REFERENCES

1. Noris M, Remuzzi G. Thrombotic microangiopathy: what not to learn from a meta-analysis. Nat Rev Nephrol. 2009;5:186–8.
2. George JN, Nester CM. Syndromes of thrombotic microangiopathy. N Engl J Med. 2014;371:1847–8.
3. Loirat C, Frémeaux-Bacchi V. Atypical hemolytic uremic syndrome. Orphanet J Rare Dis. 2011;6:60.
4. Rodríguez de Córdoba S, Harris CL, Morgan BP, Llorca O. Lessons from functional and structural analyses of disease-associated genetic variants in the complement alternative pathway. Biochim Biophys Acta. 2011;1812:12–22.
5. George JN. Systemic malignancies as a cause of unexpected microangiopathic hemolytic anemia and thrombocytopenia. Oncology (Williston Park). 2011;25:908–14.
6. Campistol JM, Arias M, Ariceta G, Blasco M, Espinosa M, Grinyó JM, et al. An update for atypical haemolytic uraemic syndrome: diagnosis and treatment. A consensus document. Nefrologia. 2013;33:27–45 [Article in English, Spanish].
7. Francis KK, Kalyanam N, Terrell DR, Vesely SK, George JN. Disseminated malignancy misdiagnosed as thrombotic thrombocytopenic purpura: a report of 10 patients and a systematic review of published cases. Oncologist. 2007;12:11–9.
8. Lesesne JB, Rothschild N, Erickson B, Korec S, Sisk R, Keller J, et al. Cancer-associated hemolytic-uremic syndrome: analysis of 85 cases from a national registry. J Clin Oncol. 1989;7:781–9.
9. Lechner K, Obermeier HL. Cancer-related microangiopathic hemolytic anemia: clinical and laboratory features in 168 reported cases. Medicine (Baltimore). 2012;91:195–205.
10. Fakhouri F, Frémeaux-Bacchi V. Thrombotic microangiopathy: eculizumab for atypical haemolytic uraemic syndrome: what next? Nat Rev Nephrol. 2013;9:495–6.

Maria Rullan [a], Joaquín Manrique [b,*], Loreto Fernandez Lorente [b], Diana Izquierdo [b], Fernanda Slon [b], Antonio José Rullan [c]

[a] *Servicio de Digestivo, Complejo Hospitalario de Navarra, Pamplona, Navarra, Spain*
[b] *Servicio de Nefrología, Complejo Hospitalario de Navarra, Pamplona, Navarra, Spain*
[c] *Centro de Salud de Tafalla, Complejo Hospitalario de Navarra, Pamplona, Navarra, Spain*

[*] *Corresponding author.*
E-mail address: jmanriquees@gmail.com (J. Manrique).

http://dx.doi.org/10.1016/j.nefroe.2016.02.003

Utility of a predictive model for chronic kidney disease in level 1 medical care☆

Utilidad de un modelo de predicción para la enfermedad renal crónica en una unidad de primer nivel de atención

To the Editor,

The 2014 Spanish agreement Document for the Detection and Management of Chronic Kidney Disease (CKD) recommended that, in people with risk factors for development of and progression of CKD, the doctor should take certain preventive measure.[1]

Despite these recommendations, the prevalence of CKD continues to rise. In Mexico, one of the Latin American countries with the highest prevalence of CKD,[2,3] there was an increase from 394 to 986 (patient per million) ppm from 2003 to 2007.

To help primary care physicians to monitor groups at risk, a model was constructed to predict probability of developing CKD, depending on the different combinations of risk factors that can be detected in a family medicine clinic.

This was a case–control study of patients treated in a primary care unit of *the Instituto Mexicano del Seguro Social* (Mexican Social Security Institute), Querétaro, Mexico, in 2013. The sample size was calculated using the formula for two proportion, with a significance level of 95%, test power 80%, OR 2.2, considering a 1:1 ratio of patients with CKD for unpaired data ($n = 100$ for each group).

Definition of groups

Cases: patients diagnosed with CKD by the renal department, glomerular filtration rate ≤60 mL/min, measured by 24 h urinary creatinine clearance, both sexes, and those older than 18 years.

Controls: patients without CKD, glomerular filtration rate ≥61 mL/min measured by the Cockcroft–Gault formula on 2

DOI of original article:
http://dx.doi.org/10.1016/j.nefro.2015.10.010.
☆ Please cite this article as: Gallardo Vidal LS, Rodríguez Méndez AJ, Burgos Ochoa M, Martínez Martínez ML, García Solís P, Villagrán Herrera ME, et al. Utilidad de un modelo de predicción para la enfermedad renal crónica en una unidad de primer nivel de atención. Nefrologia. 2016;36:196–198.

Table 1 – Multiple logistic regression model to explain chronic kidney disease.

	Chi-square 151.04	P-value 0.000	
	Coefficient	Statistic	Significance
Constant	−16.116		
Urological disease	2.561	12.509	0.000
HTN	2.185	20.931	0.000
Use of nephrotoxic drugs	2.811	22.790	0.000
Hyperuricaemia	1.908	10.318	0.001

HTN, systemic hypertension.
The statistical analysis included a Chi-square test and the calculation of the multiple logistic regression model, with a 95% confidence interval.

different occasions and confirmed by a 24 h urinary creatinine, both sexes, and those older than 18 years.

Exclusion criteria were pregnancy and other causes of proteinuria. Patients with incomplete histories were not included.

Cases were chosen using simple random sampling, and controls were chosen by non-probability quota sampling. The risk factors established by the Spanish agreement Document for CKD susceptibility, onset, and progression were taken into account for the analysis, and only those that reached statistical significance were included in the model. The variables of sex and age were not included, because they were part of the formula used to estimate glomerular filtration rate.

A Chi-square test was used to estimate the risk of odds ratio (OR). Logistic regression analysis was used to construct the model, with a method of progressive inclusion of variables, including those that reached statistical significance, with a 95% confidence level.

A probability risk analysis was performed, based on the frequency of CKD with different combinations of the variables that were found to be significant risk factors, expressed as percentages. The formula $1/(1+e^{-y})$ was used for this calculation.

The risk factors that could be used, due to their strong association, to create the model were urological diseases, systemic hypertension (HTN), hyperuricaemia, and use of nephrotoxic drugs. Nephrotoxic drugs had the strongest association (Table 1). According to this model, there is a 99.9% probability of developing CKD if a patient has all 4 risk factors. If a patient has a urological disease and uses long-term nephrotoxic drugs, the probability is 92.8% (Table 2).

Although the factors that lead to CDK[1,4,5] are widely studied, the fact is that prevention of CKD onset and progression has not been achieved.[3] Therefore, studies that allow the construction of practical predictive models adjusted to specific populations are of great relevance.

In this discussion, we cannot ignore the use of nephrotoxic drug; the probability of developing CKD with this risk factor alone is 49.9%; this is a preventable factor in any population. It must be mentioned that this rate is high due to the use of non-steroidal anti-inflammatory drugs (NSAIDs). This is similar to what author authors have found.[6,7]

In this model, urological disease was considered a significant risk factor, with a probability of 43.7%. Prostatic enlargement was the most common disease. In the Mexican population, late detection of prostatic enlargement is common, often due to men's fear of exposing their privacy during the clinical examination. This can lead to complications such as CKD.[8,9]

In Mexico, the leading reason for consultation in primary care is HTN, and, according to the proposed model, there is a 34.8% probability of developing CKD with this factor alone. Likewise, the strict monitoring of uric acid levels and their timely control must not be abandoned.[10]

In conclusion, the model that predicted the highest probability of developing CKD was that which included urological diseases, HTN, hyperuricaemia, and the use of nephrotoxic drugs.

Table 2 – Calculation of the probability of developing chronic kidney disease.

Probability Percentage	Urological disease	Systemic hypertension	Nephrotoxic drugs	Hyperuricaemia
99.9	Present	Present	Yes	Present
99.1	Present	Present	Yes	Absent
98.9	Present	Absent	Yes	Present
98.4	Absent	Absent	Yes	Present
97.9	Present	Present	No	Present
92.8	Present	Absent	Yes	Absent
89.9	Absent	Present	Yes	Absent
87.3	Present	Present	No	Absent
87.0	Absent	Absent	Yes	Present
84.0	Present	Absent	No	Present
78.2	Absent	Present	No	Present
49.9	Absent	Absent	Yes	Absent
43.7	Present	Absent	No	Absent
34.8	Absent	Present	No	Absent
28.8	Absent	Absent	No	Present
5.7	Absent	Absent	No	Absent

The statistical analysis included the calculation of the multiple logistic regression model and, later, the estimation of the probability of developing chronic kidney disease using the formula $1/(1+e^{-y})$.

Funding

We acknowledge the *Consejo Nacional de Ciencia y Tecnología* (CONACYT) (National Council of Science and Technology), through the *Consejo de Ciencia y Tecnología del Estado de Querétaro* (CONCYTEQ) (Council of Science and Technology of Querétaro State) and the Querétaro State Government for the support provided by the joint fund (QRO-2011-CO2-175384), and the support of FORDECy (193512).

REFERENCES

1. Martínez-Castelao A, Gorriz J, Bover L, Segura de la Morena J, Cebollada J, Escalad J, et al. Documento de consenso para la detección y manejo de la enfermedad renal crónica. Nefrologia. 2014;34:243–62.
2. Cortes L, Cueto AM, Santillana SP, Martínez HR, Torres L, et al. Guía Práctica Clínica Prevención, Diagnóstico y Tratamiento de la Enfermedad Renal Crónica Temprana. Guías de Práctica Clínica Medicina Interna, Instituto Mexicano del Seguro Social, vol. 1; 2013. p. 211–77.
3. Méndez-Durán A, Méndez-Bueno JF, Tapia-Yáñez T, Muñoz A, Aguilar-Sánchez L. Epidemiología de la insuficiencia renal crónica en México. Diál Traspl. 2010;31:7–11.
4. Vela XF, Henríquez D, Zelaya SM, Granados DV, Hernández MX, Orantes CM. Chronic kidney disease and associated risk factors in two Salvadorian farming communities, 2012. MEDICC Rev. 2014;16:55–60.
5. Orantes CM, Herrera R, Almaguer M, Brizuela EG, Hernández CE, Bayarre H, et al. Chronic kidney disease and associated risk factors in the Bajo Lempa region of El Salvador: nefrolempa study, 2009. MEDICC Rev. 2011;13:14–22.
6. Ingrasciotta Y, Sultana J, Giorgianni F, Caputi AP, Arcoraci V, Tari DU, et al. The burden of nephrotoxic drug prescriptions in patients with chronic kidney disease: a retrospective population-based study in Southern Italy. PLOS ONE. 2014;9:e89072.
7. Diogo L, Saitovitch D, Biehl M, Bahlis LF, Guterres MC, O'Keeffe CF, et al. ¿Hay una asociación entre antiinflamatorios no esteroides y nefropatía inducida por contraste? Arq. Bras. Cardiol. 2010;95:726–31.
8. Muñoz MN, Sossa LA, Jairo J, Grisales A, Rodríguez JD. Percepciones sobre el cáncer de próstata en población masculina mayor de 45 años Santa Rosa de Cabal 2010. Hacia la promoción de la Salud. 2011;16:147–61.
9. Pereira E, Salvador MC, Harter R. Barreras en relación a los exámenes de rastreo de cáncer de próstata. Rev Latino-Am Enfermagem. 2011;19:2–8.
10. Chaudhary K, Malhotra K, Sowers J, Aroor A. Uric acid – key ingredient in the recipe for cardiorenal metabolic syndrome. Cardiorenal Med. 2013;3:208–20.

Lilia Susana Gallardo Vidal[a,*], Adriana Jheny Rodríguez Méndez[b], Mariana Burgos Ochoa[c], Martha Leticia Martínez Martínez[b], Pablo García Solís[a], Maria Elena Villagrán Herrera[a], Ana María Pérez Baza[a]

[a] *Unidad de Medicina Familiar N.°13, Instituto Mexicano del Seguro Social, Tuxtla Gutiérrez, Chiapas, Mexico*
[b] *Facultad de Medicina, Universidad Autónoma de Querétaro, Santiago de Querétaro, Querétaro, Mexico*
[c] *Unidad de Medicina Familiar N.°14, Instituto Mexicano del Seguro Social, México, D.F., Mexico*

* *Corresponding author.*
E-mail addresses: susi2947@gmail.com, susana.gallardo@imss.gob.mx (L.S. Gallardo Vidal).

http://dx.doi.org/10.1016/j.nefroe.2015.10.009

Cloudy peritoneal dialysate effluent due to graft intolerance syndrome☆

Efluente peritoneal turbio debido a un síndrome de intolerancia al injerto renal

To the Editor,

The presence of cloudy peritoneal fluid (PF) in patients on peritoneal dialysis (PD) usually occurs in the context of infectious peritonitis. For this diagnosis, two of the following three criteria must be met: (1) the presence of abdominal pain, (2) cloudy fluid with more than 100 leukocytes/μL and more than 50% of them polymorphonucleocytes, and (3) positive culture from PF.[1] There are many causes of cloudy PF due to a high cell count. Inflammation of juxtaperitoneal organs (pancreatitis, cholecystitis, splenic infarct, appendicitis, etc.) can increase the number of polymorphonuclear lymphocytes in

DOI of original article:
http://dx.doi.org/10.1016/j.nefro.2015.04.002.
☆ Please cite this article as: Beltrán-Catalán S, Vizcaino-Castillo B, Molina-Vila P, Montomoli M, Pallardó-Mateu LM, Ávila-Bernabeu A. Efluente peritoneal turbio debido a un síndrome de intolerancia al injerto renal. Nefrologia. 2016;36:198–199.