THE IMPACT OF ASYMPTOMATIC KIDNEY STONES ON DISEASE PROGRESSION IN AUTOSOMAL DOMINANT POLYCYSTIC KIDNEY DISEASE

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INTRODUCTION

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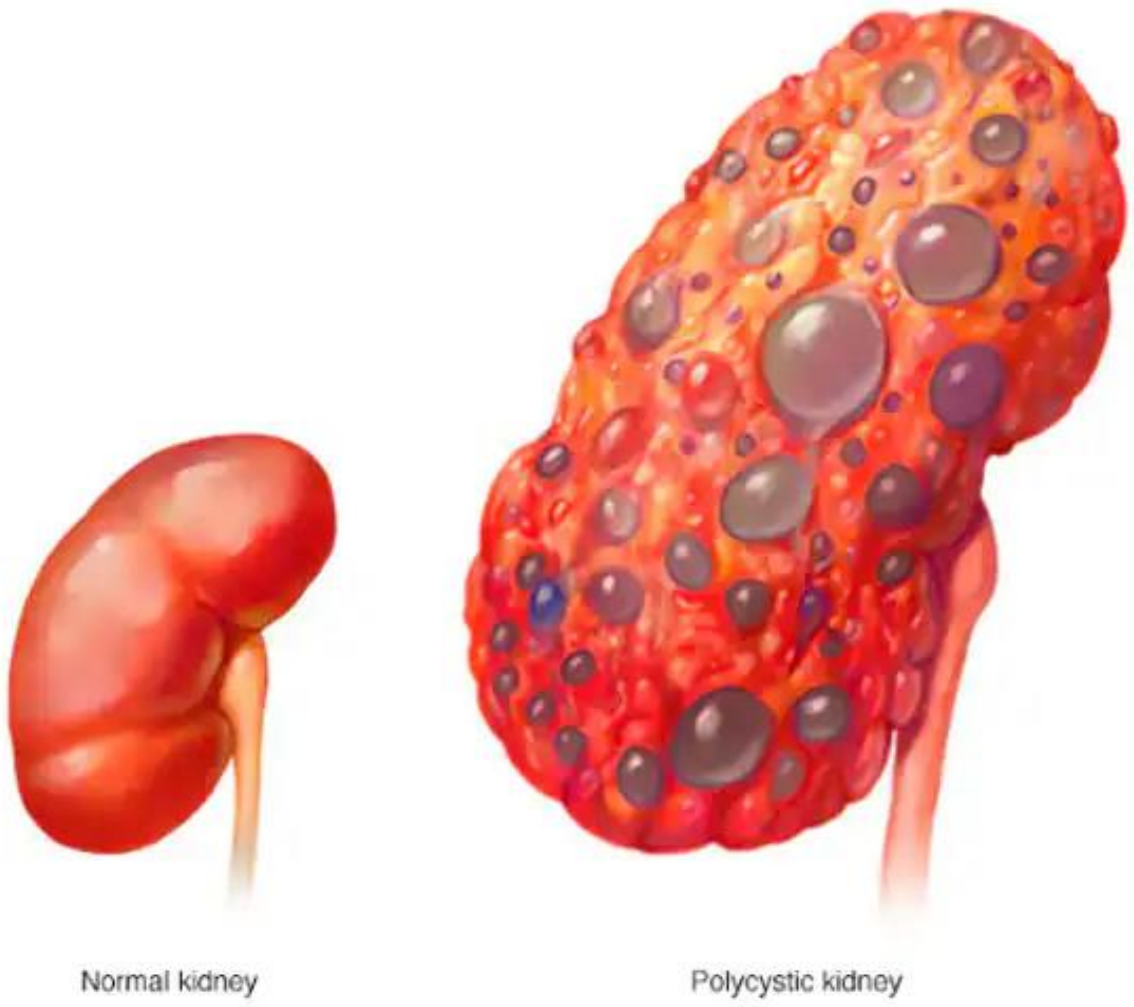
- Hypothesis
- What is Autosomal Dominant Polycystic Kidney Disease (ADPKD)
- Methods
- Results
- Conclusion

HYPOTHESIS

Asymptomatic nephrolithiasis accelerates renal function decline in Autosomal Dominant Polycystic Kidney Disease patients.

WHAT IS ADPKD?

- Autosomal Dominant Polycystic Kidney Disease (ADPKD) is one of the most common hereditary kidney disorders, with a prevalence of approximately 1:400 to 1:1000 live births, affecting millions worldwide [1].
- ADPKD is characterized by the progressive formation of fluid-filled cysts in the kidneys, leading to a decline in renal function [1,2].
- It is a major cause of end-stage renal disease (ESRD), with more than 50% of patients reaching ESRD by the age of 60.



MOST COMMON SYMPTOMS OF ADPKD

KIDNEY PAIN

You might feel kidney pain in your side, abdomen, or back. It can be moderate or intense depending on the severity of your condition.

URINARY TRACT INFECTIONS

Symptoms of a UTI can include painful urination, frequent urination, and back or flank pain.

KIDNEY STONES

Kidney stones are hard deposits that develop in the kidneys. They can cause abdominal pain and vomiting.

BLOOD IN URINE

Blood in the urine can appear pink, red, or brown, but it's not always visible to the naked eye. Sometimes, it's only detectable under a microscope.

HIGH BLOOD PRESSURE

High blood pressure is likely due to kidney cysts constricting blood vessels and making it harder for blood to flow properly.

FATIGUE

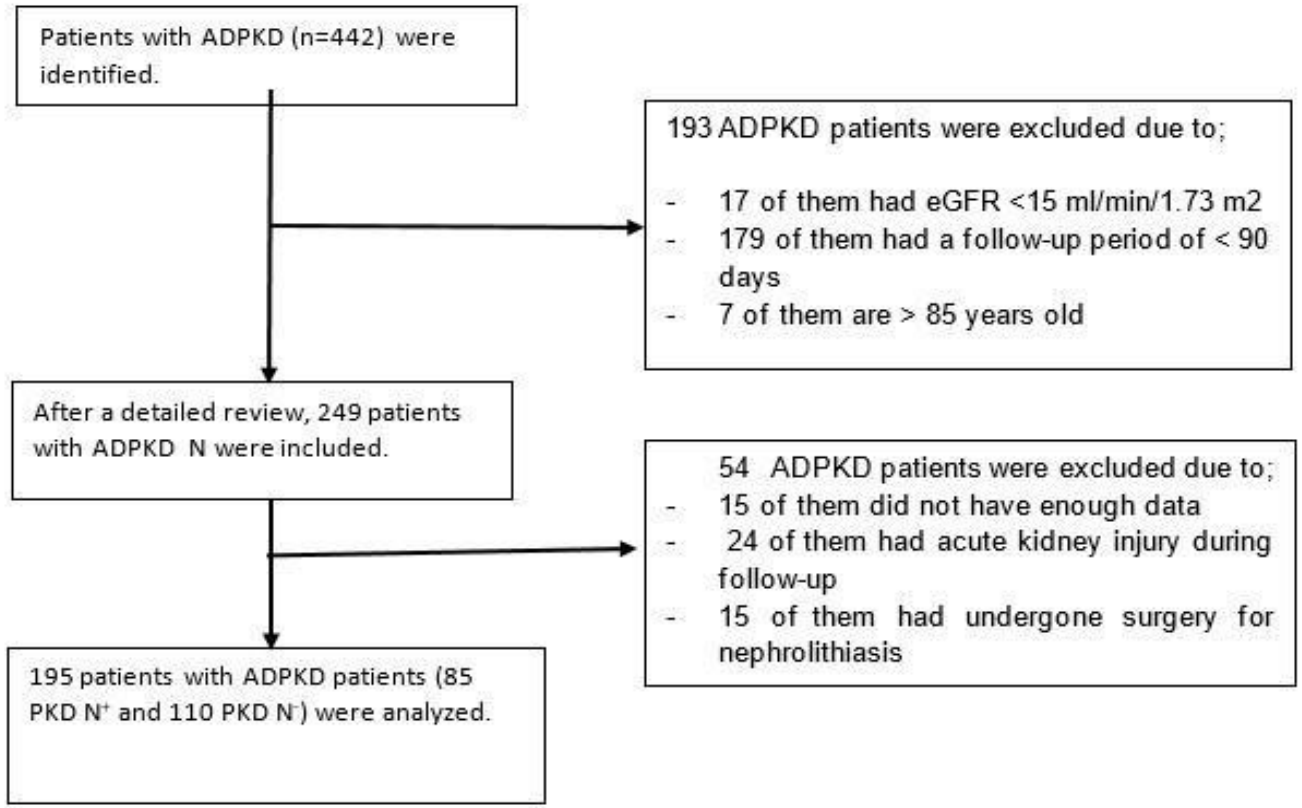
Some people with ADPKD have reported experiencing fatigue, weakness, or a general sense of discomfort.

AIM OF THE STUDY

- The aim of this study is to evaluate the impact of **kidney stones** on disease **progression** in patients with ADPKD both with and without nephrolithiasis.

METHOD

Figure 1. Flow chart of the study.



Abbreviations: ADPKD N+: autosomal polycystic kidney disease with nephrolithiasis, ADPKD N-: autosomal polycystic kidney disease without nephrolithiasis.

METHOD

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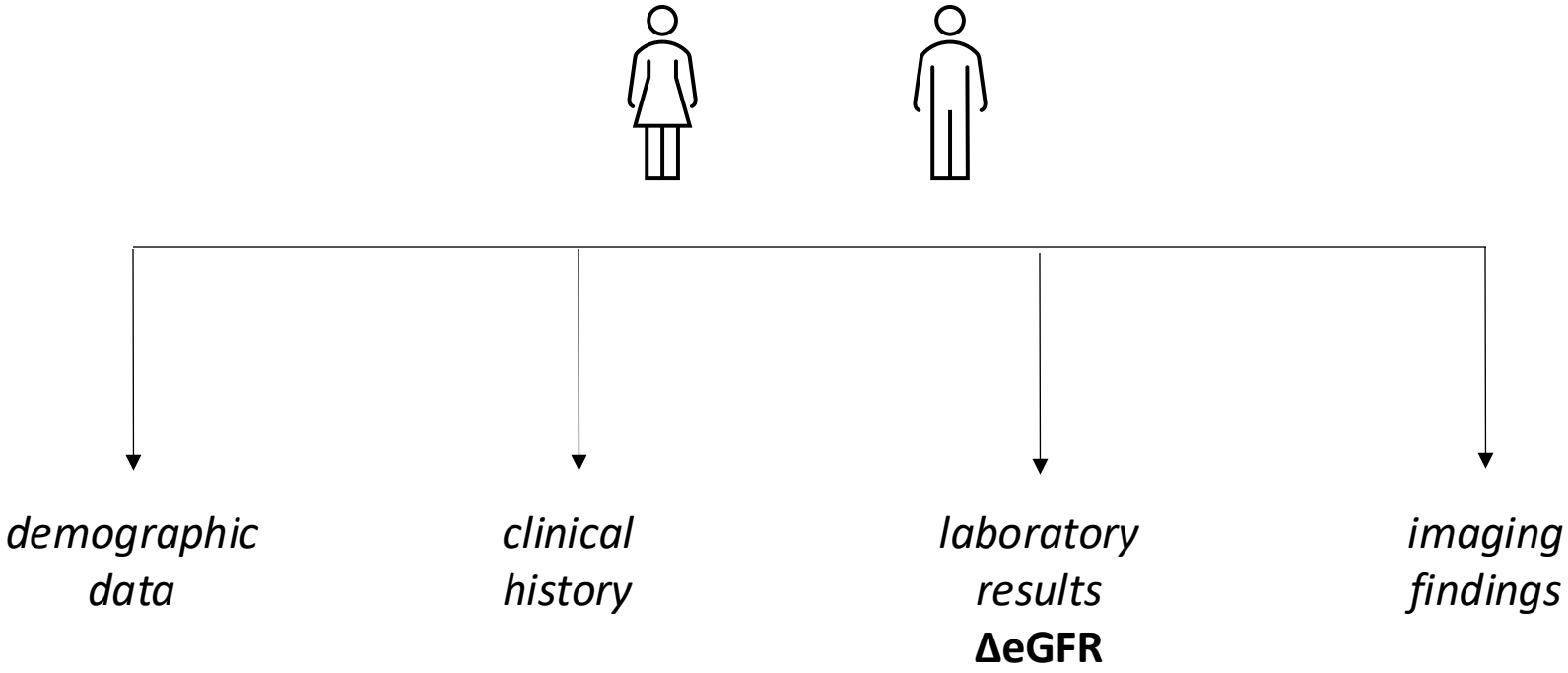

RESULTS

RESULTS

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Various biochemical parameters determined as mean values at baseline and during follow-up in patients with (ADPKD_N^+) and without (ADPKD_N^-) kidney stones (nephrolithiasis).

Biochemical parameters were expressed as median (IQR)	**ADPKD_N+ group (n=85)**	**ADPKD_N- group (n=110)**	**p***
Glucose_mean (mg/dl)	93,95 (87,65-103,88)	94,33 (87,33-101,89)	0,839
Urea_ mean (mg/dl)	41,33 (31,17-55,91)	42,67 (29,29-71,36)	0,605
Initial creatinine (mg/dl)	1,02 (0,82-1,39)	1,13 (0,79-1,64)	0,318
Creatinine-mean (mg/dl)	1,18 (0,88-1,64)	1,16 (0,83-1,95)	0,609
Initial_eGFR (ml/min/1.73m^2)	79,06 (58,26-112,73)	69,60 (42,93-103,66)	0,071
eGFR_mean (ml/min/1.73m^2)	62,58 (44,51-105,74)	59,34 (31,07-96,70)	0,199
ΔeGFR (ml/min/1.73m^2)	16,53 (10,04-27,49)	12,82 (7,10-22,03)	**0,008**
Albumin_mean (g/dl)	4,40 (4,24-4,55)	4,30 (4,15-4,50)	0,097
Calcium_mean (mg/dl)	9,48 (9,30-9,70)	9,40 (9,10-9,53)	**0,007**
Magnesium_mean (mg/dl)	1,92 (1,87-2,01)	1,92 (1,83-2,01)	0,511
Phosphorus_mean (mg/dl)	3,45 (3,14-3,75)	3,50 (3,18-3,80)	0,298
Sodium_mean (mmol/l)	139,73 (138,40-140,67)	139,67 (138,13-140,67)	0,749
Potassium_mean (mmol/l)	4,35 (4,22-4,60)	4,34 (4,17-4,64)	0,584
Bicarbonate_mean (mmol/l)	24,86 (24,39-24,86)	24,86 (24,86-24,86)	0,525
PTH_mean (pg/ml)	83,14 (60,93-121,08)	111,67 (56,90-143,73)	0,064
ALP_mean (IU/L)	74,84 (63,63-85,17)	74,84 (62,80-78,00)	0,770
Hemoglobin_mean (g/dl)	13,17 (11,98-14,72)	12,95 (12,09-14,29)	0,540
UPCR_mean (g/g)	13,17 (11,98-14,72)	12,95 (12,09-14,29)	0,834
Urine_Density_mean	1,012 (1,009-1,018)	1,011 (1,008-1,015)	0,079
Urine_pH_mean	6.0 (5,506,38)	6,0 (5,5-6,0)	0,978

RESULTS

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Correlation between ΔeGFR and other laboratory and clinical parameters

	ΔeGFR	
	R	P
Age (years)	-,184**	**0,010**
Follow-up Time (days)	,342**	**<0.001**
Body mass index (kg/m^2)	0,092	0,201
Urea_ mean (mg/dl)	0,008	0,907
Initial creatinine (mg/dl)	-0,127	0,077
Creatinine-mean (mg/dl)	0,035	0,629
Initial_eGFR (ml/min/1.73m^2)	,197**	**0,006**
Last_eGFR (ml/min/1.73m^2)	-0,107	0,137
eGFR_mean (ml/min/1.73m^2)	0,009	0,901
Glucose_mean (mg/dl)	-0,008	0,913
HBA1C_mean (%)	0,066	0,534
Total protein_mean (g/dl)	0,082	0,257
Albumin_mean (g/dl)	0,123	0,086
Calcium_mean (mg/dl)	0,096	0,180
Phosphorus_mean (mg/dl)	0,074	0,305
Magnesium_mean (mg/dl)	0,059	0,410
Sodium_mean (mmol/l)	-0,018	0,798
Potassium_mean (mmol/l)	0,039	0,589
ALP_mean (IU/L)	-0,029	0,691
PTH_mean (pg/ml)	-0,040	0,574
25-hydroxy-vitamin_D_mean	-0,097	0,179
Bicarbonate_mean (mmol/l)	-0,096	0,182
CRP_mean (mg/l)	-0,007	0,920
Hemoglobin_mean (g/dl)	0,069	0,340
UPCR_mean (g/g)	0,091	0,205
Urine_Density_mean	,116	0,105
Urine_pH_mean	-0,029	0,688

RESULTS

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Multiple linear regression model of factors associated with ΔeGFR.

	B	SE	β	P
ADBPH groups (N^+ and N^-)	3.159	1.588	**0.132**	**0.038**
Age	-0.131	0.077	-0.152	0.094
Follow-up period (days)	0.005	0.001	0.330	**<0.001**
Initial_eGFR (ml/min/1.73m^2)	0.017	0.029	0.054	0.548

Abbreviations: ADPKD= Autosomal dominant polycystic kidney disease, N^+: with nephrolithiasis, N^-: without nephrolithiasis, SE: standard error.

Δ: Initial value – last follow-up value**.**

Variables with significant p value in simple linear regression were selected for multiple linear regression model. R2=0.178 and adjusted R2=0.161

CONCLUSION

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- **Nephrolithiasis is a common complication of ADPKD**, and its presence should not be overlooked even in asymptomatic cases, as **it may still contribute to long-term adverse outcomes.**
- Further studies are needed to explore the **underlying mechanisms and potential interventions**.

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The impact of asymptomatic kidney stones on disease progression in autosomal dominant polycystic kidney disease

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Abstract

Background: Autosomal Dominant Polycystic Kidney Disease (ADPKD) is a common hereditary disorder leading to end-stage kidney disease due to the progressive formation of renal cysts. Nephrolithiasis is a frequent complication of ADPKD, with a prevalence significantly higher than in the general population. However, its role in disease progression remains underexplored. This study investigates the impact of asymptomatic nephrolithiasis on kidney function decline in ADPKD patients.

Methods: A retrospective cohort of 195 ADPKD patients was followed at our nephrology clinic. Of these, 85 patients had nephrolithiasis (N+), and 110 did not (N-). Data on demographic characteristics, biochemical parameters, and kidney function were collected. ΔeGFR (change in eGFR over time) served as the primary outcome. Statistical analyses, including correlation and multiple linear regression, were performed to assess the predictors of ΔeGFR.

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