

Add 15 Years

Diabetes - Book 3.2

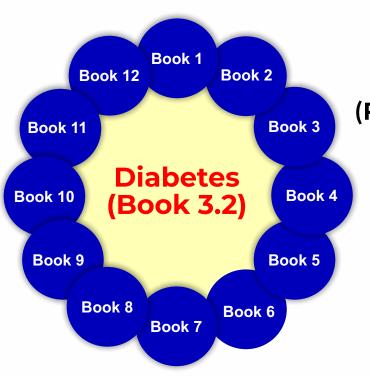
SULFONYLUREAS

(2nd generation medicine)

IN 2021: No reason for kidneys to fail!!

Before 1921: Yes, You would have died.

USA/India Edition 2021 | ENGLISH



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DM/Fellowship, USA



These "Medical Books" can really help in Adding "15 Healthier Years" to Our Lifespan!

<u>"The recommended age is 13yrs to 80yrs</u>

The sooner you start, more years you add to lifespan."



PREFACE

Think About It!

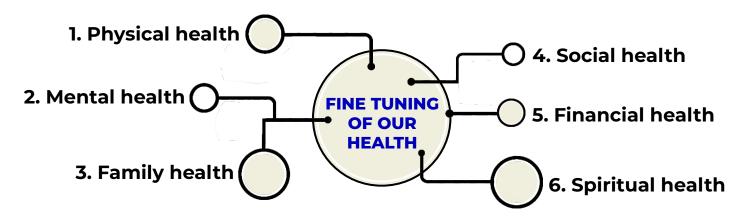
Miracles do not happen in real life.

At least in India (NOT very common in U.S.) we seek medical care only when we have so called "alarming symptoms" and MD/Physicians provide care with their focus on these "alarming symptoms". We call it "Crisis Medicine".

Personally speaking, in 2020/2021 and in the coming years, these "alarming symptoms" (called "Crisis Medicine") should be RARE before we get into the 75 to 85 years of age group.

PROVIDED

We keep **fine tuning our health** (medical definition) and gain insight about fundamental medical knowledge, and we actively plan and pay attention to our:



TRUST ME ALL THE 6 TYPES OF HEALTH ARE IMPORTANT

Results will be dramatic.

DISCLAIMER

In all the books that I am writing as a physician and a MD with a lifetime of experience (along with my team)-

I have mentioned the most common medical facts which each one of us need to know in our day to day life.

Ignorance is never a bliss and 2020 has shown us that.

I highly recommend that anybody entering middle school (8th grade i.e. a 13-year-old) should start reading these books and try to read as many as he or she can **so that they can get an insight into the most common medical facts.**

These books are written in basic English and several other languages as well.

If we get an insight into medical facts before we get into chain-smoking and excessive alcohol use or another drug abuse, then ultimately, we can live a healthy and a long life.

All my research and common sense says that starting at the age of 13 years, (that is when we enter our teenage years, our personality, our habits, our likings and our disliking -- all are pretty much shaped by the time we get to 26 years old or older.

Both India and USA are very dear to me,

In the former I was born; I have my parents. In the latter, I have my wife and my children.

One thing became obvious to me as I live in USA, that the population is taking advantage of the latest medical advances.

Our Indian community, all our friends and families, when we have medical issues, are really putting themselves at the mercies of government and private hospitals, and doctors (with "zero" trust).

In India, people have to spend their own money. Realizing this, I have provided all the medical information, which is available to us doctors, so that one can make wise choices and confidently take their health in their own hands.

<u>But still I sincerely request that you should not take any medications without the supervision of your own family doctors.</u>



The facts that I have provided in my books are available in every other medical book, but I them in very simple English or in your language because how are you going to make right choices in relation to your health, if you do not know what the answer is.

Our horoscope/stars are not enough, and consulting a pandit, priest or maulana is never enough.

Blind faith is never an option.

Prayers help, yes! when we do not know the answer to a situation.

If our car runs out of petrol, then eventually it will not move; does not matter how much we may pray, it is never going to happen unless we fill the tank.

If you anticipate and choose wisely, you will not have a crisis. So, our disclaimer is that we give you the insights but please always consult your physicians before starting any prescription medications.

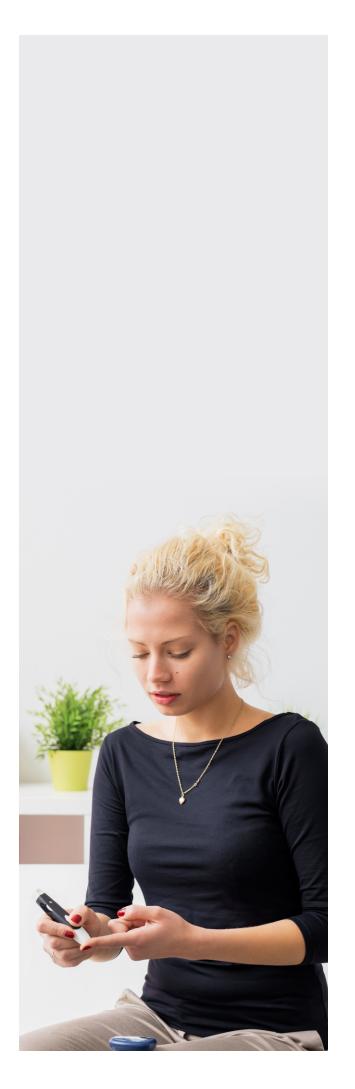


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IN 2021: No reason for kidneys to fail!!

Before 1921: Yes, You would have died.
(year of Nobel Prize for Insulin)

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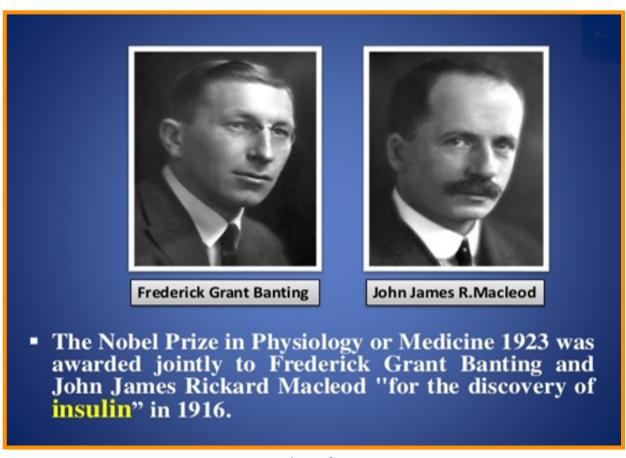


Referring Diabetes - Book 1 HIGH BLOOD SUGAR

IN 2021: No reason for kidneys to fail!!

Before 1921: Yes, You would have died.
(year of Nobel Prize for Insulin)

Introduction



Chap1Fig1

Insulin was discovered in 1921 leading to a nobel prize. In 2021 we have 12 groups of medicines for medicine diabetes.

Think About It!

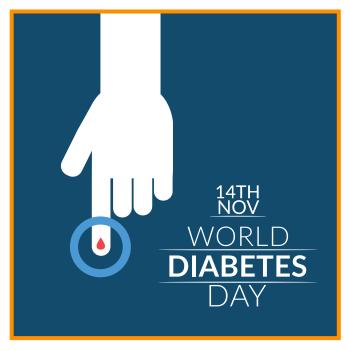
Before 1921

Every child who was born with Type 1 diabetes or lack of insulin would eventually die.

The discovery of insulin or should we say the discovery of insulin as a medicine has changed the history of diabetes and its treatment.

In 2021

We can now have a healthy life with functioning kidneys till very end!!

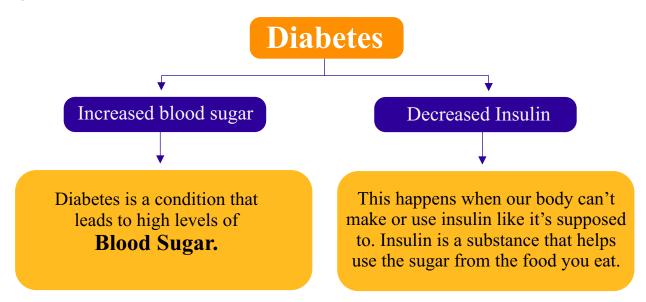


But yes, we have 12 to 13 different groups of medicines for high blood sugar.

The golden principle of the medicinal treatment of diabetes is that we start with one medication early in the course of treatment of diabetes.

We keep adding medicines as needed to control our blood sugar (along with diet & exercise)

Chap1Fig1



The Golden Principle in Management of high blood sugar (Diabetes)

The golden principle of the medical treatment of diabetes is that Once we have high blood sugar (Diabetes) – exercise and diet management are needed life-long.

Together diet, exercise and medications – all will help!!

Risk of taking medications are minimal as compared to the benefits that we receive from these medicines!

1. We start with <u>one medication</u> early in the course of treatment of diabetes

Start with one medication

2. <u>Targets</u> for blood sugar control is decided by physician.

Decide Targets

3. Usual target is **HbA1c < 7**

HbA1c < 7

4. As youngish we are more, we want to keep blood sugar is close to 100mg

Blood sugar close to 100mg

Continued

The golden principle of the medical treatment of diabetes is that Once we have high blood sugar (Diabetes) – exercise and diet management are needed life-long.

- 5. <u>Today in 2021</u> are several groups of excellent medicines are available:
- a) which can <u>bring down our blood sugar</u> by <u>different mechanisms of action.</u>
- **b**) As a golden rule, what we should start with **one medicine** if our blood sugar is not extremely high.
- c) And as time goes on.
 We can add a second medicine.

Start with one medicine, if blood sugar is not very high

Start with one medicine, Add a second medicine, if needed And add a third medicine, if necessary

d) Or we can even add a third medicine which works by a different mechanism.

Diet and exercise are an integral part of high blood sugar management!

Diet and exercise are an integral part of high blood sugar management!

Purpose of medical management and medici nes for diabetes is:

• To manage our blood sugar



Chap3Fig1

As close to 100mg as possible



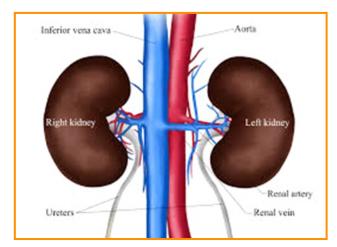
Chap3Fig2

• And HbA1c < 7



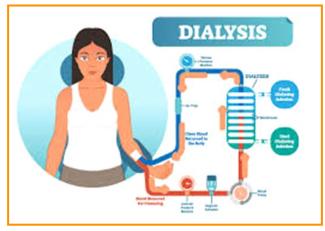
Chap3Fig3

• To prevent kidney failure



Chap3Fig4

• And no dialysis



Chap3Fig5

• No heart attack (Diabetes is literally one of the reasons)



Chap3Fig7

 No blindness (Diabetes is one of the reasons)



Chap3Fig8

 No amputation of leg (Diabetes is one of the reasons)

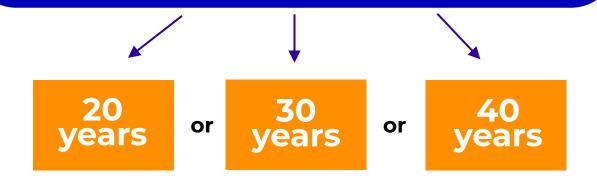


Chap3Fig9

Yes, Diabetes management can really reduce complications

If we manage diabetes from day one or <u>even before</u> we have actual diabetes (called prediabetes),

Complication are dramatically delayed by



Is it true?



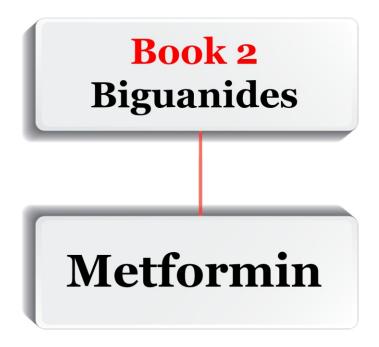
Today in 2020/2021 we have excellent medicines available

There are a number of medicines available in the market today for the treatment of Diabetes.

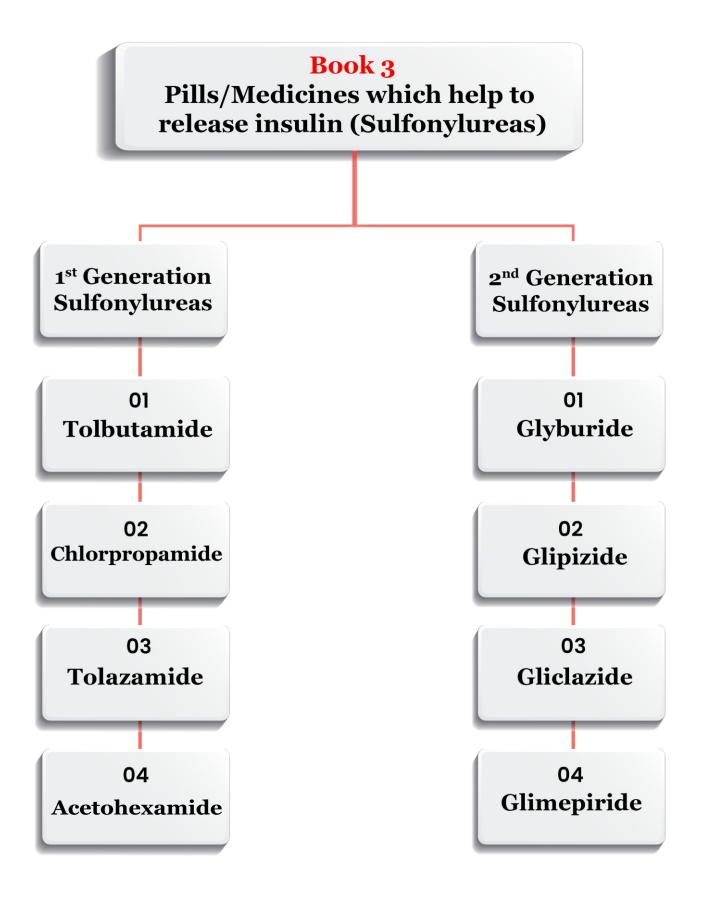
The main groups which these medicines belong to are:

Book-2 Biguanides

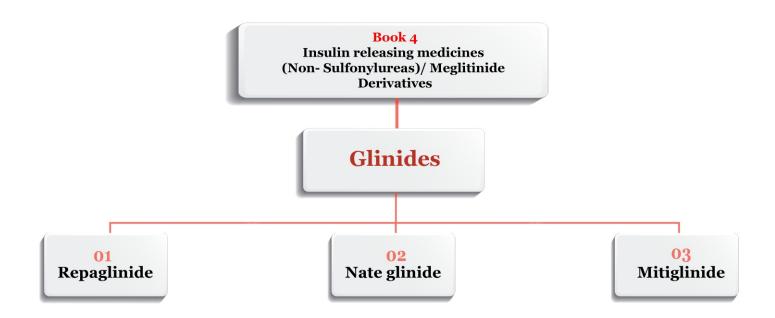
Metformin: The most famous and most used medicine and 1st medicine to start the treatment of diabetes.



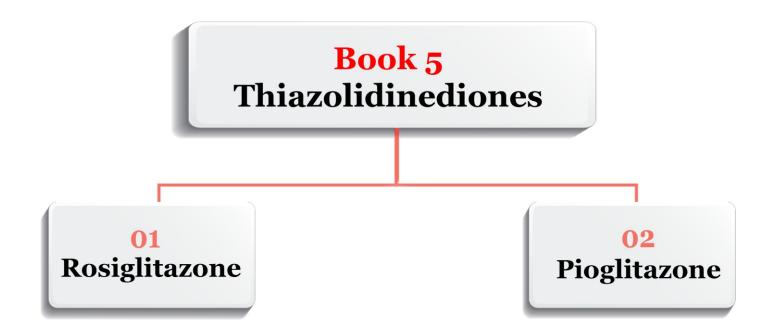
Book-3 Pills/Medicines which help to insulin (Sulfonylureas)



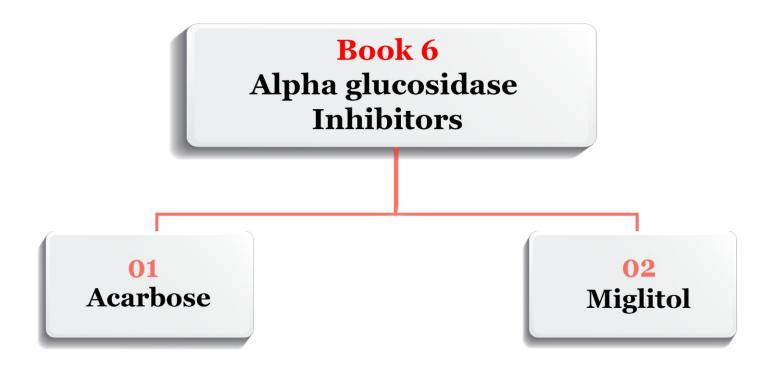
Book-4 Insulin releasing medicines (Non- Sulfonylureas)



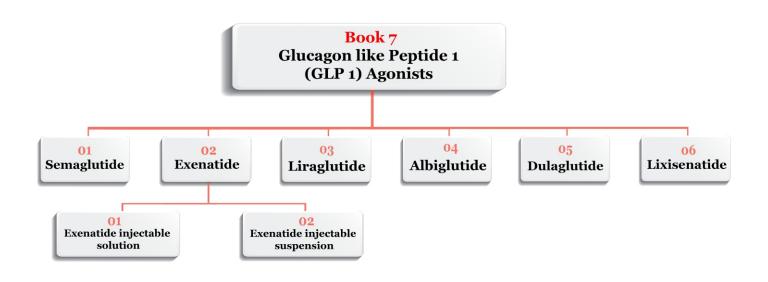
Book-5 Thiazolidinediones



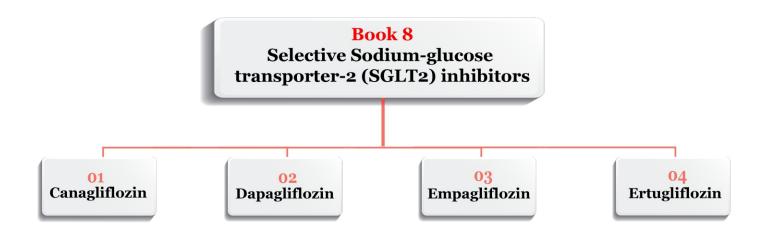
Book-6 Alpha glucosidase Inhibitors



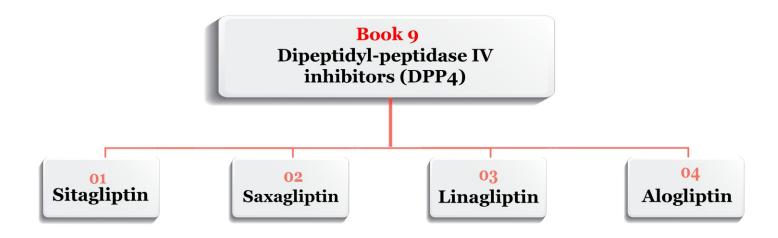
Book-7 Glucagon like Peptide 1 (GLP 1) Agnostics



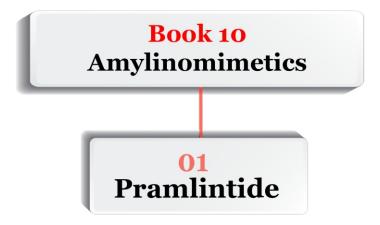
Book-8 Selective Sodium-glucose transporter-2 (SGLT2) inhibitors



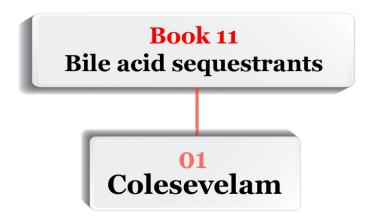
Book-9 Dipeptidyl-peptidase IV inhibitors (DPP4)



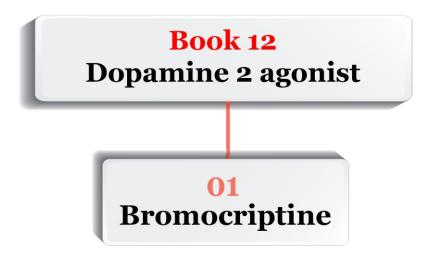
Book-10 Amylinomimetic group



Book-11 Bile acid sequestrants



Book-12 Dopamine 2 agonist



There are dramatic advances in treatment of diabetes today in 2021

Think About It!

We are **NOT** perfect; we don't need to be. But we **CANNOT** quit trying either.

Every high sugar management prescription always includes:

- 1. Medicine(s),
- 2.Diet, and
- 3.Exercise

Without these, it is impossible to achieve our targets.

In our medical world, medicines can be given by



or

By Injection below our skin (very easy to learn)



medication



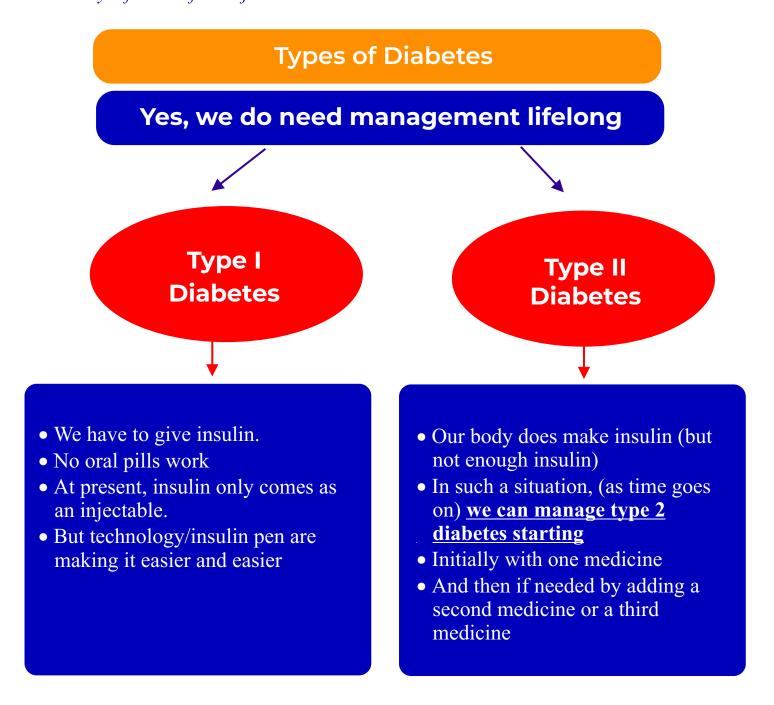


Chap6Fig2

Type 1 vs Type 2 Diabetes

Think About It!

We were always scared of needles and injection needs some degree of training so that it does not lead to any infection on the injected place. We have to follow the sterile techniques that do not lead to any infection of the injection sites.



How do we decide less dose or more dose of medicines

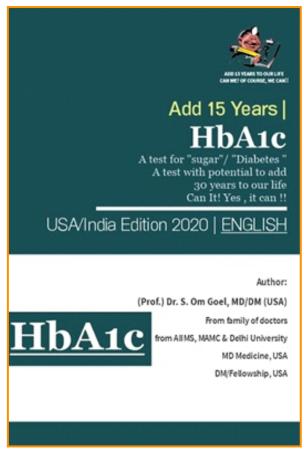
Think About It!

Our blood sugar changes all day based on

- Our meals,
- Level of activity etc.
- HbA1c remains stable over three months.

How do we decide less dose or more dose or combination of medicines?

I. We actually use HbA1c as our guideline for the treatment of diabetes.



Chap8Fig1

II. We set up a <u>target for HbA1c</u> in diabetic managementand we want that the <u>HbA1c</u> always remains 7 or less than 7.

HbA1c < 7

III. <u>If we met our target</u>, we can lower the dose.

Start with one medicine, if blood sugar is not very high

IV. <u>If our HbA1c is high</u>, then we can give the increased dose or add a 2nd pill or add even a 3rd pill.

Start with one medicine, Add a second medicine, if needed And add a third medicine, if necessary

Early diagnosis and early treatment: an absolute necessity in 2021

Think About It!

Every mom knows how her baby will start walking around in 1 year of age.

Every physician knows how to diagnose diabetes (called Prediabetes) year before you have any "symptoms".

Actually, if we can diagnose Diabetes, even before it happens to us (called as Prediabetes), we can really delay complications as mentioned and it will be a very wise thing to do.

Most important thing we have to understand is that if medicines are taken early in the diagnosis of high blood sugar/diabetes then it can delay complications related to diabetes by





Diabetes - Book 3.2 SULFONYLUREAS

(2nd generation medicine)

IN 2021: No reason for kidneys to fail!!

Before 1921: Yes, You would have died.

(year of Nobel Prize for Insulin)

Introduction to Sulfonylureas

Sulfonylureas

Chap1Fig1

Think About It!

<u>Sulfonylureas Insulin secretagogues</u> are a group of medicines which every doctoris very familiar with.

These medicines have been used for years and years.

When we were young back in 1970s-80s, we were using the 'first generation of sulfonylureas.'

As years went by, drug companies/pharmaceutical companies manufactured better acting medicines belonging to this group which we call 'second generation of sulfonylureas.'

Sulfonylureas

How do they work?

- 1. They work by directly stimulating the release of insulin from beta cells of Langerhans which lie in the pancreas
- Release Insulin directly in Pancreases.
- 2. You can take these medicines with food or before food. They **lead to the lowering of blood glucose level** indirectly by stimulating the release of the insulin

Lower the blood glucose level.

3. They are **only useful for type 2 diabetes** where our beta cells in pancreas make some degree of insulin

Only useful for Type 2 Diabetes.

4. These medicines do **lead to weight gain** which is the effect of the insulin released

Lead to weight gain.

5. And they are very good medicines in lowering our blood sugar

Excellent medicines to lower blood sugar.

If we miss our meal or we take too much of the medicine, then it can lead to actually lower blood sugar than the normal and we have to be really careful about very low blood sugar.

How to treat type 2 Diabetes?

Treatment of the type 2 diabetes always includes

So, we must educate as much as we can, the patient giving him as much insight into diabetes (high blood sugar).

• It is very important we talk <u>about the</u> <u>lifestyle changes</u>



Chap2Fig1

• We talk about **the importance of diet**



Chap2Fig2

• We talk about <u>the importance of exercising</u>



Chap2Fig3

• Weight loss always helps



Chap2Fig4

Complications of suffering from Diabetes

Complications of diabetes

What are the complications of diabetes?

Diabetes #1 cause of <u>Kidney Damage</u>

Because Diabetes is so common



Chap3Fig1

Diabetes #1 cause of Blindness

Because Diabetes is so common



Chap3Fig2

Diabetes #1 cause of Nerve Problem

Because Diabetes is so common



Chap3Fig3

Diabetes #1 cause of Loss of Limbs

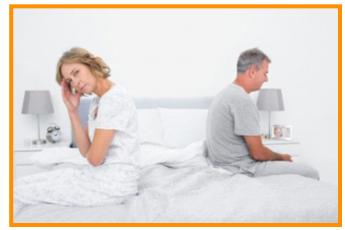
Because Diabetes is so common



Chap3Fig4

Diabetes #1 cause of Sexual Dysfunction

Because Diabetes is so common



Chap3Fig5

Diabetes #1 cause of Increased Risk of Heart Attack

Because Diabetes is so common



Chap3Fig6

How to minimize the risk of Low Blood Sugar?

<u>Sulfonylureas</u> work by releasing insulin. Insulin lowers blood sugar but if our blood sugar is already low, it can make our sugar levels very, very low which is not safe for us.

It is important to know how to minimize risk of low blood sugar

• Exercise which increases the utilization of the blood sugar. If we take the medicine with heavy exercise, it can further lower the blood sugar



Chap4Fig1

• We miss our meal. We still take the medicine, but we do miss our meal. (We take our food, it raises the blood sugar and the medicines bring it down.)



Chap4Fig2

• Another thing is when <u>our medication</u> <u>starts</u>, we start with smaller doses and we carefully raise the medicine as needed.

These are long acting medicines which keep working for a long time



Chap4Fig3

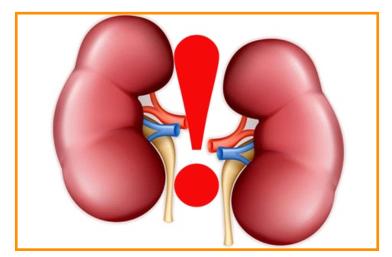
• If patients consume <u>too much</u> <u>alcohol then</u> <u>it leads to poor nutrition status</u> and affects the liver.

This affects the storage of glucose in our liver and one becomes very sensitive to low blood sugar



Chap4Fig4

• We have to understand that people with kidney failure actually need less insulin (as insulin stays longer in the blood.)



Chap4Fig3

• Some medication can cause drug interaction which decreases the effect of the medication. There is a risk of high blood sugar. If we take higher dose of medication once admitted to the hospital, then we must monitor our blood sugar levels and balance future doses



Chap4Fig4

Chapter 5

Introduction to First and Second Generation Sulfonylureas

All the second-generation sulfonylureas and first-generation sulfonylureas, are very potent (they lower blood sugar)

I. They are all **metabolized by liver.**

Metabolized By Liver

II. All medicines should be <u>taken before</u> meals

Taken Before Meals

III. All these medicines have a <u>potential of</u>
<u>causing low blood sugar if you miss your</u>
<u>meal</u> (as they keep lowering blood sugar)

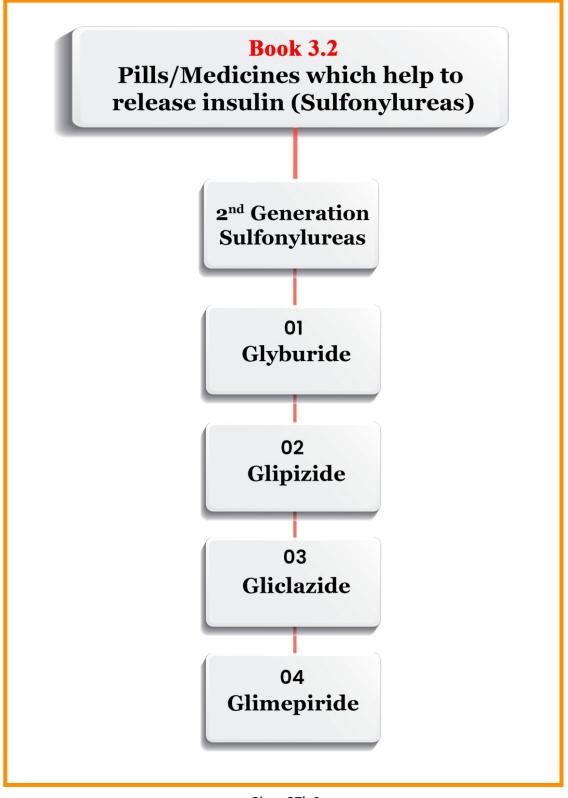
Causes Low Blood Sugar if Meal Missed

IV. Usually, we are <u>careful while giving these</u> <u>to older people</u> because older people are less tolerant to low blood sugar

Careful While Giving to Older People

Chapter 6

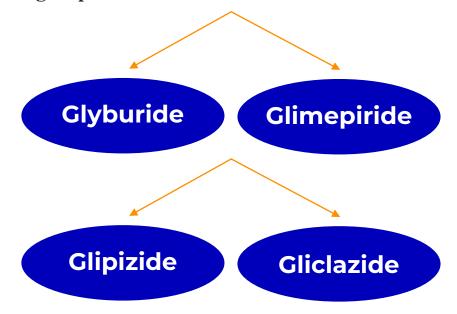
Second Generation Sulfonylureas



Chap6Fig1

There are 4 medicines in this group:

- 1. Glyburide
- 2. Glipizide
- 3. Gliclazide
- 4. Glimepiride



The best sulfonylureas to be used are usually glipizide and glimepiride. (Gliclazide is also good sulfonylureas to use, but it is not available in US.)

These medicines (second generation) are very effective.

Glyburide

- I. All diabetes medicines should be taken before meals as a golden rule.
- II. We start on a low dose and increase the dose if needed
- III. We should usually take medication at the same time every day.

Glyburide FDA Approval History

FDA Approved: Yes (Approved In September, 2002)

Brand name: Diabeta (India), Glycron (India),

Glynase (USA), Micronase (USA)

Generic name: Glyburide

Dosage form: Tablets

Treatment for: <u>Diabetes - Type 2</u>



Chap6Fig2

<u>Glybuide</u>

Chap6Fig3

What we need to know about Glyburide:

• Usual Dose: 2.5mg to 10mg

Usual dose: 2.5 mg

• We can give it **once a day or we can give it in divided doses**. As a physician, I will prefer divided doses i.e. 2.5 mg in morning with breakfast and 2.5 mg with lunch, and 5 mg with dinner

Once a day or in divided doses

• There is a long-acting formulation of glipizide, also glipizide XL which obviously we give once a day only

Glipizide XL is given once a day

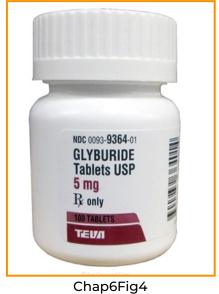
Maximum Dose: 20mg

Maximum Dose: 20mg

GLYBURIDE

Please always combine any blood sugar medicine with diet and exercise.

| Generic Name & Trade Name | About Glyburide | Cost of Glyburide for one month (in USA) | Cost of Glyburide for one month (in India) |
|------------------------------|--|--|---|
| Generic Name: Glyburide | Usual dose: 2.5-5mg once a day | Dose = Once a day (5mg) | Dose = Once a day (5mg) |
| Trade Name: | Can be increased to 20 mg once a day | 1-month = 100 tablets | 1-month = 100 tablets |
| Diabeta (India) | As a Golden Rule – before starting any | <u>Cost</u> = \$20 | <u>Cost</u> = Rs 80 |
| Glycron (India) | medicine, liver functions and kidney | | |
| Glynase (USA) | functions should be screened. | | |
| Micronase (USA) | | | |
| | | *All costs are meant for a rough estimate of one-month expense. | *All costs are means for a rough estimate of one-month expens |



Glipizide

- I. All diabetes medicines should be taken before meals as a golden rule.
- II. We start on a low dose and increase the dose if needed
- III. We should usually take medication at the same time every day.

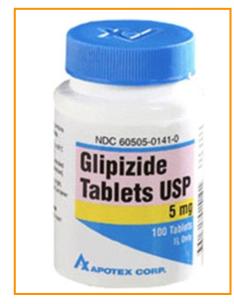
Glipizide FDA Approval History

FDA Approved: Yes (Approved In October, 2002) **Brand name:** Diabeta (India), Glycron (India),

Glynase (USA), Micronase (USA)

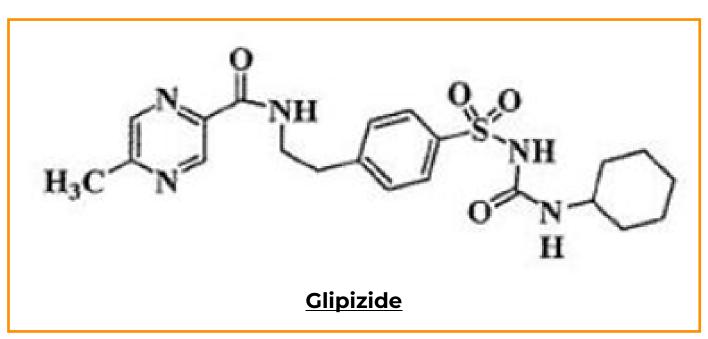
Generic name: Glipizide **Dosage form:** Tablets

Treatment for: <u>Diabetes - Type 2</u>



Chap6Fig5

<u>Glipizide</u>



Chap6Fig6

What we need to know about Glipizide:

• Usual Dose: 10mg

Usual dose: 10 mg

• We can give it once a day or we can give it in divided doses if the patient is consuming more than 20 mg.

Once a day or in divided doses if more than 20 mg

• Maximum Dose: **20mg**

Maximum Dose: 20mg

GLIPIZIDE

Please always combine any blood sugar medicine with diet and exercise.

| Generic Name & Trade Name | About Glipizide | Cost of Glipizide for one month (in USA) | Cost of Glipizide for one month (in India) |
|------------------------------|--|--|--|
| Generic Name: Glipizide | Usual dose: 5 mgtwice dayCan be increased to | Dose = Once a day (10 mg) 1-month = 60 tablets | Dose = Once a day (10 mg) 1-month = 60 tablets |
| Trade Name: | 20 mg | Cost = \$228 | Cost = Rs 85 |
| Glucotrol (USA) | As a Golden Rule – before starting any | | |
| Glucotrol XL (USA) | medicine, liver functions and kidney | | |
| Diacon (India) | functions should be screened. | | |
| Dibizide (India) | | | |
| | | *All costs are meant for a rough estimate of one-month expense. | *All costs are meant for a rough estimate of one-month expense |



Chap6Fig7

Gliclazide

- I. All diabetes medicines should be taken before meals as a golden rule.
- II. We start on a low dose and increase the dose if needed
- III. We should usually take medication at the same time every day.

Gliclazide FDA Approval History

FDA Approved: Yes (Approved In 1972)

Brand name: Diamicron (USA) Bilxona (USA)

Vamju (India) Zicron (India) Generic name: Gliclazide Dosage form: Tablets

Treatment for: <u>Diabetes - Type 2</u>



Chap7Fig8

Gliclazide

Chap7Fig9

What we need to know about Gliclazide:

• Usual Dose: 40mg

Usual dose: 40mg

• We can give it once a day or twice a day

Given once or twice a day

• Maximum Dose: **320mg**

Maximum Dose: 320mg

GLICLAZIDE

Please always combine any blood sugar medicine with diet and exercise

| Generic Name & Trade Name | About Gliclazide | Cost of Gliclazide for one month (in USA) | Cost of Gliclazide for one month (in India) |
|--|---|--|--|
| Generic Name: Gliclazide Trade Name: Diamicron (USA) Bilxona (USA) Vamju (India) Zicron (India) | Usual dose: 40 mg twice a day Can be increased to 320 mg once a day As a Golden Rule - before starting any medicine, liver functions and kidney functions should be screened. | *All costs are meant for a rough estimate of one-month | Dose = 40 mg Imonth = 30 tablets Cost = Rs 210 *All costs are meant for a rough estimate of one-month expense |
| | | expense. | of one month expense |



Chap6Fig10

<u>Glimepiride</u>

- I. All diabetes medicines should be taken before meals as a golden rule.
- II. We start on a low dose and increase the dose if needed
- III. We should usually take medication at the same time every day.

Glimepiride FDA Approval History

FDA Approved: Yes (Approved In Febuary, 1999)

Brand name: Amaryl(USA), Dexasone(USA)

Decdan (India), Dexona (India) Generic name: Glimepiride

Dosage form: Tablets

Treatment for: <u>Diabetes - Type 2</u>



Chap6Fig11

Glimepiride

Chap6Fig12

What we need to know about Glimepiride:

• Usual Dose: 2-4 mg

Usual dose: 2 mg

 We can give it once a day or we can give it in divided doses if the patient is consuming till 8 mg

Once a day or in divided doses if more than 8 mg

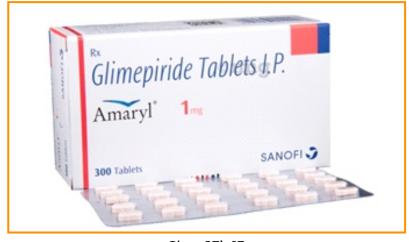
• Maximum Dose: 8 mg

Maximum Dose: 8 mg

GLIMEPIRIDE

Please always combine any blood sugar medicine with diet and exercise.

| Generic Name & Trade Name | About Glimepiride | Cost of Glimepiride for one month (in USA) | Cost of Glimepiride for one month (in India) |
|---|---|--|---|
| Generic Name: Glimepiride | Usual dose: 1 mgtwice a dayCan be increased to | Dose = Once a day (2mg) 1-month = 60 tablets | Dose = Once a day (2mg) 1-month = 60 tablets |
| Trade Name: Amaryl(USA) Dexasone(USA) Decdan (India) Dexona (India) | As a Golden Rule – before starting any medicine, liver functions and kidney functions should be screened. | <u>Cost</u> = \$66 | <u>Cost</u> = Rs 660 |
| | | *All costs are meant for a rough estimate of one-month expense. | *All costs are meant for a rough estimate of one-month expense. |



Chap6Fig13