

This is My Summary  
of the Missing part of  
the Chapter from the  
E-learning lecture . . .

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• Chronic complications of DM :-

↳ Microvascular Complications

↳ Macrovascular Complications

Very serious, e.g. Kidney, Eye, Nerves,  
Brain, Heart, Extremities

need's time, more than 10 years depending  
on adherence of the patient,  
depends on how much glucose in blood

↳ if hyperglycemia all the time he  
WILL get the chronic complications

Microvascular, Macrovascular complications  
have reasons, include -

↳ ~~Metabolites~~ of glucose  
one of glucose's metabolites  
is sorbitol, (1)  
that may ppt. in

- Nerve
- Kidney
- Artery  $\Rightarrow$  Mostly

↳ Hyperglycemia

when glucose level increases, it will bind  
to protein. (2)

Called glycoproteins "GAG's"

These glycoproteins are sticky

Circulation is full of proteins, hyperglycaemia  
"it's chronic",

So..

glucose will bind with proteins forming  
glycoproteins.

↳ May ppt. in blood vessels  
eventually  $\Rightarrow$  Atherosclerosis

But glycoprotein is viscous, present in  
the circulation,  
it will go to the kidney for filtration  
"Membrane",

with time it will reach a stage where  
it will finally block " " the  
kidney, causing  $\Rightarrow$  Diabetic Nephropathy

~~the~~ glycoprotein may ppt in nerve

Glucose  $\rightarrow$  hyperglycemia  $\rightarrow$  Metabolism  
Result leads that Metabolism "Free Radical"

Normally  $\rightarrow$  there will be Ant-oxidant  
but when talking about hyperglycemia  
 $\rightarrow$  accumulation of free radicals damaging  
the epithelial layer, capillary, nerve

glycoproteins may also bind with platelets,  
preventing platelet aggregation ~~preventing~~  
"prevent the binding of platelets with"  
another one  
which is one of the clot hormones  
along side with fibrin.  
as result...  
possibility of bleeding

Microvasculature :-  $\begin{cases} \rightarrow \text{eye} \\ \rightarrow \text{kidney} \\ \rightarrow \text{Neurology} \end{cases}$

Diabetic patients suffer Cataract, glucosuria.

That's due to presence of sugar in

filter  $\Rightarrow$  hyperosmolar pressure

in that area,

So as solution  $\Rightarrow$  water brought to  
the eye "Cataract".

More water  $\Rightarrow$  hypervolemia  $\Rightarrow$  Volume

So pressure  $\Rightarrow$  glucosuria.

در فترة لازم يفحص الدم والابواب  
في فترة لازم يمشي

(EYE)  $\nearrow$

For kidney, Two problems :-

$\hookrightarrow$  the presence of sugar in  
high amounts

$\hookrightarrow$  glycosuria

in years of diabetes, accumulation of  
glycosuria sticks to the filter

بقية من Function of kidney

مستوى الكرياتينين Creatinine level

مؤشر مهم لوظيفة الكلى Kidney function & Mark indicator

1,1 - 1,2

1,3 - 1,4

I can't assume that diabetic patient suffers chronic kidney disease for yet. Cause it's stages...

Diabetic patient with time may suffer kidney failure, due to destruction of the filter.

So No elimination of waste products  
from body  $\Rightarrow$  dialysis [dialysis]

(Kidney)  $\nearrow$

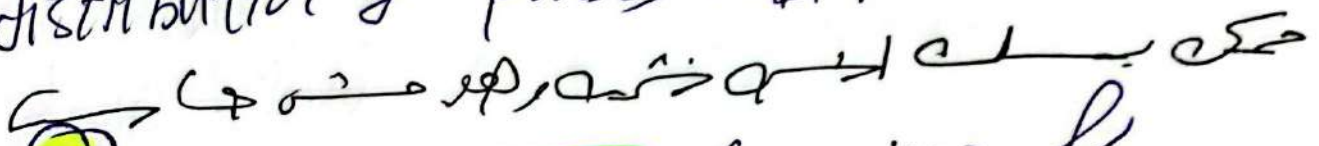
Diabetes may also cause Neuropathy

"demyelination" of the Myelin sheath

that increases speed of nerve fibres

So...

in this case due to dysfunction in the distribution of pulses  $\rightarrow$  loss of sensation



① Less of pain sensation (covering of ~~glycoprotein~~ Nociceptor by glycoprotein)

② Numbness, heat production in extremities due to No Normal circulation

(Neuropathy)  $\uparrow$

\* Macrovascular Complications: -

\* Stroke: -

due to accumulation/Vasoconstriction

No Normal blood supply

also Cataracts may occur due to the encephalopathy, "Accumulation of Urea due to protein catabolism"

### \* Cardiovascular disorders: -

Most if not all diabetic patients suffer hypertension due to problems in blood vessels "Accumulation of glycoproteins"  $\rightarrow$  atherosclerosis  
 $\rightarrow$  blood supply  $\rightarrow$  hypertension

also from the perspective of nervous system  $\rightarrow$  innervation of nerves  
selecting sympathetic/parasympathetic  
in Cardiovascular disorder

### \* Extremities: -

These people suffer ulcer called Foot ulcer "فقر الدم في القدم"  
that's due to the fact that there is No Normal circulation "Blood supply"



The extremities  $\rightarrow$  ~~injury~~?  
 or may rest after injury, No healing  
 due to upset of Nerve blood supply  
 which is main in ~~rest~~ ~~can work~~  
 healing

~~Also~~ ~~these~~

**\* infection:-**

Due to immune system,  
 hyperglycemia decreases the function of  
 Neutrophil the 1st cell works in the  
 innate immune system

infection  $\rightarrow$  ~~injury~~, ~~healing~~  
 لا يتم التئام الجرح، شفاء  
 وشفاء . healing

**\* gangrene**