

# Evidence-based medicine

Topic: peritoneal dialysis in ADPKD  
and non-ADPKD

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# Patient's profile

- This was a 29 y/o male with past history of
  - (1) chronic kidney disease, stage V, pre-dialysis stage, ADPKD related
  - (2) autosomal - dominant polycystic kidney disease (ADPKD)
  - (3) Gouty arthritis
  - (4) CAD post stenting
  - (5) Hypertension



# Patient's profile

- He went to 義大醫院 for acute gout attack, short of breath, urine amount decrease, orthopnea, nausea and vomiting.
- Due to uremic syndrome and acute pulmonary edema, emergent hemodialysis was performed on 7/3.
- Later he asked for transfer to our Hospital for further management.



# Patient's profile

- Lab data

	2007/7/9	2007/7/10	2007/7/11	1007/7/13
BUN	78.1		102.8	109.5
Cre	10.3		12.2	13
Na+	139			138
K+	3.4			3.4
pH	7.296	7.345		7.333
PaCO <sub>2</sub>	49.5	43.6		44.4
PaO <sub>2</sub>	53.3	44.6		52.2
HCO <sub>3</sub> <sup>-</sup>	23.6	23.3		23.1
SaO <sub>2</sub>	82.7	77.1		83.5

# Medical condition

- Inform patient and family to prepare for long-term dialysis.
- Renal Replacement Therapy (RRT): PD, HD, transplantation
- Family asked:  
“Could the patient received peritoneal dialysis other than hemodialysis???. . . . .”



# Background information: ADPKD

- Hereditary disorder, prevalence : 1/1000
- Mutations with pkd1 (85%) and pkd2 (15%)
- formation of renal cysts in the kidney and other organs (liver, pancreas, spleen)
- Symptoms progress with age
- The major cause of morbidity is progressive renal dysfunction
- half of patients with ADPKD undergo renal replacement therapy by age 60 years
- Cause of mortality:
  - Cardiovascular, on dialysis
  - Infection, on dialysis
  - Subarachnoidal hemorrhage from intracranial aneurysms (ICAs)

# Problems

- Could the ADPKD patient received peritoneal dialysis??
- Would peritoneal dialysis in ADPKD patients increase morbidity and mortality compared as hemodialysis??
- The differences of prognosis and outcomes in ADPKD patients on peritoneal dialysis and hemodialysis ??



# Thinking process



# P.I.C.O.

- P (patient):
  - Patient of ADPKD
- I (intervention):
  - Peritoneal dialysis
- C (comparison):
  - Hemodialysis
- O (outcome):
  - Prognosis, morbidity, and mortality

# Result

- Key words:
  - polycystic kidney disease
  - peritoneal dialysis



**ACP JOURNAL CLUB**  
Evidence-Based Medicine for Better Patient Care

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### ACP Journal Club - Search Results

Search for:

Phrases must be in "quotes"

Article type: 

- Therapeutics
- Diagnosis
- Clinical Prediction Guide
- Prognosis

 Don't use synonyms

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Found 1 matches. Showing 1 - 1.

**1. OAN: 2006 - Effect of dietary protein restriction on the progression of kidney disease: long term follow-up of the Modification of Diet in Renal Disease (MORD) Study.**

< Prev 1 Next >

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### Search Results for 'polycystic and (kidney or kidneys) and (disease or diseased or diseasing or diseases)'

Match: All | Format: Long | Sort by: Score

Refine search:

Documents 1 - 1 of 1 matches. More  \* indicate a better match.

[Intracranial Aneurysms \[April 2009, 74-8\]](#)  
... conditions for autopsy and angiography studies. Indications for angiography were family history of subarachnoid haemorrhage, autosomal dominant **polycystic kidney disease**, atherosclerosis, suspected pituitary tumour, brain tumour, or other. Results The frequency of incidental aneurysms varied considerable ...  
<http://www.ir2.ox.ac.uk/bandolier/band74/b74-8.htm/> 01/04/07, 11:19:00 bytes

The Cochrane Library | Evidence for healthcare decision making

SEARCH:

### Search Results:

There are 7 results out of 881 records for: "polycystic kidney disease in title, Abstract or keywords in The Cochrane Database of Systematic Reviews"

View: 4.2

<input type="checkbox"/>	Review title	Reviewed for:	Reviewed by:	Published:	Match %
<input type="checkbox"/>	<a href="#">Dietary protein restriction for the prevention of type 2 diabetes mellitus</a>	V Diabetes, PK 0 (PK, 00) studies	View: 2007	Review: <a href="#">Review</a>	
<input type="checkbox"/>	<a href="#">Blood pressure control strategies for autosomal dominant polycystic kidney disease</a>	AP Chronic, DL 7 (DL, 00) studies	View: 2007	Review: <a href="#">Review</a>	

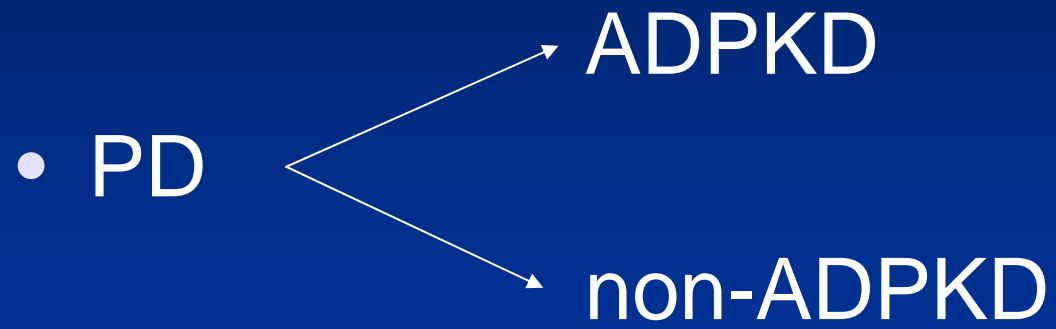
Display 20 (to report a problem)

- No useful results in ACP Journal Club, Bandolier, and Cochrane library

- So we changed the questions to ....
- In peritoneal dialysis groups, the differences of prognosis and outcomes in ADPKD and non-ADPKD



# Thinking process



# P.I.C.O.

- P (patient):
  - Patient on peritoneal dialysis
- I (intervention):
  - ADPKD
- C (comparison):
  - Non-ADPKD
- O (outcome):
  - Prognosis, morbidity, and mortality



- No useful result in ACP Journal Club, Bandolier, and Cochrane library
- Pubmed
  - Clinical Queries – Systemic Reviews (0)
  - 使用 MeSH search : “ ADPKD” and “ peritoneal dialysis” (2)
    - CAPD in patients with autosomal dominant polycystic kidney disease
    - A Comparison of Peritonitis in Polycystic and Non-Polycystic Patients on Peritoneal Dialysis



# 1. CAPD IN PATIENTS WITH AUTOSOMAL DOMINANT POLYCYSTIC KIDNEY DISEASE

- *Peritoneal Dialysis International*, Vol. 18, pp 429-432, 1998
- Retrospective, cohort study
- Methods:

Demographic Data on 26 Autosomal Dominant Polycystic Kidney Disease (ADPKD) Patients Starting CAPD and 26 Contemporary Control Patients

	ADPKD	Controls
Number of patients	26	26
Men/women	17/9	19/7
CAPD as first treatment (n)	22	19
Age at start of CAPD (years)	57±11	53±14

# CAPD IN PATIENTS WITH AUTOSOMAL DOMINANT POLYCYSTIC KIDNEY DISEASE

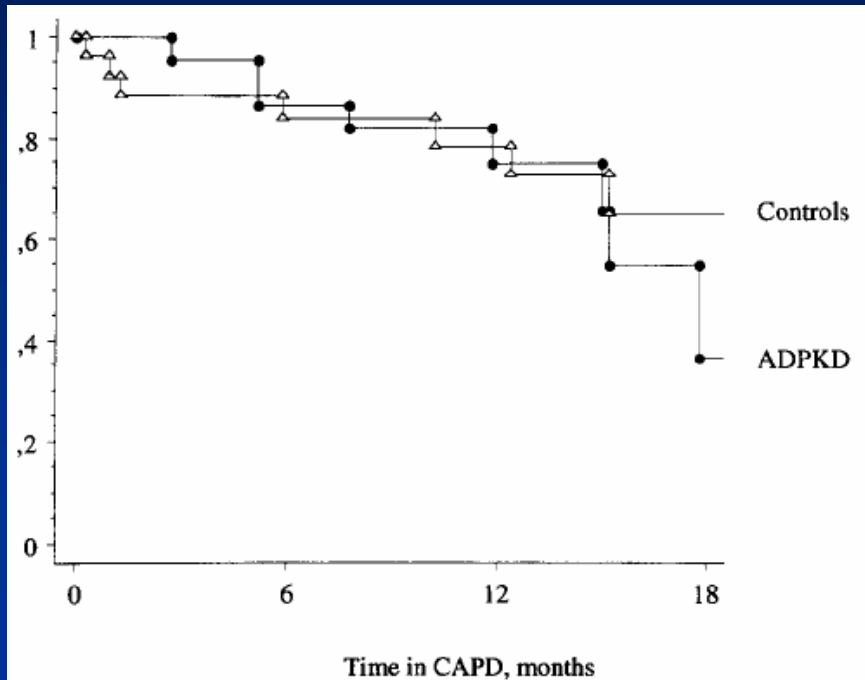


Figure 1 — Cumulative survival in CAPD of 26 patients with autosomal dominant polycystic kidney disease (ADPKD) and 26 contemporary controls, according to Kaplan–Meier. Patients who underwent renal transplantation were censored. Numbers at risk were 19 ADPKD patients and 18 control patients after 6 months and 11 and 14 after 12 months. There was no significant difference between the groups.

Reasons for Cessation of CAPD in 20 of 26 Autosomal Dominant Polycystic Kidney Disease (ADPKD) Patients and 17 of 26 Contemporary Control Patients

	ADPKD	Controls
Death	3	5
Transplantation	12	7
Definite transfer to hemodialysis due to		
Peritonitis	0	2
Hernia	0	0
Insufficient dialysis	2	0
Obesity	1	1
Pain related to catheter	1	2
Protein loss, hypotension	1	0

Peritonitis During CAPD Treatment in 26 Autosomal Dominant Polycystic Kidney Disease (ADPKD) Patients and 26 Contemporary Control Patients

	ADPKD	Controls
Number of patients with exit-site infections	2	2
Number of patients with peritonitis	7	12
Number of peritoneal infections	14	15
Infectious agents		
Cutaneous bacteria	9	8
Colonic bacteria	2	3
Negative culture	3	4

# CAPD IN PATIENTS WITH AUTOSOMAL DOMINANT POLYCYSTIC KIDNEY DISEASE

Results of Initial Peritoneal Dialysis Capacity (PDC) Measurement in 21 Autosomal Dominant Polycystic Kidney Disease (ADPKD) Patients and 20 Contemporary Control Patients (mean  $\pm$ SD) (There were no significant differences between the groups.)

	ADPKD	Controls
BMI (kg/m <sup>2</sup> )	23.3 $\pm$ 3.5	23.1 $\pm$ 4.7
Dialysis surface area (m <sup>2</sup> /1.73 m <sup>2</sup> )	2.45 $\pm$ 0.92	2.51 $\pm$ 0.80
Absorption (mL/min/1.73 m <sup>2</sup> )	1.9 $\pm$ 0.8	2.1 $\pm$ 0.9
Large pore flow (mL/min/1.73 m <sup>2</sup> )	0.10 $\pm$ 0.05	0.12 $\pm$ 0.10
Hydraulic conductance (mL/min/mmHg/1.73 m <sup>2</sup> )	0.07 $\pm$ 0.03	0.07 $\pm$ 0.03
Ultrafiltration rate (mL/24 hr)	574 $\pm$ 608	268 $\pm$ 474
PD clearance (mL/min/1.73 m <sup>2</sup> )	4.4 $\pm$ 0.8	4.5 $\pm$ 0.6
Total creatinine clearance (mL/min/1.73 m <sup>2</sup> )	6.2 $\pm$ 1.2	6.9 $\pm$ 1.5
Residual renal clearance (mL/min/1.73 m <sup>2</sup> )	1.9 $\pm$ 2.1	1.9 $\pm$ 1.4
Protein loss by PD (g/24 hr)	10.4 $\pm$ 3.2	10.2 $\pm$ 4.4
Dietary caloric requirement (kcal/24 hr)	1771 $\pm$ 323	1668 $\pm$ 399

- Result: CAPDs were no specific problems related to ADPKD
- Level of evidence: **2b**

## 2. A Comparison of Peritonitis in Polycystic and Non-Polycystic Patients on Peritoneal Dialysis

- *Peritoneal Dialysis International*, Vol. 24, No. 1, 2004
- Retrospective, cohort study
- Methods:
  - Peritonitis in 535 patients in CAPD

	non-ADPKD	ADPKD
patient No.	505	30
age	55.9±17.9	65.4±13.0
duration on CAPD	1.4	1.6

# A Comparison of Peritonitis in Polycystic and Non-Polycystic Patients on Peritoneal Dialysis

TABLE 1  
Episodes per Person-Year (with 95% Confidence Intervals)

Age (years)	Non-polycystic kidneys			Polycystic kidneys		
	≤60	61–70	>70	≤60	61–70	>70
Patients ( <i>n</i> )	273	98	134	10	8	12
Total episodes/person-year	0.45 (0.35, 0.59)	0.76 (0.56, 1.03)	0.73 (0.58, 0.92)	0.40 (0.16, 0.98)	0.64 (0.27, 1.55)	0.74 (0.36, 1.51)
Gram-negative episodes/person-year	0.27 (0.19, 0.38)	0.46 (0.32, 0.65)	0.33 (0.24, 0.46)	0.07 (0.02, 0.30)	0.21 (0.10, 0.46)	0.44 (0.17, 1.14)

- Age effect, not polycystic effect
- Peritoneal episodes in ADPKD was 11% lower than non-ADPKD
- G(-) episode in ADPKD was 35% lower than non-ADPKD

# A Comparison of Peritonitis in Polycystic and Non-Polycystic Patients on Peritoneal Dialysis

TABLE 2  
Number of Months per Episode

Age (years)	Non-polycystic kidneys			Polycystic kidneys		
	≤60	61-70	>70	≤60	61-70	>70
Patients ( <i>n</i> )	273	98	134	10	8	12
Total episodes (months/episode)	26.44	15.83	16.44	29.90	18.63	16.29
Lower CL	20.26	11.67	13.10	12.27	7.73	7.96
Upper CL	34.50	21.49	20.62	72.87	44.92	33.36
Gram-negative episodes [months/G(-) episode]	44.60	26.21	36.38	164.47	55.90	27.15
Lower CL	31.46	18.34	26.34	39.47	25.96	10.51
Upper CL	63.24	37.45	50.25	658.38	120.40	70.15

CL = confidence limit.

- Peritonitis:
  - Non-ADPKD: 20.18 months
  - ADPKD: 20.97 months
- G(-) peritonitis:
  - Non-ADPKD: 36.9 months
  - ADPKD: 53.13 months

# A Comparison of Peritonitis in Polycystic and Non-Polycystic Patients on Peritoneal Dialysis

- Results:
  - No difference of peritonitis and G(-) between ADPKD and non-ADPKD
- Level of evidence: **2b**

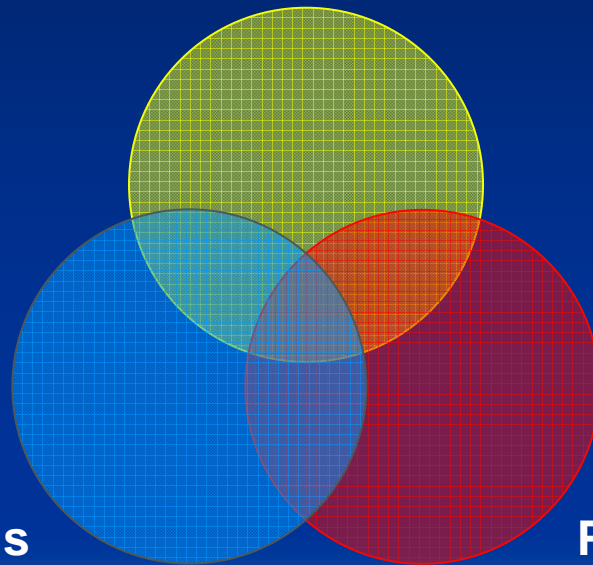


# Oxford Centre for Evidence-based Medicine Levels of Evidence

Level	Prognosis
1a	SR (with <a href="#">homogeneity*</a> ) of inception cohort studies; <a href="#">CDR†</a> validated in different populations
1b	Individual inception cohort study with $\geq 80\%$ follow-up; <a href="#">CDR†</a> validated in a single population
1c	All or none case-series
2a	SR (with <a href="#">homogeneity*</a> ) of either retrospective cohort studies or untreated control groups in RCTs
2b	<b>Retrospective cohort study</b> or follow-up of untreated control patients in an RCT; Derivation of <a href="#">CDR†</a> or validated on split-sample§§§ only
2c	"Outcomes" Research
3a	
3b	
4	Case-series (and <a href="#">poor quality prognostic cohort studies***</a> )
5	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"

# Clinical decision

Evidence-base medicine



Expert's opinions

Patient's opinions



# Clinical decision

- Evidence-base medicine:
  - no significant difference of mortality and morbidity in peritoneal dialysis between ADPKD and non-ADPKD (2b)



# Clinical decision

- **Expert's opinion:**
  - ADPKD had defects in various wall structure, increased rates of diverticulum, herniation, and aneurysms, so increased rate of diverticulitis, and then peritonitis
  - may complicated in clinical diagnosis and decision making: peritonitis, cyst infection, cyst rupture, hemorrhage



# Clinical decision

- **Patient's opinion:**
  - Convenient??
  - Self-care quality??
- **Final Clinical decision:**
  - He receive AV fistula creation, and now receive regular HD

