90-proof whiskey.

| DASH, Dietary Approaches to Stop Hypertension; SBP, systolic blood pressure.

- **Medical treatment:**
  - List of drugs:
    1. Anti-adrenergic: central (alpha methyl dopa), alpha blockers (prazocin) & beta blockers
    2. Direct vasodilators
    3. ACE-I, ARBs, Rennin antagonists
    4. Diuretics
    5. CCBs
**FIGURE 15-2.** Algorithm for treatment of hypertension. Drug therapy recommendations are graded with strength of recommendation and quality of evidence in brackets. Strength of recommendations: A, B, C = good, moderate, and poor evidence to support recommendation, respectively. Quality of evidence: 1 = Evidence from more than 1 properly randomized, controlled trial; 2 = Evidence from at least 1 well-designed clinical trial with randomization; from cohort or case-controlled analytic studies; or dramatic results from uncontrolled experiments or subgroup analyses. 3 = Evidence from opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert communities. (ACE, angiotensin-converting enzyme; ARB, angiotensin receptor blocker; CCB, calcium channel blocker; DBP, diastolic blood pressure; SBP, systolic blood pressure.) (Adapted from references 1 and 2.)

**FIGURE 15-3.** Compelling indications for individual drug classes. Compelling indications for specific drugs are evidence-based recommendations from outcome studies or existing clinical guidelines. The order of drug therapies serves as a general guidance that should be balanced with clinical judgment and patient response; however, standard pharmacotherapy should be considered first-line recommendations, preferably in the order depicted. Add-on pharmacotherapy recommendations are intended to be used to further reduce risk of cardiovascular events and to lower blood pressure to goal values. Blood pressure control should be managed concurrently with the compelling indications. Drug therapy recommendations are graded with strength of recommendation and quality of evidence in brackets. Strength of recommendations: A, B, C = good, moderate, and poor evidence to support recommendation, respectively. Quality of evidence: 1 = Evidence from more than 1 properly randomized, controlled trial; 2 = Evidence from at least 1 well-designed clinical trial with randomization; from cohort or case-controlled analytic studies or multiple time series or dramatic results from uncontrolled experiments or subgroup analyses. 3 = Evidence from opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert communities. (ACE, angiotensin-converting enzyme; ARB, angiotensin receptor blocker; CCB, calcium channel blocker) (Adapted from references 1, 2, 56, and 74.)
**Summary:**

- **Classification of hypertension is based on BP levels as well as comorbidities like heart disease, diabetes, and renal disease.**
- **Lifestyle intervention should be recommended for patients with prehypertension and all stages of hypertension.**
- **Compelling indications mandate therapy with specific medications.**

---

### Compelling Indications

<table>
<thead>
<tr>
<th>Compelling Indication</th>
<th>Diuretic</th>
<th>BB</th>
<th>ACEI</th>
<th>ARB</th>
<th>CCB</th>
<th>Aldo ANT</th>
<th>Clinical Trial Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>ACC/AHA heart failure guideline, MERT-HF, COPERNICUS, CIIBIS, SOLVD, AIRE, TRACE, VelHEFT, RALES</td>
</tr>
<tr>
<td>Postmyocardial infarction</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>ACC/AHA post-MI guideline, BHAT, SAVE, Capri/o, EPHESUS</td>
</tr>
<tr>
<td>High coronary disease risk</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td>ALLHAT, HOPE, ANBP2, LIFE, CONVINCE</td>
</tr>
<tr>
<td>Diabetes</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>NKF-ADA guideline, UKPDS, ALLHAT</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>NKF guideline, captopril trial, RENAA, IDNT, REIN, AASK</td>
</tr>
<tr>
<td>Recurrent stroke prevention</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>PROGRESS</td>
</tr>
</tbody>
</table>

---

Notes:

- Compelling indications for antihypertensive drugs are based on benefits from ongoing studies or existing clinical guidelines; the compelling indication is managed in parallel with the BP.
- Conditions for which clinical trials have demonstrated benefits for specific classes of antihypertensive drugs.
- ACEI, angiotensin-converting enzyme inhibitor; Aldo ANT, aldosterone antagonists; ARB, angiotensin receptor blockers; BB, beta blockers; CCB, calcium channel blockers.
Mechanism of action:
- Angiotensin-converting enzyme inhibitors reduce the activity of the renin-angiotensin-aldosterone system.
- This will lead to:
  1. Lower arteriolar resistance >> decrease if blood pressure
  2. Increase venous capacity, increase cardiac output, cardiac index, stroke work, and volume
  3. Lower renovascular resistance and lead to increased natriuresis (excretion of sodium in the urine).
  4. Aldosterone will decrease.
  5. Bradykinin will increase due to less inactivation that is done by ACE >> dry cough
• **Medical uses:**
  1. Treatment of HTN
  2. Post MI to decrease cardiac remodeling
  3. Treatment of HF
  4. Diabetic nephropathy

• **Members of the group and trade names:**
  - Captopril: capoten 25-50 mg
  - Ramipril: tritace 1.25-2.5-5 mg  tritace protect 10mg
  - Lisinopril: sinopril, zestril 5-10-20 mg  - Enalapril: ezapril 5-10-20 mg
- **Perindopril**: adwipril 4mg, coversyl 5-10 mg

- **Benzapril**: cibacin 5-10-20 mg
- **Moexipril**: primox 7.5-15 mg

- **Fosinopril**: monopril 10-20 mg

**Dosage:**
Dosage should be adjusted according to the clinical response

<table>
<thead>
<tr>
<th>Name</th>
<th>Equivalent daily dose</th>
<th>Start</th>
<th>Usual</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benazepril</td>
<td>10 mg</td>
<td>10 mg</td>
<td>20–40 mg</td>
<td>80 mg</td>
</tr>
<tr>
<td>Captopril</td>
<td>50 mg (25 mg bid)</td>
<td>12.5–25 mg bid-tid</td>
<td>25–50 mg bid-tid</td>
<td>450 mg/d</td>
</tr>
<tr>
<td>Enalapril</td>
<td>5 mg</td>
<td>5 mg</td>
<td>10–40 mg</td>
<td>40 mg</td>
</tr>
<tr>
<td>Fosinopril</td>
<td>10 mg</td>
<td>10 mg</td>
<td>20–40 mg</td>
<td>80 mg</td>
</tr>
<tr>
<td>Lisinopril</td>
<td>10 mg</td>
<td>10 mg</td>
<td>10–40 mg</td>
<td>80 mg</td>
</tr>
<tr>
<td>Moexipril</td>
<td>7.5 mg</td>
<td>7.5 mg</td>
<td>7.5–30 mg</td>
<td>30 mg</td>
</tr>
<tr>
<td>Perindopril</td>
<td>4 mg</td>
<td>4 mg</td>
<td>4–8 mg</td>
<td>16 mg</td>
</tr>
<tr>
<td>Quinapril</td>
<td>10 mg</td>
<td>10 mg</td>
<td>20–80 mg</td>
<td>80 mg</td>
</tr>
<tr>
<td>Ramipril</td>
<td>2.5 mg</td>
<td>2.5 mg</td>
<td>2.5–20 mg</td>
<td>20 mg</td>
</tr>
<tr>
<td>Trandolapril</td>
<td>2 mg</td>
<td>1 mg</td>
<td>2–4 mg</td>
<td>8 mg</td>
</tr>
</tbody>
</table>
• **Side effects:**
  1- Intolerance >> dry cough and angioedema >> related to bradykinin metabolism
  2- Headache, dizziness, fatigue, nausea
  3- Hypotension
  4- Hyperkalemia
  5- Decrease GFR and elevation of serum creatinine

• **Contraindications:**
  1- Intolerance
  2- Pregnancy
  3- SBP < 90mmHg
  4- Serum potassium more than 5.5 mEq/liter
  5- Serum creatinine > 3 mg/dl or increase creatinine more than 30% of the basal level
  6- Bilateral renal artery stenosis

• Some evidence based data (how can you choose ACE-I):

  - All ACE inhibitors have similar antihypertensive efficacy when equivalent doses are administered.
  - Captopril, the first ACE inhibitor, has a shorter duration of action and an increased incidence of adverse effects. Captopril is also the only ACE inhibitor which is capable of passing through the blood–brain barrier, although the significance of this characteristic has not been shown to have any positive clinical effects.
  - Ramipril demonstrated an ability to reduce the mortality rates of patients who suffered a myocardial infarction, and to slow the subsequent development of heart failure. This finding was made after it was discovered that regular use of ramipril reduced mortality rates even in test subjects who did not suffer from hypertension. Some believe that ramipril's additional benefits may be shared by some or all drugs in the ACE inhibitor class. However, ramipril currently remains the only ACE inhibitor for which such effects are actually evidence-based.
  - A meta-analysis confirmed that ACE inhibitors are pivotal and certainly the first-line choice in hypertension treatment. This meta-analysis was based on 20 trials and a cohort of 158 998 patients, of whom 91% were hypertensive. Angiotensin-converting enzyme (ACE) inhibitors were used as the active treatment in 7 trials (n=76 615) and angiotensin receptor blocker (ARB) in 13 trials (n=82 383). Results showed that ACE inhibitors were associated with a statistically significant 10% mortality reduction. In contrast, no significant mortality reduction was observed with ARB treatment.
  - Interestingly, analysis of mortality reduction by different ACE inhibitors showed that perindopril-based regimens were associated with a statistically significant 13% all-cause mortality reduction.
  - Taking into account the broad spectrum of the hypertensive population, one might expect that an effective treatment with ACE inhibitors, in particular with perindopril, would result in an important gain of lives saved.
- **Combination with ARBs?**
  - The combination therapy of angiotensin II receptor antagonists with ACE inhibitors may be superior to either agent alone.
  - This combination may increase levels of bradykinin while blocking the generation of angiotensin II and its activity at the AT\(_1\) receptor.
  - This 'dual blockade' may be more effective than using an ACE inhibitor alone, because angiotensin II can be generated via non-ACE-dependent pathways.
  - Preliminary studies suggest this combination of pharmacologic agents may be advantageous in the treatment of essential hypertension, chronic heart failure, and nephropathy.
  - However, the more recent ONTARGET study showed no benefit of combining the agents and more adverse events.
  - While statistically significant results have been obtained for its role in treating hypertension, clinical significance may be lacking.
  - Patients with heart failure may benefit from the combination in terms of reducing morbidity and ventricular remodeling.
  - The most compelling evidence for the treatment of nephropathy has been found: This combination therapy partially reversed the proteinuria and also exhibited a renoprotective effect in patients afflicted with diabetic nephropathy, and pediatric IgA nephropathy.

**Angiotensin Receptor Blockers (ARBs)**

- **Mechanism of action:**
  - prevent the action of angiotensin II at the AT\(_1\) receptor
  - They do not inhibit the breakdown of bradykinin or other kinins, and are thus only rarely associated with the persistent dry cough

- **Medical uses:**
  1. primarily used for the treatment of hypertension where the patient is intolerant of ACE inhibitor therapy.
  2. More recently, they have been used for the treatment of heart failure in patients intolerant of ACE inhibitor therapy, particularly candesartan.
  3. Irbesartan and losartan have trial data showing benefit in hypertensive patients with type II diabetes, and may delay the progression of diabetic nephropathy.
  4. Candesartan is used experimentally in preventive treatment of migraine. Lisinopril has been found less often effective than candesartan at preventing migraine.
**Members and trade names:**

1- Candesartan cilexetil: **Atacand, blopress 8-16 mg candesar 4-8 mg**

2- Irbesartan: **aprovel, X-Tension, kasnartan, irbedrin 50-75-150-300 mg**

3- Losartan potassium: **Amosar, losar, cozAAr, kanzar 25-50-100 mg**

4- Valsartan: **diovan, tareg, disarton 80-160-320 mg**
5- Olmesartan medoxomil: **angiosartan, erastapex 10-20-40 mg**

6- Telmisartan: **biocardis, micardis 40-80 mg**

- **Side effects:**
  As ACE-I except dry cough and angioedema as ARBs don’t affect bradykinin metabolism

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**Adrenergic receptor antagonists**

- **Centrally acting: (alpha-methyl dopa)**
  - Central inhibition of sympathetic system
  - **Aldomet 250mg**
  - Has many S.E. specially CAH and hemolytic anemia
  - Safe in pregnancy so used in PIH, pre eclampsia

- **Alpha blockers: (Prazocin)**
  - Block alpha receptors causing VD
  - **Minipress 1,2mg**
  - S.E. are sudden syncope and tachycardia
  - Used also in ttt of BPH
Vasodilators

- Act directly on the smooth muscle of arteries to relax their walls
- they are only used in hypertensive emergencies or when other drugs have failed, and even so are rarely given alone.
- They include:
  1. Sodium nitroprusside: A very potent, short-acting vasodilator, is most commonly used for the quick, temporary reduction of blood pressure in emergencies (such as malignant hypertension or aortic dissection).
  2. Hydralazine and its derivatives are also used in the treatment of severe hypertension, although they should be avoided in emergencies. They are no longer indicated as first-line therapy for high blood pressure due to side effects and safety concerns, but hydralazine remains a drug of choice in gestational hypertension.

Rennin Inhibitors

- Renin comes one level higher than Angiotensin Converting Enzyme (ACE) in the Renin-Angiotensin System.
- Inhibitors of renin can therefore effectively reduce hypertension.
- Aliskiren (developed by Novartis) is a renin inhibitor which has been approved by the US-FDA for treatment of hypertension.
Mechanism of action:
- Beta blockers block the action of endogenous catecholamines epinephrine (adrenaline) and norepinephrine (noradrenaline) in particular, on β-adrenergic receptors, part of the sympathetic nervous system.
- Three types of beta receptors are known, designated β₁, β₂ and β₃ receptors.
  - β₁-adrenergic receptors are located mainly in the heart and in the kidneys.
  - β₂-adrenergic receptors are located mainly in the lungs, gastrointestinal tract, liver, uterus, vascular smooth muscle, and skeletal muscle.
  - β₃-adrenergic receptors are located in fat cells.
  - Stimulation of β₁ receptors by epinephrine and norepinephrine induces:
    - A positive chronotropic and inotropic effect on the heart and increases cardiac conduction velocity and automaticity.
    - on the kidney causes renin release.
  - Stimulation of β₂ receptors induces:
    - smooth muscle relaxation, tremor in skeletal muscle and increases glycogenolysis in the liver and skeletal muscle.
  - Stimulation of β₃ receptors induces lipolysis.
- Beta blockers inhibit these normal epinephrine and norepinephrine-mediated sympathetic actions.
- they reduce excitement/physical exertion on heart rate and force of contraction, and also tremor and breakdown of glycogen, but increase dilation of blood vessels and constriction of bronchi.
- On blood pressure: decrease of blood pressure
- On heart: decrease of HR, contractility and automaticity >> decrease of cardiac work
• **Classes of β-blockers:**

  1. Non-selective:
     - Propranolol
     - sotalol
     - Carvedilol (has additional α-blocking activity)
  2. β₁-Selective: *(there’s no complete selectivity they may act on other beta receptors)*
     - bisoprolol
     - atenolol
     - nebivolol

• **Medical uses:**
  1. Treatment of hypertension
  2. Treatment of Angina pectoris
  3. Treatment of congestive HF
  4. Class II antiarhythmics
  5. Mitral valve prolapsed (MVP)
  6. Prophylactic in Migraine
  7. Essential tremors and to control tremors & tachycardia with anxiety and hyperthyroidism
  8. Prevention of variceal bleeding
  9. Acute aortic dissection
  10. Hypertrophic obstructive cardiomyopathy
  11. Marfan syndrome (treatment with propranolol slows progression of aortic dilation and its complications)

• **Side effects:**
  1. Chest: bronchospasm
  2. Heart: bradycardia, hypotension, heart block
  3. Others: fatigue, reversible impotence, masking signs of hypoglycemia in diabetes
**Preparations and trade names:**

1. **Propranolol:** *Inderal & indolol 10, 40 mg*
   - 10 mg: Used in the treatment of portal HTN
   - 40 mg: Used in the treatment of Oesophageal varices, splenomegaly & congestive gastropathy

2. **Bisoprolol:** *concor & bistol 2.5, 5, 10 mg*
   - Usually once daily

3. **Atenolol:** *tenormin, ateno, blokium 25, 50, 100 mg*
   - Used in pregnancy induced HTN

4. **Dilatrol, Carvopress:** *1.25, 6.25, 12.5, 25 mg*
   - Used in Congestive heart failure
   - Start with 1/8 of the target dose and increase the dose gradually every 1-2 weeks to reach the target dose which is 25-50 mg of carvedilol daily
Calcium Channel Blockers

- **Mechanism of action:**
  - Calcium channel blockers work by blocking voltage-gated calcium channels (VGCCs) in tissues in which depolarization depends on calcium influx rather than sodium influx e.g. cardiac muscle and blood vessels.
  - This decreases intracellular calcium leading to a reduction in muscle contraction.
  - On blood vessels: arteriolar VD (not venous) >> decrease of total peripheral resistance & after load
  - On heart: -ve inotropic, -ve chronotrop & decrease AV conduction >> decrease of cardiac output & slow the heart rate

- **Classes of CCBs:**
  1. **Dihydropyridine:**
     - are often used to reduce systemic vascular resistance and arterial pressure, but are not used to treat angina because the vasodilation and hypotension can lead to reflex tachycardia.
     - with the exception of amlodipine, nicardipine, and nifedipine, which carry an indication to treat chronic stable angina as well as vasospastic angina
     - Dihydropiridine calcium channel blockers can worsen proteinuria in patients with nephropathy
     - Members are: amlodipine, nifedipine, nicardipine, lacidipine, nimodipine, felodipine, …etc
  2. **Non-dihydropyridine:**
     a) **Phenylalkylamine:**
        - are relatively selective for myocardium, reduce myocardial oxygen demand and reverse coronary vasospasm, and are often used to treat angina.
        - They have minimal vasodilatory effects compared with dihydropyridines and therefore cause less reflex tachycardia, making it appealing for treatment of angina, where tachycardia can be the most significant contributor to the heart's need for oxygen.
        - Therefore, as vasodilation is minimal with the phenylalkylamines, the major mechanism of action is causing negative inotropy.
        - The representative of this group is Verapamil
b) Benzothiazepine:
- are an intermediate class between phenylalkylamine and dihydropyridines in their selectivity for vascular calcium channels.
- By having both cardiac depressant and vasodilator actions, benzothiazepines are able to reduce arterial pressure without producing the same degree of reflex cardiac stimulation caused by dihydropyridines.
- The representative of this group is Deltiazem

• Medical uses:
  - Treatment of hypertension
  - Treatment of angina pectoris and IHD
  - They are class 4 anti-arrhythmic drugs specially in ttt of atrial flutter and AF

• Side effects:
  - Headache & flushing
  - Hypotension & aggravation of HF
  - Reversible oedema of lower limbs
  - Bradycardia with verapamil & deltiazem
  - Tachycardia with nifedipine
  - Constipation
  - Gingival overgrowth

• Preparations and trade names:
  - Amlodipine: 5 or 10mg once daily
  - Norvasc, alkapress, regcor, vasopine, ...etc
- Nifedipine: 10, 20, 30 mg  
  *Epilat, Epilat retard, adalat, adalat LA, …etc*

- Verapamil: 40, 80, 120, 240 mg  
  *Isoptin, veratens, cardiomil SR, ….etc*

- Deltiazem: 60, 90, 120, 200, 240, 300 mg  
  *Altiazem, delay-tiazem SR, …etc*
HENSTREWES DHA BOMGAHA WAAM,A WAAM IN DA'AWA WAAM WAA NEEKABY 1 IYEBDA, WALLE NEEKABY 2 IYEBDA MIMAACA GUURAYN AABMUQIYIHSU, WALLE SIBDAYN NEEMA Qaadka Iska Misaal.

- **What we mean by diuretic:**
  A diuretic provides a means of forced diuresis which elevates the rate of urination

- **Categories of diuretic and their site of action:**
  1. High ceiling loop diuretics: Act on loop of Henle
  2. Low ceiling thiazide diuretics: Act on proximal part of DCT
  3. Potassium sparing diuretics: Act on distal part of DCT and collecting duct
  4. Carbonic anhydrase inhibitors: Act on PCT
  5. Osmotic diuretics: Act on many sites of nephron as illustrated on the diagram
  6. Natriuretic peptides:
     - Afferent arteriolar dilatation & efferent arteriolar constriction >> ++ GFR
     - Natriuresis
     - Peripheral arteriolar and venous dilatation

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![Diagram of renal physiology and diuretics](image-url)
I. High ceiling loop diuretics: [the most potent diuretics]

- **Mechanism of action:**
  - Loop diuretics act on the Na\(^+\)-K\(^+\)-2Cl\(^-\) cotransporter in the thick ascending limb of the loop of Henle to inhibit sodium and chloride reabsorption.
  - This is achieved by competing for the Cl\(^-\) binding site.
  - Because magnesium and calcium reabsorption in the thick ascending limb is dependent on sodium and chloride concentrations, loop diuretics also inhibit their reabsorption.
  - By disrupting the reabsorption of these ions, loop diuretics prevent the urine from becoming concentrated and disrupt the generation of a hypertonic renal medulla.
  - Without such a concentrated medulla, water has less of an osmotic driving force to leave the collecting duct system, ultimately resulting in increased urine production.
  - Loop diuretics cause an increase in the renal blood flow by this mechanism. This diuresis leaves less water to be reabsorbed into the blood, resulting in a decrease in blood volume.
  - The collective effects of decreased blood volume and vasodilation decrease blood pressure and edema.

- **Medical uses:**
  1. Heart failure
  2. Hypertension
  3. Liver cirrhosis
  4. Renal impairment & nephritic syndrome

- **Members of the group and trade names:**
  1. Frusemide:
     - Most famous trade name is *Lasix 40mg* (last six hrs. regarding duration of action)
     - Sometimes, patients are prescribed 40 mg of Lasix in the morning.
     - The usual dose is 100 mg per day, divided into two or three doses.
     - Potassium supplements are necessary, along with dietary potassium.

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**Frusemide:**

- **Lasix 40mg**
- **Octosemide-K** (frusemide 40mg + KCL 600mg)
2. Bumetanide:
   - Bumetanide is 40 times more potent than furosemide (for patients with normal renal function).
   - **Trade names** are burinex or edemex 1mg

3. Torsemide:
   - Compared to other loop diuretics, torasemide has a more prolonged diuretic effect than equipotent doses of furosemide and relatively decreased potassium-loss.
   - Not proven to be ototoxic
   - **Trade names** are examide or torseretic 5,10,20mg

**Side effects:**
1. Hypokalemia >> ppt digitalis toxicity
2. Hypochloremic alkalosis >> may lead to tetany
3. Hyponatremia
4. Hypomagnesemia
5. Hyperuricemia >> avoid in gout
6. Hyperglycemia
7. Hyperlipidemia
8. Ototoxic

**II. Low ceiling thiazide diuretics:**

**Mechanism of action:**
- Inhibition of reabsorption of sodium (Na\(^+\)) and chloride (Cl\(^-\)) ions from the distal convoluted tubules in the kidneys by blocking the thiazide-sensitive Na\(^+\)-Cl\(^-\) symporter.
- Thiazide diuretics also increase calcium reabsorption at the distal tubule. This action is augmented by parathyroid hormone
• **Medical uses:**
  1. Hypertension (they are one of the 1\textsuperscript{st} drugs of choice in ttt of HTN)
  2. Heart failure
  3. Liver cirrhosis
  4. Due to its ability to lower urinary calcium excretion and therefore increasing blood levels of calcium it can be used in: Renal calcium calculi, osteoporosis (also stimulate osteoblast differentiation and bone mineral formation by unknown mechanism)

• **Side effects:**
  1. Hypokalemia >> ppt digitalis toxicity
  2. Hypochloremic alkalosis >> may lead to tetany
  3. Hyponatremia
  4. Hypomagnesemia
  5. Hyperuricemia >> avoid in gout
  6. Hyperglycemia
  7. Hyperlipidemia
  8. Hypercalcemia

• **Members of the group and trade names:**
  1. Hydrochlorothiazide (HCT):
     - Trade names are **Hydretic or hydrex 25**
  
  2. Metolazone:
     - Trade name is **metenix 5mg**
     - Used in CRF in comination with loop diuretics

  3. Indapamide:
     - Trade names are **Natrilix SR 1.5mg, diurex 2.5mg**
     - reduce stroke and all cause mortality when given people over the age of 80 for the treatment of hypertension.
III. Potassium sparing diuretics:

- They are weak diuretics compared to other groups
- They are used with other groups to gain two benefits:
  1. Synergistic effect of diuresis
  2. Retention of potassium for prevention of hypokalemia caused by loop and HCT

**Mechanism of action:**
- These are diuretics which do not promote the secretion of potassium into the urine
- They are competitive antagonists that either compete with aldosterone for intracellular cytoplasmic receptor sites, or directly block sodium channels
- According to the mechanism they are classified into 2 classes:
  1. Aldosterone antagonists:
     - spironolactone, which is a competitive antagonist of aldosterone.
     - Aldosterone normally adds sodium channels in the principal cells of the collecting duct and late distal tubule of the nephron.
     - Spironolactone prevents aldosterone from entering the principal cells, preventing sodium reabsorption.
  2. Epithelial sodium channel blockers: amiloride and triamterene.

**Members of the group and trade names:**

1. Spironolactone: الافضلى
   - Trade name is **aldactone 25,100mg**
   - Used also in some cases to gain its antiandrogenic effect. It is frequently used to treat a variety of cosmetic conditions in which androgen hormones play a role, including hirsutism, androgenic alopecia, acne, and seborrhea in females.

2. amiloride and triamterene are combined with other diuretics

**Side effects:**

1. Hyperkalemia & metabolic acidosis
2. Gynecomastia with prolonged use
IV. **Carbonic anhydrase inhibitors:**
- Inhibit the enzyme carbonic anhydrase which is found in the proximal convoluted tubule.
- This results in several effects including bicarbonate retention in the urine, potassium retention in urine and decreased sodium absorption.
- Drugs in this class include acetazolamide (*cidamex*), it is used for glaucoma.

V. **Osmotic diuretics:**
Compounds such as mannitol are filtered in the glomerulus, but cannot be reabsorbed. Their presence leads to an increase in the osmolarity of the filtrate. To maintain osmotic balance, water is retained in the urine.

VI. **Natriuretic peptides:**
- Afferent arteriolar dilatation & efferent arteriolar constriction >> ++ GFR
- Natriuresis
- Peripheral arteriolar and venous dilatation

VII. **Preparations containing diuretics combination:**
1. Frusemide + spironolactone >> lasilactone 50,100mg
2. Spironolactone + HCTZ >> spirozide, aldactazide
3. Amiloride + HCTZ >> moduretic
4. Amiloride + HCTZ + atenolol >> atenoretic
5. Xipamide (like HCTZ) + triametrene >> epitens
Combination (multi-ingredient) antihypertensive agents

- دي مجموعة من ادوية الضغط واللي مش بيتم البدء بيه من اول خطوة في علاج الضغط وانما يتمثل زي ما بيقولوا combo tablets
  - في الخطوات اللي بعد كده في علاج الضغط لما تجي تستخدم كذا دوا 
    يعني مثلا لو فلودي عيان ACE-I + ARB + Diuretic
  - يعني مثلا بعض عيان بيماخذن 3 اقراص فممكن ندليه
  - يعني مثلاً عيان بيماخذن اقراص ACE-I combination + ARB

- هنستعرض مع بعض اهم واشهر الاسماء في هذه المجموعة

  • ACE-I combinations:

1. Captopril + HCTZ >> capozide
2. Captopril + indapamide >> normaten
3. Enalapril maleate + HCTZ >> ezapril-Co
4. Lisinopril + HCTZ >> sinopril Co or zestoretic
5. Ramipril + HCTZ >> tritace comp LS
6. Perindopril + indapamide >> Bipreterax, preterax
7. Fosinopril + HCTZ >> monozide

  • ARBs combinations:

1. Losartan K + HCTZ >> amosar forte, losar plus, modazar, kanzar-H, ...etc
2. Valsartan + HCTZ >> Co-Diovan, Co-Tareg
3. Olmesartan + HCTZ >> erastapex plus
4. Telmisartan + HCTZ >> Micardis Plus
5. Irbesartan + HCTZ >> CoAprovel, X-Tension Plus
6. Candesartan + HCT >> Atacand Plus
• **Beta blockers combinations:**

1. Bisoprolol + HCTZ >> **concor plus**
2. Atenolol + chlorothalidone >> **blokim Diu**
3. Carvedilol + HCTZ >> **Co-Dilatrol**

![Co-Dilatrol](image1)

• **CCB combinations:**

1. Amlodipine + benzapril Hcl >> **Amlo-ACE 5/10**
2. Verapamil + trandolapril >> **Tarka**
3. Amlodipine + valsartan >> **Exforge**
4. Felodipine + metoprolol >> **Logimax**
5. Nifidipine + Atenolol >> **tenolat SR**

• **Multi-ingredient combinations:**

1. Reserpine + clopamide + dihydroergocristine
Drug Dispensing Permission

Name: ............  Date: / /
Diagnosis: .................................. Unit: ..... 

Rx Capoten 25mg tab
كل 8 ساعات قبل الاكل بساعة يومياً

R/ Aspocid 75mg tab
قرصين بعد الغداء يومياً

R/ Ator 20mg tab
قرص بعد العشاء بساعتين يومياً
(يمكن بتناول في اي وقت لانه طويل المدى)

Signature
Drugs used in Hypotension

لازم قبل ما تستخدم اي دواء من الادوية دي ان العيان بيعاني من الضغط الواطي لان في ناس ببالي ضغطهم الطبيعي واطي خاصة في البنات 
وكمان اناكد ان العيان ضغطه واطي في كذا قياس مش من مرة واحدة اقول ده عيان ضغطه واطي No symptoms no treatment وزي ما الجملة الشهرة بتقول 
كمان مهم جدا انك تتاكد من سبب ان ضغط العيان واطي يعني لو في مرض معين نعالجه او لو بياخد دوا معين نوقفه والا لو اديت علاج يرفع الضغط من غير ما تعالج السبب هتكون يعالج symptomatic

- **Heptaminol:**
  - Mechanism:
    1. Strengthen the systolic contraction of the myocardium
    2. Peripheral vasoconstriction
    3. Increase coronary blood flow
  - Preparations: Corasore 150mg tab and drops

- **Etiefrine HCl:**
  - Mechanism:
    1. Sympathomimetic agent, has high affinity for alpha and beta-2 receptors
    2. Increase cardiac contractility >> ++ stroke volume
    3. ++ venous pressure
  - Preparations:
    1. Effortil 5mg tab and 7.5mg drops (1-2 tab tds & 10-20 drops tds)
    2. Vascon 5mg tab and vascon 10mg drops
• **Midodrine:**
  - **Mechanism:**
    1. Sympathomimetic agent with selective alpha agonist activity
    2. Peripheral vasoconstrictor only with no direct cardiac stimulatory effect and not cause postural hypotension
  - **Preparations:**
    Midodrine 25mg tab and 10mg drops (1 tab or 5-10 drops 2-3 times daily)

• **Fludrocortisone:**
  - Not used as 1st drug in hypotension and used only in severe cases
  - Used mainly in adrenal insufficiency as replacement therapy
  - Trade name is Astonin-H 0.1mg tab

### Hints on anticoagulant Drugs

• **Introduction:**
  - prevents coagulation (clotting) of blood.
  - prevents deep vein thrombosis, pulmonary embolism, myocardial infarction and stroke.
  - Some anticoagulants are used in medical equipment, such as test tubes, blood transfusion bags, and renal dialysis equipment.

• **Heparin:**
  - **Mechanism of action:**
    - Accelerate the inhibitory effect of Antithrombin III on thrombin and factor X
  - LMWH or **clexane** is widely used as it has less side effects and doesn’t need monitoring
  - Antidote is protamine sulphate
• **Warfarin:**
  - **Mechanism of action**
    - Warfarin inhibits the vitamin K-dependent synthesis of biologically active forms of the calcium-dependent clotting factors II, VII, IX and X, as well as the regulatory factors protein C, protein S, and protein Z

• **Medical uses:** as 2ry prevention for further thrombosis in thrombotic diseases
  1. AF & artificial valves
  2. MI
  3. DVT
  4. Pulmonary embolism

• **Preparations:**
  - **Marevan 1,3,5 mg**
    - Starting dose usually 5mg once daily
    - Maintenance dose is according to the target INR which is different according to the underlying condition
    - The usual target of INR is 2-3 in many cases

• **Side effects:**
  1. The most famous is hemorrhage
  2. Cross the placental barrier so it is contraindicated during pregnancy

• **Interactions:**
  1. Leafy vegetables which is rich in vitamin K antagonise marevan making the adjustment of the dose very difficult
  2. Metronidazole and macrolides potentiate its action
HINTS ON ANTIHEMORRHAGIC DRUGS

- **Etamsylate:**
  - Acts selectively on capillary wall and rapidly normalize its resistance and permeability so it has anthemorrhagic and capillary protective action
  - Prophylaxis and control of capillary bleeding of different etiology, including: menorrhagia and metrorrhagia without organic pathology, after trans-urethral resection of the prostate, hematemesis, melena, hematuria, epistaxis
  - **Trade name** is dicynone, hemostop 250 and 500 mg tabs and amp.

- **Phytominadion (Vit K):**
  - Essential for clotting factors II, VII, IX, X
  - Used in ttt and prevention of He due to Vit K deficiency specially with liver diseases
  - **Trade names** are cona-adion, konakion, phytomenadione

- **Tranexamic acid:**
  - Inhibits activation of plasminogen into plasmin in the fibrinolytic cycle
  - Used in many cases e.g. trauma, uterine bleeding, cardiac & ortho surgeries, dental extraction, GI bleeding, hemophilia …etc
  - **Trade names** are Kapron, cyclokapron, tranex & bledex
  - CI in patient with active intravascular clotting because of the risk of thrombosis

HINTS ON ANTIPLATELET DRUGS

- **Introduction:**
  - They’re group of drugs that interfere with platelet aggregation through various mechanisms so they can inhibit thrombus formation
  - They are effective in the arterial circulation, where anticoagulants have little effect.
  - They are widely used in primary and secondary prevention of thrombotic cerebrovascular or cardiovascular disease.
Classes:
1. Irreversible cyclooxygenase inhibitors: Aspirin
2. Adenosine diphosphate (ADP) receptor inhibitors: Clopidogrel (Plavix)
3. Phosphodiesterase inhibitors: Cilostazol (Pletal) >> usually used as anticlaudicant and in peripheral vascular diseases (VD + antiplatelet effect)
4. Adenosine reuptake inhibitors: Dipyridamole (Persantine) >> usually used in combination with aspirin (not alone) in 2ry prevention of stroke

I. Aspirin: (acetylsalicylic acid)
- Mechanism of action:
  1. Irreversible inhibition of cyclooxygenase enzyme required for PGs and TXs formation
  2. Low doses can inhibit TX-A2 interfering with platelet aggregation
  3. Inhibition of COX-1 (PGs for inflammation) & COX-2 (PGs for gastric mucosa) >> so it has antiinflammatory effect with GI upset

- Medical uses:
  1. treatment of Pain, Headache, fever
  2. treatment of inflammatory diseases e.g. Rheumatic fever
  3. Prevention of heart attacks and strokes
  4. Coronary and carotid arteries, bypasses and stents

- Preparations:
  # it has different trade names with different concentrations
  # low concentrations are used to gain the antiplatelet effect (75-81mg)
  # high concentrations are used to gain the analgesic, antiinflammatory, antipyretic effect (325mg)
  # To gain the antiplatelet effect the loading dose is 300mg (4 tabs) then the maintenance is 75-81mg daily
  1. Aspocid, aggrex 75mg
2. Juspirin 81 mg
3. Asprotect 100mg
4. Aspocard 150mg
5. Rivo ped 162
6. Aggrex 250mg, aspirin or aspocid 300mg, ecoprin 325mg

- **Side Effects:**
  1. GIT Disturbance and erosions
  2. Prolonged Bleeding Time
  3. Salicylate intolerance

- **Contraindications:**
  1. Hemophilia
  2. GIT disturbances and ulcers
  3. Kidney Diseases, hyperuricenia and gout
  4. G6PD
  5. In children up to 15 years old as a treatment of common cold and influenza as it is linked to Reye's Syndrome

---

**II. Clopidogrel:**

- **Mechanism of action:**
  - Adenosine diphosphate (ADP) receptor inhibitor
  - The blockade of this receptor inhibits platelet aggregation by blocking activation of the glycoprotein IIb/IIIa pathway.
  - The IIb/IIIa complex functions as a receptor mainly for fibrinogen and vitronectin but also for fibronectin and von Willebrand factor.
  - Activation of this receptor complex is the "final common pathway" for platelet aggregation and is important in the cross-linking of platelets by fibrin.

- **Medical uses:**
  1. Prevention of vascular ischemic events in patients with symptomatic atherosclerosis
  2. Acute coronary syndrome without ST-segment elevation (NSTEMI),
  3. ST elevation MI (STEMI)
  4. It is also used, along with aspirin, for the prevention of thrombosis after placement of intracoronary stent
  5. As an alternative antiplatelet drug for patients who are intolerant to aspirin.
- **Preparations:**
  
  # loading dose is 300mg then one tab of 75mg once daily
  1. **Plavix 75mg 28 tab** (205 L.E.)
  2. **Stroka 75mg 30 tab** (199 L.E.)
  3. **Thrombo 75mg 30 tab** (144 L.E.)
  4. **Clopex 75mg 30 tab** (60 L.E.)
  5. **Myogrel 75mg 10 tab** (48 L.E.)
  6. **Sigmagrel 75mg 20 tab** (20 L.E.)

- **Side effects:**
  
  1. Sever neutropenia
  2. TTP
  3. Hemorrhagic disorders specially if combined with other antiplatelets like aspirin
  4. GI disturbance
  5. Rash
  6. Respiratory (infrequent): Upper respiratory infections, rhinitis, shortness of breath, cough
  7. Cardiovascular: chest pain, edema (generalized swelling)
  8. Thrombocytopenia (reduction of platelets, 0.2% severe cases as compared to 0.1% under aspirin)

---

*N.B. In November 2009, the FDA announced that clopidogrel should be used with caution in patients on proton pump inhibitors such as omeprazole and esomeprazole.*
Hints on circulatory disturbance drugs

معظم الأدوية في المجموعة دي بتعتبر في الحالات الناتجة من نقص وصول الدم لجزء معين من الجسم نتيجة مشاكل بالارزة

- **Betahistine HCL**:
  - **Mechanism**: Histamine antagonist and improves the microcirculation
  - **Uses**: Reduce symptoms of vertigo, tinnitus, Meniere’s disease
  - **S.E.** include GI disturbance, headache, skin rash, pruritis
  - **Precautions**:
    - Not given to patients with pheochromocytoma
    - Given cautiously to patients with asthma and peptic ulcer
  - **Preparations**: betaserc, verserc, microserc, histine 8,16,24mg
  - **Dosage**: The usual dose is 16mg tab tds with meals

- **Buflomedil HCL**
  - **Mechanism**: Inhibits alpha receptors, inhibits platelets aggregation, improves RBCs deformability
  - **Indications**:
    1. Peripheral vascular diseases
    2. Chronic vasculopathies of the lower limb
    3. Skin necrosis
    4. Cerebrovascular disorders e.g. Cerebrovascular insufficiency and senile dementia
    5. Vascular disorders e.g. Raynaud’s phenomenon and diabetic retinopathy
  - **S.E.** include GI disturbance, headache, skin rash, pruritis, vertigo, syncope and paraesthesia.
  - **Precautions**: Over dose may produce severe hypotension and tachycardia
  - **Preparations**: vilatol 300, 600 mg
  - **Dosage**: 300-600mg daily
- **Cinnarizine: or with domperidone**
  - **Mechanism:** inhibit calcium transport across cell membrane and antihistaminic >> inhibits VC
  - **Uses:** used control of vestibular symptoms of both peripheral and central origin and of labyrinthine disorders such as vertigo, dizziness, tinnitus, nystagmus, nausea & vomiting
  - **S.E. and precautions:** like sedating anti histaminics including CNS manifestations and ant cholinergic manifestations
  - **Preparations:**
    - Cinnarizine: stugeron, cinnarizine 25,75mg
    - Cinnarizine + domperidone: vertigun
  - **Dosage:** one tabs 2:4 times daily

- **Isoxuprine:**
  - **Mechanism:** vasodilator, relaxation of uterine smooth muscles & produce positive inotropic effect
  - **Uses:** tocolytic in premature labour, cerebrovascular insufficiency and Raynaud's phenomenon
  - **S.E.:** flushing, hypotension, tachycardia, rash & maternal pulmonary edema
  - **Precautions:** not given immediately post partum or in premature labor if there’s infection
  - **Preparations:** vascular, duvadilan 20mg
  - **Dosage:** 20mg 2:3 times daily

- **Naftidrofureryl oxalate:**
  - Vasodilator in ttt of peripheral and cerebral vascular disorders
  - Enhance cellular oxidative capacity so protect cells against the result of ischemia
  - **Trade names** are: cerebromap, praxilene 200mg
  - **Dosage:** 1 cap 2:3 times daily

- **Trimetazidine:**
  - **Mechanism:** Produce anti-ischemic action without affecting blood supply but it acts by maximizing the glucose utilization to produce more ATP
  - **Indications:**
    1. Heart: IHD (angina and MI)
    2. ENT: vertigo and tinnitus
    3. Eye: chorioretinal disorders of vascular origin
  - **Trade names:** vastrel MR 35mg, metacardia, tricardia, vastrel, vastor 20mg
  - **Dosage:** one tab 2:3 times daily
• **Piribedil:**
  - **Mechanism:** dopamine antagonist that increase blood supply to ischemic tissues
  - **Indications:**
    1. Treatment of Parkinson's disease (PD), either as monotherapy (without L-DOPA (Levodopa)) or in combination with L-DOPA therapy, in the early stages as well as in the advanced stages of the disease.
    2. Treatment of pathological cognitive deficits in the elderly (impaired attention, motivation, memory, etc.).
    3. Treatment of dizziness in the elderly.
    4. Treatment of retinal ischemic manifestations.
    5. Adjuvant treatment in intermittent claudication due to peripheral vascular disease (PVD) of the lower limbs (stage 2).
    6. Anhedonia and treatment-resistant depression in unipolar and bipolar depressives (off label).
    7. Treatment of gait disorders associated to Parkinson disease (no related cause) and other forms of parkinsonism
  - **Side effects:**
    1. GI upset (nausea, vomiting, flatulence) we can add motilium
    2. Orthostatic hypotension or drowsiness may occur, particularly in predisposed individuals
  - **Preparations:** trivastal 20mg, trivastal retard 50mg
  - **Dosage:** One tablet daily at the end of the main meal. In severe cases: two tablets daily in two doses.

• **Pentoxifylline:**
  - **Mechanism:** pentoxifylline improves red blood cell deformability, reduces blood viscosity and decreases the potential for platelet aggregation and thrombus formation.
  - **Indications:**
    - It is used to treat intermittent claudication resulting from obstructed arteries in the limbs, and vascular dementia.
    - Pentoxifylline improves blood flow through peripheral blood vessels and therefore helps with blood circulation in the arms and legs (e.g. intermittent claudication), and the brain (hence its use in vascular dementia).
  - **Side effects:** nausea, dizziness, headache, flushing, angina, palpitations, cardiac arrhythmias
  - **Precautions:**
    - Not used in cerebral he and acute MI
    - Used cautiously in IHD and hypotension
    - You should reduce the dose in hepatic and renal impairment
  - **Preparations:** Trental, pexal, pental 400mg
Hints on HLT of Hyperlipidemia and AntiHyperlipidemics

• What we mean by hyperlipidemia?
  - Elevated LDL, triglycerides, or both of them

• Plan of treatment:
  A. Life style modification:
     - Control of diet
     - Regular exercise
  B. Antihyperlipidemics:
     1. Statins:
        - Mechanism of action:
          ➢ They are HMG-CoA reductase inhibitors so they decrease synthesis of cholesterol
          ➢ They increase LDL & VLDL uptake from circulation by hepatocytes
          ➢ Statins exhibit action beyond lipid-lowering activity in the prevention of atherosclerosis.
            The ASTEROID trial showed direct ultrasound evidence of atheroma regression during statin therapy.
            Researchers hypothesize that statins prevent cardiovascular disease via four proposed mechanisms:
              a. Improve endothelial function
              b. Modulate inflammatory responses
              c. Maintain plaque stability
              d. Prevent thrombus formation
Preparations:

- The most famous trade names are Lipitor and Ator.
- Usual at night as cholesterol synthesis appears to occur mostly at night.

<table>
<thead>
<tr>
<th>% LDL Reduction (approx.)</th>
<th>Atorvastatin</th>
<th>Fluvastatin</th>
<th>Lovastatin</th>
<th>Pravastatin</th>
<th>Resuvastatin</th>
<th>Simvastatin</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-20%</td>
<td>--</td>
<td>20 mg</td>
<td>10 mg</td>
<td>10 mg</td>
<td>--</td>
<td>5 mg</td>
</tr>
<tr>
<td>20-30%</td>
<td>--</td>
<td>40 mg</td>
<td>20 mg</td>
<td>20 mg</td>
<td>--</td>
<td>10 mg</td>
</tr>
<tr>
<td>30-40%</td>
<td>10 mg</td>
<td>60 mg</td>
<td>40 mg</td>
<td>40 mg</td>
<td>5 mg</td>
<td>20 mg</td>
</tr>
<tr>
<td>40-45%</td>
<td>20 mg</td>
<td>--</td>
<td>80 mg</td>
<td>80 mg</td>
<td>5-10 mg</td>
<td>40 mg</td>
</tr>
<tr>
<td>46-50%</td>
<td>40 mg</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>10-20 mg</td>
<td>80 mg*</td>
</tr>
<tr>
<td>50-55%</td>
<td>80 mg</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>20 mg</td>
<td>--</td>
</tr>
<tr>
<td>56-60%</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>40 mg</td>
<td>--</td>
</tr>
</tbody>
</table>

* 80mg dose no longer recommended due to increased risk of rhabdomyolysis

Starting dose

- Starting dose: 10-20 mg, 20 mg, 10-20 mg, 40 mg, 10 mg, 5 mg if hypothyroid, >65 yo, Asian, 20 mg.
- If higher LDL reduction goal: 40 mg if >45%, 40 mg if >25%, 20 mg if >20%, -- 20 mg if LDL >130 mg/dL (4.67 mmol/L), 40 mg if >45%

Optimal timing:

- Anytime: Evening
- Evening: With evening meals
- Anytime: Anytime
- Evening: Evening

- Side effects:
  - Reversible increase of liver enzymes
  - Myositis and rhabdomyolysis
  - Statins may slightly increase the risk of diabetes
- **Drug interactions:**
  - Fibrates increase the risk of rhabdomyolysis
  - Some authors suggest that not all fibrates make that drug interaction. It can only occur with Gemfibrozil (lipozid).
  - They also recommended the usage of fibrates and statins with close monitoring of liver enzymes and creatine kinase.

2. **Ezetimibe:**

  - **Mechanism of action:**
    - Decrease intestinal absorption of cholesterol
    - --- LDL
  - **Preparations:** cholstop, choletimb 10mg
  - **Side effects:**
    - Reversible increase of liver enzymes
    - Myositis and rhabdomyolysis
      # there is combination of Ezetimibe/simvastatin called INEGY to gain both benefits of the drugs.
      # Recent studies showed that combination of niacin with statin is superior to Ezetimibe/simvastatin combination in decreasing arterial wall thickness and LDL.
      # Recent studies showed also that ezetimibe increase the arterial wall thickness which worsen the atherosclerosis although it decreases LDL
      # So ezetimibe is not recommended as 1st line of treatment for elevated LDL

if TGs are over 400 as with this high level they can induce fatal acute pancreatitis and retinal vein thrombosis so we must start by ttt of elevated TGs
3. **Cholestryramine:**
   - **Mechanism of action:**
     - they bind bile acids and sequester them from enterohepatic circulation.
     - Since bile acid sequesterants are large polymeric structures, they are not well-absorbed from the gut into the bloodstream.
     - They - - - LDL
   - **Medical uses:**
     - Adjuvant therapy with statins in ttt of elevated LDL
     - In chronic liver diseases like liver cirhosis to prevent pruritis caused by bile acid deposition in skin
     - Treatment of diarrhea caused by excess bile salts entering the colon rather than being absorbed at the end of the small intestine e.g. after removal of the gall bladder
     - Treatment of hyperthyroidism as an adjuvant therapy by inhibiting the enterohepatic circulation, more L-thyroxine will be lost through defecation, thus lowering body thyroxine levels.
   - **Preparations:**
     Questran, Cholestran sachet
   - **Side effects:**
     Nausea, vomiting, constipation and flatulence

4. **Fibrates:**
   - **Mechanism of action:**
     - +++ lipoprotein lipolysis >> Increased triglyceride-rich lipoproteins (TRL) lipolysis >> -- TGs
     - Induction of hepatic fatty acid (FA) uptake and reduction of hepatic triglyceride production
   - **Medical uses:**
     - Lowering TGs
     - Improve insulin resistance when dyslipidemia is associated with metabolic syndrome
   - **Preparations:**
     - Fenofibrate: lipanthyl, Ipolex
     - Bezafibrate: Bezalip Retard
     - Gemfibrozile: lopid
   - **Side effects:**
     ++ risk of myopathy specially with statins

5. **Niacin (nicotinic acid):**
   - -- LDL & TGs
   - ++ HDL
   - Better than ezetimibe when combined to statins as mentioned before.
   - S.E. are headache, diarrhea and flushing
**Diosmin:**
- **Action:** This medicine is a venotonic (it increases venous tone) and a vasculoprotector (it increases resistance in small blood vessels and restores the integrity of cap endothelium).
- **Uses:** It is recommended for treating venous circulation disorders (swollen legs, pain, restless legs) and for treating acute hemorrhoidal attack.
- **Side effects:** GI disturbances
- **Preparations:** daflon, dafrex, dioven 500mg
- **Dosage:**
  - For venous insufficiency, the dosage is 2 tablets daily.
  - For acute hemorrhoidal attack, the dosage is 6 tablets daily for 4 days, followed by 4 tablets daily over the next 3 days.

**Rutin + vitamin C:**
- **Vit C potentiat the action of rutin and it is the cement of connective tissue**
- **As diosmin but also guard against corneal inflammation in DM**
- **Does** is 1:2 tab. Tds
- **Preparations:** Ruta-C, rutalex

**Calcium dobesilate:**
- **Regulate the physiological functions of resistance and permeability of the capillary wall**
- **Used in corneal inflammation in DM, venous inflammation, prevention of hge in gyna diseases**
- **Dose** is one cap tds with food
- **Trade names:** doxium 250,500mg
2-Hints on cardiology medicine
**Introduction:**

A group of pharmaceuticals that are used to suppress abnormal rhythms of the heart (cardiac arrhythmias), such as atrial fibrillation, atrial flutter, ventricular tachycardia, and ventricular fibrillation.

**Classes:**

- There are five main classes in the Singh Vaughan Williams classification of antiarrhythmic agents:
  1. Class I agents interfere with the sodium (Na\(^+\)) channel.
  2. Class II agents are anti-sympathetic nervous system agents. Most agents in this class are beta blockers.
  3. Class III agents affect potassium (K\(^+\)) efflux.
  4. Class IV agents affect calcium channels and the AV node.
  5. Class V agents work by other or unknown mechanisms.
<table>
<thead>
<tr>
<th>Class</th>
<th>Known as</th>
<th>Examples</th>
<th>Mechanism</th>
<th>Clinical uses in cardiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ia</td>
<td>fast-channel blockers-affect QRS complex</td>
<td>Guanidine, Procainamide, Disopyramide</td>
<td>$\text{Na}^+$ channel block (intermediate association/disassociation)</td>
<td>prevention of paroxysmal recurrent atrial fibrillation (triggered by vagal overactivity) prevention of atrial fibrillation in Wolf-Parkinson-White syndrome</td>
</tr>
<tr>
<td>Ib-Do not affect QRS complex</td>
<td>Lidocaine, Phenytoin, Mexiletine, Tocainide</td>
<td>$\text{Na}^+$ channel block (fast association/disassociation)</td>
<td>treatment and prevention during and immediately after myocardial infarction, though this practice is now discouraged given the increased risk of asystole, ventricular tachycardia, atrial fibrillation</td>
<td></td>
</tr>
<tr>
<td>Ic</td>
<td>Flecainide, Propafenone, Moricizine</td>
<td>$\text{Na}^+$ channel block (slow association/disassociation)</td>
<td>prevents paroxysmal atrial fibrillation, treats recurrent tachyarrhythmias of abnormal conduction system, contraindicated immediately post-myocardial infarction.</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Beta-blockers</td>
<td>Propranolol, Esmolol, Timolol, Metoprolol, Atenolol, Bisoprolol</td>
<td>beta blocking. Propranolol also shows some class I action</td>
<td>decrease myocardial infarction mortality, prevent recurrence of tachyarrhythmias</td>
</tr>
<tr>
<td>III</td>
<td></td>
<td>Amiodarone, Sotalol, Ibutilide, Dofetilide, Dronedarone, E-4031</td>
<td>K⁺ channel blocker Sotalol is also a beta blocker</td>
<td>in Wolf-Parkinson-White syndrome (sotalol) ventricular tachycardias and atrial fibrillation (Ibutilide) atrial flutter and atrial fibrillation</td>
</tr>
<tr>
<td>IV</td>
<td>slow-channel blockers</td>
<td>Verapamil, Diltiazem</td>
<td>Ca²⁺ channel blocker</td>
<td>prevent recurrence of paroxysmal supraventricular tachycardia reduce ventricular rate in patients with atrial fibrillation</td>
</tr>
<tr>
<td>V</td>
<td></td>
<td>Adenosine, Digoxin, Magnesium Sulfate</td>
<td>Work by other or unknown mechanisms (Direct nodal inhibition)</td>
<td>Used in supraventricular arrhythmias, especially in Heart Failure with Atrial Fibrillation, contraindicated in ventricular arrhythmias. Or in the case of Magnesium Sulfate, used in Torsades de Pointes.</td>
</tr>
</tbody>
</table>
**Hints on Digoxin**

- **Mechanism of action:**
  - **Digoxin** binds to a site on the extracellular aspect of the α-subunit of the Na⁺/K⁺ ATPase pump in the membranes of heart cells (myocytes) and decreases its function.
  - This causes an increase in the level of sodium ions in the myocytes, which leads to a rise in the level of intracellular calcium ions, thus raising the calcium concentration in myocardiocytes and pacemaker cells.
  - Increased intracellular calcium lengthens phase 4 and phase 0 of the cardiac action potential, which leads to a decrease in heart rate.
  - Increased amounts of Ca²⁺ also leads to increased contractility, the force of contraction, of the heart.
  - There is also evidence that digoxin increases vagal activity, thereby decreasing heart rate by slowing depolarization of pacemaker cells in the AV node. This negative chronotropic effect would therefore be synergistic with the direct effect on cardiac pacemaker cells.

- **Actions:**
  1. Positive inotropic: so ++ cardiac output, -- venous congestion, -- cardiac size
  2. Negative chronotropic: due to direct inhibition of the SAN & vagal stimulation
  3. Increase excitability of the atria and ventricles
  4. Decrease AVN conduction
  5. Slight VD in HF
  6. Mild diuretic effect in HF
  7. ECG changes:
     - Digitalis effect: sagging depression of ST segment, flat or inverted T wave
     - Toxicity: Different types of arrhythmias

- **Medical uses:**
  1. Rapid atrial arrhythmias: AF, atrial flutter, SVT
  2. Heart failure:
     - It is not widely used now in ttt of HF due to presence of alternatives which have better effect and less side effects
     - It is used in HF if it’s accompanied by rapid atrial arrhythmias or after failure of control of HF by other medications like BB, ACE-I and diuretics

- **Side effects:**
  - The main side effect of digitalis and most important is digitalis toxicity

- **Contraindications:**
  1. Digitalis toxicity
  2. Ventricular tachycardia
  3. Relatively CI in: incomplete heart block, nodal rhythm, hypertrophic cardiomyopathy
• **Preparation:**
  - **Lanoxin, Cardixin 0.25mg**
  - Loading dose: 2 tabs for 5 days
  - Maintenance dose: one tab daily
  - We should give the patient drug holiday as digoxin has cumulative effect

• **Drug interactions:**
  1. verapamil (decreases renal and extrarenal clearance of digoxin, increases digoxin levels, have additive effects in slowing AV)
  2. Amiodarone, dronedarone (increase serum digoxin concentrations resulting in clinical toxicity)
  3. Clarithromycin, erythromycin
  4. Itraconazole, voriconazole

**Hints on Nitrates**

• **Actions:**
  1. Dilate the coronaries
  2. Reduce preload as they’re vendilators

• **Medical uses:**
  1. Treatment of angina pectoris (during and in between attacks)
  2. Treatment of anal fissure

• **Preparations:**
  1. Isosorbide mononitrate:
     - Used as prophylactic treatment in between the attacks
     - **Trade names** are: Imdur, effox, monomack 20, 40, 60mg tab
       - 25, 50mg cap
2. Isosorbide dinitrate:
   - Usually used during the attack due to rapid action
   - **Trade names** are: Dinitra 5,10mg tab
     isomack 20,40mg cap

3. Nitroglycerin:
   - May be used during the attack or in between according to the concentration
   - **Trade names** are:
     - Angised 0.5 (used sublingually during the attack)
     - Nitromack Retard 2.5,5mg cap
     - Nitroderm-TTS 10,15 patches
     - Deponite NT5,10 patches (1-2 patches daily)

- **Side effects**:
  1. Severe headache (throbbing)
  2. Tolerance (use the smallest effective dose & allow a nitrate free interval about 8 hrs. daily)

**Drug Interactions:**
1. Sildenafil: exaggerated VD >> syncope or myocardial infarction
2. N-acetyl cisten & captoril with sustained release mononitrate increase the efficacy of isosorbide mononitrate and exercise time in these patients
3. Verapamil with sustained release mononitrate >> improve left ventricular function
4. Other CCBs with mononitrate >> orthostatic hypotension
5. Propranolol with mononitrate >> decrease in portal blood pressure

**Nicorandil** nitrate derivate:
- As nitrates (venodilator) also it is arteriodilator & coronary dilator >> -- preload, -- afterload & improves coronary circulation
- R/ randil (10mg twice daily with max dose 30mg twice daily)
- used if there’s no response to nitroglycerin
Hints on ischemic chest pain

- **pain of cardiac neurosis**
  - بدأيا ودا شيء مهم جدا جدا جدا لازم نحط في بالنا حاجة مهمة جدا وبتتنسي مع انها شائعة جدا وهي ده مشهور اكتر في البنات اللي سنهم صغير ظنناه أن في موقف حصل زعلها فحصل كده وده بيكون مالوش علاج غير يس كلمتين للعئيدة لرفع معنيتها وخلاص

- **good history about the pain**
  - مهم جدا واول خطوة بنعملها لاي عيان داخل بيشتكي من chest pain وقيل اي شيء لازم اخذ وده عشان اعرف هل هو典型 ischemic chest pain ولا مجرد حاجة نفسية ولا له سبب ثاني واذا فلامم تكون عارفين ايه هي موافقات النوع ده من المصدر

- **Criteria of chest pain of cardiac origin due to angina pectoris:**
  1. **Site:** diffuse retrosternal
  2. **Radiation:** shoulders, arms, forearms (specially the left side) - neck and lower jaw – less commonly back or epigastrium
  3. **Character:** crushing, compressing, squeezing, suffocating, heaviness
  4. **Duration:** several minutes (if >20 min AMI and UA should be considered)
  5. **Precipitated by:** stress, sexual intercourse, cold weather, heavy meals
  6. **Relieved by:** rest & sublingual nitrates
  7. **Associated symptoms:**
     - Dyspnea, palpitation, dizziness
     - Sweating, nausea, vomiting
     - Angor animi

- **Pain of unstable angina:**
  1. **Worsening angina:**
     - increased in severity, frequency, duration
     - occurs at rest or with minimal exertion
     - pain of recent onset within 2 months
     - angina resistant to therapy
  2. **20% of UA will pass to AMI and some consider UA as intermediate syndrome between angina and AMI so the most important drug in that phase is antiplatelet**

- **Pain of AMI:** (diagnosed by typical chest pain - typical ECG - typical enzymes)
  1. **Typical:** as angina but:
     - More severe, more prolonged, more radiating
     - May occur without precipitating factor & not relieved by rest or SL nitrates
  2. **Atypical:** sense of indigestion, or atypical location of the pain
  3. **Absent with** DM i.e. autonomic neuropathy, elderly patients (silent MI)

- **Important clues:**
  1. Anti anginal drugs are Nitrates, CCBs, BB >>> usually we start with nitrates
  2. for stable angina add BB or CCBs, if persistent anginal pain on 2 drugs apply triple therapy
  3. for variant angina add CCBs to nitrates
  4. UA the most important is antiplatelets and anticoagulants
The following algorithm shows a brief approach to ischemic chest pain:

1. **Chest discomfort suggestive of ischemia**
   - EMS assessment and care and hospital preparation:
     - Monitor, support ABCs. Be prepared to provide CPR and defibrillation
     - Administer oxygen, Aspirin, Nitroglycerin, and Morphine if needed
     - If available, obtain 12-lead ECG; if ST-elevation:
       - Notify receiving hospital with transmission or interpretation
       - Begin fibrinolytic checklist
     - Notified hospital should mobilize hospital resources to respond to STEMI
   - Immediate ED assessment (<10 min)
     - Check vital signs; evaluate oxygen saturation
     - Establish IV access
     - Obtain/review 12-lead ECG
     - Perform brief, targeted history, physical exam
     - Review/complete fibrinolytic checklist; check contraindications
     - Obtain initial cardiac marker levels, initial electrolyte and coagulation studies
     - Obtain portable chest x-ray (<30 min)

2. **Immediate ED general treatment**
   - Start oxygen at 4 L/min; maintain O2 sat >90%
   - Aspirin 162 to 325 mg (if not given by EMS)
   - Nitroglycerin sublingual, spray, or IV
   - Morphine IV if pain not relieved by nitroglycerin

3. **Review initial 12-lead ECG**

4. **ST elevation or new or presumably new LBBB; strongly suspicious for injury ST-Elevation MI (STEMI)**
   - Start adjunctive treatments as indicated (see text for contraindications)
     - Do not delay reperfusion
     - β-Adrenergic receptor blockers
     - Clopidogrel
     - Heparin (UFH or LMWH)

5. **ST depression or dynamic T-wave inversion; strongly suspicious for ischemia**
   - High-Risk Unstable Angina/Non-ST-Elevation MI (UA/NSTEMI)
   - Start adjunctive treatments as indicated (see text for contraindications)
     - Nitroglycerin
     - β-Adrenergic receptor blockers
     - Clopidogrel
     - Heparin (UFH or LMWH)
     - Glycoprotein IIb/IIIa inhibitor

6. **Time from onset of symptoms ≤12 hours**
   - Start reperfusion therapy as indicated
     - Be aware of reperfusion goals
       - Door-to-balloon inflation (PCI) goal of 90 min
       - Door-to-needle (fibrinolysis) goal of 30 min
     - Continue adjunctive therapies and:
       - ACE inhibitors/angiotensin receptor blocker (ARB) within 24 hours of symptom onset
       - HMG CoA reductase inhibitor (statin therapy)

7. **High-risk patient**
   - Refractory ischemic chest pain
   - Recurrent/persistent ST deviation
   - Ventricular Tachycardia
   - Hemodynamic instability
   - Signs of pump failure
   - Early invasive strategy, including catheterization and revascularization for shock within 48 hours of an AMI
   - Continue ASA, Heparin, and other therapies as indicated
     - ACE inhibitor/ARB
     - HMG CoA reductase inhibitor (statin therapy)
     - Not at high risk: cardiology to risk-stratify

8. **Develops high or intermediate risk criteria**
   - OR
   - Troponin-positive?

   - Yes
     - Consider admission to ED chest pain unit or to monitored bed in ED
     - Follow:
       - Serial cardiac markers (including Troponin)
       - Repeat ECG/continuous ST segment monitoring
       - Consider stress test

   - No
     - Develops high or intermediate risk criteria
     - OR
     - Troponin-positive?

   - Yes
     - If no evidence of ischemia or infarction, can discharge with follow-up

   - No
Drug Dispensing Permission

Name: .......... Date: //
Diagnosis: Angina Pectoris Unit: .....

Rx Plavix 75mg tab
قرص مرة يوميا

R/ Aspocid 75mg tab
قرصين بعد الغداء يوميا

R/ Concor 2.5mg tab
قرص مرة يوميا صباحا

R/ Effox 20mg tab
قرص صباحا ومساءا يوميا

R/ Dinitra 5mg tab
قرص خت اللسان عند اللزوم

R/ Ator 20mg tab
قرار بعد العشاء بساعتين

Signature
Introduction:

- Diabetes mellitus is a chronic disease which cannot be cured except in very specific situations.
- Management concentrates on keeping blood sugar levels as close to normal “euglycemia” as possible, without causing hypoglycemia.
- This can usually be accomplished with diet, exercise, and use of appropriate medications (insulin in the case of type 1 diabetes, oral medications, as well as possibly insulin, in type 2 diabetes).
- Patient education, understanding, and participation is vital, since the complications of diabetes are far less common and less severe in people who have well-managed blood sugar levels.
- The goal of treatment is an HbA1C level of 6.5%, but should not be lower than that, and may be set higher.
- Attention is also paid to other health problems that may accelerate the deleterious effects of diabetes. These include smoking, elevated cholesterol levels, obesity, high blood pressure, and lack of regular exercise.
• **Diet control:**

- Important in control of both types of DM
- The main goal is to keep the caloric intake in a range compatible with insulin
- For average weight patient the daily caloric intake should be 30 cal/kg/day
- Diet should contain 50% carbohydrates, 30% fats, 20% proteins
- Avoid simple sugars and allow complex sugars
- High fiber diet and small frequent meals

**What is the Diabetes Food Pyramid?**

The Diabetes Food Pyramid is a general guide of what and how much to eat each day. It is similar to the Food Pyramid you see on many food packages. The food groups and suggested servings per day are listed below:

- **The pyramid is divided into six groups.**
- **You should eat more foods from the largest group at the base of the pyramid and less from the smaller groups at the top of the pyramid.**
- The number of servings needed every day is not the same for everyone, so a range of servings is given to ensure you get the foods you need for good health.

- **Milk:** Source of calcium, protein, vitamins A and D. 2-3 servings/day.
- **Vegetables:** Provide vitamins A, C, folate, and fiber. 3-5 servings/day.
- **Grains, Beans, and Starchy Vegetables:** Good source of B vitamins and fiber. 6 or more servings/day.
- **Fruits:** Contain vitamins C, A, potassium, folate, and fiber. 3-4 servings/day.
- **Meats and Others:** Good source of iron, zinc, B vitamins, and protein. 2-3 servings/day.
- **Fats, Sweets, and Alcohol:** The foods at the tip of the pyramid should be eaten in small amounts. Fats and oils should be limited because they are high in calories. Sweets are high in sugar and should only be eaten once in a while.
• **Insulin:**

  - **Indications:**
    1. Type I DM
    2. Type II DM not controlled by diet and oral hypoglycemic drugs
    3. DKA & hyper osmolar coma
    4. Diabetes with pregnancy
    5. Surgery
    6. Severe liver or renal disease
    7. Severe stress e.g. infection

  - **Preparations:**
    1. Rapid-acting types are presently insulin analogues, such as the insulin analogues aspart or lispro. These begin to work within 5 to 15 minutes and are active for 3 to 4 hours. Most insulins form hexamers which delay entry into the blood in active form; these analog insulins do not, but have normal insulin activity
    2. Short-acting, such as regular insulin – starts working within 30 minutes and is active about 5 to 8 hours.
    3. Intermediate-acting, such as NPH – starts working in 1 to 3 hours and is active 16 to 24 hours.
    4. Long-acting, such as ultralente insulin – starts working in 4 to 6 hours, and is active well beyond 32 hours.
    5. Insulin glargine and Insulin detemir – both insulin analogues which start working within 1 to 2 hours and continue to be active, without major peaks or dips, for about 24 hours, although this varies in many individuals.
    6. A mixture of NPH and regular insulin – starts working in 30 minutes and is active 16 to 24 hours. There are several variations with different proportions of the mixed insulins.
    7. A mixture of Semilente and Ultralente (typically in the proportion 30% Semilente to 70% Ultralente), known as Lente, is typically active for an entire 24 hour period.

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- The most important and common in uses is Mixtard 30 100IU/ml (30% regular insulin + 70% NPH)
- 1 ml contains 100 IU of insulin human. 1 vial contains 10 ml equivalent to 1000 IU
- **Dosage:**
  - If a patient is newly diagnosed, the usual daily total insulin requirement for Type 1 diabetes is 0.5-0.7 units/kg/day. For Type 2 diabetes, the usual total insulin requirement is 0.5-1.0 unit/kg/day.
  - Treatment is usually started with 20 unit/day in average weight patient & gradually increased by 5-10 units/day until blood glucose is controlled.
  - Close monitoring of blood glucose level is a must via:
    - Home procedure daily
    - Lab blood glucose every month
    - HbA1c every 2-3 months

- **Routes of administration:**
  - *Subcutaneous:* most common route
    1. Single injection before breakfast:
      - 30% short + 70% long of the required dose
      - Advantage: single shoot
      - Disadvantage: nocturnal hypoglycemia & no strict control
    2. Twice daily injections: commonly used
      - Morning injection 2/3 of the total daily dose
      - Evening injection 1/3 of the total daily dose
    3. Multiple daily injections:
      - Short acting before each meal and single long acting at night
      - Used after DKA and with poor glycemic control
    4. Continuous subcutaneous insulin infusion (insulin pump or artificial pancreas)
      - Supplies short and long acting over the 24 hrs via subcutaneous catheter
      - Delivers Basal insulin along the whole day and bolus dose with meals
      - Advantages:
        - Eliminate the need of the injections
        - More accurate than injections
        - Decrease fluctuation in blood glucose level
      - Disadvantages:
        - Expensive
        - Inconvenient
        - DKA if the catheter accidentally comes out & there’s no insulin for hours
  - Infusion or IM: in cases of emergency e.g. DKA & hyperosmolar coma
  - Insulin spray nasal or oral (recent)
  - Oral insulin and pancreatic transplantation

- **Side effects:**
  1. Hypoglycemia: overdose or missed meal
  2. Lipodystrophy
  3. Weight gain
  4. Insulin resistance due to antibodies against insulin preparations (least with human) or obesity
  5. Allergy (least with human)
**Oral hypoglycemic drugs:**

- Insulin sensitizers: Biguanides, Sulfonylureas, Thiazolidinediones, Non-sulfonylureas: i.e. meglitinides, Alpha-glucosidase inhibitors, Dipeptidyl Peptidase-4 Inhibitors

- **Mechanism of action:**
  1. Decrease blood glucose via: (it is euglycemic and don’t cause hypoglycemia)
     - Decrease glucose absorption
     - Decrease gluconeogenesis
     - Increase passage of glucose into cells
  2. Improves insulin resistance
  3. Decrease appetite

- **Indications:**
  1. Type 2 DM (Typical reduction in glycated hemoglobin (A1C) values for metformin is 1.5–2.0%)
  2. Polycystic ovary syndrome
  3. Prediabetes and gestational diabetes (controversy)

- **Side effects:**
  1. GI disturbances including diarrhea, cramps …etc (most common)
  2. Loss of appetite
  3. Lactic acidosis
  4. Homocysteinemia
  5. Anemia due to B12 malabsorption

- **Contraindications:**
  1. Type I DM
  2. Type II DM with severe hyperglycemia
  3. DKA
  4. Diabetes with pregnancy
  5. Surgery
  6. Severe liver or renal disease

- **Preparation and dosage:**
  - Cidophage, glucophage, diaphage 500,850, 1000 mg
  - R/ metformin 500mg tab

- **Interactions:**
  - Cimetidine and cephealexin increase plasma concentration of metformin

**Biguanides: (metformin) 1st line drug of choice in ttt of type 2 DM**
Thiazolidinediones: (glitazones) Pioglitazone

- **Mechanism of action:**
  - Thiazolidinediones or TZDs act by activating PPARs (peroxisome proliferator-activated receptors), a group of nuclear receptors with greatest specificity for PPARγ (gamma).
  - It modulates the transcription of the insulin-sensitive genes involved in the control of glucose and lipid metabolism in the muscle, adipose tissue, and the liver.
  - As a result:
    1. Insulin resistance is decreased
    2. Adipocyte differentiation is modified
    3. VEGF-induced angiogenesis is inhibited
    4. Leptin levels decrease (leading to an increased appetite)

- **Indications:**
  1. Type 2 DM (Typical reduction in glycated hemoglobin (A1C) values is 1.5–2.0%)
  2. Polycystic ovary syndrome

- **Side effects:**
  1. Fluid retention and edema
  2. Increase risk of bladder cancer

- **Contraindications:**
  1. Type I DM
  2. Type II DM with severe hyperglycemia
  3. DKA
  4. Diabetes with pregnancy
  5. Heart failure

- **Preparations and dosage:**
  - Actos, ensudyne 15,30mg diabetonorm 45mg
  - 15-45mg once daily
✓ Sulfonylureas

- **Mechanism of action:**
  1. Increase insulin secretion from pancreas (main action)
  2. Decrease insulin resistance
  3. Decrease hepatic glucose production, decrease of hepatic clearance of insulin
  4. Decrease lipolysis

- **Generations:**
  - **First generation** (long acting >> high incidence of hypoglycemia)
    a. Chlorpropamide
    b. Tolbutamide
    c. Tolazamide
  - **Second generation** (short acting >> less incidence of hypoglycemia)
    a. Glipizide
    b. Gliclazide
    c. Glibenclamide
    d. Glimepiride

Some classify glimepiride as second-generation, while others classify it as third-generation.

- **Indications:**
  - Type 2 DM

- **Side effects:**
  1. Hypoglycemia specially with 1st generation
  2. BM depression specially with chlorpropamide
  3. GI irritation
  4. Skin rash
  5. Weight gain

- **Contraindications:**
  1. Type I DM
  2. Type II DM with severe hyperglycemia
  3. DKA
  4. Diabetes with pregnancy
  5. Surgery
  6. Severe liver or renal disease

- **Preparations:**
  1. Glipizide:
    - oral rapid- and short-acting anti-diabetic drug
    - trade name: minidiab 5
    - not secreted by kidney so suitable for patients with renal impairment
2. **Gliclazide:**
   - *Diamicron 80mg, diamicron 30,60 MR*
   - Dosage: 80-240mg daily on divided doses

3. **Glibenclamide:**
   - Trade name: *daonil 5*
   - ½ tab /12 hrs increased gradually till reach normal blood level with maximum dose 3 tabs daily
   - Side effects:
     1. This drug is a major cause of drug induced hypoglycemia. (up to 20-30%)
     2. Cholestatic jaundice is noted.
     3. Associated with significantly higher annual mortality when combined with metformin than other insulin-secreting medications

4. **Glimepiride:**
   - 3rd generation SU
   - Less incidence of hypoglycemia 2-4%
   - Trade names: *amaryl, dolcyl 1,2,3,4 mg, diabenor 2,3 mg, glimadel 1,2,3,4*
   - Dose is 1-4 mg once daily
   - Considered the best member of SU
✓ Meglitinides:
  - Have the same action of SU as secretagogues
  - They are more potent than SU and with less incidence of hypoglycemia
  - Members:
    1. Repaglinide: novonorm 0.5,1,2 mg
    2. Nateglinide: starlix 120mg

Repaglinide caused an increased incidence in male rats of benign adenomas (tumors) of the thyroid and liver. No such effect was seen with the other drug of its class nateglinide.

✓ Alpha-glucosidase inhibitors: (acarbose)
  - **Mechanism of action:**
    - Alpha-glucosidase inhibitors are saccharides that act as competitive inhibitors of enzymes needed to digest carbohydrates: specifically alpha-glucosidase enzymes in the brush border of the small intestines.
    - The membrane-bound intestinal alpha-glucosidases hydrolyze oligosaccharides, trisaccharides, and disaccharides to glucose and other monosaccharides in the small intestine.
    - Acarbose also blocks pancreatic alpha-amylase in addition to inhibiting membrane-bound alpha-glucosidases. Pancreatic alpha-amylase hydrolyzes complex starches to oligosaccharides in the lumen of the small intestine.
  - **Uses:**
    - Type 2 DM particularly with post prandial hyperglycemia (less effective than most other diabetes pills in decreasing glycated hemoglobin).
  - **Side effects:**
    - GI upset in the form of flatulence and diarrhea due to action of colonic bacteria on undigested carbohydrates
  - **Preparations & dosage:**
    - Glucobay 50,100mg
    - 100-400mg daily at the start of the meal
Dipeptidyl peptidase-4 inhibitors:

- **Mechanism of action:**
  - Increase incretin levels (GLP-1 and GIP), which inhibit glucagon release, which in turn increases insulin secretion, decreases gastric emptying, and decreases blood glucose levels.
  - Incretins are insulin secretagogues. The two main candidate molecules that fulfill criteria for being an incretin are glucagon-like peptide-1 (GLP-1) and gastric inhibitory peptide (glucose-dependent insulinitropic peptide, GIP). Both GLP-1 and GIP are rapidly inactivated by the enzyme dipeptidyl peptidase-4 (DPP-4)

- **Members:**
  - Sitagliptin: **Januvia**
  - Vildagliptin: **Gluvas**

- **Side effects:**
  - Nasopharyngitis (the common cold), headache, nausea, hypersensitivity and skin reactions
The DPP-4 enzyme is known to be involved in the suppression of certain malignancies, particularly in limiting the tissue invasion of these tumours. Inhibiting the DPP-4 enzymes may allow some cancers to progress.

Injectable Incretin mimetics:

Injectable Glucagon-like peptide analogs and agonists
- Glucagon-like peptide (GLP) agonists bind to a membrane GLP receptor.
- As a consequence, insulin release from the pancreatic beta cells is increased.
- Endogenous GLP has a half-life of only a few minutes, thus an analogue of GLP would not be practical.
  a) Exenatide (also Exendin-4, marketed as Byetta) is the first GLP-1 agonist approved for the treatment of type 2 diabetes. Exenatide is not an analogue of GLP but rather a GLP agonist. Exenatide has only 53% homology with GLP, which increases its resistance to degradation by DPP-4 and extends its half-life. Typical reductions in A1C values are 0.5–1.0%.
  b) Liraglutide, a once-daily human analogue (97% homology), has been developed by Novo Nordisk under the brand name Victoza. The product was approved by the European Medicines Agency (EMEA) on July 3, 2009, and by the U.S. Food and Drug Administration (FDA) on January 25, 2010.

There’re many combination drugs between metformin and SU & most of the other groups to form combo tablets for examples:
- Amaryl-M (amaryl+ metformin)
- Janumet (sitagliptin + metformin)
- Pioglutamet (pioglitazone + metformin)
- Glucovance, diavance, glimet, meburide (glibenclamide + metformin)
- Engilor (glibizide + metformin)
<table>
<thead>
<tr>
<th>Class</th>
<th>Compound(s)</th>
<th>Cellular mechanism</th>
<th>action(s)</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biguanides</td>
<td>Metformin</td>
<td>Activates AMP-kinase</td>
<td>▼ Hepatic glucose production</td>
<td>Extensive experience</td>
<td>Gastrointestinal side effects (diabetes, abdominal cramping)</td>
<td>Low</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No weight gain</td>
<td>Lactic acidosis risk (rare)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>No hypoglycemia</td>
<td>Vitamin B₁₂ deficiency</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td>Likely ▼ CVD events (UKPDS)</td>
<td>Multiple contraindications: CKD, acidosis, hypoxia, dehydration, etc.</td>
<td></td>
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<tr>
<td>Sulfonylureas</td>
<td>2nd generation</td>
<td>Closes K&lt;sub&gt;ATP&lt;/sub&gt; channels on β-cell plasma membranes</td>
<td>▼ Insulin secretion</td>
<td>Extensive experience</td>
<td>Hypoglycemia</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Glyburide/glibenclamide</td>
<td></td>
<td></td>
<td>▼ Microvascular risk (UKPDS)</td>
<td>Weight gain</td>
<td></td>
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<tr>
<td></td>
<td>Glipizide</td>
<td></td>
<td></td>
<td></td>
<td>? Blunts myocardial ischemic preconditioning</td>
<td></td>
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<tr>
<td></td>
<td>Gliclazide&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td>Low durability</td>
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<tr>
<td></td>
<td>Glimepiride</td>
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<tr>
<td>Meglitinides (gliptins)</td>
<td>Repaglinide</td>
<td>Closes K&lt;sub&gt;ATP&lt;/sub&gt; channels on β-cell plasma membranes</td>
<td>▼ Insulin secretion</td>
<td>▼ Postprandial glucose excursions</td>
<td>Hypoglycemia</td>
<td>High</td>
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<td></td>
<td>Nateglinide</td>
<td></td>
<td></td>
<td>Dosing flexibility</td>
<td>Weight gain</td>
<td></td>
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<td>? Blunts myocardial ischemic preconditioning</td>
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<td></td>
<td></td>
<td>Frequent dosing schedule</td>
<td></td>
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<tr>
<td>Thiazolidinediones</td>
<td>Pioglitazone&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Activates the nuclear transcription factor PPAR-γ</td>
<td>▼ Insulin sensitivity</td>
<td>No hypoglycemia</td>
<td>Weight gain</td>
<td>High&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Rosiglitazone&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
<td></td>
<td>Durability</td>
<td>Edema/heart failure</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▼ HDL-C</td>
<td>Bone fractures</td>
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<td></td>
<td></td>
<td>▼ Triglycerides (pioglitazone)</td>
<td>▼ LDL-C (rosiglitazone)</td>
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<td></td>
<td>▼ CVD events (ProACTIVE, pioglitazone)</td>
<td>▼ MI (meta-analyses, rosiglitazone)</td>
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<td></td>
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<td></td>
<td>▼ Bladder cancer (pioglitazone)</td>
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<td>α-Glucosidase inhibitors</td>
<td>Acarbose</td>
<td>Inhibits intestinal α-glucosidase</td>
<td>▼ Slows intestinal carbohydrate digestion/absorption</td>
<td>No hypoglycemia</td>
<td>Generally modest HbA&lt;sub&gt;1c&lt;/sub&gt; efficacy</td>
<td>Moderate</td>
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<td></td>
<td>Miglitol</td>
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<td></td>
<td>▼ Postprandial glucose excursions</td>
<td>Gastrointestinal side effects (flatulence, diarrhea)</td>
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<tr>
<td></td>
<td>Voglibose&lt;sup&gt;b,d&lt;/sup&gt;</td>
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<td></td>
<td>▼ CVD events (STOP-NIDDM)</td>
<td>Frequent dosing schedule</td>
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<td>DPP-4 inhibitors</td>
<td>Sitagliptin</td>
<td>Inhibits DPP-4 activity, increasing postprandial active incretin (GLP-1, GIP) concentrations</td>
<td>▼ Insulin secretion (glucose-dependent)</td>
<td>No hypoglycemia</td>
<td>Generally modest HbA&lt;sub&gt;1c&lt;/sub&gt; efficacy</td>
<td>High</td>
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<td></td>
<td>Vildagliptin&lt;sup&gt;c&lt;/sup&gt;</td>
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<td></td>
<td>▼ Glucagon secretion (glucose-dependent)</td>
<td>Urticaria/angioedema</td>
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<td>Saxagliptin</td>
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<td>Linagliptin&lt;sup&gt;b,d&lt;/sup&gt;</td>
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<td>Class</td>
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<td>Disadvantages</td>
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<td>Bile acid sequestrants</td>
<td>Colesevelam</td>
<td>Binds bile acids in intestinal tract, increasing hepatic bile acid production; ? activation of farnesoid X receptor (FXR) in liver</td>
<td>Unknown</td>
<td>No hypoglycemia</td>
<td>Generally modest HbA1c efficacy</td>
<td>High</td>
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<td></td>
<td></td>
<td></td>
<td>? ↓ Hepatic glucose production</td>
<td>↓ LDL-C</td>
<td>Constipation</td>
<td>High</td>
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<td></td>
<td></td>
<td></td>
<td>? ↑ Incretin levels</td>
<td></td>
<td>↑ Triglycerides</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>? absorption of other medications</td>
<td></td>
<td>May ↓ absorption of other medications</td>
<td>High</td>
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<tr>
<td>Dopamine-2 agonists</td>
<td>Bromocriptine</td>
<td>Activates dopaminergic receptors</td>
<td>Modulates hypothalamic regulation of metabolism</td>
<td>No hypoglycemia</td>
<td>Generally modest HbA1c efficacy</td>
<td>High</td>
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<tr>
<td>(quick-release)</td>
<td></td>
<td></td>
<td>↑ Insulin sensitivity</td>
<td></td>
<td>Dizziness/syncope</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>↓ CVD events (Cycloset Safety Trial)</td>
<td></td>
<td>Nausea</td>
<td>High</td>
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<tr>
<td></td>
<td>Exenatide</td>
<td>Activates GLP-1 receptors</td>
<td>↑ Insulin secretion (glucose-dependent)</td>
<td>No hypoglycemia</td>
<td>Gastrointestinal side effects (nausea/vomiting)</td>
<td>High</td>
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<tr>
<td>GLP-1 receptor</td>
<td>Exenatide extended release</td>
<td></td>
<td>↓ Glucagon secretion (glucose-dependent)</td>
<td>Weight reduction</td>
<td>Acute pancreatitis</td>
<td>High</td>
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<tr>
<td>agonists</td>
<td>Laraglutide</td>
<td></td>
<td>Slows gastric emptying</td>
<td>? Potential for improved β-cell mass/function</td>
<td>C-cell hyperplasia/medullary thyroid tumors in animals</td>
<td>High</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>↑ Satiety</td>
<td>? Cardiovascular protective actions</td>
<td>Injectable</td>
<td>High</td>
</tr>
<tr>
<td>Amylin mimetics</td>
<td>Pramlintide</td>
<td>Activates amylin receptors</td>
<td>↓ Glucagon secretion</td>
<td>↓ Postprandial glucose excursions</td>
<td>Training requirements</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Slows gastric emptying</td>
<td>Weight reduction</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>↑ Satiety</td>
<td></td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Insulins</td>
<td>Human NPH</td>
<td>Activates insulin receptors</td>
<td>↑ Glucose disposal</td>
<td>Universally effective</td>
<td>Hypoglycemia</td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td>Human Regular</td>
<td></td>
<td>↓ Hepatic glucose production</td>
<td>Theoretically unlimited efficacy</td>
<td>Weight gain</td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td>Lispro</td>
<td></td>
<td></td>
<td>↓ Microvascular risk (UKPDS)</td>
<td>? Mitogenic effects</td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td>Aspart</td>
<td></td>
<td></td>
<td></td>
<td>Injectable</td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td>Glulisine</td>
<td></td>
<td></td>
<td></td>
<td>Training requirements</td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td>Glargine</td>
<td></td>
<td></td>
<td></td>
<td>“Stigma” (for patients)</td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td>Detemir</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td>Premixed (several types)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Variable</td>
</tr>
</tbody>
</table>
KEY POINTS regarding type II DM

- Glycemic targets and glucose-lowering therapies must be individualized.
- Diet, exercise, and education remain the foundation of any type 2 diabetes treatment program.
- Unless there are prevalent contraindications, metformin is the optimal first-line drug.
- After metformin, there are limited data to guide us.
- Combination therapy with an additional 1–2 oral or injectable agents is reasonable, aiming to minimize side effects where possible.
- Ultimately, many patients will require insulin therapy alone or in combination with other agents to maintain glucose control.
- All treatment decisions, where possible, should be made in conjunction with the patient, focusing on his/her preferences, needs, and values.
- Comprehensive cardiovascular risk reduction must be a major focus of therapy.

Algorithm for management of type II DM by American Diabetes Association 2012
• مافيش عيان سكر بياخد دواء السكر فقط من غير اي ادوية ثانية لازم وهم جدا جدا مع اكتشاف السكر عمل تحاليل وفحوصات للعين ده للتأكد من عدم وجود مضاعفات ولحمايته من المضاعفات اللي هتحصل ولو بعد حين ولكن العلاج الفعال والالتزام بالعلاج بياخر حدوثها اكيد لفترات متاخرة من العمر ومن الفحوصات المهمة هيكون فحص قاع العين للتأكد من وجود retinopathy او عده

• ومن الفحوصات المهمة هيكون قاع عين للتأكد من وجود retinopathy او عدمه عيان العلاج بعد كده Base line عيان العلاج بعد كده عيان العلاج بعد كده عيان العلاج بعد كده عيان العلاج بعد كده عيان العلاج بعد كده عيان العلاج بعد كده عيان العلاج بعد كده عيان العلاج بعد كده

1. **Vitamin B complex:**
   - Trade names: neurovit, neuroton, bico forte, ... etc
   - Used commonly with DM
   - One tab. tds

2. **Thiotacid:**
   - Active ingredient: thioctic acid
   - Indications:
     - Diabetic polyneuropathy
     - Neuritis
     - Poly-neuritis
     - Optic neuritis
     - Encephalopathies
   - 600-1800 mg daily in divided doses

3. **Milga:**
   - Active ingredients: Benfotiamine, vitamin B6, vitamin B12
   - Indications:
     - Diabetic polyneuropathy
     - Neuritis
     - Poly-neuritis
   - One to three tabs. Daily (should be taken with adequate amount of liquid)

4. **Folic acid:**
   - Trade name: folc acid
   - Commonly in pregnancy during the 1st trimester only
   - One tab. Once daily
5. Iron:

- Trade names: hemoton, hemacaps, ferrotron, ferrosanol duodenale, ... etc
- Used in iron deficiency anemia, pregnancy, ... etc
- One cap. After the main meal
- S.E. GI upset and constipation
- CI with peptic ulcer

6. Calcium:

- Trade names: calcimate, marcal, uskade, ....etc
- Used commonly in patents with renal diseases, pregnancy, ....etc
- One cap. tds

7. Vitamin D:

- Trade names: one alpha, bone one
- Used in vit D deficiency, renal failure (lack of activation of vit D)
- One tab. يوم بعد يوم

8. Potassium:

- Trade names: potassium M syrup, slow K tabs.
- Uses: with diuretics (loop, thiazide) and some renal diseases with hypokalemia, other causes of hypokalemia ... etc

9. Vitamin C:

- Trade names: cevarol, C-Retard
- Uses: phosphate stones, common cold, CT diseases (vitamin c is the cement of connective tissue)
10. Zinc:
    - Trade names: *arca zinc*
    - Uses: zinc is essential for hair & skin, during pregnancy, treatment of acne

11. Multi vitamins:
    - Trade names:
      - *Vitamax plus, mniravit, Ferrocal, totavit, ....etc*
Drug Dispensing Permission

Name: ............
Diagnosis: Type 2 DM

Date: / /
Unit: ..... 

Rx
Cidophage Retard 850mg tab
قرص بعد الفطار والعشاء يوميا

R/ Amaryl 3mg tab
قرار قبل الفطار مرة يوميا

R/ Aspocid 75mg tab
قرارين بعد الغداء يوميا

R/ Ator 20mg tab
قرار بعد العشاء بساعتين يوميا

R/ Neurovit tab
قرار كل 8 ساعات يوميا

Signature
References

- Wikipedia the free encyclopedia: www.wikipedia.org
- Umaee FarmMed: http://umaeeenews.blogspot.com
- Cleveland clinic: http://www.clevelandclinicmeded.com/
- Joint National Committee (JNC) guidelines
- ATLAS-1 by dr. Hanein Wely
- Internal medicine books by dr. Sherif El-Hawary