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Original Article

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Polycystic kidney size and outcomes on peritoneal dialysis: comparison with haemodialysis

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Abstract

Background. For many nephrologists, patients with polycystic kidney disease (PKD) have an increased risk of complications and technique failure on peritoneal dialysis (PD) due to enlarged kidneys. The literature showed that PD can be as good a therapeutic option as haemodialysis (HD) for patients with PKD. However, no study has focused on the impact of polycystic kidney size on outcomes for patients on PD.

Methods. This is a retrospective monocentric study. Fifty-eight patients with PKD started dialysis between January 2000 and December 2010: 24 on PD and 34 on HD. Kidney size assessed by abdominal computed tomography scans was available for 45 patients (19 on PD and 26 on HD). PD technique survival, specific PKD complications and mechanical and infectious PD complications, as need for pre-transplant nephrectomy and kidney transplantation, were considered.

Results. The two cohorts were similar in terms of age and body surface area. The median kidney size was not significantly different between PD and HD patients [19.1 cm (12.5–32.5) versus 16.5 cm (11.8–33.8), respectively, P = 0.13]. However, we identified an increased number of PD patients with larger kidneys [(>25 cm) (27.8% on PD versus 7.7% on HD (P = 0.07)]. Neither cystic (infection or haemorrhage) nor mechanical complications (hernias and leaks) were different in PD or HD. Ten patients experienced PD-related peritonitis, mainly due to non-enteric bacterial pathogens. The main reason for stopping PD and HD was transplantation. Six PD patients underwent nephrectomy in order to access the transplant programme. Among them, five were maintained on PD after surgical procedure with good adequacy dialysis criteria.

Conclusions. We observed no deleterious impact of kidney size on outcomes on PD when compared with HD. A large kidney size in patients with PKD is not a contraindication to PD. Patients for whom a pre-transplant nephrectomy is mandatory can also safely opt for PD as a dialysis method.

Keywords: dialysis; kidney size; nephrectomy; polycystic kidney disease

Introduction

Adult polycystic kidney disease (PKD) is the most common inherited renal disease. PKD affects 1/400 to 1/1000 individuals, making this disease the Western world's fourth leading cause of end-stage renal diseases (ESRD) after diabetes, hypertension and glomerulonephritis [1]. Data from the French dialysis registry *Réseau Epidémiologie et Information en Néphrologie* (REIN) showed that among 9584 patients who started dialysis in 2011, 98 (6.2%) had PKD as cause of ESRD [2]. This registry also indicated that peritoneal dialysis (PD) was significantly less often chosen by PKD patients than other nephropathy to start dialysis [3].

The lower number of patients on PD in PKD most probably reflects some of the concerns that nephrologists may have in this regard. Indeed, the issue of an increased rate of mechanical complications (leak, hernia) and enteric peritonitis due to higher intra-peritoneal pressure (IPP), especially in patients with a past history of diverticulosis (by enteric bacterial translocation) can be raised [4–7]. Nevertheless, considering studies in a large cohort recently published, PD is now considered as a feasible dialysis method for most PKD patients without higher risk of infectious or mechanical complications [8–10]. However, a selection bias in the population studied can occur as authors cannot exclude that PKD patients were selected for PD, based on a low kidney volume. Some nephrologists may also be reluctant to increase volumes of infused dialysate to avoid elevated intraperitoneal pressure (IPP), particularly for PKD patients with the largest kidneys. Consequently, adequacy parameters might be difficult to reach for these patients. Finally, many PKD patients are listed for kidney transplantation and some may require a

unilateral pre-transplant of the native nephrectomy 'to make space' for transplantation. In this situation, some concerns might again be expressed regarding evolution of renal residual function after such surgery and doubts have been raised regarding the difficulties of achieving adequacy parameters.

Today, although PD is considered to be a suitable dialysis method for most PKD patients, some questions still remain unanswered. PKD is a very polymorphic disease considering kidney size and the potential influence of kidney size both on infectious and mechanical complications. Previous studies evaluated the results of PD in PKD patients but none took into account the kidney size as a key variable. Moreover, studies have not as yet compared PKD patients on PD versus HD to analyse the respective infectious or mechanical complications, with the potential influence of kidney size.

Here, we report our experience in the management of PKD patients on HD and PD over a 10-year period. We also explored the influence of kidney size, as measured by abdominal computed tomography (CT) scan, on outcomes of PKD patients on PD when compared with those on HD.

Materials and methods

Study population

This study is a retrospective chart review of all PKD patients who started dialysis (PD or HD) between January 2000 and December 2010 at the University Hospital, Besançon, France.

Demographic and baseline clinical characteristics. During this period 556 patients were on HD and 391 on PD. Among them, 58 PKD patients began dialysis. The dialysis method was chosen by the patients in accordance with their referent nephrologist. No systematic policy in the department to favour PD or HD according to specific situations was established. Clinical parameters such as age, gender, weight, height, past medical history of diabetes, age at the start of dialysis and dialysis modality were collected at inclusion. We also recorded complications of PKD that had occurred before dialysis onset (cyst haemorrhage and infection, symptomatic diverticulosis and hernia surgery). Patients listed for kidney transplantation were reported. Patients with a past history of kidney transplantation were excluded.

Follow-up. The time on dialysis treatment was recorded. Complications of PKD were also recorded over the dialysis period. Other complications inherent to PD such as leak and peritonitis were reported.

Among reasons for stopping PD, kidney transplantation and transfer from PD to HD, as well as its indication (peritonitis, inadequate dialysis, mechanical complication ...), were analysed. Data on mortality and causes of death were included.

All patients listed for kidney transplantation were considered by the surgical kidney transplant team to evaluate their need for a unilateral pre-transplant native nephrectomy. Indeed, during the entire study period, the surgical team policy was to plan a pre-transplant retroperitoneal nephrectomy systematically if the lower poles of the kidneys were located in the iliac fossae. The need for a native nephrectomy during dialysis treatment was assessed as well as the indication given (space for transplantation, recurrent bleeding or infection).

For patients on PD, adequacy parameters (weekly urea and creatinine clearances), urine output and peritoneal membrane permeability status (D/P creatinine in 4 h, 2.27% glucose PET) were analysed.

Kidney size measured by CT scan

Forty-five abdominal CT scans were available in the 56 PKD patients (19 and 26 for patients on PD and HD, respectively). The sub-group with abdominal CT scan was representative of the total population (data not shown). Abdominal CT scan was mainly done either for surgical pre-transplant screening before kidney transplantation, or for PKD complications (abdominal pains, bleeding or infection). A reproducible measurement was made by one radiologist at the University Hospital, Besançon, France. The kidney size was measured considering the longest kidney axis on a sagittal plane of abdominal sections. As a final value for each patient, we considered the mean size of the two kidneys as no asymmetric kidney size was observed (data not shown). Moreover, it has been previously demonstrated that an annual rate of increase in total kidney volume did not differ significantly between the left and right kidneys [11].

Statistical analysis

All data are reported as mean ± standard deviation or median and range for continuous variables unless otherwise indicated as percentages for categorical data. For normally distributed variables, patients on PD and HD were compared using the χ^2 test for dichotomic variables and Student's *t*-test for continuous variables. Differences were considered statistically significant for $P < 0.05$.

Results

Baseline characteristics

Fifty-eight PKD patients began dialysis over a 10-year period: 24 on PD (41%) and 34 on HD (59%). The mean age at dialysis start was 55 years. PD was mainly started in automated PD (APD) (67%) compared with continuous ambulatory PD (CAPD) (33%).

There was no statistical difference between PD and HD patients at inclusion except a higher proportion of patients listed for transplantation on HD (85%) compared with PD (54%) ($P = 0.009$). We also observed a higher proportion of older patients (age upper 70 years) on PD versus HD, 37.5 versus 6%, respectively ($P = 0.002$) (Table 1).

The median kidney size was not significantly different between the two cohorts. Nineteen (76%) PD patients were assessed by CT scan with a median kidney size of 19.1 cm (12.5–32.5 cm) and 26 (76.5%) patients on HD with a median kidney size of 16.5 cm (11.8–33.8 cm) ($P = 0.13$). To better represent the space occupied by kidneys in the abdominal cavity, we also calculated the median kidney size/body surface area ratio. We did not observe any difference between PD and HD patients (data not shown). Nonetheless, the analysis taking into account five ranges of median kidney size (<15, 15–20, 20–25 and >25 cm) identified an increased number of PD patients

Table 1. Baseline characteristics

	HD ($n = 34$)	PD ($n = 24$)	P
Gender (male, %)	15 (44)	16 (66.7)	0.09
Weight (kg)	70.9 ± 13.8	71.3 ± 14.1	0.9
Height (m)	1.62 ± 0.3	1.7 ± 0.1	0.9
Body surface area (m^2)	1.8 ± 0.2	1.8 ± 0.2	0.5
Diabetes mellitus (%)	2 (5.9)	0	–
Specific PKD complications before starting dialysis			
None (*n*, %)	19 (55.8)	12 (50)	0.7
Cystic complication (recurrent infections, hemorrhage) (*n*, %)	9 (26.5)	8 (33.3)	0.6
Hernia surgery (*n*, %)	5 (14.7)	4 (16.7)	0.8
Symptomatic diverticulosis (*n*, %)	2 (5.9)	0	0.2
Dialysis modality at starting	Arteriovenous fistula, $n = 33$ Venous central catheter, $n = 1$	CAPD, $n = 8$ (33.3%) APD, $n = 16$ (66.7%)	
Age at dialysis start (years)	54 ± 10	57 ± 17	0.4
Patients listed for kidney transplantation (*n*, %)	29 (85.3)	13 (54.2)	0.009
Median kidney size (cm)	16.5 [11.8–33.8] ($n = 26$)	19.1 [12.5–32.5] ($n = 19$)	0.13

Table 2. Outcomes after dialysis start on haemodialysis (HD) and peritoneal dialysis (PD)

	HD ($n = 34$)	PD ($n = 24$)	P
Median time on dialysis (months)	22 [2–125]	19 [1–64]	0.19
Specific PKD complications after starting dialysis			
No (*n*, %)	25 (73.5)	18 (75)	0.9
Median kidney size (cm)	15.55 [12.8–33.8] ($n = 19$)	18.8 [12.5–32.5] ($n = 14$)	0.15
Yes (*n*, %)	9 (26.5)	6 (25)	0.9
Median kidney size (cm)	21.3 [11.8–27.1] ($n = 7$)	23.7 [12.6–30.4] ($n = 5$)	0.65
Cystic complication (recurrent infections, hemorrhage) (*n*, %)	7 (20.6)	3 (12.5)	0.4
Hernia surgery (*n*, %)	1 (2.9)	2 (8.3)	0.4
Symptomatic diverticulosis (*n*, %)	1 (2.9)	1 (4.2)	0.8
Peritonitis	–	15 episodes/10 patients	
Enteric peritonitis	–	3	
Adequacy parameters (*n*, %)			
At 6 months: $n = 20$			
6 months: total weekly Kt/*V* urea >1.7	–	18 (90)	
6 months: total weekly creatinine clearance >45 L/1.73 m^2	–	17 (85)	
At 1 year: $n = 15$			
1 year: total weekly Kt/*V* urea >1.7 + creatinine clearance >45 L/1.73 m^2	–	12 (80)	
At 2 years: $n = 8$			
2 year: total weekly Kt/*V* urea >1.7 + creatinine clearance >45 L/1.73 m^2	–	6 (75)	
Nephrectomy (*n*, %)	22 (64.7)	6 (25)	0.003
Pre-transplant unilateral native nephrectomy (*n*, %)	18 (52.9)	6 (25)	0.03
Median kidney size (cm)	20.7 [12.8–33.8] ($n = 13$)	26.9 [16.2–32.5] (n = 6)	0.09
Median time on dialysis before pre-transplant nephrectomy (months)	4 [0–30]	9 [8–17]	0.2
Kidney transplantation (*n*, %)	27 (79.4)	10 (41.7)	0.003
Patients not listed for kidney transplantation censured	93.1% ($n = 27/29$)	76.9% ($n = 10/13$)	0.13
Median time on dialysis before transplantation (months)	18 [2–59]	18 [9–36]	0.4
Death (*n*, %)	3 (8.8)	5 (20.8)	0.19
Transfer from DP to HD	–	7 (29.1%)	
Median kidney size (cm)		20.3 [12.5–31.1] ($n = 5/6$) following by: 4 still on HD 1 kidney transplantation 2 deaths	

with larger kidneys (>25 cm) [27.8% on PD versus 7.7% on HD (P = 0.07)].

More than 50% of the PKD patients both on PD and HD did not experience specific PKD complications before starting dialysis.

Follow-up

The median time on dialysis for the entire cohort was 19 months (1–125 months), without significant difference between both groups (P = 0.19) (Table 2).

PKD complications and mechanical complications. None of the patients underwent hernia surgery at the same time of PD catheter insertion.

Most PD and HD patients did not experience any specific PKD complication during dialysis treatment. One PD patient developed early right hydrothorax linked to a pleuroperitoneal leak with immediate and definitive transfer to HD. One HD and two PD patients underwent hernia surgery. On PD, hernia surgery always led to temporary transfer to HD (4 weeks) before PD recovery.

For patients with CT documentation of size, for both PD and HD, the median kidney size was numerically larger for patients with complications compared with those without: 23.7 versus 18.8 cm on PD and 21.3 versus 15.5 cm on HD, respectively (P = 0.8 on PD and P = 0.4 on HD).

Peritonitis in PD patients. Fifteen episodes of infectious peritonitis occurred in 10 patients (7 patients with

1 episode, 2 patients with 2 episodes and 1 patient with 4 episodes, respectively). Microbiology results were available for all episodes. Overall, seven were caused by Gram-positive organisms, mainly streptococci, one by Gram-negative organisms and seven were culture-negative peritonitis episodes. No polymicrobial peritonitis cases occurred. One patient was transferred to HD within 30 days following a non-enteric peritonitis. No peritonitis episodes required the removal of PD catheter.

There were three episodes of enteric peritonitis: one episode linked to symptomatic diverticulosis and two episodes without underlying enteric diseases found. Two episodes of enteric peritonitis resolved after antibiotherapy adapted to the antibiotic assay and one patient (77 years old) died during his stay in intensive care with death attributed to the peritonitis

Adequacy on PD. Adequacy parameters on PD were analysed at 6 months, 1 year and 2 years. For this analysis, three patients had no data available over the period on PD and one patient had no data consequent to his transfer to HD after early pleuroperitoneal leak. At 6 months ($n = 20$), 18 patients (90%) had weekly total Kt/*V* urea >1.7 and 17 patients (85%) had weekly total creatinine clearance >45 L/1.73 m^2. At 1 year ($n = 15$: 3 kidney transplantations and two transfers to HD), the adequacy target parameters were both achieved in 80% of the patients. At 2 years ($n = 8$: 5 kidney transplantations, 1 transfer to HD and 1 death), adequacy parameters were both reached in 75% of the patients. Two patients never achieved adequacy parameters and were transferred to HD after 2 years on PD. The mean kidney size of these two patients was 14.1 and 26.8 cm. A third patient had breast cancer at PD start with progressive alteration of her general state. Adequacy parameters were not reached but PD prescription was not changed and she died after 1 year.

Outcome at the end of the follow-up

(i) Kidney transplantation: it was the main outcome both in PD and HD patients. Thirteen PD patients and 29 HD patients were listed for kidney transplantation which occurred in 77% ($n = 10$) and 93% ($n = 27$) of patients on PD and HD, respectively (P = 0.13). The median time on PD and HD before kidney transplantation was 18 months in the two groups. One more patient, first on PD, underwent kidney transplantation after transfer to HD.

(ii) Transfer from PD to HD: seven patients were transferred from PD to HD. Reasons for transfers were early pleuroperitoneal leak ($n = 1$), PD catheter dysfunctions ($n = 2$), patient choice ($n = 1$), non-enteric peritonitis ($n = 1$) and inadequate dialysis ($n = 2$). For patients with CT documentation of size, the median kidney size was not larger for patients on PD transferred to HD compared with those not transferred [20.3 cm (12.5–31) versus 19 cm (12.6–32.5), respectively, P = 0.98]. Among these seven patients, one underwent kidney transplantation after transfer to HD, four were still on HD at the end of the follow-up and two died.

(iii) Still on dialysis: six patients were still on dialysis at the end of follow-up (two on PD and four on HD). Four patients, transferred from PD to HD, were also still on dialysis.

(iv) Death: eight patients died during follow-up (five on PD and three on HD). Causes of death were related to PD in one case, following an enteric peritonitis episode, as mentioned earlier. For those on HD, cause of death was related to PKD status for one patient (death after pre-transplant nephrectomy). Two additional patients, initially on PD, died after being transferred to HD.

(v) Pre-transplant native nephrectomy: more patients on HD underwent nephrectomy compared with those on PD [$n = 22$ (64%) on HD versus $n = 6$ (25%) on PD; P = 0.003]. For those on PD, all nephrectomies were required for kidney transplantation. One patient among the PD cohort actually started on HD just after his pre-transplant nephrectomy and was transferred definitively to PD 1 month later. Of those on HD, 18 (81.8%) nephrectomies were pre-transplant nephrectomies and 4 were linked to cystic complications such as recurrent cystic infections and/or haemorrhage. The median time on PD and HD before pre-transplant nephrectomy was 9 months (8–17) and 4 months (0–30), respectively (P = 0.2). For patients with CT documentation of size, the median size of the native kidneys removed on PD and HD was 26.9 cm (16.2–32.5) and 20.7 cm (2.8–33.8), respectively (P = 0.09).

Outcome after pre-transplant nephrectomy on PD

Six patients underwent pre-transplant nephrectomies on PD. All nephrectomies were followed by one month on HD. After this period of temporary HD, one patient refused to restart but for all the others, PD was resumed. Adequacy parameters and urine volume output were available for four patients after nephrectomy. For all of them, adequacy parameters were achieved and urine output preserved. Evolution of peritoneal permeability membrane status over the period following pre-transplant nephrectomy was available for three patients and showed no modification of status.

Discussion

Few previous studies had already reported that PD can be as a good therapeutic option as HD for patients with PKD [8–10]. Nevertheless, PD is often avoided because of concerns about mechanical complications and enteric peritonitis. Consequently, the proportion of PKD patients on PD compared with HD is still low [3]. The present study, performed on 58 PKD patients, shows that in over 10 years' experience, PD could have been proposed to PKD patients with good results. Many patients on PD and HD, both during the pre- and post-dialysis period, did not experience complications attributable to PKD status. During the period studied, no assessment of IPP was performed in order to guide the prescription of intraperitoneal volumes. Although there was a trend for patients on PD to have larger kidneys than on HD, the intraperitoneal volumes infused were standard (fill volume commonly prescribed: 2 L) without negatively impacting outcomes on PD. APD, widely used in our PKD patients, a usually young population, might be an answer. In APD, higher fill volumes of dialysate are better tolerated with a lower risk to increase IPP [12]. The low risk of enteric peritonitis observed in our cohort is consistent with previously published data [13, 14]. Lobbedez *et al.* [8] recently performed a retrospective cohort study based on the data of the French dialysis registry *Registre de Dialyse péritonéale de Langue Française* (RDPLF) by comparing 344 PKD patients with 3818 non-PKD patients. They found neither a higher incidence of enteric peritonitis within the PKD cohort, nor

any association between PKD as cause of PD technique failure. In the literature, Dejardin *et al.* [15] observed that an IPP >14 cmH_2O was associated with a significantly higher incidence of enteric peritonitis in a cohort of 61 consecutive PD patients; the number of PKD patients was however too low to draw firm conclusions about the influence of IPP in this population.

PKD patients mainly achieved the recommended adequacy parameters. It is worth noting that PKD patients with the largest kidneys, in our cohort, were on PD, reinforcing the fact that access to PD can be offered to these patients, prioritizing, if possible, APD, allowing a good performance with less limitation and better tolerance of the fill volumes prescribed.

In 2012, data issued of the report from the French peritoneal dialysis registry (RDPLF) showed that 36% of patients stopping PD were due to transfer to HD, making a transfer from PD to HD the second leading cause for stopping PD after death [16]. Here, the uncertainty surrounding the safety and sustainability of PD technic rather than PKD status itself was the main cause of the low rate of transfer from PD to HD observed over the 10-year period. As expected, the main reason for stopping dialysis was kidney transplantation. These results again are consistent with those of Lobbedez *et al.* based on the data of the RDPLF and could be explained by the younger age of these patients and the lower prevalence of comorbidities [6]. As a result, the average time on dialysis was also likely short in this population. We also described an older population on PD compared with HD with consequently a significantly lower rate of kidney transplantation with PD. For those on PD, one of the main concerns which may lead a majority of nephrologists to prefer HD for PKD patients could also be the need to perform nephrectomy before kidney transplantation. When PD is chosen as a dialysis method, this surgical procedure commonly planed when starting dialysis is required, is always first followed by 1 month on HD in our centre. We reported a good experience in about five patients on PD needing pre-transplant nephrectomy and maintained on PD after the required temporary HD period and this until kidney transplantation. Unfortunately, only few data about peritoneal membrane permeability were available after pre-transplant nephrectomy but no modification was observed. To our knowledge, this study is the first to compare PKD patients on PD and on HD. Analysis of the absence of a deleterious impact of kidney size on outcomes on PD when compared with HD is also an original finding of our study. Positive outcomes in adults on PD after native nephrectomy have already been published. This literature is mainly represented by case reports and mostly reports native nephrectomy for kidney cancer and not for PKD patients listed for transplantation [17, 18]. Other teams may have a different policy and may, for example, schedule a native nephrectomy only during the kidney transplantation procedure. In our cohort, frequently PKD patients on PD requring a pre-transplant nephrectomy, and we report here the safety of maintaining PD when nephrectomy is planned during PD therapy and also to transfer to PD when nephrectomy has been performed followed by HD as a first dialysis method.

The main limitation of our study is, first, the small number of patients which did not allow strong statistical power analysis. However, the Franche-Comté (Besançon) is the region in France with the highest PD incidence and prevalence rate (data issued of REIN 2011). Therefore, the experience reported here provides a valuable tool to effectively compare two PKD cohorts quite similarly distributed between HD and PD. Secondly, we unexpectedly observed a higher proportion of patients on HD requiring a pre-transplant nephrectomy but this does not detrimentally affect our conclusions. Finally, CT scans were performed at different time points during dialysis, so we did not consider the possible kidney volume progression in our patients.

In conclusion, our study provides strong data to show that PD is a successful kidney replacement modality for many PKD patients, whatever their kidney size, even in patients who need a pre-transplant nephrectomy.

Authors' contribution

C.C.: study design, draft of the manuscript and supervision of the project. C.R.: data review and revision, manuscript preparation. E.D.: data collection. C.B.-V.: data collection and patient recruitment. J.M.C.: patient recruitment. D.D.: manuscript preparation.

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References

1. Torres VE, Harris PC, Pirson Y. Autosomal dominant polycystic kidney disease. *Lancet* 2007; 369: 1287–1301
2. REIN annual data report. www.soc-nephrologie.org/REIN/documents.htm
3. Couchoud C, Savoye E, Frimat L *et al*. Variability in case mix and peritoneal dialysis selection in fifty-nine French districts. *Perit Dial Int* 2008; 28: 509–517
4. Bargman JM. Hernias in peritoneal dialysis patients: limiting occurrence and recurrence. *Perit Dial Int* 2008; 28: 349–351
5. Del Peso G, Bajo MA, Costero O *et al*. Risk factors for abdominal wall complications in peritoneal dialysis patients. *Perit Dial Int* 2003; 23: 249–254
6. De V, Scalamogna A, Scanziani R *et al*. Polycystic kidney disease and late peritoneal leakage in CAPD: are they related? *Perit Dial Int* 2002; 22: 82–84
7. Scheff RT, Zuckerman G, Harter H *et al*. Diverticular disease in patients with chronic renal failure due to polycystic kidney disease. *Ann Intern Med* 1980; 92(Pt 1): 202–204
8. Lobbedez T, Touam M, Evans D *et al*. Peritoneal dialysis in polycystic kidney disease patients. Report from the French peritoneal dialysis registry (RDPLF). *Nephrol Dial Transplant* 2011; 26: 2332–2339
9. Li L, Szeto CC, Kwan BC *et al*. Peritoneal dialysis at the first-line renal replacement therapy in patients with autosomal dominant polycystic kidney disease. *Am J Kidney Dis* 2011; 57: 903–907
10. Kumar S, Fan SL, Raftery MJ *et al*. Long term outcome of patients with autosomal dominant polycystic kidney diseases receiving peritoneal dialysis. *Kidney Int* 2008; 74: 946–951
11. Sise C, Kusaka M, Wetzel LH *et al*. Volumetric determination of progression in autosomal dominant polycystic kidney disease by computed tomography. *Kidney Int* 2000; 58: 2492–2501
12. Fischbach M, Terzic J, Dangelser C *et al*. Improved dialysis dose by optimizing intraperitoneal volume prescription thanks to intraperitoneal pressure measurements in children. *Adv Perit Dial* 1997; 13: 271–273
13. Pandya BK, Friede T, Williams JD. A comparison of peritonitis in polycystic and non-polycystic patients on peritoneal dialysis. *Perit Dial Int* 2004; 24: 79–81

14. Hadimeri H, Johansson AC, Haraldsson B *et al*. CAPD in patients with autosomal dominant polycystic kidney disease. *Perit Dial Int* 1998; 18: 429–432
15. Dejardin A, Robert A, Goffin E. Intraperitoneal pressure in PD patients: relationship to intraperitoneal volume, body size and PD-related complications. *Nephrol Dial Transplant* 2007; 22: 1437–1444
16. RDPLF (Registre de Dialyse Peritonéale de Langue Française) annual data. www.rdplf.org/epidemiologie-dialyse-peritoneale.html
17. Creagh T, Grace P, Bouchier-Hayes D *et al*. Peritoneum-preserving radical nephrectomy in a patient on continuous ambulatory peritoneal dialysis. *Eur Urol* 1992; 21: 172–173
18. Hsu CY, Hsieh MF, Sun CY *et al*. Patient able to stay on peritoneal dialysis after retroperitoneal-approach radical nephrectomy. *Perit Dial Int* 2012; 32: 104–106

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