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The Relationship of Osmolality and Kidney Outcomes in Patients with Autosomal Dominant Polycystic Kidney Disease

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Clinical Trial Registration My study was a clinical trial and is registered in one of the registries recommended by the International Committee of Medical Journal Editors (ICMJE).	N/A because this is not a clinical trial
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Declaration of Helsinki For all clinical experimentation described in the manuscript, I adhered to the Declaration of Helsinki and indicated my response below accordingly.	This study includes clinical experimentation and complies with the Declaration of Helsinki.
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If yes, please provide a list of study group(s) and members that have contributed to or participated in the submitted work in some way. as follow-up to "Study Group: Does your paper include study group(s)? If yes, please provide a list of study group(s) and members that have contributed to or participated in the submitted work in some way. This list may contain either a collaboration of individuals (e.g., investigators) and/or the name of an organization (e.g., a laboratory, educational institution, corporation, or department) and its members"	*Collaborators of the CysticHK cohort: Ho-Kwan SIN, MBChB, FHKAM, Associate Consultant; Elaine HO, MBChB, FHKAM, Consultant; Lorraine Pui-Yuen KWAN, MBBS, FHKAM, Associate Consultant; Sing-Leung LUI, MD, FHKAM, Consultant; Koon-Ming CHAN, MBBS, FHKAM, Associate Consultant; Gary Tung-Sen SHUM, MBBS, FHKAM, Associate Consultant; Samuel Ka-Shun FUNG, MBBS, FHKAM, Consultant; Ka-Lok CHAN, MBBS, FHKAM, Associate Consultant; Sunny WONG, MBBS, FHKAM, Consultant; Anthony Kai-Ching HAU, MBBS, FHKAM, Consultant; Ronald Chi-Chun LIN, MBBS, FHKAM, Associate Consultant; Sze-Kit YUEN, MBChB, FHKAM, Consultant; Lap-Ming KWOK, MBBS, FHKAM, Associate Consultant
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The Relationship of Osmolality and Kidney Outcomes in Patients with Autosomal Dominant Polycystic Kidney Disease

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ABSTRACT

Background. Current treatment of autosomal dominant polycystic kidney disease (ADPKD) is mainly focused on inhibiting cystogenesis through arginine vasopressin suppression and there have been interests in achieving similar vasopressin suppression by reduction of osmolality with increased water intake. However, the causal relationship between serum osmolality and kidney outcome remained unclear in ADPKD patients. We aim to evaluate the relationship of serum osmolality and its effect on kidney outcome in ADPKD patients.

Methods. Three hundred and eleven tolvaptan treatment-naïve ADPKD patients were recruited prospectively from the CysticHK cohort, a territory-wide ADPKD registry across twelve tertiary hospitals in Hong Kong. Beside clinical data, serial measurement of serum and urinary osmolality were obtained every six months over five years. All participants were treated according to the standard of clinical care. The primary outcome was the 40% decline from baseline eGFR.

Results. Patients with a high serum osmolality have a worse kidney outcome, as shown by the Kaplan-Meier plots (log-rank p=<0.001) and the Cox regression model that showed a 5.91 times higher risk of reaching 40% eGFR decline compared to the top with bottom quartiles of osmolality (p=0.018). In contrast, there is an inverse relationship for urine osmolality. A ROC analysis to assess the predictive efficacy of osmolality for identifying those at high risk of kidney decline also showed a good performance for serum osmolality (AUC 0.81, 95%CI, 0.73-0.89; p<0.001). The urinary osmolality did not show a clinical meaningful predictive efficacy (AUC 0.35, 95%CI 0.28-0.43; p=0.003).

Conclusions. Serum osmolality may be a possible surrogate marker for the clinical monitoring of ADPKD patients, especially when access to copeptin level is limited; and high serum osmolality conveys possible detrimental effect on the kidney outcomes.

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INTRODUCTION

Autosomal dominant polycystic kidney disease (ADPKD) is the most common hereditary kidney disease, accounting for about 10% of prevalent patients with kidney failure [1]. It is characterized by the development of multiple progressively enlarging kidney cysts which eventually replace healthy tissue, leading to kidney failure [2]. There have been considerable advances in the field regarding prognostication and treatment recently. In particular, the advent of effective disease-modifying agents (with tolvaptan as the first approved agent) has transformed the management paradigm of ADPKD and there is now important drive to diagnose the disease early, such that treatment can be started promptly and proactively [3].

Indeed, two major trials have demonstrated the efficacy of the first disease-modifying agent tolvaptan [4,5]. Despite evidence of clear efficacy in delaying disease progression, the uptake of Tolvaptan remains limited in many regions due to significant side effects and prohibitive reasons such as cost [6,7]. There have been interests in achieving similar arginine vasopressin (AVP) suppression through increased water intake, but trials have yet to demonstrate its benefit [8]. One challenge in the study design is to ensure patient's tolerance and compliance to increased water intake, but there are no effective surrogate markers to monitor whether patients have achieved adequate hydration status. Serum copeptin has been proposed as a possible biomarker, but it is largely limited to research

settings [9]. Urinary osmolality (uOSM) has also been shown to be a useful surrogate marker [10], but association of serum osmolality (sOSM) with kidney outcome is unclear [11,12].

In this study, we aim to evaluate the relationship of osmolality and its effect on kidney outcome in patients with ADPKD using the CysticHK cohort, a territory-wide registry of involving 300 Chinese patients with ADPKD across twelve major public hospitals in Hong Kong. By defining the causal relationship of osmolality and kidney outcomes in ADPKD patients, it will help guide management, especially where effective disease-modifying agents such as tolvaptan and serum copeptin testing are limited.

METHODS

This is a multi-centre prospective study (Supplemental Figure 1). Unrelated adult patients with clinical diagnosis of ADPKD based on imaging [13] and family history were recruited from the CysticHK cohort. This is a territory-wide registry of Chinese patients with ADPKD across twelve major public hospitals in Hong Kong. Patients with an estimated glomerular filtration rate (eGFR) less than 30ml/min/1.73m2 (CKD-EPI formula) or already on kidney replacement therapy were excluded. Patients already on tolvaptan are also excluded for this study and these are patients who are either not indicated for tolvaptan following assessment or have declined the medication.

At the initial clinic visit after recruitment, baseline specified clinical data and biochemical parameters were collected. An MRI were also performed after the first visit. The protocol of the MRI acquisition has been adapted from that used by the EuroCYST consortium [14]. Patients were then followed routinely every six months as per our protocol or earlier if clinically indicated (such as rapidly worsening in kidney function). The clinical data and biochemical parameters were collected at each follow-up visit. These include blood tests and eGFR measurement. In particular, morning sOSM and uOSM (as suggested by the current KIDGO guideline for ADPKD [3]) were also routinely measured at each follow-up visit with a time-averaged osmolality calculated for analysis at the end of the whole study period. All participants were treated according to the standard of care in routine clinical practice and they were encouraged to increase water intake according to thirst by the treating physician. The primary outcome was an assessment of kidney disease progression as defined by the slope of eGFR decline or a 40% decline from baseline eGFR. We calculated the slope of eGFR for each patient using a linear mixed model with random intercept and slope to account for the subject variability. Comparative analysis was done according to quartiles of osmolality. Further details of the protocol are presented in our previous paper [15].

Statistical analysis was performed by SPSS software version 29.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics was used to describe the baseline characteristics of patients. Data are presented as mean ± standard deviation (SD) or median (inter-quartile range [IQR]) as appropriate. Difference between groups were compared by ANOVA test as appropriate. Correlations between

parameters were analysed with Pearson's rank correlation coefficients. Kaplan-Meier survival analysis and the Cox regression analysis were performed to assess the longitudinal association between the primary kidney event (i.e., 40% decline from baseline eGFR, dialysis, or death) and the different osmolality quartiles. Differences between Kaplan-Meier curves were tested using the log-rank test. Receiver-operating characteristic (ROC) curves were constructed by standard methods. The ability of osmolality target to identify those at high risk of reaching 40% eGFR decline was analysed using the area under the curve (AUC). Because osmolality may be affected by diuretics, a sensitivity analysis was conducted using the same methodology, but patients on diuretics were excluded. P values < 0.05 were considered statistically significant. All probabilities were two-tailed.

The study was approved by the Clinical Research Ethics Committee of the Chinese University of Hong Kong (CREC Ref. No. 2018.421) and the study was performed in compliance with the Declaration of Helsinki.

RESULTS

Three hundred and eleven patients with ADPKD recruited were available for analysis. Their baseline characteristics are summarized in Table 1. The mean age in the cohort is 53.1 ± 13.7 years old and there was a female preponderance (1.57 to 1). The mean age at diagnosis was 36.2 ± 15.1 years old. Two hundred and forty-four patients (78.5%) had a positive family history. The baseline biochemical parameters are shown in Table 2. The mean creatinine was 95.83 ± 38.45 μmol/l, while

the mean time-averaged sOSM and uOSM was 293.95 ± 6.03 and 415.74 ± 133.31 mOsm/Kg respectively. We then compared the characteristics according to quartiles of sOSM (Table 3) or uOSM (Table 4) respectively. Those with high sOSM tended to be older diagnosed at a later age, and had a higher systolic blood pressure. They also had a significantly bigger height adjusted total kidney volume (HtTKV) with worse kidney function and slope of eGFR decline as compared to those with a low sOSM. In contrast, there is an inverse relationship for uOSM (Table 4).

We also performed a Pearson's correlation analysis for sOSM. There is a significant strong correlation with creatinine and a modest correlation with slope of eGFR decline ($r = 0.646$, $p < 0.001$; $r = -0.227$, $p < 0.001$ respectively). There is also a modest correlation between sOSM and Ht-TKV ($r = 0.397$, $p < 0.001$). As for uOSM, there is a significant but modest correlation with creatinine and slope of eGFR decline and Ht-TKV ($r = -0.142$, p 0.021; $r = 0.200$, $p < 0.001$; $r = -0.298$, $p < 0.001$).

Kaplan-Meier plots were done to compare the risk of reaching 40% eGFR decline between those with high sOSM/uOSM values to those with low values, respectively. Those with a higher sOSM throughout the follow up period had a significantly worse kidney function decline (log-rank $p = <0.001$) (Figure 1). Again, there was an inverse relationship in kidney outcome in those with a high uOSM (log-rank $p = 0.009$) (Figure 2). Univariate and multivariate Cox regression model were also done to assess the risk of 40% eGFR decline (Table 5). In the multivariate model, those with highest sOSM quartiles have a 5.914 (95% confidence interval 1.364 to 25.644, $p = 0.018$) times higher risk

to reach 40% eGFR decline as compared to those with the lowest sOSM quartiles. In contrast, there is an inverse relationship among the uOSM quartiles as compared to the sOSM quartiles.

A sensitivity analysis was performed with the exclusion of those on diuretics, and otherwise conducted using the same procedures as for the original analysis. Sixteen patients were excluded and their baseline characteristics were similar to the original cohort (Supplemental Table 1 and Supplemental Table 2). The sensitivity analysis showed that the significant effect of sOSM on kidney outcome diminished slightly in the multivariate Cox regression model (Supplemental Table 3).

Finally, we performed a ROC curves analysis to assess the predictive efficacy of osmolality for identifying those at high risk of kidney decline (Figure 3). The AUC for sOSM was 0.81 (95%CI, 0.73-0.89; p <0.001), showing a good performance. Based on the ROC curve, we tested our target for sOSM >290 mOsm/kg. At this value, the sensitivity and the specificity are 92.3% and 33.2%. Although statistically significant, the uOSM did not show a clinical meaningful predictive efficacy (AUC, 0.35, 95%CI 0.28-0.43; p = 0.003).

DISCUSSION

Our results showed that there is a significant correlation and causal relationship between sOSM and kidney outcomes in adult patients with ADPKD. This is suggested by the Kaplan-Meier survival plots and the multivariate Cox regression analysis showing a 5.914 times higher risk to reach 40% eGFR decline comparing those with the highest sOSM to those with the lowest sOSM quartiles. The

AUC in our ROC curves analysis for sOSM was shown to be 0.81, suggesting that this may be a useful marker in the monitoring for kidney decline. Indeed, sOSM has been previously shown to be an independent risk factor for kidney function decline and the risk of chronic kidney disease in healthy individuals [16,17]. However, the relationship of sOSM and kidney function decline is less definitive in patients with ADPKD, and this study provides some evidence for this relationship.

AVP is known to be produced and stored in neurons within the hypothalamus, and these neurons express osmoreceptors that are exquisitely responsive to sOSM [18, 19]. High sOSM is a significant physiological stimulant of AVP and copeptin secretion. Studies in non-ADPKD patients have suggested that the sOSM level are directly proportional to those of copeptin, a surrogate marker for AVP [20,21]. There have also been studies reporting an association between sOSM and copeptin levels in patients with ADPKD [22]. Overall, this forms the basis and rationale for increased water intake and a low osmolar diet to maintain a low sOSM to delay disease progression through reduced release of AVP, with the latest KDIGO guideline suggesting that patients with ADPKD adapt to a water intake of 2–3 litres per day, spread throughout the day [3].

However, several studies on ADPKD patients have also suggested that the relationship between sOSM and AVP levels, obtained after water deprivation, was severely blunted [21,23]. These findings suggested that there is possibly a central defect altering the release of AVP in response to increased osmolality [24]. Further study delineating the pathophysiology of possible central osmoregulation defects in patients with ADPKD would be needed. Unfortunately, we do not have the AVP or

copeptin level to assess this relationship in our study at present. Our data clearly demonstrated a correlation between sOSM and Ht-TKV, suggesting a possible link between the degree of sOSM with the severity of ADPKD based on the Mayo classification. Regardless, our prospective data with a long follow up period of five years showed that high sOSM is evidently associated with a worse kidney outcome, although it may be partially driven by diuretics as noted from the sensitivity analysis showing a diminished hazard ratio following exclusion of those on diuretics.

Our results also showed that there is an inverse relationship of uOSM, which is in keeping with previous studies [10]. Results from the TEMPO 3:4 trial showed that a lower baseline uOSM is independently associated with presence of hypertension, lower eGFR, higher Ht-TKV and higher age [10]. These data suggest that patients with ADPKD have defects in urine concentrating capacity and these defects are thought to be the cause of increased AVP secretion [22,25,26]. Indeed, findings of a decreased urine concentrating capacity in an early phase of ADPKD, before kidney impairment occurs, strengthen this hypothesis [27]. Given uOSM is closely related to disease severity, the inverse relationship seen here for uOSM may simply reflect a reverse causality, reflecting the ability of urine concentrating capacity decreases as the disease progresses.

There are also other biomarkers being investigated currently, with HtTKV being an established gold standard [9]. For example, our previous study suggested that differences in MRI morphology pattern may confer varying prognostic values similar to Mayo classification [15]. However, sOSM and uOsm may offer a relatively cheaper and easily accessible options. A combined assessment of

these surrogate markers together may be very useful in providing a more accurate prognostic assessment.

Whether copeptin levels are available or not, sOSM and other biochemical and clinical parameters would increase the strength of these surrogate biomarkers and biochemical and clinical correlates would provide the nephrologist with a stronger database with which to guide treatment. These data will provide an estimate of time to renal failure. With this estimate, preparations can begin for preparation of either transplant, preferred, or type of dialysis and the required surgery for the choice. The decision to pursue transplantation is time-sensitive, and the use of multiple surrogate markers of the shape of decline in slope to renal failure will determine if a patient remains in a favourable position to receive a transplant. As age advances, together with the probability of new co-morbidities, transplantation may become a less viable choice.

The strength of our study is that this is a territory-wide database involving 311 ADPKD patients across multiple tertiary centres in Hong Kong with serial data and a long follow up of about five years. This will provide long term longitudinal information and allow analysis at a population-based level. Additionally, our data are taken from the CysticHK registry in a real-world setting, which closely reflects clinical effects in real-life. Furthermore, this particular cohort of patients are tolvaptan treatment naïve, which could truly reflect the effects of the sOSM and uOSM without the influence of tolvaptan.

However, our study has several limitations. As mentioned, we do not have a corresponding copeptin level for correlation and comparative analysis. Although copeptin has been suggested as a better and more reliable marker than sOSM [28], it is important to note that this measurement is currently not readily available with access limited to only a few places. Unlike the TEMPO study cohort which restricted use of diuretics, and included dietary and standard fluid ingestion recommendations [10], we did not control the patient's dietary intake or have detailed information on salt intake in our study, which may affect the overall serum and urine osmolality. Some patients may also be on medications that may affect the uOSM, which we did not exclude in our cohort. This have affected the urine concentrating ability and could confound the overall results. However, the sensitivity analysis excluding patients on diuretics showed the effect of sOSM and uOSM on kidney outcome remained significant. Our study is not a randomised controlled trial and thus its correlation between sOSM and kidney outcomes is only observational and may not be definitive, especially with respect to reverse causality. Finally, our cohort is mostly comprised of Chinese patients, and our results may not be generalisable to other ethnicities.

Nevertheless, our study showed that sOSM may be a possible surrogate marker for the monitoring of patients with ADPKD, especially when access to copeptin level is limited, and high sOSM level appears to convey a detrimental effect on the kidney outcomes. Further studies would be needed to confirm these finding, which may allow sOSM to be a new surrogate marker for monitoring in clinical practices as well as a potential target for research trials.

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REFERENCES

1. Lanktree MB, Haghighi A, Guiard E, et al. Prevalence estimates of polycystic kidney and liver disease by population sequencing. J Am Soc Nephrol. 2018 Oct;29(10):2593-2600. doi: 10.1681/ASN.2018050493.
2. Chebib FT, Torres VE. Autosomal dominant polycystic kidney disease: core curriculum 2016. Am J Kidney Dis. 2016 May;67(5):792-810. doi: 10.1053/j.ajkd.2015.07.037
3. Kidney Disease: Improving Global Outcomes (KDIGO) ADPKD Work Group. KDIGO 2025 Clinical Practice Guideline for the Evaluation, Management, and Treatment of Autosomal Dominant Polycystic Kidney Disease (ADPKD). Kidney Int. 2025 Feb;107(2S):S1-S239. doi: 10.1016/j.kint.2024.07.009. PMID: 39848759
4. Torres VE, Chapman AB, Devuyst O, et al; TEMPO 3:4 Trial Investigators. Tolvaptan in patients with autosomal dominant polycystic kidney disease. N Engl J Med. 2012 Dec 20;367(25):2407-18. doi: 10.1056/NEJMoa1205511
5. Torres VE, Chapman AB, Devuyst O, et al; REPRISE Trial Investigators. Tolvaptan in Later-Stage Autosomal Dominant Polycystic Kidney Disease. N Engl J Med. 2017 Nov 16;377(20):1930-1942. doi: 10.1056/NEJMoa1710030
6. Calvaruso L, Yau K, Akbari P, et al. Real-life use of tolvaptan in ADPKD: a retrospective analysis of a large Canadian cohort. Sci Rep. 2023 Dec 14;13(1):22257. doi: 10.1038/s41598-023-48638-9
7. Inoue R, Nishi H, Inoue D, et al. Regional Variance of the Early Use of Tolvaptan for Autosomal Dominant Polycystic Kidney Disease. Kidney360. 2020 Jun 16;1(8):740-745. doi: 10.34067/KID.0002262020
8. Rangan GK, Wong ATY, Munt A, et al. Prescribed Water Intake in Autosomal Dominant Polycystic Kidney Disease. NEJM Evid. 2022 Jan;1(1):EVIDoa2100021. doi: 10.1056/EVIDoa2100021
9. Ghanem A, Borghol AH, Munairdjy Debeh FG, et al. Biomarkers of Kidney Disease Progression in ADPKD. Kidney Int Rep. 2024 Jul 14;9(10):2860-2882. doi: 10.1016/j.ekir.2024.07.012
10. Devuyst O, Chapman AB, Gansevoort RT, et al. Urine Osmolality, Response to Tolvaptan, and Outcome in Autosomal Dominant Polycystic Kidney Disease: Results from the TEMPO 3:4 Trial. J Am Soc Nephrol. 2017 May;28(5):1592-1602. doi: 10.1681/ASN.2016040448

11. Akbari A, Sriperumbuduri S, Mangalgi S, et al. Spot Versus 24-Hour Urine Osmolality Measurement in Autosomal Dominant Polycystic Kidney Disease: A Diagnostic Test Study. Kidney Med. 2025 Jan 15;7(3):100965. doi: 10.1016/j.xkme.2025.100965
12. Casteleijn NF, Zittema D, Bakker SJ, et al. Urine and plasma osmolality in patients with autosomal dominant polycystic kidney disease: reliable indicators of vasopressin activity and disease prognosis? Am J Nephrol. 2015;41(3):248-56. doi: 10.1159/000382081
13. Pei Y, Obaji J, Dupuis A, et al. Unified criteria for ultrasonographic diagnosis of ADPKD. J Am Soc Nephrol. 2009 Jan;20(1):205-12. doi: 10.1681/ASN.2008050507
14. Petzold K, Gansevoort RT, Ong AC, et al. Building a network of ADPKD reference centres across Europe: the EuroCYST initiative. Nephrol Dial Transplant. 2014 Sep;29 Suppl 4:iv26-32. doi: 10.1093/ndt/gfu091. Erratum in: Nephrol Dial Transplant. 2014 Dec;29(12):2353. PMID: 25165183
15. Fung WW, Szeto CC, Chow KM, et al. Clinical Characteristics and Kidney Outcomes in Chinese Patients with Autosomal Dominant Polycystic Kidney Disease. Kidney360. 2024 May 1;5(5):715-723. doi: 10.34067/KID.0000000000000433
16. Wu JJ, Tung CW, Lin CW, et al. Serum Osmolality as a Predictor of Renal Function Decline: A Retrospective Cohort Study. J Clin Med. 2024 Oct 30;13(21):6505. doi: 10.3390/jcm13216505
17. Kuwabara M, Hisatome I, Roncal-Jimenez CA, et al. Increased Serum Sodium and Serum Osmolarity Are Independent Risk Factors for Developing Chronic Kidney Disease; 5 Year Cohort Study. PLoS One. 2017 Jan 12;12(1):e0169137. doi: 10.1371/journal.pone.0169137. Erratum in: PLoS One. 2018 May 17;13(5):e0197941. doi: 10.1371/journal.pone.0197941
18. Davies AG. Antidiuretic and growth hormones. Br Med J. 1972 Apr 29;2(5808):282-4. doi: 10.1136/bmj.2.5808.282
19. Cuzzo B, Padala SA, Lappin SL. Physiology, Vasopressin. [Updated 2023 Aug 14]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK526069/ [Last accessed on 10 June 2025]
20. Meijer E, Bakker SJ, Halbesma N, et al. Copeptin, a surrogate marker of vasopressin, is associated with microalbuminuria in a large population cohort. Kidney Int. 2010 Jan;77(1):29-36. doi: 10.1038/ki.2009.397
21. Meijer E, Bakker SJ, de Jong PE, et al. Copeptin, a surrogate marker of vasopressin, is associated with accelerated renal function decline in renal transplant recipients. Transplantation. 2009 Aug 27;88(4):561-7. doi: 10.1097/TP.0b013e3181b11ae4

22. Boertien WE, Meijer E, Zittema D, et al. Copeptin, a surrogate marker for vasopressin, is associated with kidney function decline in subjects with autosomal dominant polycystic kidney disease. Nephrol Dial Transplant. 2012 Nov;27(11):4131-7. doi: 10.1093/ndt/gfs070
23. Casteleijn NF, Zittema D, Bakker SJ, et al. Urine and plasma osmolality in patients with autosomal dominant polycystic kidney disease: reliable indicators of vasopressin activity and disease prognosis? Am J Nephrol. 2015;41(3):248-56. doi: 10.1159/000382081
24. Ho TA, Godefroid N, Gruzon D, et al. Autosomal dominant polycystic kidney disease is associated with central and nephrogenic defects in osmoregulation. Kidney Int 2012; 82: 1121–9
25. Gabow PA, Kaehny WD, Johnson AM, et al. The clinical utility of renal concentrating capacity in polycystic kidney disease. Kidney Int. 1989 Feb;35(2):675-80. doi: 10.1038/ki.1989.38
26. Devuyst O, Torres VE. Osmoregulation, vasopressin, and cAMP signaling in autosomal dominant polycystic kidney disease. Curr Opin Nephrol Hypertens. 2013 Jul;22(4):459-70. doi: 10.1097/MNH.0b013e3283621510
27. van Gastel MDA, Torres VE. Polycystic Kidney Disease and the Vasopressin Pathway. Ann Nutr Metab. 2017;70 Suppl 1:43-50. doi: 10.1159/000463063
28. Zittema D, Boertien WE, van Beek AP, et al: Vasopressin, copeptin, and renal concentrating capacity in patients with autosomal dominant polycystic kidney disease without renal impairment. Clin J Am Soc Nephrol 2012;7:906-913

Figure Legend

Figure 1. Kaplan-Meier curves showing 40% eGFR decline against sOSM quartiles over a period of 5 years

- Those with a high average sOSM have a significant higher risk of kidney decline leading to a 40% drop of eGFR (log rank = <0.001).

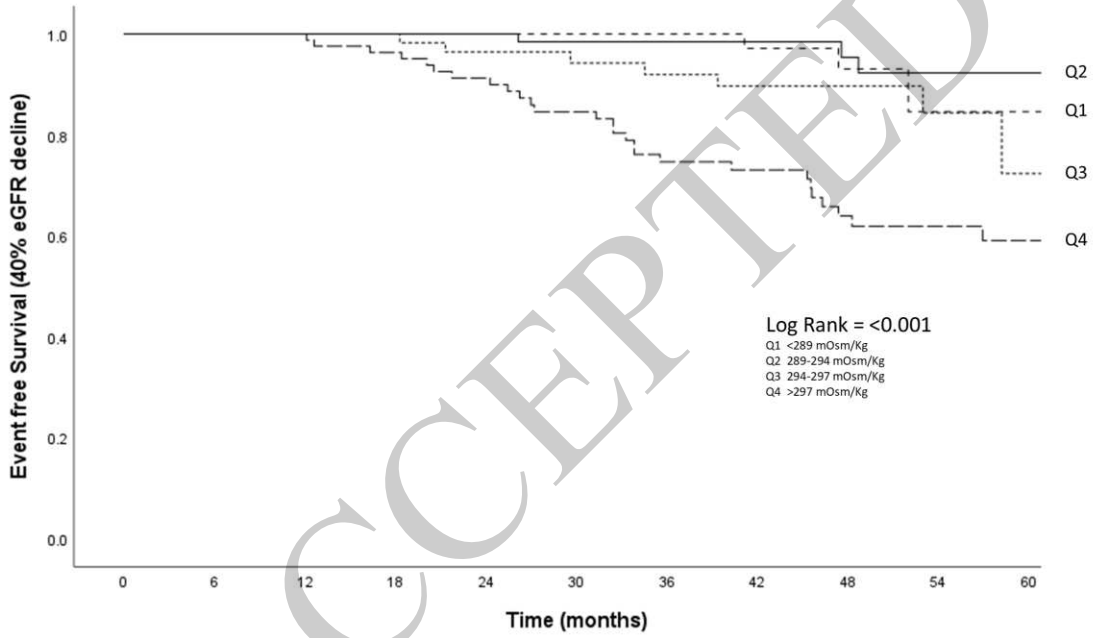


Figure 2. Kaplan-Meier curves showing 40% eGFR decline against uOSM quartiles over a period of 5 years

- Those with a high average uOSM have a significant lower risk of kidney decline leading to a 40% drop of eGFR ((log rank = 0.009).

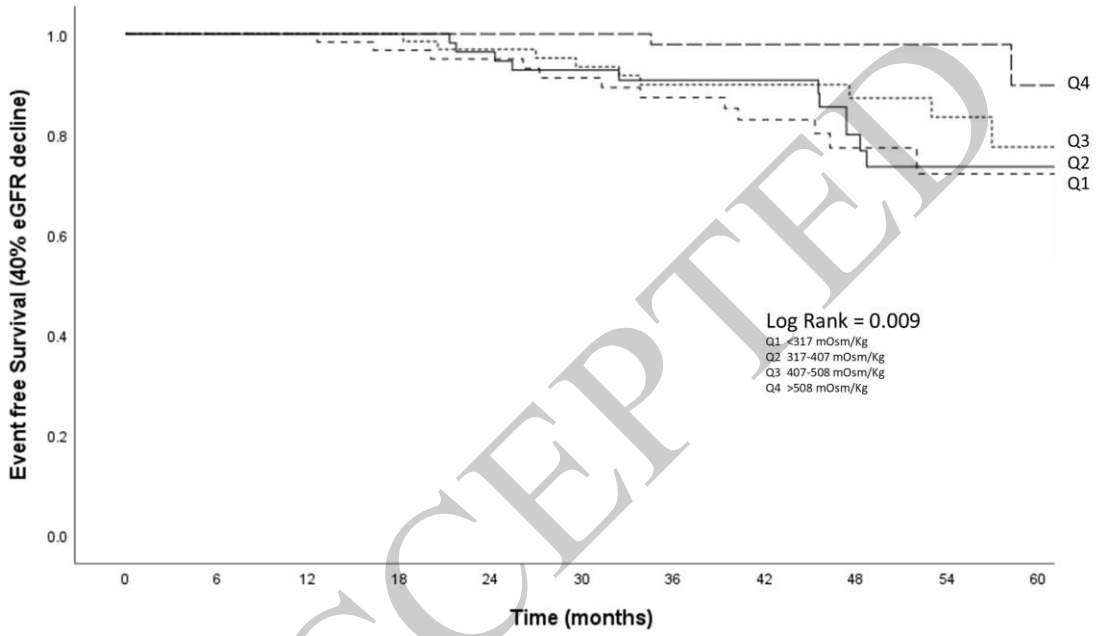
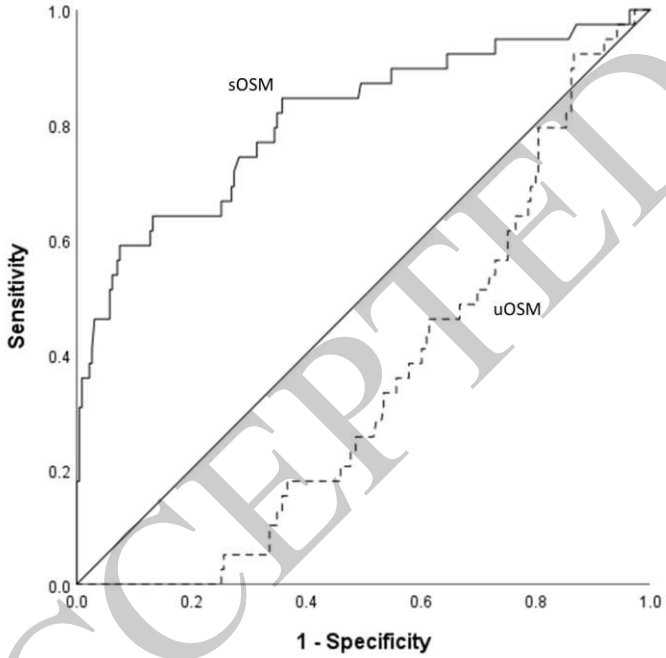


Figure 3. ROC curve of sOSM and uOSM for predicting risk to 40% eGFR decline from baseline.

- The sOSM and the risk to 40% eGFR decline is significantly correlated (AUC 0.81). The uOSM did not show a clinical meaningful predictive efficacy (AUC 0.35).



Supplemental Table of Contents

TABLE 1. Demographic and baseline clinical data

Number of patients	311
Sex male : female	121 : 190
Age (years)*	53.1 ± 13.7
Duration of follow up (months)*	43.6 ± 15.8
Age at diagnosis (years)*	36.2 ± 15.1
Family history	244 (78.5%)
Smoker	37 (11.9%)
Comorbidities	
Diabetes	31 (10.0%)
Hypertension	182 (58.5%)
Hyperlipidemia	131 (42.1%)
Ischemic heart disease	8 (2.6%)
Stroke	16 (.1%)
Peripheral vascular disease	0 (0%)
Respiratory disease	29 (9.3%)
Cancer	18 (5.8%)
Clinical parameters/ arthrometries	
Height (m)*	1.64 ± 0.09
Weight (Kg)*	64.4 ± 13.1
Blood pressure (mmHg)*	133.3 ± 17.7 / 77.4 ± 11.4
Medications	
ACE inhibitors/ Angiotensin II receptor blockers	187 (60.1%)
Diuretics	16 (5.1%)
MRI parameters	
Total Kidney Volume (TKV) (ml)#	1088 (626 – 1794)
Height adjusted TKV (ml/m)#	648 (371 – 1061)
Mayo class (1A:1B:1C:1D:1E:2) %	13.5: 20.6: 25.1: 13.5: 10.3: 17.0

*Expressed as mean ± standard deviation; # Expressed as median (Interquartile range)

TABLE 2. Baseline biochemical parameters

Number of patients	311
Haemoglobin (g/dL)	12.36 ± 1.68
White blood cell (x 10^9/L)	6.35 ± 2.00
Platelet (x 10^9/L)	238.02 ± 65.62
Sodium (mmol/l)	140.00 ± 2.96
Potassium (mmol/l)	4.15 ± 0.42
Urea (mmol/l)	8.90 ± 6.31
Creatinine (µmol/l)	95.83 ± 38.45
Total protein (g/L)	73.56 ± 4.15
Albumin (g/L)	38.86 ± 3.96
Bilirubin (µmol/l)	9.36 ± 5.59
Alkaline phosphatase (IU/L)	71.81 ± 30.63
Alanine aminotransferase (IU/L)	21.88 ± 15.26
Calcium (mmol/l)	2.34 ± 0.09
Phosphate (mmol/l)	1.15 ± 0.25
Urate (mmol/l)	0.36 ± 0.11
Osmolality (mOsm/Kg)	294.03 ± 9.16
Urinary Osmolality (mOsm/Kg)	432.84 ± 174.51
Time-averaged Osmolality (mOsm/Kg)	293.95 ± 6.03
Time-averaged Urinary Osmolality (mOsm/Kg)	415.74 ± 133.31
Urinary protein/ Creat ratio (mg/mg Cr)	0.21 ± 0.33

*Data expressed as mean ± standard deviation

TABLE 3. Differences in sOSM group according to quartiles

Parameter	sOSM (mOsm/Kg)				P value
	Q1 <289	Q2 289-294	Q3 294-297	Q4 >297	
Number of patients	72	80	68	91	
Clinical*					
Age (years)	43.2±10.9	50.9±12.9	57.6±11.5	60.9±12.0	<0.001
Age at diagnosis (years)	29.5±13.0	35.1±14.9	39.8±14.3	41.7±14.8	<0.001
Systolic blood pressure (mmHg)	128.7±19.1	132.7±15.4	134.3±18.2	138.6±18.0	0.008
Diastolic blood pressure (mmHg)	76.4±12.2	78.6±10.5	75.8±11.8	78.6±11.2	0.334
Age starting antihypertensives (year)	34.5±10.4	43.4±12.4	45.8±11.2	43.8±12.1	<0.001
Blood*					
Haemoglobin (g/dL)	12.59±1.25	12.73±1.66	12.46±1.84	11.84±1.78	0.005
White blood cell (x 10^9/L)	6.27±1.57	6.20±1.71	6.26±2.00	6.62±2.53	0.544
Platelet (x 10^9/L)	263.1±51.2	234.7±65.4	240.4±68.2	220.6±69.3	0.001
Sodium (mmol/l)	138.1±2.7	139.6±2.2	140.6±1.9	141.0±3.8	<0.001
Potassium (mmol/l)	4.0±0.4	4.0±0.4	4.2±0.3	4.3±0.5	<0.001
Urea (mmol/l)	5.0±1.6	6.8±2.6	8.5±3.0	14.0±9.3	<0.001
Creatinine (µmol/l)	67.4±19.6	82.4±22.7	98.1±31.5	125.3±44.1	<0.001
Bilirubin (µmol/l)	9.1±5.1	9.1±3.9	9.6±4.9	8.8±5.7	0.789
Alkaline phosphatase (IU/L)	59.8±38.4	69.7±24.0	72.6±20.5	84.2±34.1	<0.001
Alanine aminotransferase (IU/L)	19.6±17.3	23.4±14.4	22.1±13.0	23.0±16.8	0.503
Albumin (g/L)	40.0±2.8	39.1±3.7	38.9±3.9	37.3±4.4	<0.001
Calcium (mmol/l)	2.33±0.08	2.34±0.08	2.36±0.08	2.32±0.11	0.092
Phosphate (mmol/l)	1.10±0.16	1.09±0.15	1.11±0.15	1.27±0.37	<0.001
Urate (mmol/l)	0.29±0.07	0.35±0.08	0.39±0.11	0.39±0.12	<0.001
Urinary protein/ Creat ratio (mg/mg Cr)	0.14±0.22	0.18±0.24	0.14±0.11	0.38±0.52	<0.001
MRI parameters*					
Total Kidney Volume (ml)	906±698	999±669	1408±1224	2182±1946	<0.001
HtTKV (ml/m)	560±412	609±403	852±733	1322±1190	<0.001
Primary outcome*					
Slope of eGFR decline (ml/min per 1.73m^2/ year)	-2.09±3.15	-2.89±4.51	-2.99±3.48	-3.55±3.03	0.130
Event-free survival at 2 years	1.0	1.0	0.97	0.91	<0.001
Event-free survival at 5 years	0.84	0.92	0.73	0.59	<0.001

eGFR, estimated glomerular filtration rate; HtTKV, Height adjusted Total Kidney Volume.

*Data expressed as mean ± standard deviation

TABLE 4. Differences uOSM group according to quartiles

Parameter	uOSM (mOsm/Kg)				P value
	Q1 <317	Q2 317-407	Q3 407-508	Q4 >508	
Number of patients	83	76	77	75	
Clinical*					
Age (years)	55.2±12.8	58.6±13.7	51.9±12.0	48.7±14.5	<0.001
Age at diagnosis (years)	37.7±13.2	41.2±15.7	34.4±14.4	33.4±15.0	0.010
Systolic blood pressure (mmHg)	135.1±17.5	138.4±20.9	130.4±15.9	132.1±16.1	0.052
Diastolic blood pressure (mmHg)	77.9±11.4	76.4±11.1	77.3±9.8	78.3±12.4	0.765
Age starting antihypertensives (year)	42.5±12.8	45.3±11.2	40.6±9.1	42.6±15.6	0.276
Blood*					
Haemoglobin (g/dL)	11.65±1.67	12.11±1.68	12.54±1.68	13.18±1.37	<0.001
White blood cell (x 10^9/L)	6.90±2.65	6.18±1.71	6.20±2.20	6.16±1.21	0.114
Platelet (x 10^9/L)	243.3±67.3	226.3±58.3	230.1±67.4	252.6±64.4	0.084
Sodium (mmol/l)	138.9±3.7	139.8±2.2	140.6±3.5	140.4±2.3	0.006
Potassium (mmol/l)	4.2±0.5	4.1±0.4	4.2±0.4	4.1±0.4	0.632
Urea (mmol/l)	10.4±8.9	9.3±6.3	8.5±4.2	6.6±2.1	0.003
Creatinine (µmol/l)	101.1±41.7	98.1±43.0	93.0±35.1	81.6±23.6	0.014
Bilirubin (µmol/l)	7.8±3.4	8.8±3.6	10.5±7.5	9.0±4.0	0.023
Alkaline phosphatase (IU/L)	77.5±25.6	79.0±48.0	69.8±26.8	65.9±19.6	0.061
Alanine aminotransferase (IU/L)	21.3±15.6	21.8±15.0	23.1±18.6	21.9±12.1	0.918
Albumin (g/L)	38.0±4.3	38.1±3.8	38.2±4.1	40.2±2.9	0.002
Calcium (mmol/l)	2.34±0.11	2.34±0.10	2.32±0.07	2.34±0.07	0.608
Phosphate (mmol/l)	1.24±0.33	1.19±0.25	1.10±0.21	1.06±0.16	<0.001
Urate (mmol/l)	0.36±0.10	0.36±0.12	0.38±0.11	0.34±0.09	0.141
Urinary protein/ Creat ratio (mg/mg Cr)	0.32±0.52	0.21±0.31	0.23±0.31	0.13±0.11	0.022
MRI parameters*					
Total Kidney Volume (ml)	1618±1203	1426±1214	1841±2073	769±474	0.002
HtTKV (ml/m)	986±708	871±770	1129±1265	464±274	0.002
Primary outcome*					
Slope of eGFR decline (ml/min per 1.73m^2/ year)	-3.80±3.81	-2.88±4.38	-3.06±2.95	-1.87±3.04	0.027
Event-free survival at 2 years	0.95	0.96	0.97	1.0	0.009
Event-free survival at 5 years	0.72	0.74	0.78	0.90	0.009

eGFR, estimated glomerular filtration rate; HtTKV, Height adjusted Total Kidney Volume.

*Data expressed as mean ± standard deviation

TABLE 5. Univariate and multivariate Cox regression analysis on the risk of 40% eGFR decline

Clinical factors	Univariate		Multivariate	
	Hazard ratio (95% CI)	P value	Hazard ratio (95% CI)	P value
Hypertensive	2.497 (1.279 – 4.874)	0.007	1.434 (0.700 – 2.934)	0.324
Male	2.042 (1.129 – 3.696)	0.018	1.441 (0.737 – 2.817)	0.285
Quartiles of sOSM				
Q1 <289 mOsm/kg	Reference		Reference	
Q2 289-294 mOsm/kg	0.997 (0.223 – 4.462)	0.997	1.362 (0.248 – 7.465)	0.722
Q3 294-297 mOsm/kg	2.670 (0.707 – 10.085)	0.148	3.163 (0.661 – 15.139)	0.149
Q4 >297 mOsm/kg	4.263 (1.900 – 20.648)	0.003	5.914 (1.364 – 25.644)	0.018
Quartiles of uOSM				
Q1 <317 mOsm/kg	Reference		Reference	
Q2 317-407 mOsm/kg	0.840 (0.393 – 1.794)	0.652	0.666 (0.309 – 1.435)	0.299
Q3 407-508 mOsm/kg	0.484 (0.207 – 1.128)	0.093	0.410 (0.174 – 0.969)	0.042
Q4 >508 mOsm/kg	0.128 (0.029 – 0.565)	0.007	0.129 (0.029 – 0.582)	0.008

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Disclosure Updated Date: December 23, 2025

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O. Devuyst reports the following:
Employer: University of Zurich; Consultancy: Sanofi, Vertex; and Advisory or Leadership Role: Editorial board: Kidney International, Nephrology Dialysis Transplantation, Pflügers Archiv, CJASN.

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Olivier Devuyst
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease.
Date of Completion: January 15, 2026
Disclosure Updated Date: January 15, 2026

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

ASN Journal Disclosure Form

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S. Fung reports the following:
Employer: Princess Margaret Hospital, Hospital Authority; Research Funding: Research studies with Sanofi, Abbvie, GSK, Amgen, Mallinckrodt, Pfizer, NephroGenex.; Advisory or Leadership Role: Hong Kong Society Of Nephrology; The Federation Of Medical Societies Of Hong Kong; Hong Kong Kidney Foundation; Hong Kong Transplant Sport Association ; World Transplant Games Federations; and Other Interests or Relationships: Honorary Advisor Lions Kidney Educational Centre & Research Foundation ; Honorary Advisor Renal Mutual Help Association Princess Margaret Hospital ; Honorary Advisor Hong Kong Transplant Sports Association ; Honorary Advisor Alliance For Renal Patients Mutual Help Association.

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Samuel K.S. Fung
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: January 14, 2026
Disclosure Updated Date: January 14, 2026

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
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W. Fung reports the following:
Employer: Prince of Wales Hospital, Hospital Authority

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Winston Ws Fung
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 9, 2025
Disclosure Updated Date: December 9, 2025

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
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K. Hau has nothing to disclose.

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Kc Hau
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: January 24, 2026
Disclosure Updated Date: January 24, 2026

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

ASN Journal Disclosure Form

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T. Ho reports the following:
Employer: Tseung Kwan O Hospital

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Tsz ling Ho
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 9, 2025
Disclosure Updated Date: December 9, 2025

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

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P. Kwan reports the following:
Employer: Tung Wah Hospital

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Pui Yuen Lorraine Kwan
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 22, 2025
Disclosure Updated Date: December 22, 2025

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

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L. Kwok has nothing to disclose.

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Lap Ming Kwok
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: January 7, 2026
Disclosure Updated Date: January 7, 2026

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

ASN Journal Disclosure Form

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V. Kwong reports the following:
Employer: Prince of Wales Hospital, Hong Kong

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Vickie wai ki Kwong
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 9, 2025
Disclosure Updated Date: December 9, 2025

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

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L. Lau reports the following:
Employer: Prince of Wales Hospital

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Lik Fung Sam Lau
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 8, 2025
Disclosure Updated Date: December 8, 2025

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

ASN Journal Disclosure Form

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P. Li reports the following:
Employer: Prince of Wales Hospital; Advisory or Leadership Role: President, International Association of Chinese Nephrologists; President, Hong Kong Academy of Medicine; Both unpaid; Editorial Board of KI, PDI; unpaid;; and Other Interests or Relationships: Member of ASN, ISN, ERA, ISPD.

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Philip K.T. Li
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 9, 2025
Disclosure Updated Date: February 12, 2025

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JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

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S. Lui reports the following:
Employer: Tung Wah Hospital; Ownership Interest: Hang Seng Bank (Hong Kong); Bank of China (Hong Kong); Tracker Fund (Hong Kong); and Research Funding: Otsuka Pharmaceutical Development & Commercialization Inc.; Bayer Healthcare Pharmaceutical Inc.

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Sing-Leung Lui
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 9, 2025
Disclosure Updated Date: December 12, 2024

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KIDNEY360 Accessing Our World From Every Angle
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ASN Journal Disclosure Form

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A. Ong reports the following:
Employer: University of Sheffield; Consultancy: Mironid; Vertex; GSK; Crinetics; Torque Bio - All moneys paid to institution; Advisory or Leadership Role: Steering committee - SAB - Mironid; All moneys paid to institution; and Other Interests or Relationships: ERA Council - unpaid; NDT Editorial Board - unpaid;.

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Albert C. Ong
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 9, 2025
Disclosure Updated Date: January 6, 2025

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

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W. Pang reports the following:
Employer: The Chinese University of Hong Kong

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Wing fai Pang
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 22, 2025
Disclosure Updated Date: December 22, 2025

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L. Ronald reports the following:
Employer: Hospital Authority

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Lin Ronald
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: January 8, 2026
Disclosure Updated Date: January 8, 2026

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

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T. Shum has nothing to disclose.

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Tung sen Shum
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 10, 2025
Disclosure Updated Date: December 10, 2025

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JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
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H. Sin reports the following:
Employer: Kwong Wah Hospital

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Ho kwan Ken Sin
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: January 14, 2026
Disclosure Updated Date: January 14, 2026

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

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C. Szeto reports the following:
Employer: The Chinese University of Hong Kong; Consultancy: Baxter Healthcare; Gilead Science; Research Funding: Baxter Healthcare; Fresnius; Fibrogen Inc; Gilead; Honoraria: Baxter Healthcare; Advisory or Leadership Role: Baxter Healthcare, Gilead Science; and Other Interests or Relationships: Pfizer; AstraZeneca.

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Cheuk-Chun Szeto
Manuscript ID: K360-2025-001216R1
Manuscript Title: "The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 9, 2025
Disclosure Updated Date: December 9, 2025

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
CJASN Clinical Journal of the American Society of Nephrology

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S. Wong reports the following:
Employer: United Christian Hospital, Hospital Authority; Research Funding: Travere Therapeutics, Inc.; Advisory or Leadership Role: Chairman of the Hong Kong Society of Nephrology 2023-2025 (unpaid); Chairman of the Central Renal Committee of the Hospital Authority, Hong Kong since Dec 2024 (unpaid for this capacity); and Other Interests or Relationships: Chairman of the Hong Kong Society of Nephrology 2023-2025.

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Sunny Sze ho Wong
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease.
Date of Completion: January 15, 2026
Disclosure Updated Date: January 15, 2026

ASN American Society of Nephrology
JASN Journal of the American Society of Nephrology
KIDNEY360 Accessing Our World From Every Angle
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S. Yuen has nothing to disclose.

I understand that the information above will be published within the journal article, if accepted, and that failure to comply and/or to accurately and completely report the potential financial conflicts of interest could lead to the following: 1) Prior to publication, article rejection, or 2) Post-publication, sanctions ranging from, but not limited to, issuing a correction, reporting the inaccurate information to the authors' institution, banning authors from submitting work to ASN journals for varying lengths of time, and/or retraction of the published work.

Name: Sze Kit Yuen
Manuscript ID: K360-2025-001216R1
Manuscript Title: The relationship of osmolality and kidney outcomes in patients with autosomal dominant polycystic kidney disease
Date of Completion: December 13, 2025
Disclosure Updated Date: December 13, 2025