

Age, Hypertension and Diabetes as Major Role Players In Chronic Kidney Disease Scenario; a Clinical Observational Retrospective Study



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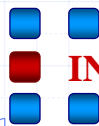
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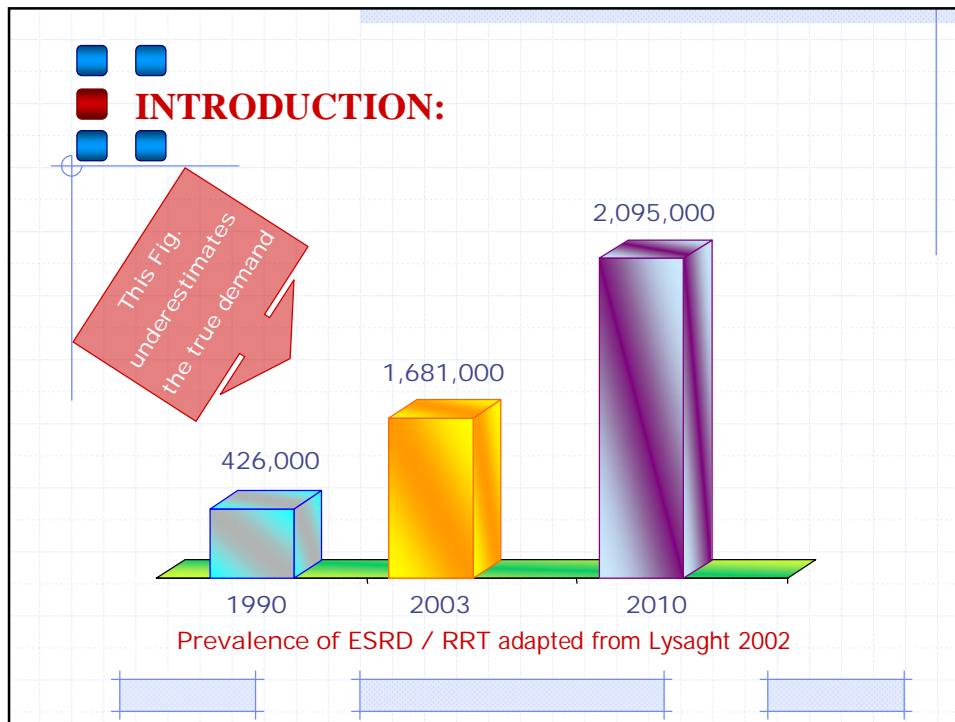
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INTRODUCTION:

- Chronic kidney disease is a major public health problem and the number of patients with CKD and the subsequent need for RRT has reached epidemic proportion. (Mahon 2006)
- Worldwide, it is estimated that over 1.5 million patients with ESRD currently require maintenance dialysis, and this number is increasing at a rate of 7% per year. (Lysaght 2002)
- If the trend continues, the number will exceed 2 million by 2010. (Xue & Ma 2001)

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- INTRODUCTION:**
- Definition of Chronic Kidney Disease Criteria**
- Kidney damage for ≥ 3 months, as defined by structural or functional abnormalities of the kidney, with or without decreased GFR, manifest by *either*:**
 - Pathological abnormalities; or
 - Markers of kidney damage, including abnormalities in the composition of the blood or urine, or abnormalities in imaging tests
 - GFR < 60 mL/min/1.73 m² for ≥ 3 months, with or without kidney damage**
- Adapted from NKF, K/DOQI Clinical Practice Guidelines for CKD, 2002.

SIGNIFICANCE OF RESEARCH:

According to that definition, patients with chronic kidney disease have been classified into 5 different stages.

➤ Kidney function progressively declines in most patients with CKD after sufficient damage has occurred to lower the GFR.

Stage	Description	GFR (mL/min/1.73 m ²)
1	Kidney damage with normal or ↑ GFR	≥90
2	Kidney damage with mild ↓ GFR	60–89
3	Moderate ↓ GFR	30–59
4	Severe ↓ GFR	15–29
5	Kidney failure	<15 (or dialysis)

➤ This progressive damage has been attributed to a variety of mechanisms and factors.

➤ The following table shows the factors that participating in deposition and progression of Chronic Kidney Disease.

Adapted from NKF, K/DOQI Clinical Practice Guidelines for CKD, 2002.

SIGNIFICANCE OF RESEARCH:

Clinical Factors	Sociodemographic Factors
Diabetes	Older age
Hypertension	US ethnic minority status: African American, American Indian, Hispanic, Asian or Pacific Islander
Autoimmune diseases	Exposure to certain chemical and environmental conditions
Systemic infections	Low income/education
Urinary tract infections	
Urinary stones	
Lower urinary tract obstruction	
Neoplasia	
Family history of chronic kidney diseases	
Recovery from acute kidney failure	
Reduction in kidney mass	
Exposure to certain drugs	
Low birth weight	

Adapted from NKF, K/DOQI Clinical Practice Guidelines for CKD, 2002.

SIGNIFICANCE OF RESEARCH:

- The GFR decline rate should be assessed in all patients with chronic kidney disease to identify the GFR decline rate and its significance.
- To Predict the interval until the onset of kidney failure.
 - Assess the effect of interventions to slow the GFR decline.
 - Identify modifiable factor that increase the GFR decline rate.
- To achieve such an accurate assessment, we have to Interpretation of the results into Clinical Practical identify and examine the effect of the risk factors on the GFR decline rate which leads to transfer the CKD patient from stage to another till the ultimate result of End stage kidney failure.

METHODOLOGY:

- This is an observational retrospective study conducted in (HUKM). The study has been achieved by reviewing specified number of adult CKD patient's Bed-Head Tickets (BHT) to collect all the required data including patient's sociodemographic information, all the well approved potential risk factors of CKD and the related laboratory tests results of those patients according to particular data collection forms designed for this study.

METHODOLOGY:

- The dependant variable (Y) that had been studied and used to classify the CKD patients sample into 5 different groups, was the level of GFR. While the independent variables (Xs) were the CKD risk factors.
- The risk factors (Xs) had been classified into two simple groups (modifiable and non-modifiable) based on the possibility of making a clinical intervention to prevent or avoid each of them.

METHODOLOGY:

- Sample size has been calculated using specialized mini software for multiple regressions. The software works according to statistical formula concerning power analysis for population correlation (R) as following.

Constant

$$n = \frac{L}{f^2} + k + 1$$

No. of predictors ⁹⁷⁵⁾

Sample Size

$$PESI = \frac{R^2}{1 - R^2}$$

- So, with 20 studied predictors (k) and a correlation of 85% (R), the sample size (n) should be at least 30 patients per each group to give a research power (p) of 95% ($\alpha = 0.05$).

METHODOLOGY:

➤ *Inclusion Criteria:*

Only adult CKD patients of 18 years old and above was selected conveniently and classified according to patients GFR and if there was any evidence of kidney damage.

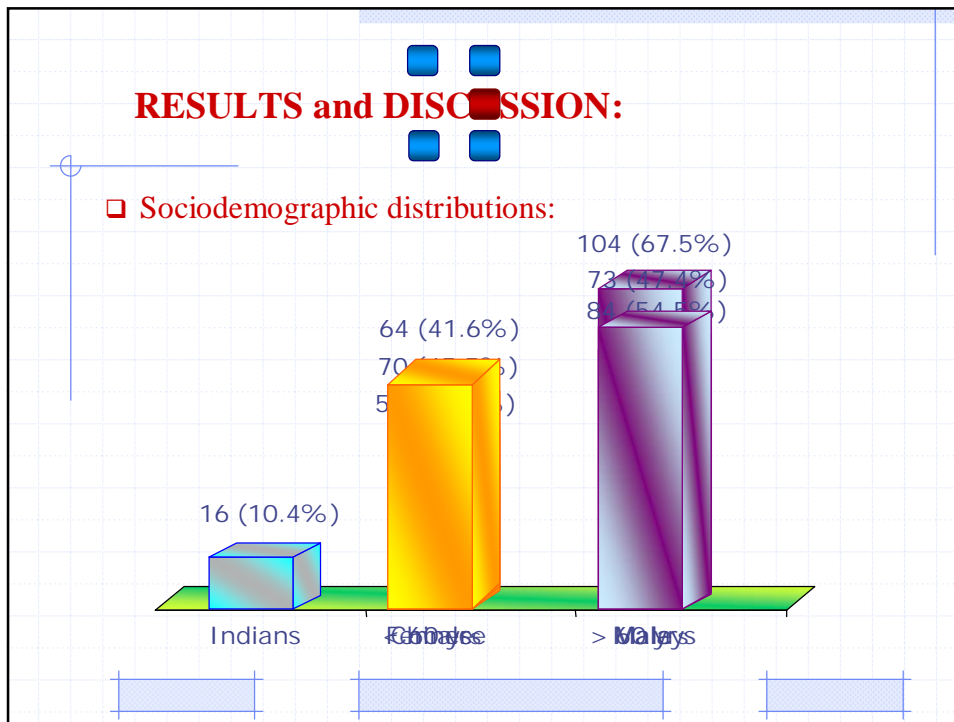
➤ *Exclusion Criteria:*

Patients of less than 18 years old or whom their Bed-Head Tickets were indiscernible or they had not been assessed well for all the required factors.

METHODOLOGY:

➤ All the factors had been answered and summarized in the form of (Yes/No) type, and the data set was developed and analyzed by using (SPSS 12.0 for windows).

➤ Since the dependent variable (Y = GFR level) is classified into 5 different groups in order, therefore the data set has been processed under an ordinal logistic regression model to highlight the internal relation among the risk factors (independent variables) which lead into overall effect on the CKD state of the patients.



RESULTS and DISCUSSION:

- in order to understand the overall effect of each individual risk factor in the presence of the other factors, the data has been processed under an ordinal logistic regression model.
- We have to notice first how fit is that model for the studied data and the following table shows the Goodness of fit result

	Chi-Square	Degree of freedom (df)	Significance (p)
Pearson	596.686	565	
Deviance	419.082	565	

RESULTS and DISCUSSION:

- In the 1st step after considering all the factors under that model, the age appears as the most influencing risk factor with B value = - 1.524 ($p < 0.05$).
- After few steps which led to keep and examine only the modifiable risk factors, the hypertension appears as the most influencing risk factor with B value = - 1.642 ($p < 0.05$).

RESULTS and DISCUSSION:

- While among the other factors, Diabetes Mellitus (DM) appears as a factor of a high influence only in certain cases like:
 - A** – If the effect of Metformin had been eliminated, Diabetes Mellitus appears as a factor of a significant influence with B value = 0.832 ($p < 0.05$) or;
 - B** – If the effect of ACEIs or ARBs had been eliminated, Diabetes Mellitus appears as a factor of a significant influence with B value = 0.844 ($p < 0.05$).



RESULTS and DISCUSSION:

- As the model process goes a head, the other risk factors remain of insignificant effect although it still considered as CKD risk factors.

	(B)	Std. Error	Wald	df	Sig. (p)
Age	- 1.524	0.358	18.150	1	
Hypertension	- 1.642	0.757	4.705	1	
DM	0.685	0.429	2.546	1	
DM (No Metformin)	0.832	0.413	4.064	1	
DM (No ACEIs & ARBs)	0.844	0.418	4.068	1	



RESULTS and DISCUSSION:

- ❑ **Hypertension and renal failure:**
 - Epidemiological data on the risk of hypertensive patients to develop renal failure offer contrasting results.
 - The kidneys of essential hypertensives studied by renal biopsy show vascular abnormalities characterized by focal and segmental sclerosis and hyalinosis.

(Goldblatt et al. 1989; Tracy 1992)

RESULTS and DISCUSSION:

➤ The mechanism by which the elevated blood pressure can induce progressive renal failure is not clearly known. But two different hypotheses have been put forward:

(Tolins et al. 1988)

A – Renal damage is the result of glomerular ischemia and hypoperfusion due to the narrowing of preglomerular vessels; or

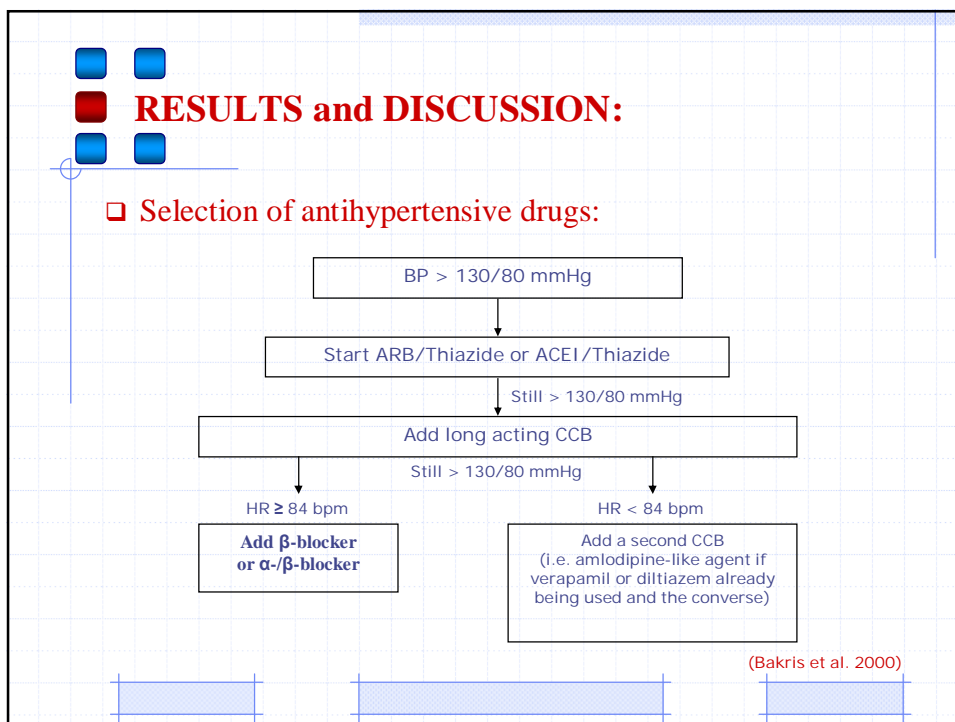
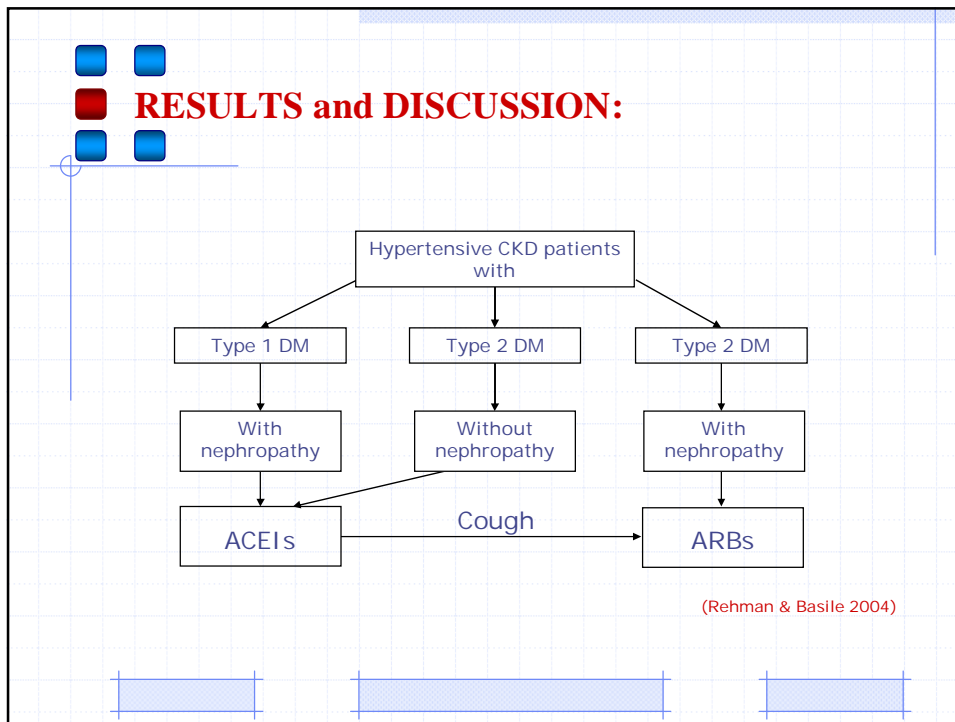
B – It's the consequence of glomerular capillary hypertension and hyperperfusion due to a loss of the renal autoregulatory response.

RESULTS and DISCUSSION:

❑ Strategies for slowing progressive renal failure in hypertensive patients:

- BP should be reduced to 130/80 mmHg with whatever antihypertensive therapy is necessary to achieve the target BP.
- Antihypertensive drug recommendations for patients with hypertension and renal disease:
 - Most important: lower BP to goal.
 - Multiple antihypertensive drugs may be needed.
 - Impressive results have been achieved with ACEIs in type 1 diabetic nephropathy, proteinuria > 1 g/d, and renal insufficiency. And with ARBs in type 2 diabetics with nephropathy.

(Chobanian et al. 2003; Brenner et al. 2001; Lewis et al. 2001)





CONCLUSION:

- Hypertension is a major risk factor for the elderly and confers considerable morbidity and mortality.
- Therefore, drug therapy should be considered if systolic blood pressure is persistently greater than 140 mmHg or diastolic blood pressure in 90 mmHg or higher.
- In the elderly CKD patients with hypertension, ACEIs or ARBs therapy with or without a diuretic should be initially used. The goal to control the blood pressure is to be reduced to < 130/80 mmHg.



CONCLUSION:

- There is, at the present, no strong evidence to support the use of an ACEI + ARB together. And diuretic should be added to one of them before using that combination.
- While a calcium channel blocker of either the non-DHP or DHP class can be used if the pulse is < 84 bpm whereas a beta blocker can be used when the pulse is above that value.
- Alpha-blocker can also be used as an additive therapy to further reduce blood pressure.



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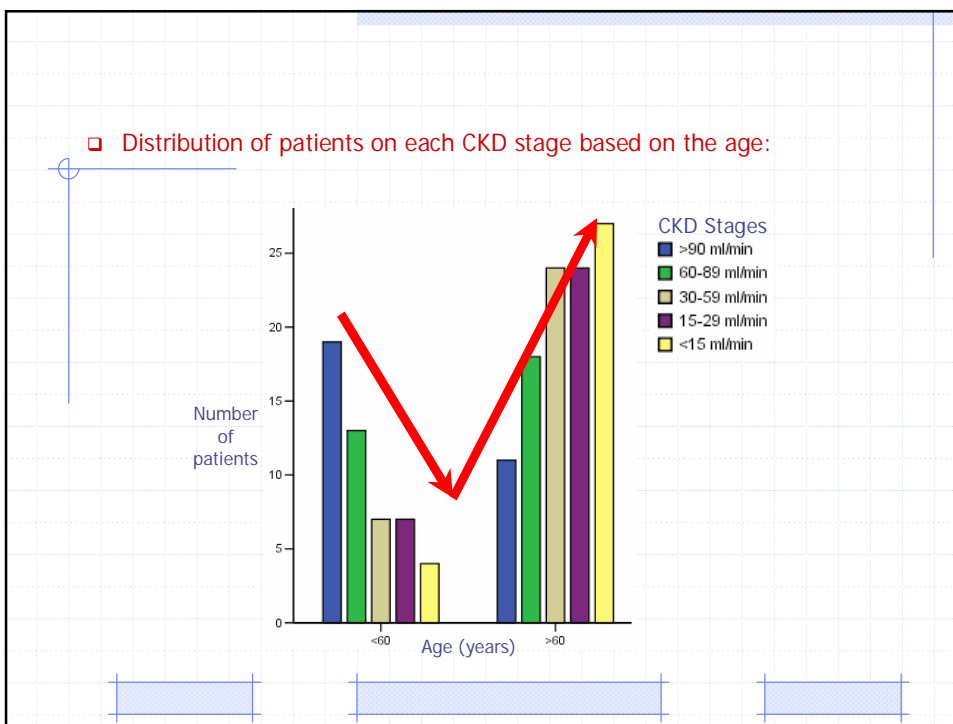
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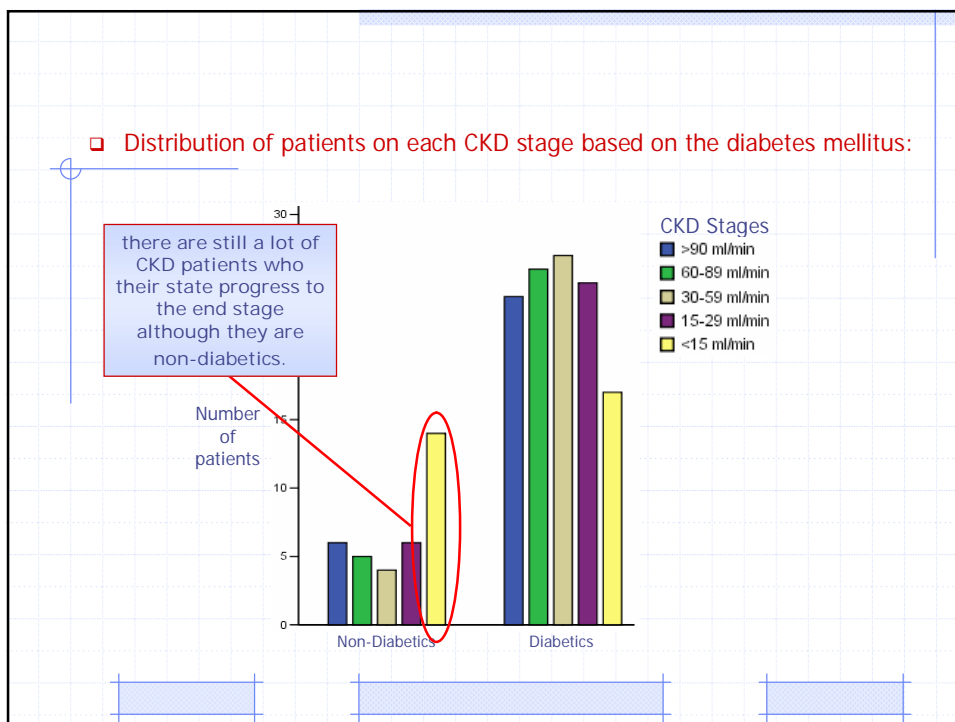
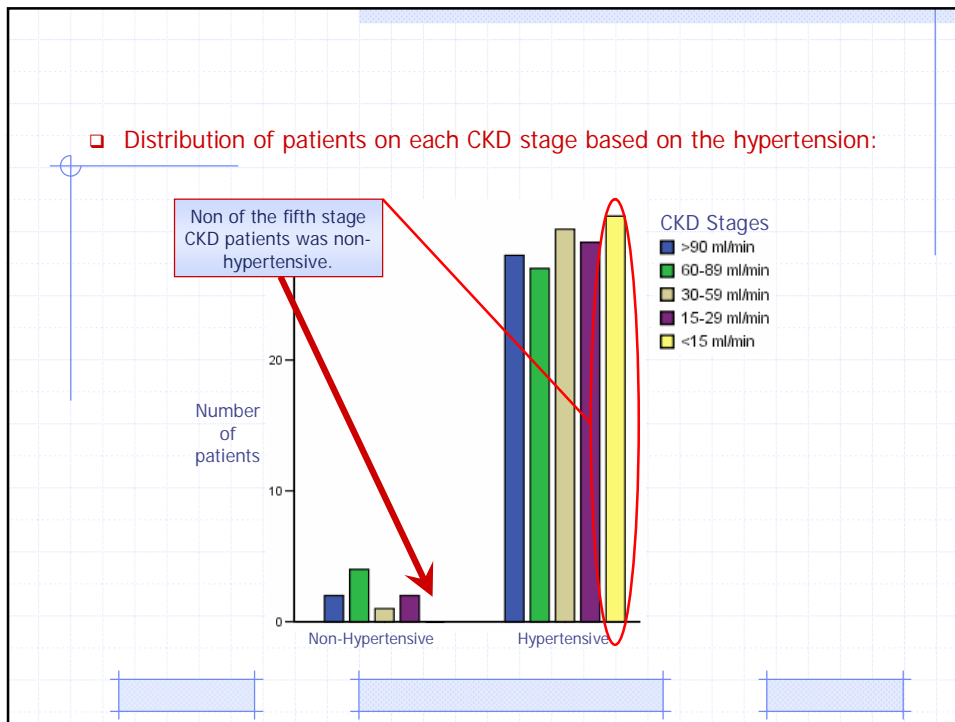
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