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number : 7

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Recap

Last lecture we started talking about the **drug reaction (drug adverse effect)** and we divided them into five types:

1) **Augmented pharmacological effect**: related to receptors, dose related, relatively common 80%, it isn't fatal.

2) **Bizarre pharmacological effect**: unpredictable, mostly fatal, rare.

3) **Chronic effect**: after taking the drug for a long time. Example: cortisone causes osteoporosis after long time of treatment (6 months).

4) **Delayed side effect**: we stop using the drug and the adverse effect appears after a while, linked to cancer drugs and biological weapons.

5) **End of treatment effects**: when you cut the use of drug abruptly, linked to central nervous system drugs and cortisone. We should reduce the dose gradually if we want to cut the use of those drugs.

Risk factors:

1) Gender: women are more susceptible to adverse effects than men.

2) Pregnancy

3) Breast feeding

4) Genetics

5) Age: being very old or very young.

6) Disease status of the patient (renal failure/ liver failure/heart failure/etc.…)

End of recap (minute 7:20)

We balance everything in our life according to the **risk** and **benefit**, even drug prescription.

Drugs are not a simple thing to give your patients, because there are **side effects** we can predict, others we **can't**, some that may occur after a while, and some may occur with chronic use, so it's a complicated issue, that's why when we want to prescribe a drug, we have to balance between the risk and benefit.

With every drug use, **unwanted effects must be taken into account**. Before prescribing a drug, the physician should therefore assess the **risk:benefit** ratio.

-How will I know the risk and benefit?

The risk is known by knowing the side effect, and the benefit is the beneficial or therapeutic effect.

In prescribing drugs, Knowledge of principal and adverse effects is a prerequisite.

Real life example: if we have 100 colorectal cancer patients, 10 or 15 percent of them will refuse to take the chemotherapy prescribed. As a doctor, your role is to speak to your patients and make sure they understand that even though cancer medications are so bad (Cause fatigue, bone marrow suppression etc..), they might help decrease the risk which is **death**.

Minute 10:36

This is the importance of pharmacology, not just to memorize the drugs and what they're used for, but to understand everything about the drug, how it works, its risks and benefits, and then deliver that picture to your patient.

Another example: If you have patient with pancreatic cancer, you don't prescribe him any chemotherapy medications because they won't do any good.

Here we come to conclusion that chemotherapy risk: benefit ratio differ from patient to patient. (in colorectal cancer the benefit is more than the risk while in pancreatic cancer the risk is more than the benefit)

Risk: benefit ratio are affected by the 5 risk factors we mentioned earlier.

For example: a 10-year-old child shouldn't be prescribed a drug called atorvastatin, because it may cause bone and cartilage malformations, while after 6-8 years, the bone and cartilage growth will be complete so this drug can be prescribed.

Remember that risk: benefit ratio is not static but **dynamic**, and it is more important in drugs that have a narrow therapeutic index.

Communication with the patient is very important. You have to speak clearly and slowly, use simple language and words the patient would understand. Be aware of difference in languages and cultures, and use clear language to avoid the patients having misunderstanding of what you're trying to tell them.

In other countries, the average meeting between a doctor and a patient is 25 minutes, why? To give the patients a clear explanation of their case and the drug they're being prescribed. So when you become a doctor, sit with your patients, communicate and talk to them.

Minute 19:20

Things you should keep in mind:

1) Balance between over-prescription (prescribing unneeded drugs, like antibiotics) and under-prescription (not prescribing a needed drug, cortisone, many patients refuse to take cortisone because of its adverse effects).

2) **Avoid** a pill for every ill, because there is no drug without any side effects.

3) Always consider nonpharmacological therapy, because, for example, if hyperlipidemia patients took drugs for it, they will have to take it for the rest of their lives, and you don't want that.

***The following is not included in the material we're taking, but Dr. Malek found it was important for us to know.

Pregnancy and side effects

Most drugs transfer at 1500% more than that of the maternal lipids, so concentrations of the drug in the fetus is more than the mother. Why is that a problem? Because we can't define the effect of the drug on the pregnancy, as no mother will let her child be put at risk for an experiment, also it is ethically illegal. That's why pregnant women are advised to stay away from drugs as much as possible.

So from where do we get the idea of a drug having teratogenic activity or not? From the **experiments done on animals**, and from previous experiences of **pregnant ladies taking drugs.** So if a pregnant woman,

for some reason, takes a drug and it affects the baby by causing malformations or teratogenic effect, then it is considered bad.

Why is identification of teratogenic effects difficult? Because **control experiment cannot be done on human.**

When giving a drug to a pregnant woman, try giving the **lowest** dose possible, for the **shortest** period of time, and avoid using **new drugs** that have **unknown** side effects.

Classification :(FDA pregnancy category)

5 categories: A, B, C, D, X

Category X:

Studies in animals or humans have demonstrated fetal abnormalities and/or there is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience, and the risks involved in use of the drug in pregnant women clearly outweigh potential benefits (risk>benefits).

Example drugs: atorvastatin, simvastatin, warfarin, methotrexate,

finasteride.

Even common drugs like atorvastatin can cause teratogenic effects when used by pregnant women, so drugs in this category should never be prescribed to them.

Category D:

There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or

studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Drugs in this category can be prescribed in **urgent** situations, and only if the therapeutic effect is more than the risk.

Category C:

Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks. Most drugs are in this category.
Example drugs: tramadol, gabapentin, amlodipine, trazodone.

Those drugs can be prescribed after evaluation of risk: benefit ratio and justification of prescription.

Categories A and B

Can be prescribed because there isn't a proof that they have any risk on the pregnancy.

End resolution:

Pregnancy is a special case that we deal with, we avoid using any drug and if we have to, we only do it with the lowest dose possible within the shortest time possible.

Minute 32:20 (End of lecture)

Sorry for any mistakes ✌

As to diseases, make a habit of two things –to help, or at least, to do no harm.

-Hippocrates