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Letter to the Editor

Morbidity, mortality, and renal replacement therapy for chronic kidney disease in Mexico between 2016 and 2018

Morbilidad, mortalidad y terapia de reemplazo renal por enfermedad renal crónica en México entre 2016 y 2018

Dear Editor:

Due to the availability, access, and the administration of specialised health services for chronic illnesses in Mexico, the clinical epidemiology of risk factors associated to Chronic Kidney Disease (CKD)[1] is not homogenous throughout the country; the state of Yucatan in Mexico, according to the National Health and Nutrition Survey in 2016 and 2018,[2] has the highest prevalence of obesity and diabetes, while leading the rate of urolithiasis hospitalizations and hospitalizations due to urinary tract stones that far exceeds that of other states of Mexico,[3] which implies that the burden of CKD in the state of Yucatan could also exceed proportionally the trends at the national level. The objective of the present study is to describe the epidemiology of CKD in Mexico, during the years 2016, 2017 and 2018, with emphasis on Yucatan, with respect to hospitalizations, in-hospital deaths, general deaths, and Renal Replacement Therapy (RRT).

The present is a retrospective cross-sectional, descriptive study with a focus on clinical epidemiology of chronic kidney disease in Mexico, based on Open Access Datasets from the General Directorate of Health Information,[4] the National Institute of Statistics and Geography[5], and the National Centre of Transplants[6] corresponding to the period between January 2016 and December 2018 The analyses were conducted using Stata 15® software.

Hospitalizations due to CKD, stage of CKD, in-hospital deaths, and general mortality

A total of 350, 997 hospital discharges due to CKD were recorded in Mexico during the period studied, with 2017 exhibiting the greatest number of discharges ($n = 120{,}746$), compared to years 2016 ($n = 116, 218$) and 2018 ($n = 114, 033$); with 7646 aged <15 years.

Both, at the national level (71.84%; $n = 249{,}130$) and in Yucatan (91.17%; $n = 3832$), in most discharges, the stage of CKD was not specified or recorded in the adult population. Among the records of patients admitted with a first-time diagnosis, women experienced greater hospital mortality (8.38%; $n = 212$) ($p = <0.01$).

In general, 28,783 deaths due to CKD took place in Mexico in the studied period (2135 < 15 years of age) mortality rate from this cause was 23 per 100,000 inhabitants at the national level and 25 per 100,000 in Yucatan. 82.77% ($n = 23, 349$) of the national deaths and 86.50% ($n = 487$) of those that occurred in Yucatan were not classified by stage of CKD. In Yucatan, there were a proportionally greater mortality among patients <15 years (Table 1).

Hospital procedures and renal replacement therapy (RRT)

In Mexico, 9316 kidney transplants were recorded, the modal year was 2017 during the study period, at a national level, but in Yucatan there was a decrease in transplants between 2016 and 2018. For receivers of age ≥15, the percentage of live donors was significantly greater. The transplant rate per 1,000,000 inhabitants was 74 at the national level and 41 in Yucatan. In the state of Yucatan, a progressive decrease in the proportion of cadaver donors per year (50%–23%), whilst the live donors were observed to be increasing (50%–77%) (Table 2). A total of 516,287 dialysis procedures were recorded during the period, of these, the Haemodialysis (HD) was the most common RRT (79.65%, $n = 411{,}222$), whilst Peritoneal Dialysis (PD) was less common (20.35%, $n = 105{,}065$), as shown in Table 2.

We have presented the epidemiological panorama of CKD in México, with emphasis on the state of Yucatán. The frequency of intrahospital infections was increased as the days of hospitalization also increased, which is consistent with what has been reported in other studies[7,8]; additionally, the hospital infection was most frequent among those that were discharged due to death.

Table 1 – Hospitalizations, in-hospital deaths, and general mortality due to CKD in Mexico between 2016 and 2018.

Hospitalizations[a] due to Chronic Kidney Disease in Mexico and Yucatan, by age groups (*N* = 350,997).

Variables	≥15			<15		
	Mean ± SD		*P* value	Mean ± SD		*P* value
	Mexico (*n* = 339,154)	Yucatan (*n* = 3975)		Mexico (*n* = 7418)	Yucatan (*n* = 228)	
Age (years)	**45.36 ± 17.31**	**53.88 ± 14.08**	**<0.001**	**10.20 ± 3.93**	**9.05 ± 3.93**	**<0.001**
Length of hospitaliaation (days)	**1.69 ± 7.13**	**4.81 ± 7.34**	**<0.001**	**2.64 ± 7.62**	**4.37 ± 6.82**	**<0.001**
	% (*n*)			% (*n*)		
Gender (male)	**37.31 (183,899)**	**54.22 (1483)**	**<0.001**	54.12 (4014)	57.46 (131)	0.319
First-time hospitalizations	**36.34 (123,242)**	**63.72 (2533)**	**<0.001**	**15.72 (1166)**	**71.93 (164)**	**<0.001**
Inhospital infection	0.5 (1681)	0.53 (21)	0.771	0.42 (31)	0.44 (1)	0.962
In-hospital mortality	**1.92 (6504)**	**5.72 (227)**	**<0.001**	1.29 (96)	2.19 (5)	0.242
Stage at first hospitalization	General		≥15		<15	
	Mexico (*n* = 346,794)	Yucatan (*n* = 4203)	Mexico (*n* = 339,154)	Yucatán (*n* = 3975)	Nacional (*n* = 7418)	Yucatan (*n* = 228)
			% (*n*)			
Stage 3	0.15 (512)	0.36 (15)	0.15 (500)	0.38 (15)	0.16 (12)	–
Stage 4	0.26 (910)	0.33 (14)	0.26 (892)	0.30 (12)	0.24 (18)	0.88 (2)
Stage 5	27.75 (96,242)	8.14 (342)	26.87 (91,132)	8.1 (322)	65.92 (4890)	8.77 (20)
Unclassified Stage	71.84 (249,130)	91.17 (3832)	72.72 (246,630)	91.22 (3626)	33.67 (2499)	90.35 (206)

General deaths due to CKD in Mexico and in Yucatan, by age group and stage (N = 28,773)

Variables	≥15 (*N* = 26,638)			<15 (*N* = 2135)		
	Mexico (*n* = 26,118)	Yucatan (*n* = 520)	*P* value	Mexico (*n* = 2092)	Yucatan (*n* = 43)	*P* value
	Mean ± SD			Mean ± SD		
Age (years)	**65.74 ± 19.91**	**69.11 ± 16.39**	**<0.001**	**5.77 ± 3.06**	**4.79 ± 2.90**	**0.037**
		% (*n*)			% (*n*)	
Gender (male)	**57.37 (14,985)**	**51.73 (269)**	**0.01**	**57.46 (1202)**	**41.86 (18)**	**0.041**
Rural community	**21.41 (5503)**	**15.34 (86)**	**<0.001**	19.46 (400)	17.07 (7)	0.703
Medical assistance at death	**94.17 (23,435)**	**96.80 (491)**	**0.016**	95.74 (1908)	100 (37)	0.199
Affiliation to Health Services[a]	**86.77 (20,844)**	**95.25 (461)**	**<0.001**	88.87 (1741)	97.44 (38)	0.09
CKD stage at death	General		≥15		<15	
	Mexico (*n* = 28,220)	Yucatan (*n* = 563)	Mexico (*n* = 26,118)	Yucatan (*n* = 520)	Mexico (*n* = 2092)	Yucatan (*n* = 43)
			% (*n*)			
Stage 3	0.17 (47)	0.18 (1)	0.16 (43)	0.19 (1)	0.19 (4)	–
Stage 4	0.41 (117)	0.53 (3)	0.41 (106)	0.58 (3)	0.48 (10)	–
Stage 5	16.68 (4707)	12.79 (72)	16.34 (4268)	12.88 (67)	20.94 (438)	11.63 (5)
Unclassified stage	82.74 (23,349)	86.50 (487)	83.09 (21,701)	86.35 (449)	78.39 (1640)	88.37 (38)

[a] Hospitalization data refers only to public hospitals.

Table 2 – Clinical epidemiology of Renal Replacement Therapy in Mexico between 2016 and 2018.

Percentage of kidney transplants, according to the type of donor, by year in Mexico and Yucatan (N = 9316)

Year	Mexico (n = 9225)		Yucatan (n = 91)	
	Cadaveric donor	Living donor	Cadaveric donor	Living donor
	% (n)			
2016 (n = 3037)	28% (n = 848)	72 (2155)	50% (n = 17)	50% (n = 17)
2017 (n = 3168)	29% (n = 923)	71% (n = 2219)	46% (n = 12)	54% (n = 14)
2018 (n = 3111)	32% (n = 977)	68% (n = 2103)	23% (n = 7)	77% (n = 24)

Kidney transplant in patients ≥15 years old in Mexico and Yucatan (N = 8880)

Variable	Mexico (n = 8790)	Yucatan (n = 90)	Difference	P value
	Mean ± SD			
Age (years)	35.15 ± 13.44	36.62 ± 13.37	1.48	0.297
Time elapsed until transplant	315.09 ± 654.12	289.50 ± 478.49	25.59	0.711
			% (n)	
Gender (male)	63.90 (5617)	58.89 (53)	0.05	0.325
Cadaveric donor	**28.96 (2546)**	**38.89 (35)**	**0.1**	**0.039**

Therapeutic procedures of hemodialysis and peritoneal dialysis in Mexico 2016–2018 (N = 516,287)

Year	Hemodialysis (n = 411,222)	Peritoneal dialysis (n = 105,065)
	% (n)	
2016	80.37 (135,849)	19.63 (33,171)
2017	79.51 (134,033)	20.49 (34,532)
2018	79.09 (141,340)	20.91 (37,363)

Mexico ranks second place in Latin American countries in respect to the number of patients that are using PD modality. However, it has been reported that the access to RRT, is unequal in the population due to their affiliation with the health services, A large part of the population is affiliated with public services; however, medical coverage is limited in these patients, because CKD and RRT translates to a large economic burden for the patients and struggle to comply with the expenses for the adequate care necessary for disease management.[9,10] Finally, it is important to mention that the current surveillance system of CKD in Mexico does not include patient-centred statistics, follow ups nor a record of patients that have PD at home. New efforts are needed to improve monitoring of patients since their diagnosis, this could orient on progression timing, survival and other indicators that could be sensible to change along with new health approaches and therapeutic innovations and permit contrasting the Mexican trends in CKD with those from around the world. Improving health care and timely diagnosis in Mexico, particularly in the states with higher prevalence of obesity, diabetes, and hypertension, such as Yucatan may be considered as essential for the well being and prognosis of patients.

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¿Sinergia del tratamiento con tiosulfato sódico y hemodiálisis extendida en el manejo de la calcifilaxis? A propósito de un caso

Synergy of sodium thiosulphate treatment and expanded hemodialysis in the management of calciphylaxis? A case report

Sr. Director:

La calcifilaxis, también conocida como arteriolopatía urémica calcificante (CUA), es una complicación grave e infrecuente en los pacientes en hemodiálisis crónica[1]. En su patogenia, además de la implicación del metabolismo mineral-óseo, se ha planteado el posible papel deletéreo que podrían tener determinadas moléculas de tamaño medio[2]. La hemodiálisis extendida (HDx) justamente favorece la eliminación efectiva de este tipo de moléculas, por lo que creemos que podrían jugar un papel en el manejo de esta entidad.

Presentamos el caso de una mujer de 47 años con antecedentes de diabetes mellitus tipo 1 de larga data y mal control, hipertensión arterial, cardiopatía isquémica cónica y estenosis aórtica severa, que requirió recambio valvular aórtico con inicio de anticoagulación con acenocumarol 2 meses antes del ingreso, hiperparatiroidismo secundario y enfermedad renal crónica categoría G5 según KDIGO 2012 de probable etiología diabética en hemodiálisis crónica a través de una fístula arteriovenosa radiocefálica en miembro superior izquierdo.

Refiere un cuadro de 2 semanas de evolución caracterizado por la presencia de lesiones inicialmente pequeñas y eritematosas que fueron progresando a ulcerosas, algunas circulares con un centro negruzco, muy dolorosas, con presencia de exudado que resulta positivo para *Pseudomonas aeruginosa*. Se realiza biopsia cutánea de una de las lesiones siendo esta compatible con calcifilaxis por lo que se decide su ingreso en nefrología. Analíticamente destaca una procalcitonina 1,49 ng/m; proteína C reactiva 26,6 mg; índice neutrófilo-linfocito (INL) 5,75; índice plaquetas-linfocito (IPL) 413,70 e índice de inmunidad-inflamación sistémica (SII) 1.737; calcio 10,30 mg/dl; fosfato 5,05 mg/dl; hormona paratiroidea (PTH) biointacta (1-84) 490 pg/m y 25-OH-vitamina D 10,8 ng/m. La ecografía cervical muestra un nódulo hipoecogénico de 1,38 cm de diámetro en relación con hiperplasia vs. hipertrofia de glándulas paratiroides.

Se decide manejo conjunto con dermatología con curas cada 48 h con tiosulfato sódico tópico, además de tiosulfato sódico intravenoso a dosis de 12,5 g poshemodiálisis (3 veces por semana). Se intensificó la dosis de diálisis con sesiones diarias de 210 min y cambio a hemodiálisis extendida con filtro Theranova 500® 2 m^2 (Baxter International Inc., Deerfield, IL, EE. UU.) con un Qb medio de 313 ml/min, un Qd medio de 500 ml/min y un Kt medio de 41 l. Entre otras medidas se cambió a anticoagulación con enoxaparina, se suspendió su tratamiento con paricalcitol, vitamina D y hierro. Se optimizó el manejo de su hiperparatiroidismo secundario con cinacalcet, quelantes de fósforo no cálcicos y baño de diálisis bajo en calcio (1,25 mEq/l). Se asoció antibioterapia con ceftazidima y vancomicina.

Al alta, se evidencia mejoría de los parámetros inflamatorios, junto con una buena evolución de las lesiones cutáneas hasta su resolución completa a los 5 meses del inicio del tratamiento (tabla 1 y fig. 1). Sin embargo, observamos un empeoramiento de la PTH a pesar del aumento progresivo en a la dosis de calcimiméticos. Se decide iniciar etelcalcetida intradiálisis, estando pendiente de evolución en el momento actual.

A pesar del tratamiento correcto un gran porcentaje de pacientes fallecen (35% en un año, a pesar del tratamiento y el 55% si no se trata)[3]. Se ha mencionado que la alteración del metabolismo mineral-óseo es el principal factor predisponente de esta enfermedad[1]. Sin embargo, este caso resalta el posible rol de otros factores no tradicionales dada la persistencia en el tiempo del hiperparatiroidismo, a pesar de evidenciar una mejoría sustancial y mantenida tanto de las lesiones como de los parámetros inflamatorios.