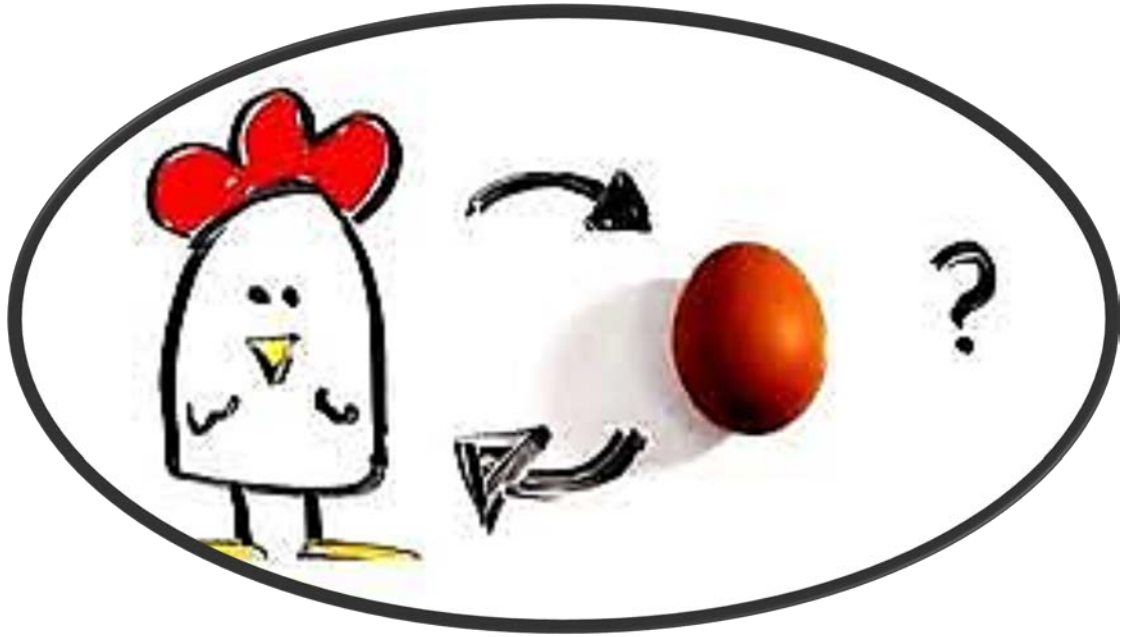
UROLITIASIS Y OSTEOPOROSIS
¿CUÁL ES LA RELACIÓN?



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DECLARACION DE CONFLICTOS DE INTERES

No tengo conflictos de interés en relación al contenido de esta exposición

EPIDEMIOLOGÍA DE LA UROLITIASIS

Sex	Prevalence	Incidence
Men	10.6%	140.6 per 100,000 population
Women	7.1%	65.8 per 100,000 population

Year following initial stone event	Risk of recurrence
2	11%
5	20%
10	31%
15	39%

Ziemba, J.B. Investig. Clin. Urol. 2017, 58, 299–306

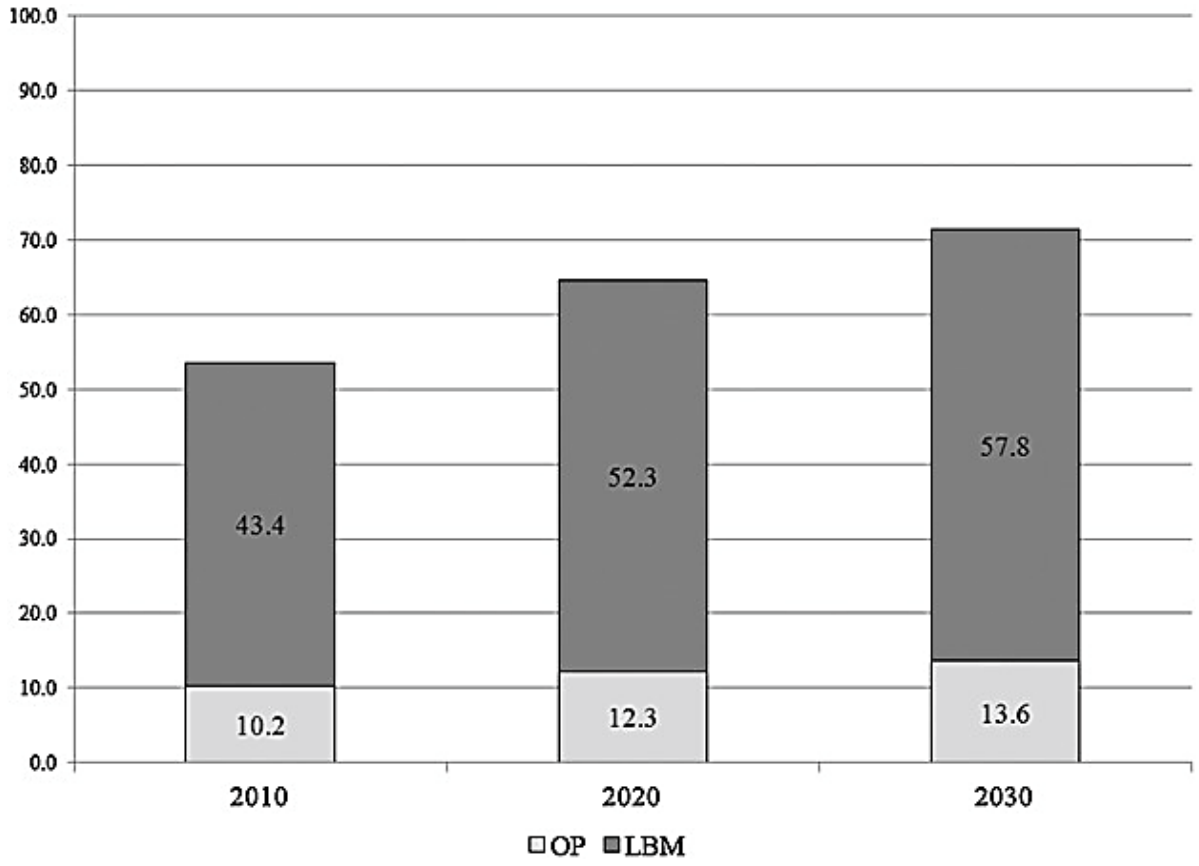
Scales CD Jr. Eur Urol 2012;62:160-5

Characteristic	Odds ratio (95% CI)	*p* value
Age, yr		
20–39	1.00 (referent)	–
40–59	1.83 (1.37–2.45)	<0.001
≥60	2.18 (1.74–2.73)	<0.001
Female	0.63 (0.52–0.75)	<0.001
Race		
White, non-Hispanic	1.00 (referent)	–
Black, non-Hispanic	0.37 (0.28–0.49)	<0.001
Hispanic	0.60 (0.49–0.73)	<0.001
Other/multiracial	0.57 (0.37–0.89)	0.014
BMI category		
Normal	1.00 (referent)	–
Overweight	1.29 (0.96–1.72)	0.0875
Obese	1.55 (1.25–1.94)	<0.001
Household income, $		
≥75 000	1.00 (referent)	–
35 000–74 999	1.49 (1.16–1.92)	0.002
20 000–34 999	1.65 (1.27–2.15)	<0.001
0–19 999	1.57 (1.17–2.09)	0.002
Diabetes	1.59 (1.22–2.07)	<0.001
Gout	1.92 (1.44–2.56)	<0.001

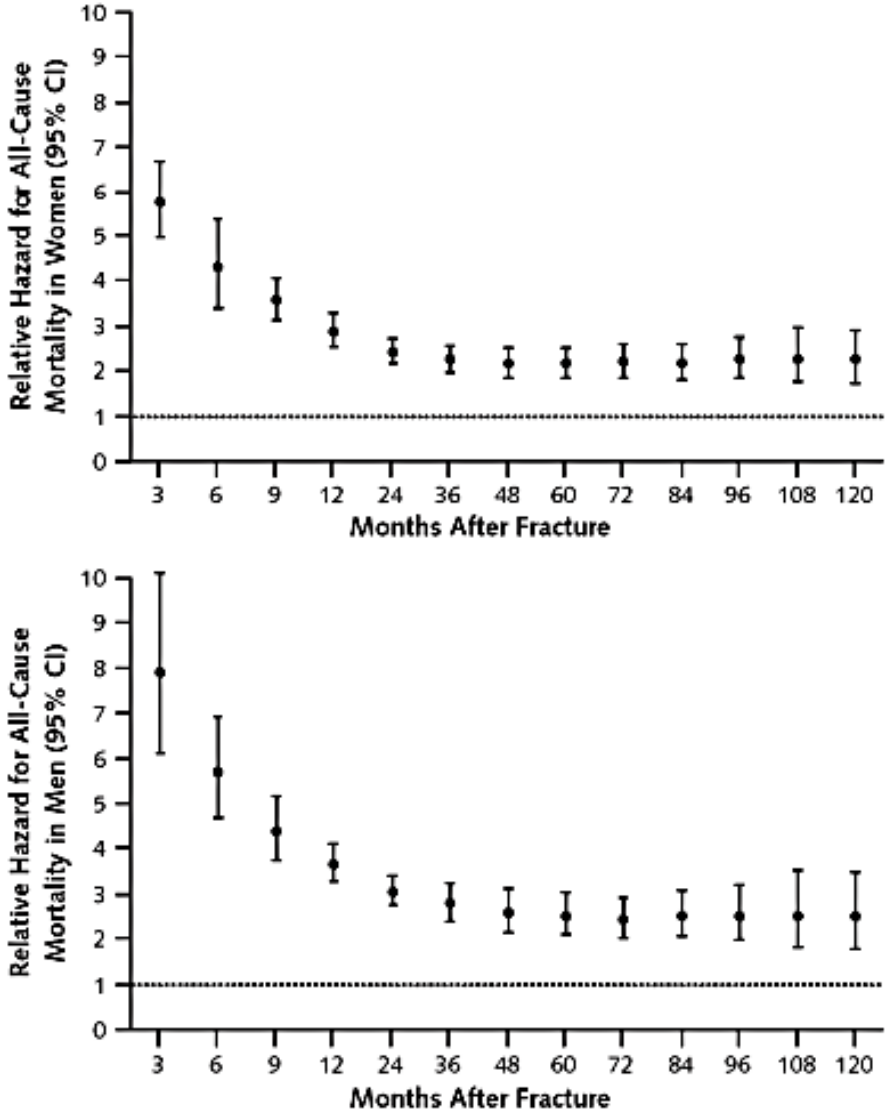
CI = confidence interval; BMI = body mass index.

EPIDEMIOLOGÍA DE LA OSTEOPOROSIS

Proyección de la prevalencia (%) de osteoporosis (OP) y masa ósea baja (LBM), Medida por DPX en CL o CF, en mayores de 50 años no institucionalizados de EEUU

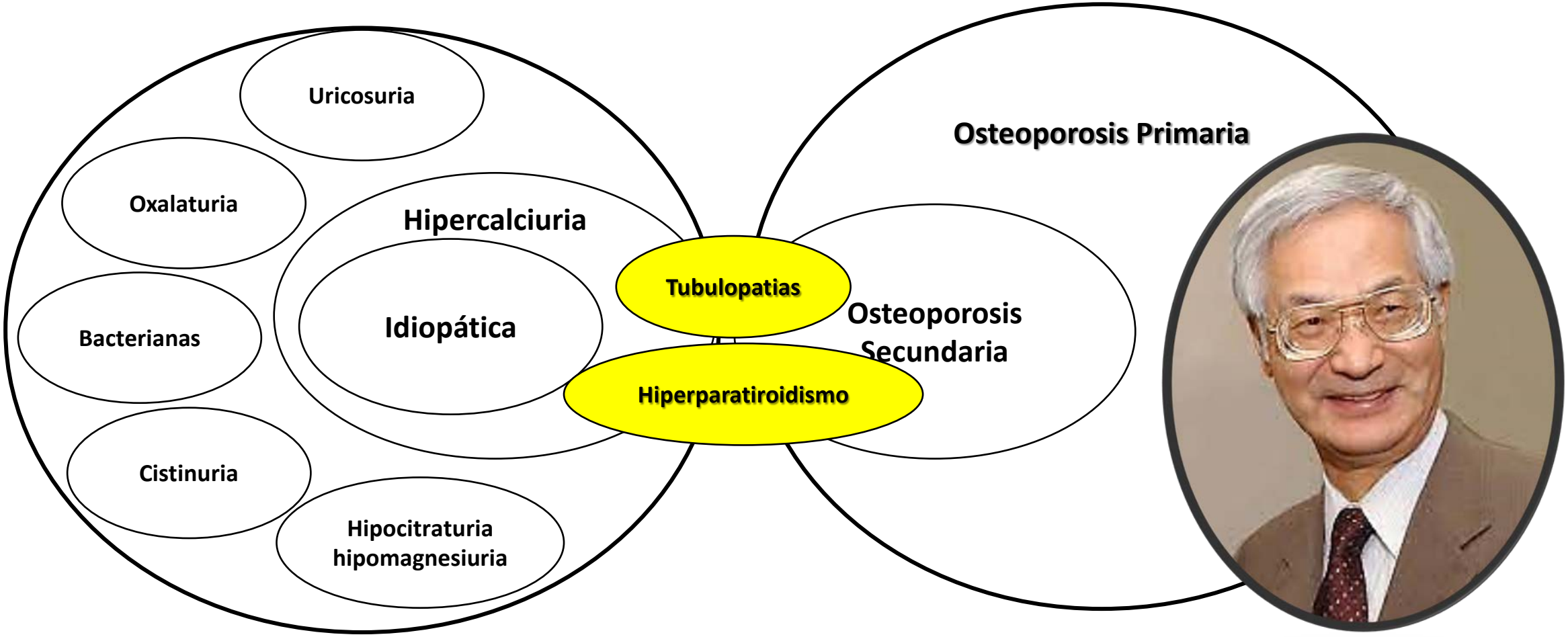


Wright NC. J Bone Miner Res. 2014. doi:10.1002/jbmr.2269



Haentjens P. Ann Intern Med. 2010; 152: 380–390

UROLITIASIS Y OSTEOPOROSIS
¿CUÁL ES LA RELACIÓN?



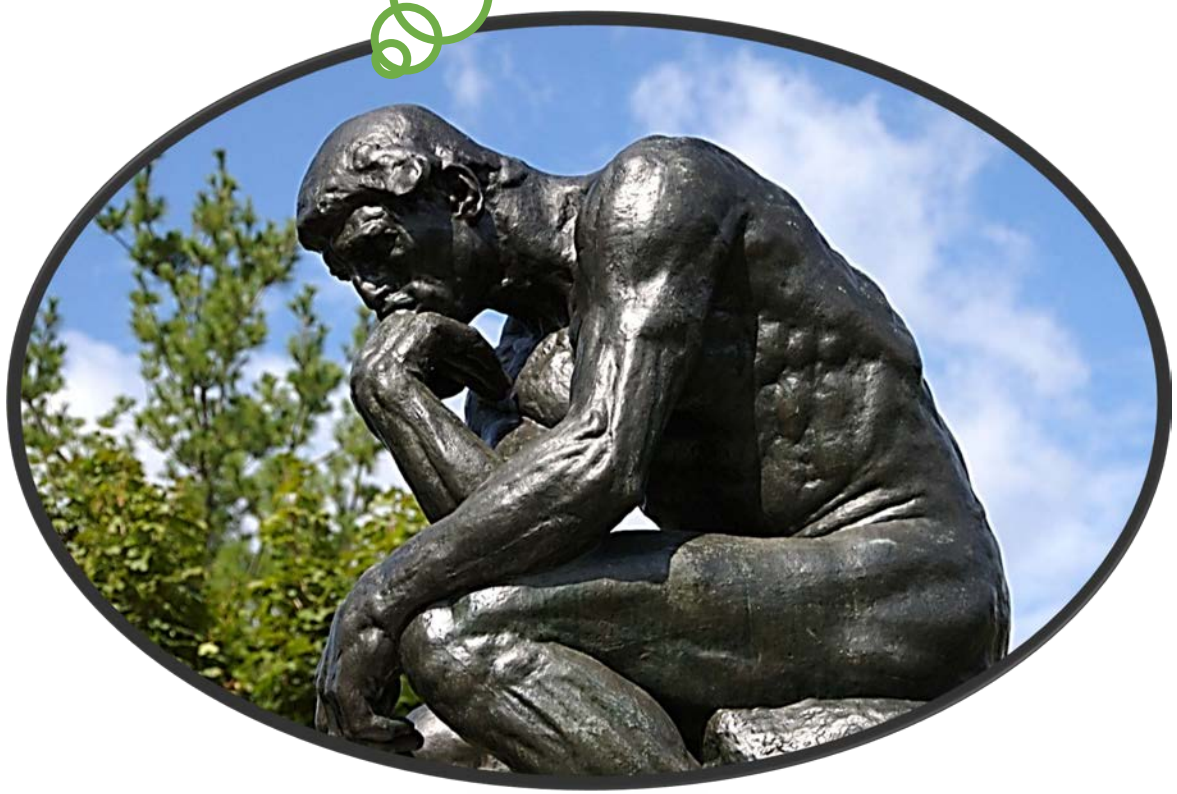
Características de los residentes de Rochester, Minnesota
Con urolitiasis sintomática

	N	*%*
Type of stone		
Calcium oxalate	158	25.3
Calcium phosphate	15	2.4
Mixed	45	7.2
Urate	8	1.3
Other	1	0.2
Unknown	397	63.6
Clinical diagnosis[a]		
Hyperuricemia/gout	146	23.4
Idiopathic hypercalciuria	47	7.5
Hyperparathyroidism	13	2.1
Small bowel resection	9	1.4
Inflammatory bowel disease	4	0.6
Sarcoidosis	1	0.2
Uncertain	428	68.6

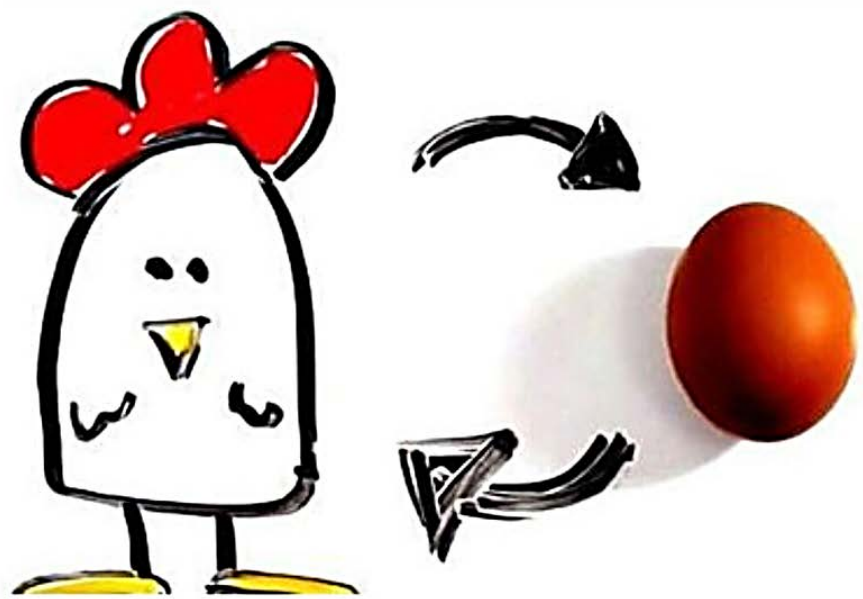
[a] More than one diagnosis may have been reported

Melton LJ. Kidney Int. 1998;53(2):459–64

…Hiperparatiroidismo primario, tubulopatías….



ASOCIACIÓN ENTRE UROLITIASIS Y OSTEOPOROSIS



ASOCIACIÓN ENTRE UROLITIASIS Y DMO

Analysis	Number of studies	Number participants		Meta-analysis				Heterogeneity
		Nephrolithiasis	HC	SMD	95 % CI		*p* value	I^2
Lumbar spine								
BMD	15	1037	2584	**−0.58**	**−0.91**			
T-score	7	390	282					
Z-score	11	421						
Total hip								
							0.04	73
					−1.11	**−0.52**	**<0.0001**	72
			182	**−0.82**	**−1.10**	**−0.54**	**<0.0001**	32
Fe								
BMD	8	523	537	**−0.35**	**−0.66**	**−0.03**	**0.03**	78
T-score	6	360	252	**−0.67**	**−1.00**	**−0.34**	**<0.0001**	69
Z-score	8	347	380	−0.41	−0.85	0.03	0.07	85

24 estudios de casos y controles.
1595 pacientes con nefrolitiasis y 3402 controles sanos.
Sólo se excluyó HPP

Lucato, P. Osteoporos. Int. 2016, 27, 3155–3164

ASOCIACIÓN ENTRE UROLITIASIS Y FRACTURAS

Fracture site	*Men*	*Women*
Wrist	1.68 (1.02–2.76)	1.13 (0.73–1.76)
Spine	2.32 (1.04–5.18)	1.75 (0.58–5.29)

OR de prevalencia e IC 95% para fracturas de columna y muñeca en personas con antecedentes de urolitiasis en relación al control, ajustado por edad y raza/etnicidad (NHANES III)

Lauderdale DS. J Bone Miner Res. 2001;16(10):1893–8

Clinical diagnosis[a]		
Hyperuricemia/gout	146	23.4
Idiopathic hypercalciuria	47	7.5
Hyperparathyroidism	13	2.1
Small bowel resection	9	1.4
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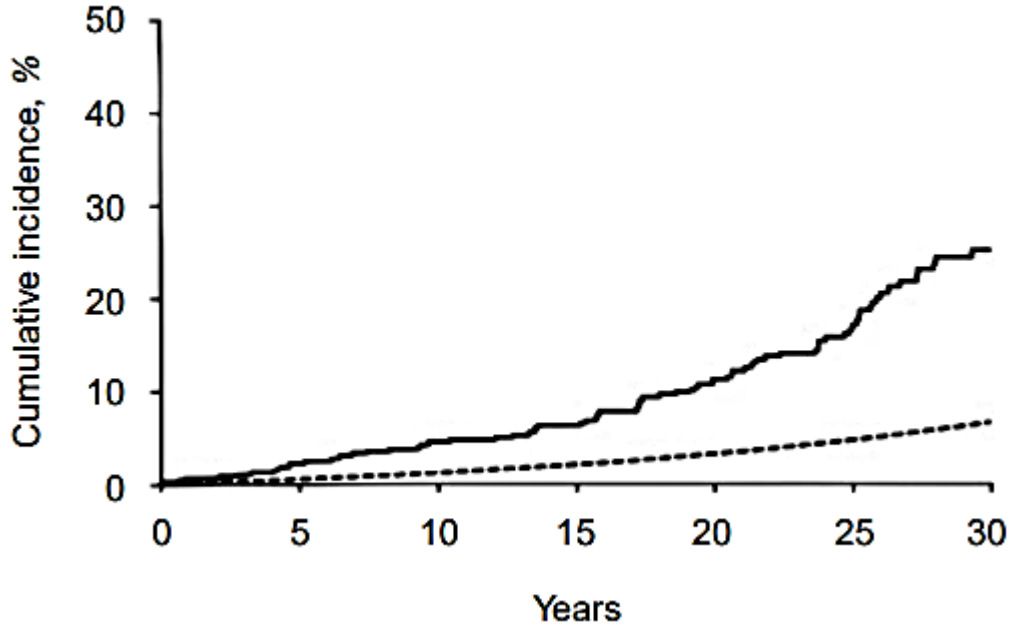
Sarcoidosis	1	0.2
Uncertain	428	68.6

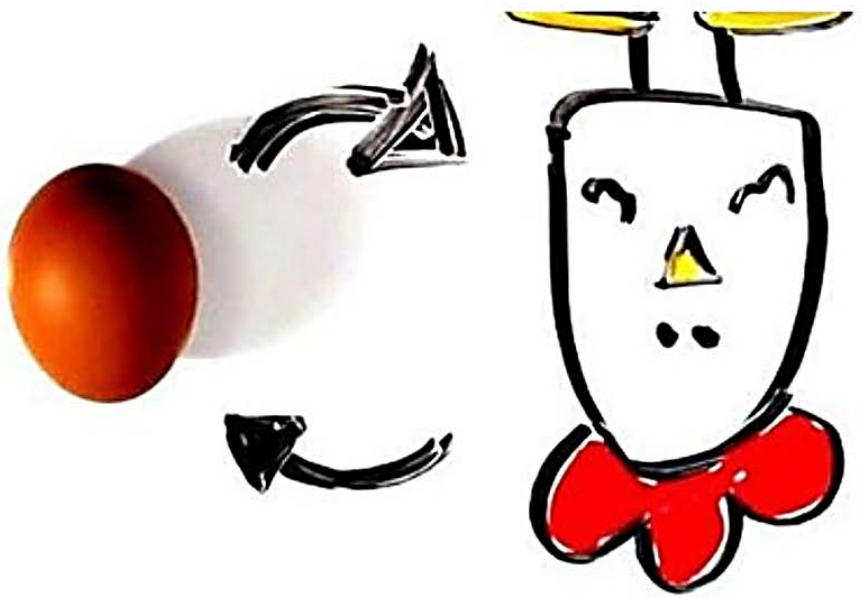
[a] More than one diagnosis may have been reported



Incidencia acumulada de fracturas vertebrales observada (línea continua) y esperada (línea discontinua) entre los residentes de Rochester, Minnesota después del episodio inicial de urolitiasis sintomática

Melton LJ. Kidney Int. 1998;53(2):459–64

ASOCIACIÓN ENTRE OSTEOPOROSIS Y UROLITIASIS

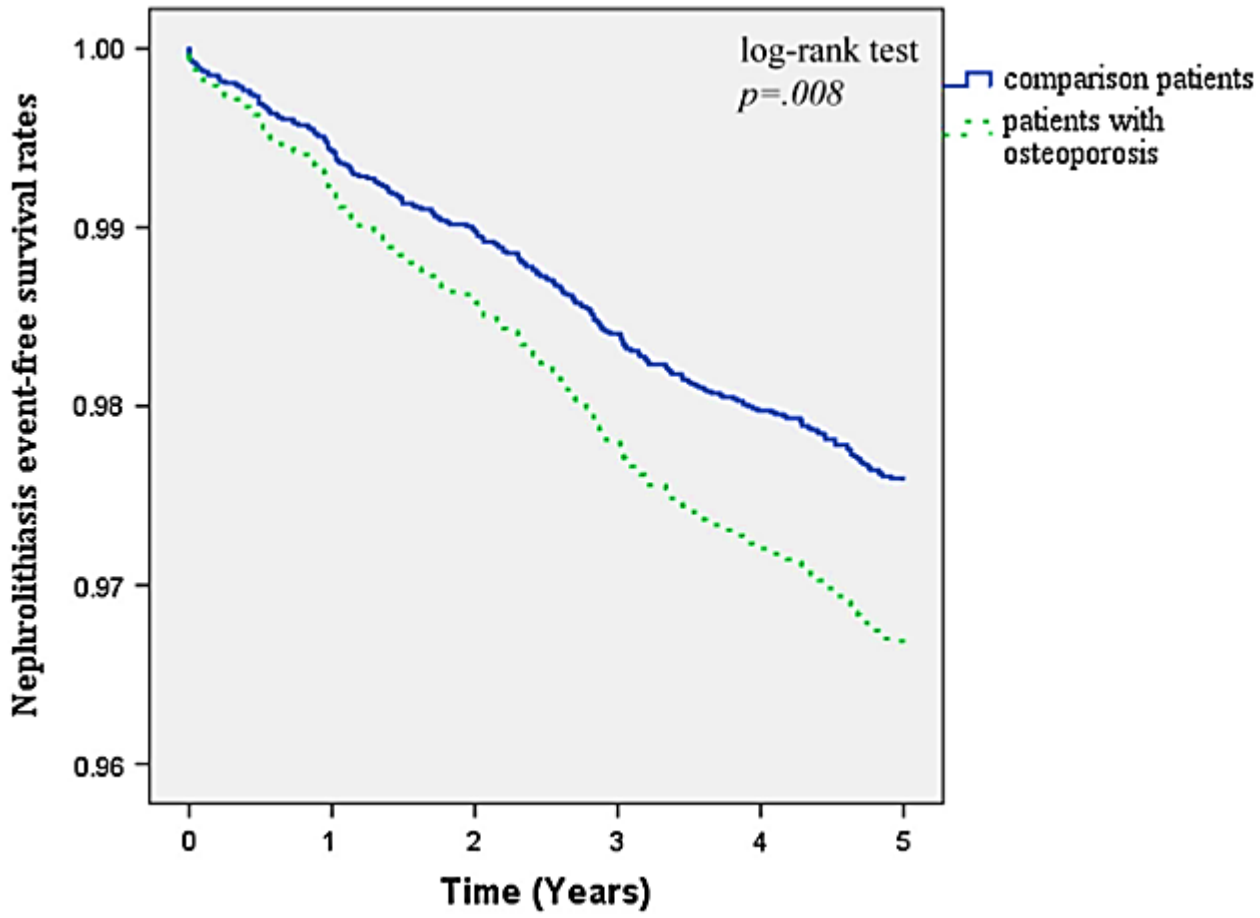


ASOCIACIÓN ENTRE OSTEOPOROSIS Y UROLITIASIS

HR de nefrolitiasis sintomática en pacientes con osteoporosis durante el período de seguimiento de 5 años

Development of symptomatic nephrolithiasis	Total		Patients with osteoporosis		Patients without osteoporosis	
	No.	(%)	No.	(%)	No.	(%)
5-year follow-up period						
Yes	225	2.8	60	3.7	165	2.5
No	7945	97.2	1574	96.3	6371	97.5
Crude HR (95 % CI)				1.48 (1.10–1.99)**	1	
Adjusted HR (95 % CI)				1.38 (1.03–1.86)*	1	

Total sample number = 8170



Chou, P.S. Calcif. Tissue Int. 2014, 95, 317– 322

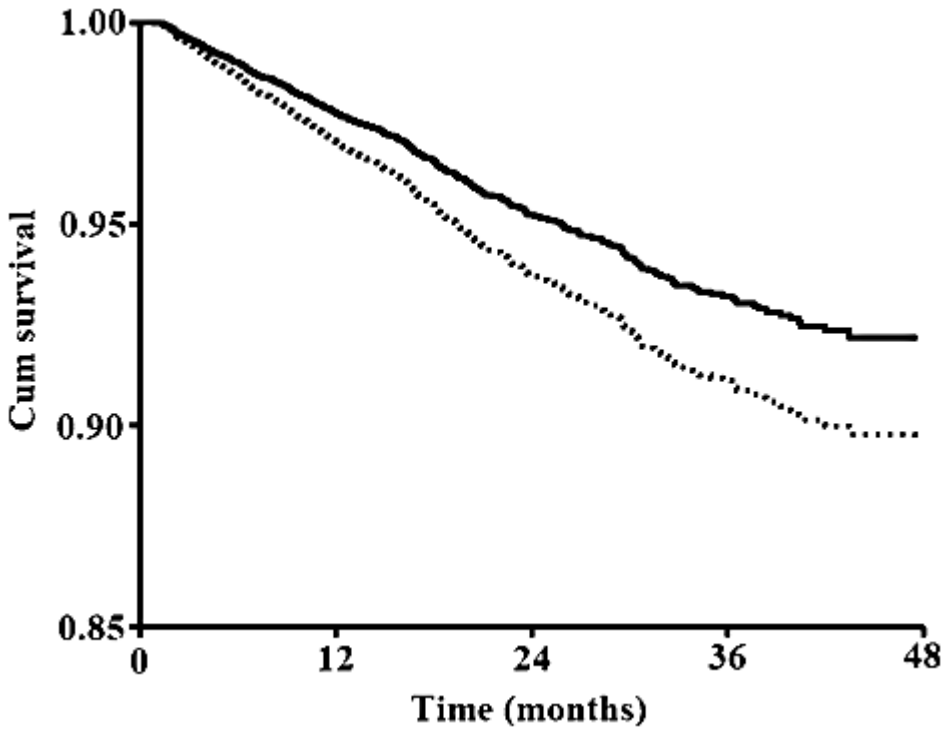
ASOCIACIÓN ENTRE OSTEOPOROSIS Y UROLITIASIS

Factores de riesgo para la urolitiasis incidente en sujetos del sur de Italia mayores de 40 años

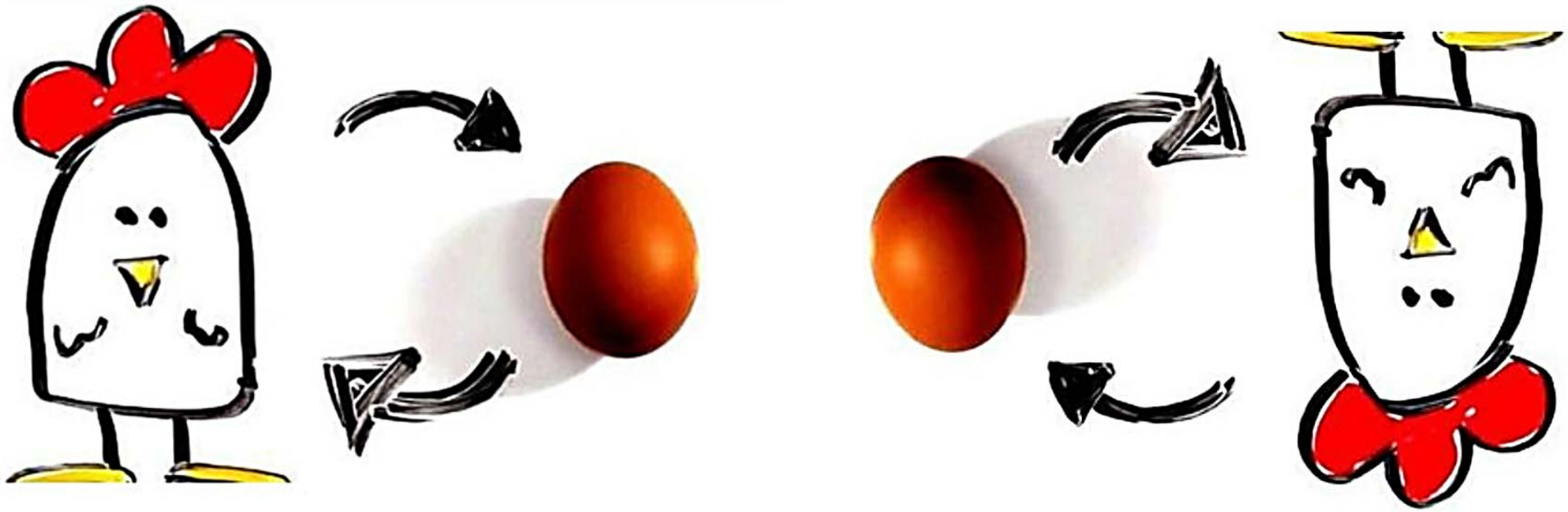
	p	HR	95% CI	
Osteoporosis diagnosis (y/n)	0.04	1.33	1.01	1.74
Age (years)	0.02	0.99	0.98	1.00
Sex (m/f)	0.52	0.87	0.56	1.34
BMI (Kg/m^2)	0.22	0.99	0.97	1.01
Osteoporosis treatment (y/n)	0.39	1.15	0.84	1.56
Current smokers (y/n)	0.18	1.17	0.93	1.48
Previous smokers (y/n)	0.68	1.08	0.73	1.60

***Se excluyó HPP**

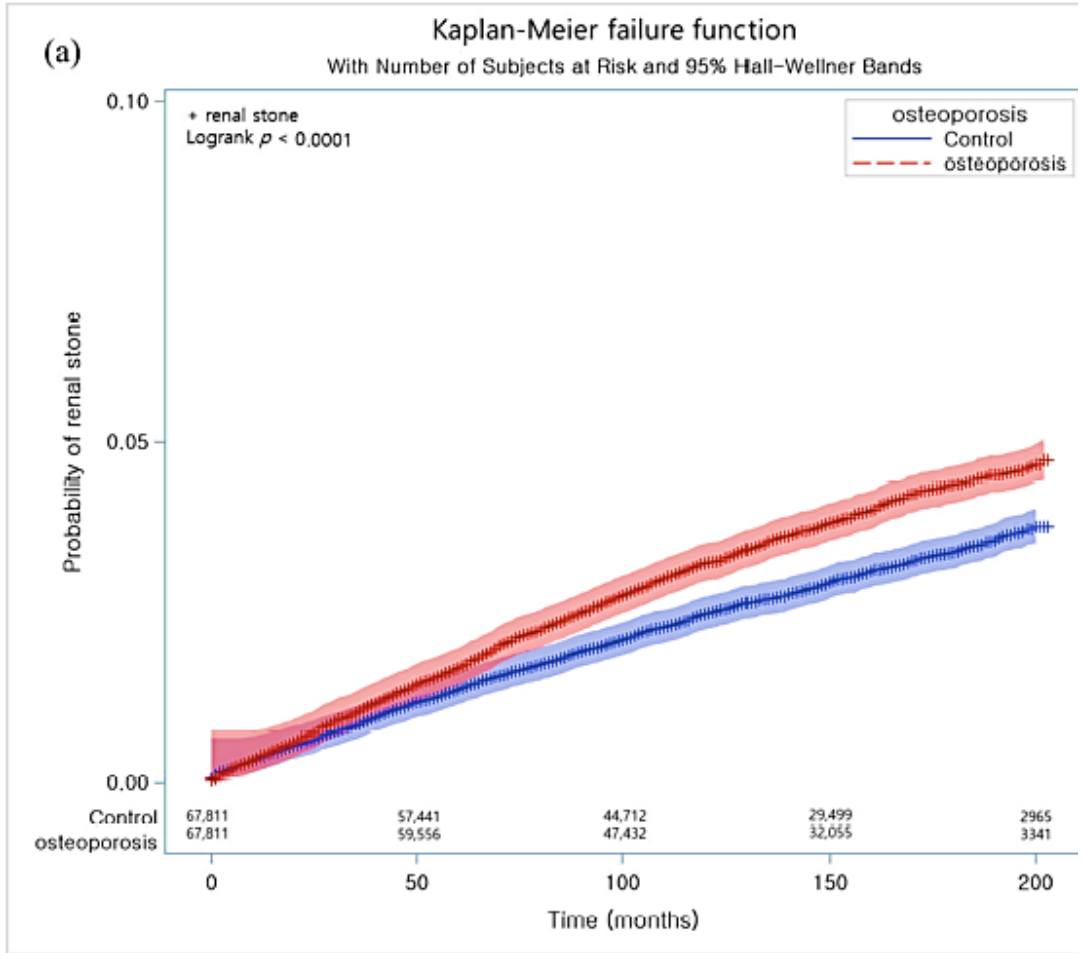
Probabilidad dependiente del tiempo de aparición de nefrolitiasis. La línea punteada y la línea continua indican pacientes con y sin osteoporosis

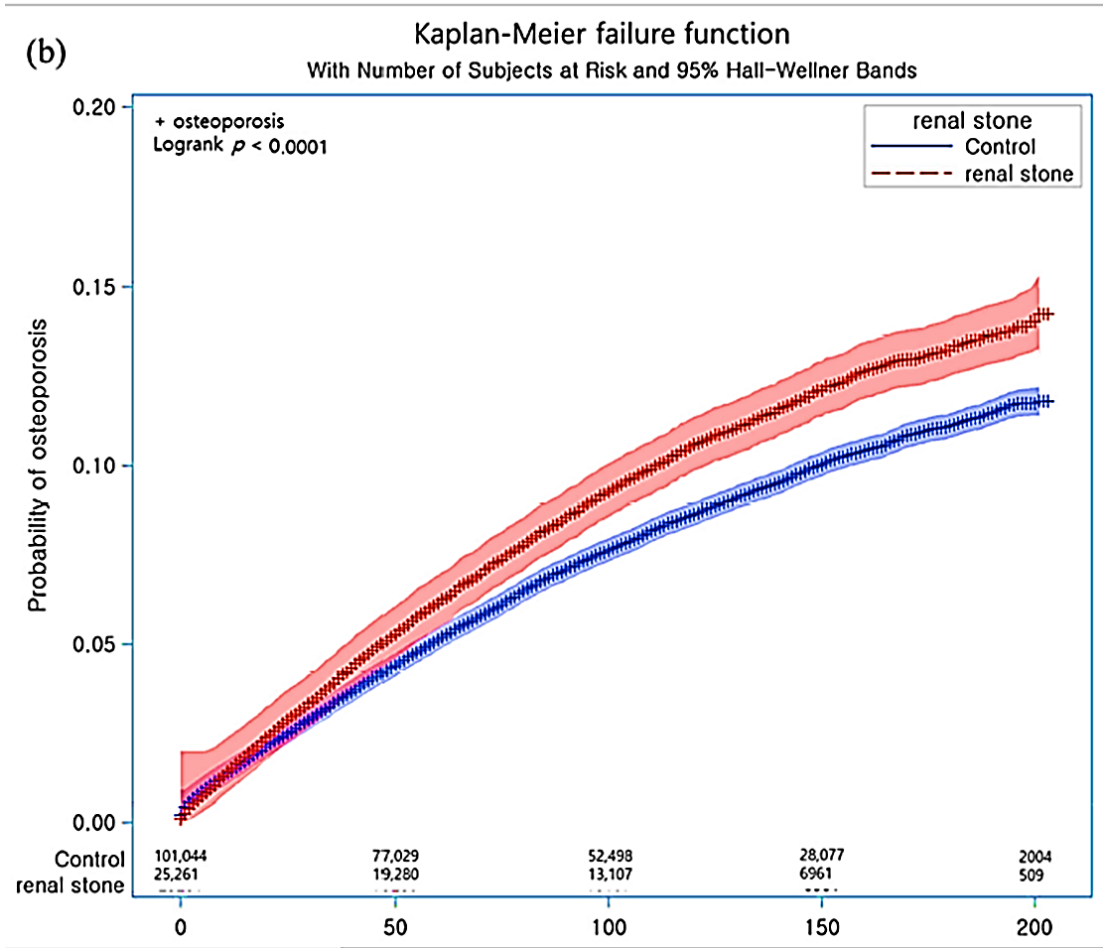


Rendina D. Calcifed Tissue International (2020) 107:446–452



RELACIÓN RECÍPROCA ENTRE LA OSTEOPOROSIS Y LOS CÁLCULOS RENALES





So Young Kim. J. Clin. Med. 2022, 11,6614.https://doi.org/10.3390/jcm11226614

HIPERCALCIURIA Y DMO

Outcome	Number comparisons	β	95 % CI		p value	R^2
Lumbar BMD	7	0.002	−0.005	0.009	0.63	0.00
Lumbar T-score	5	0.0002	−0.003	0.003	0.90	0.00
Lumbar Z-score	7	0.002	−0.009	0.14	0.68	0.00
Total hip BMD	Only 2 studies					
Total hip T-score	4	−0.006	−0.02	0.01	0.49	0.00
Total hip Z-score	4	−0.006	−0.02	0.01	0.49	0.00
Neck BMD	Only 3 studies with data about calciuria					
Neck T-score	**4**	**−0.0003**	**−0.005**	**−0.0001**	**0.05**	**1.00**
Neck Z-score	**5**	**−0.006**	**−0.010**	**−0.002**	**0.04**	**0.41**

Bold values represent significant results (p-values <0.05)

β unstandardized regression coefficient, *CI* confidence interval, *BMD* bone mineral density

Asociación entre la diferencia en calcio en orina de 24 h (calculado como nefrolitiasis menos controles) y estimaciones de salud ósea. Se excluyó HPP

Lucato, P. Osteoporos. Int. 2016, 27, 3155–3164

UROLITIASIS NORMOCALCIURICA Y OSTEOPOROSIS

BMD (gr/cm^2)

	Group 1 (BMD)	Group 2 (BMD)	*P*
Total femur	0.897 ± 0.132	0.945 ± 0.170	<0.05
Femur neck	0.759 ± 0.132	0.887 ± 0.135	<0.001
Lumbal Spine (L2–L4)	0.874 ± 0.130	1.021 ± 0.301	<0.001
t score			
	Group 1 (*t* score)	Group 2 (*t* score)	*P*
Total femur	−0.795 ± 0.689	−0.588 ± 2.416	>0.05
Femur neck	−0.883 ± 0.749	0.435 ± 0.547	<0.001
Lumbal spine (L2–L4)	−1.509 ± 1.224	−0.225 ± 0.854	<0.001

Means ± SD are shown

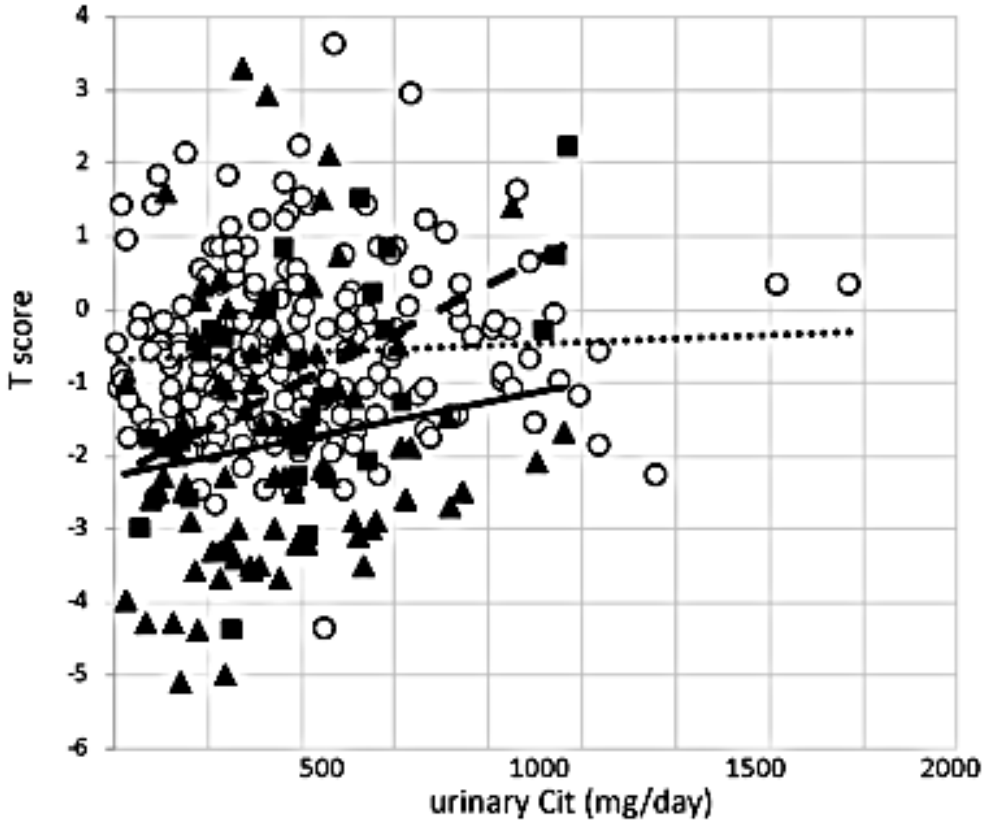
P values were calculated by unequal variance (Students's *t* tests)

Grupo 1: Al menos 2 episodios de urolitiasis y normocalciuria (N= 155)

Grupo 2: Controles sin historia personal ni familiar de urolitiasis (N=60)

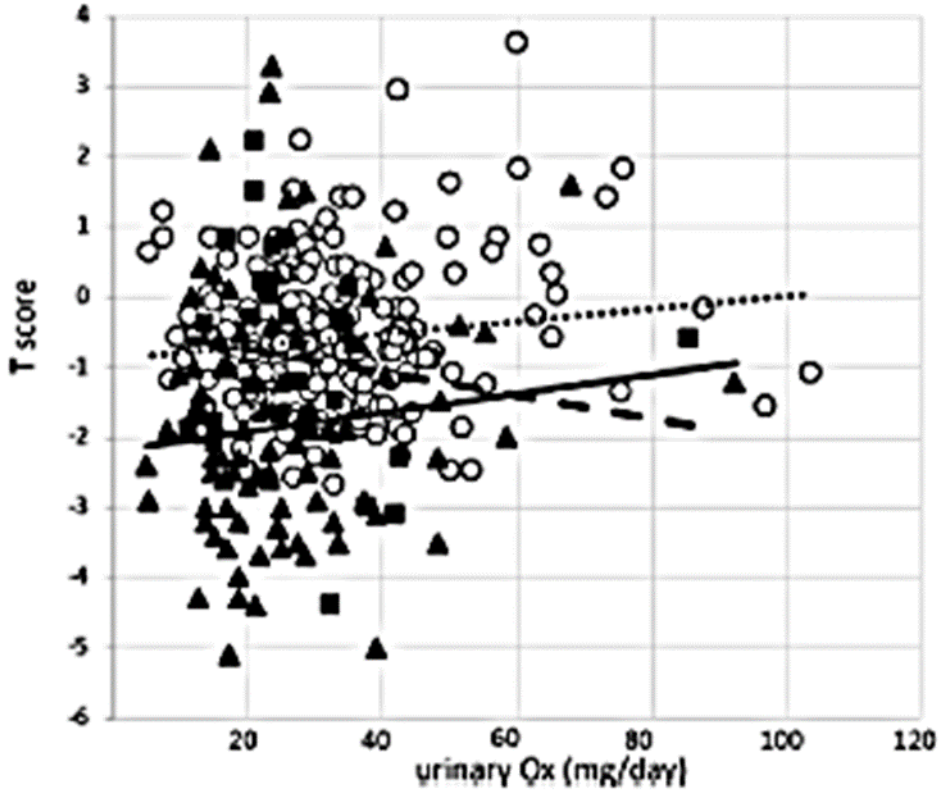
Tugen V. Urol Res (2007) 35:29–34

HIPOCITRATURIA, HIPEROXALURIA Y DMO



Pruebas de correlación de rango de Spearman entre Tscore y citrato en orina de 24 horas (N= 370)

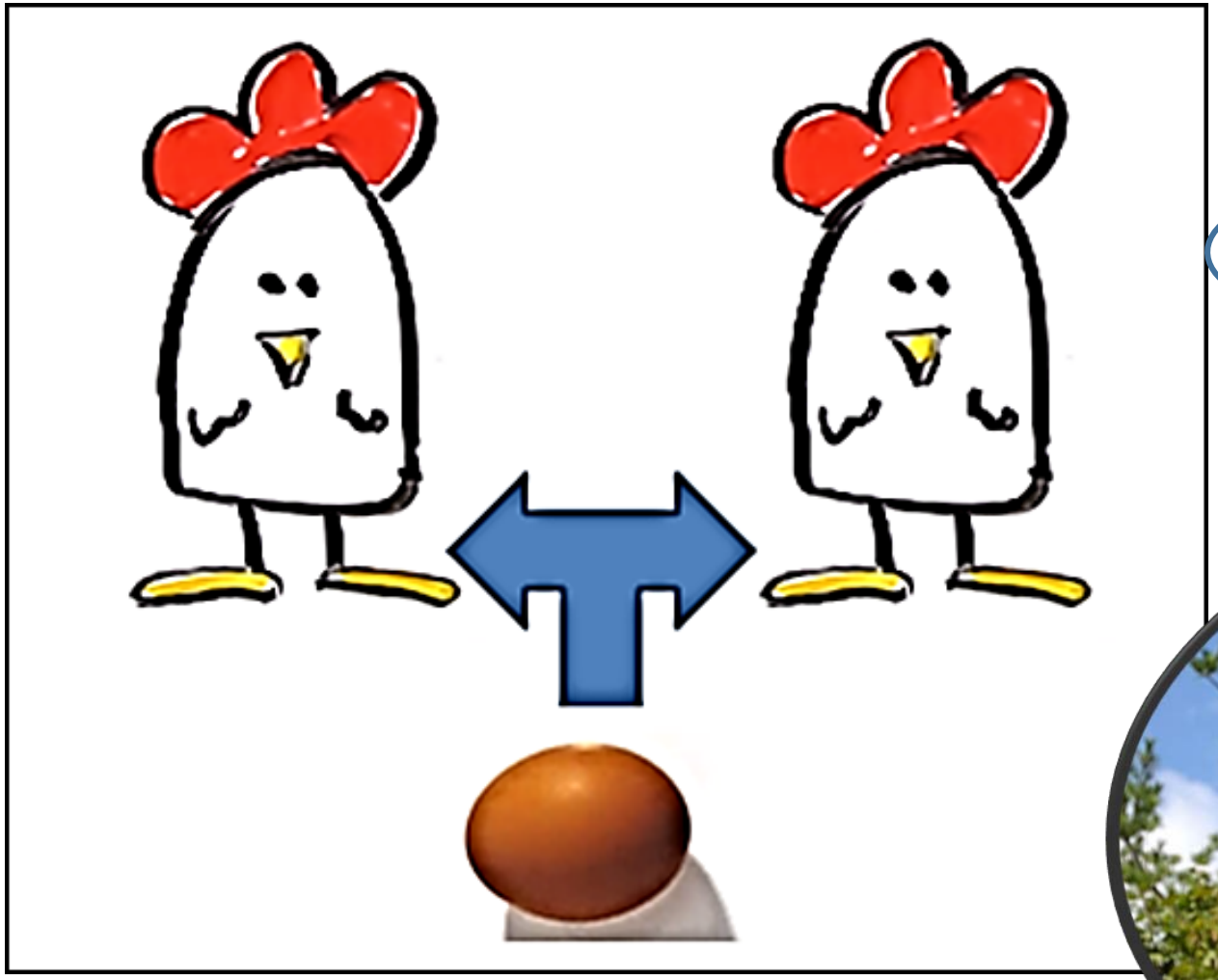
Varones: coef=0.18, p=0.01
Mujeres premenopausicas: coef=0.57 p=0.003
Mujeres postmenopausicas: coef=0.22, p=0.12



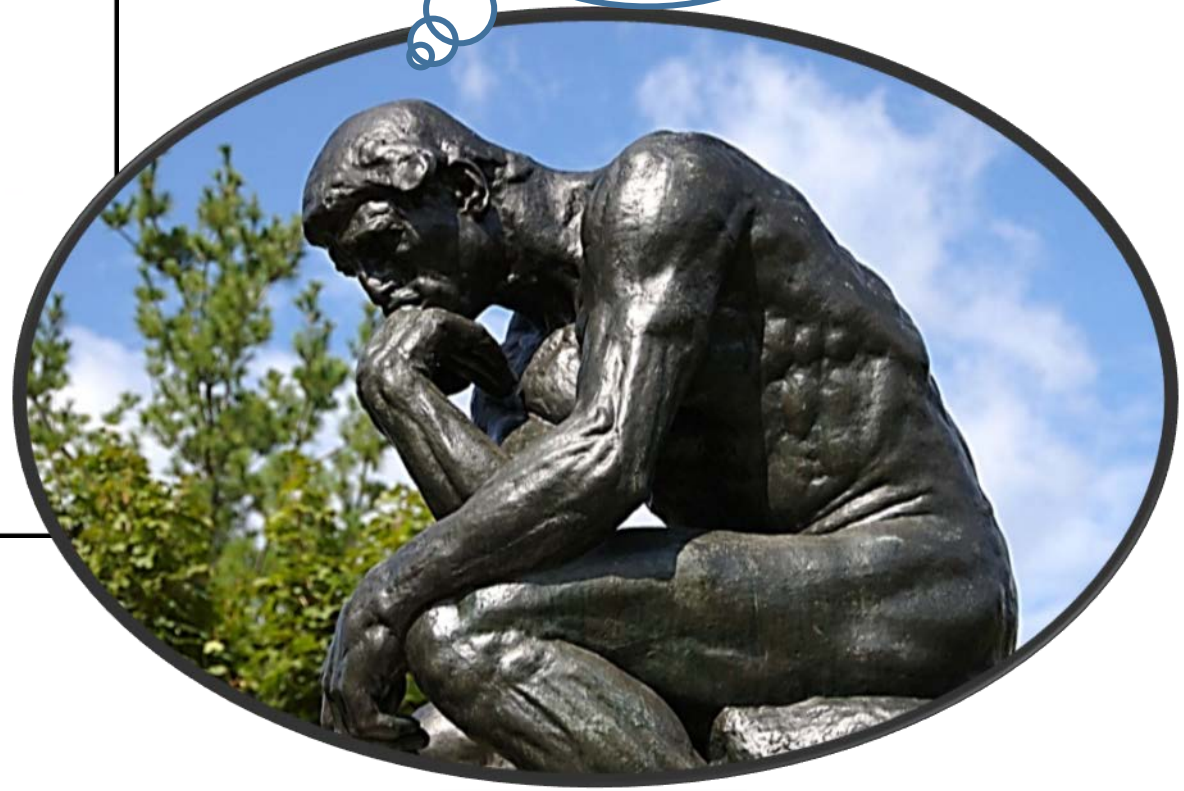
Pruebas de correlación de rango de Spearman entre Tscore y oxalato en orina de 24 horas (N= 370)

Varones: coef=0.14, p=0.05
Mujeres premenopausicas: coef=0.21 p=0.31
Mujeres postmenopausicas: coef=0.11, p=0.44

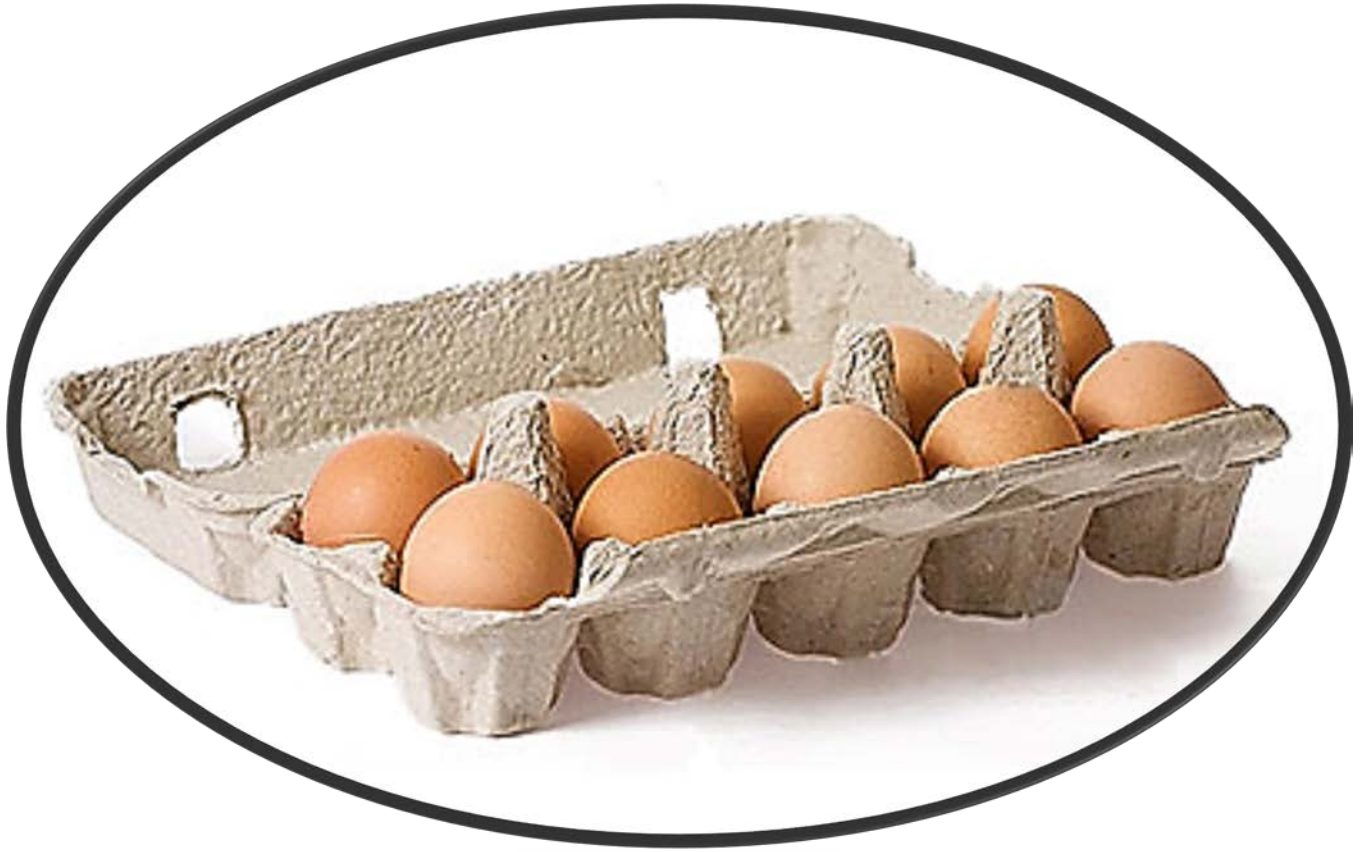
Taguchi K. BMC Urol (2020) 20:174 https://doi.org/10.1186/s12894-020-00749-5



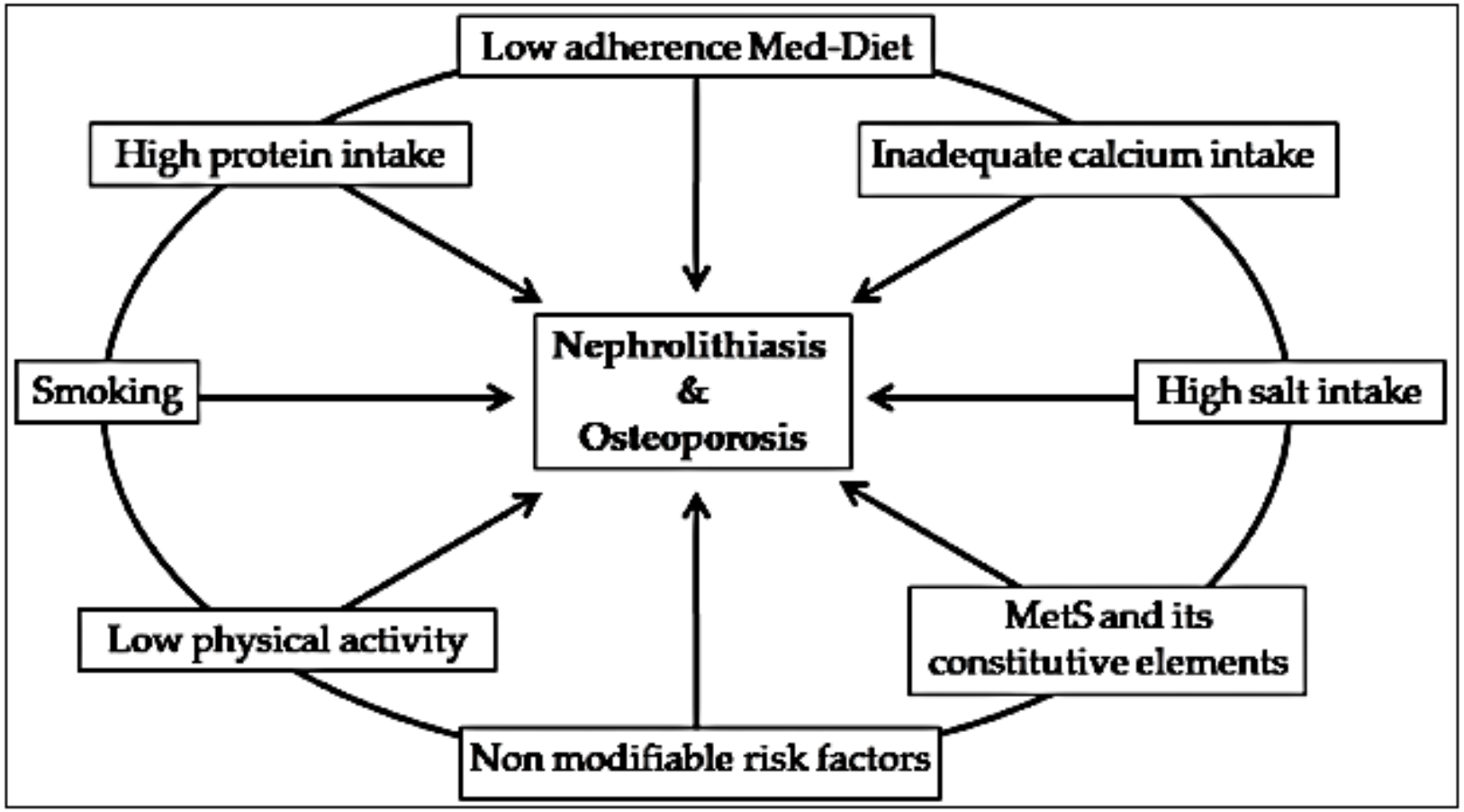
¿Y cuál sería el huevo?



FACTORES PATOGÉNICOS COMUNES

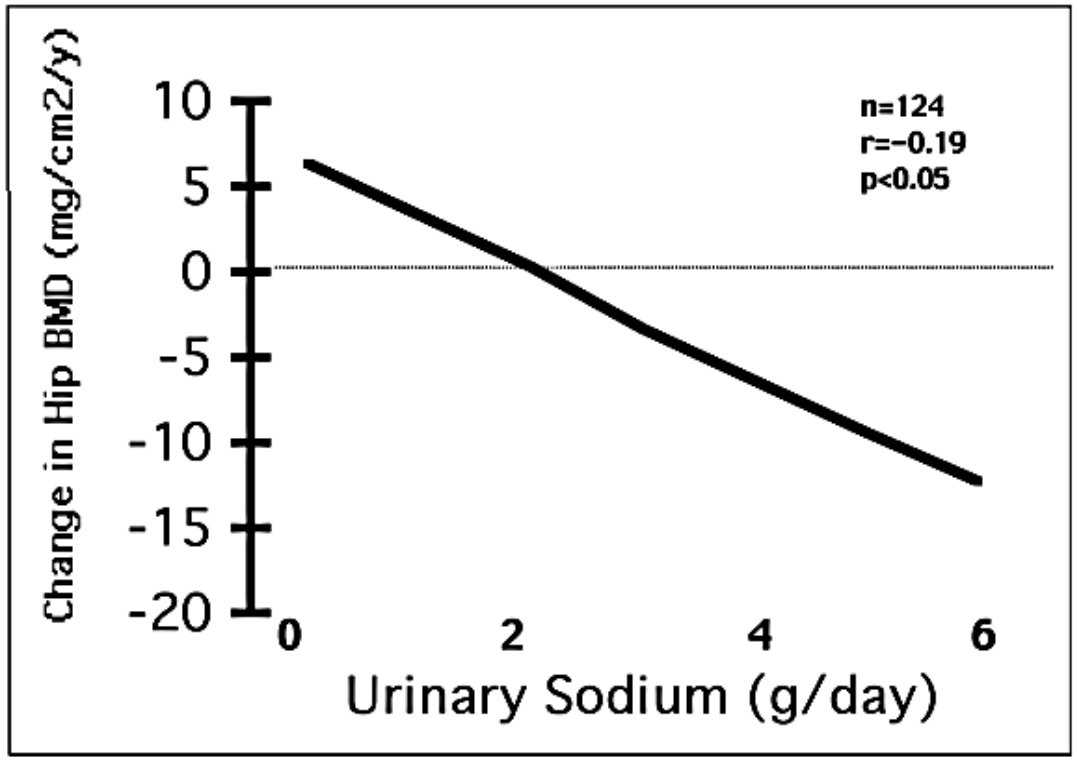


FACTORES PATOGÉNICOS COMUNES



Rendina D. Int. J. Mol. Sci. 2020, 21, 8183; doi:10.3390/ijms21218183

INGESTA AUMENTADA DE SAL



	Group		
Nutrient	**IH (n = 55)**	**NC (n = 50)**	**P valu**
Calcium (mg)	520.13 ± 245.62	531.44 ± 299.48	0.832
Salt (g)*	16.47 ± 5.93	11.79 ± 3.87	< 0.001

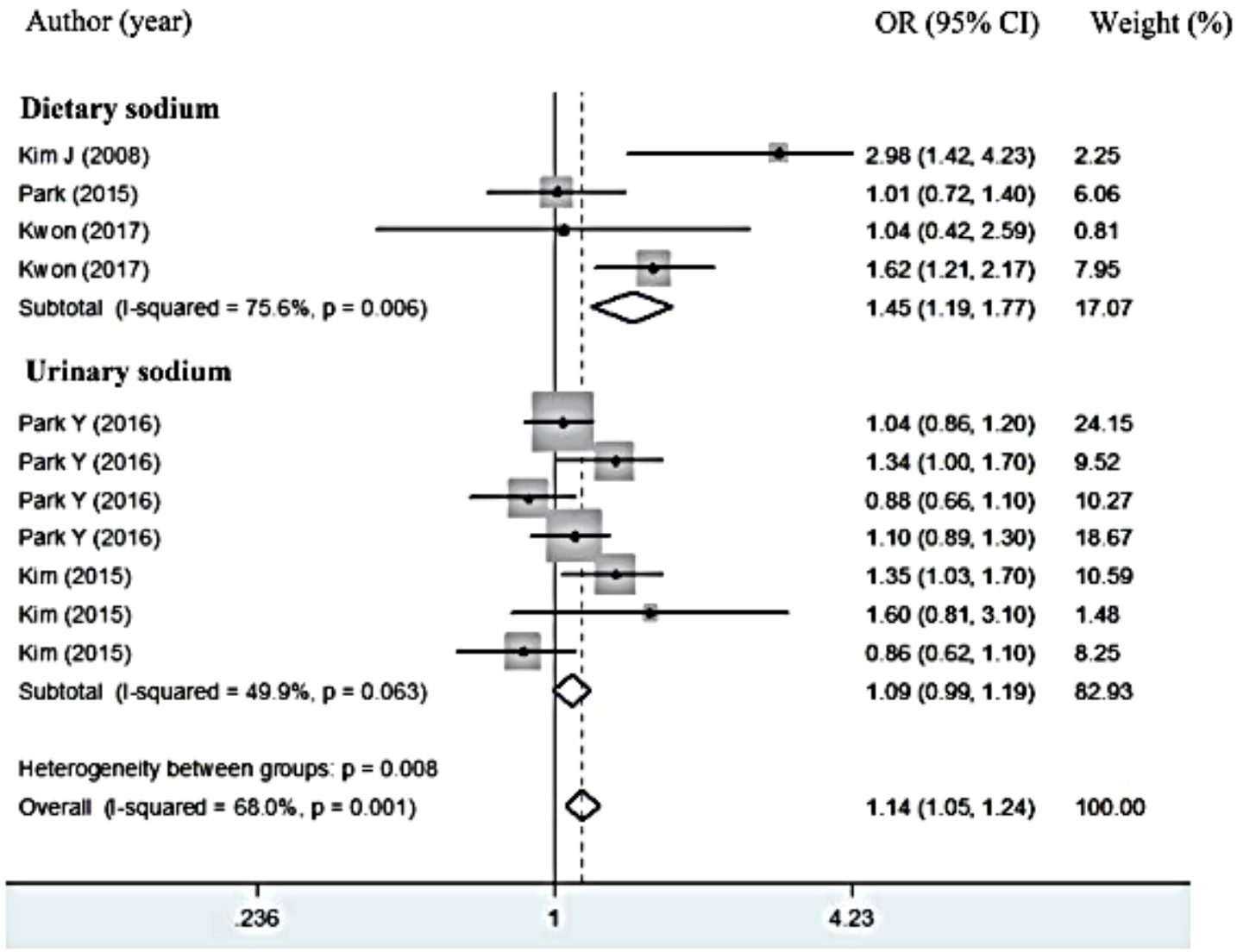
* Based on 24-hour urine

Descripción de la mediana y DS para la composición de la ingesta dietética diaria en sujetos hipercalciuricos y controles

Cappuccio, F.P.J. Nephrol. 2000, 13, 169–177

Timio, F. Blood Press. 2003, 12, 122–127

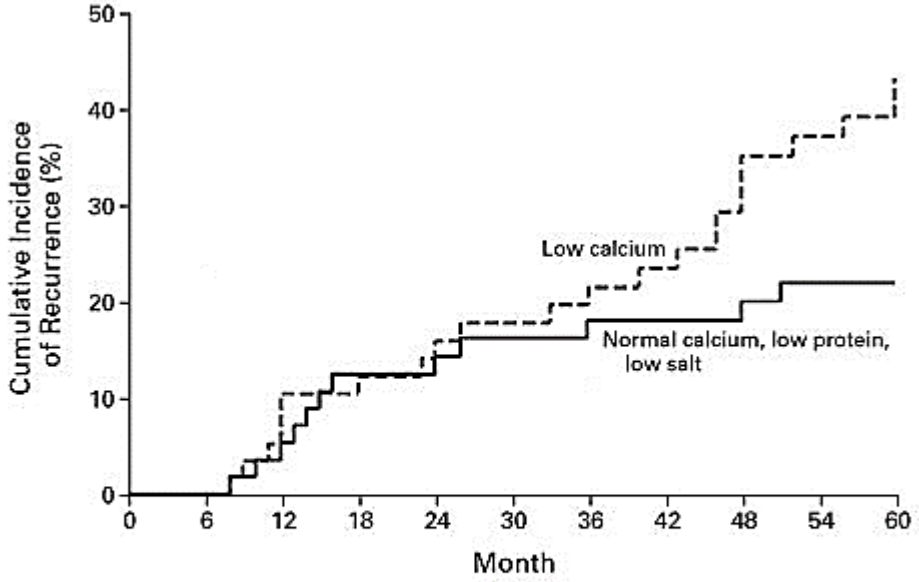
INGESTA DE SAL Y RIESGO DE FRACTURAS



Fatahi, S. J. Am. Coll. Nutr. 2018, 37, 522–532

INGESTA DE CALCIO Y RIESGO DE UROLITIASIS

VARIABLE*	DIETARY CALCIUM†					CHI (P FOR TREND)‡
	GROUP 1 (N = 8861)	GROUP 2 (N = 9029)	GROUP 3 (N = 9106)	GROUP 4 (N = 9184)	GROUP 5 (N = 9330)	
Dietary calcium intake (mg/day)	<605	605–722	723–848	849–1049	≥1050	—
Incidence/100,000 person-yr	435	310	279	266	243	—
No. of cases	139	102	93	89	82	
Age-adjusted RR	1.0	0.71	0.64	0.61	0.56	−4.37 (<0.001)
95% CI		0.55–0.92	0.50–0.83	0.47–0.80	0.43–0.73	
Multivariate RR	1.0	0.74	0.68	0.68	0.66	−2.38 (0.018)
95% CI		0.57–0.97	0.52–0.90	0.51–0.90	0.49–0.90	



No. AT RISK											
Low calcium	60	59	51	49	46	44	42	39	33	31	28
Normal calcium, low protein, low salt	60	57	53	47	46	45	44	43	41	40	40

Curhan, G.C. N. Engl. J. Med. 1993, 328, 833–838

Borghi, L. N. Engl. J. Med. 2002, 346, 77–84

INGESTA DE AZUCARES SIMPLES

OR ajustadas para el consumo de refrescos de cola y riesgo de fractura de muñeca y antebrazo

	Odds ratios (95% CI): per unit increase Times of drinking cola/week
Crude odds ratio	1.39 (1.01, 1.91)*
Step 1[a]	1.43 (1.03, 1.97)*
Step 2[a]	1.33 (0.96, 1.83)
Step 3[a]	1.32 (0.96, 1.82)
Step 4[a]	1.31 (0.94, 1.83)

[a] Step 1: adjusted for milk intake; step 2: television, computer and video watching only; step 3: bone mineral density only; step 4: all factors including milk intake, television, computer and video watching, lumbar spine bone apparent mineral density, and metacarpal morphometry
$P < 0.05$

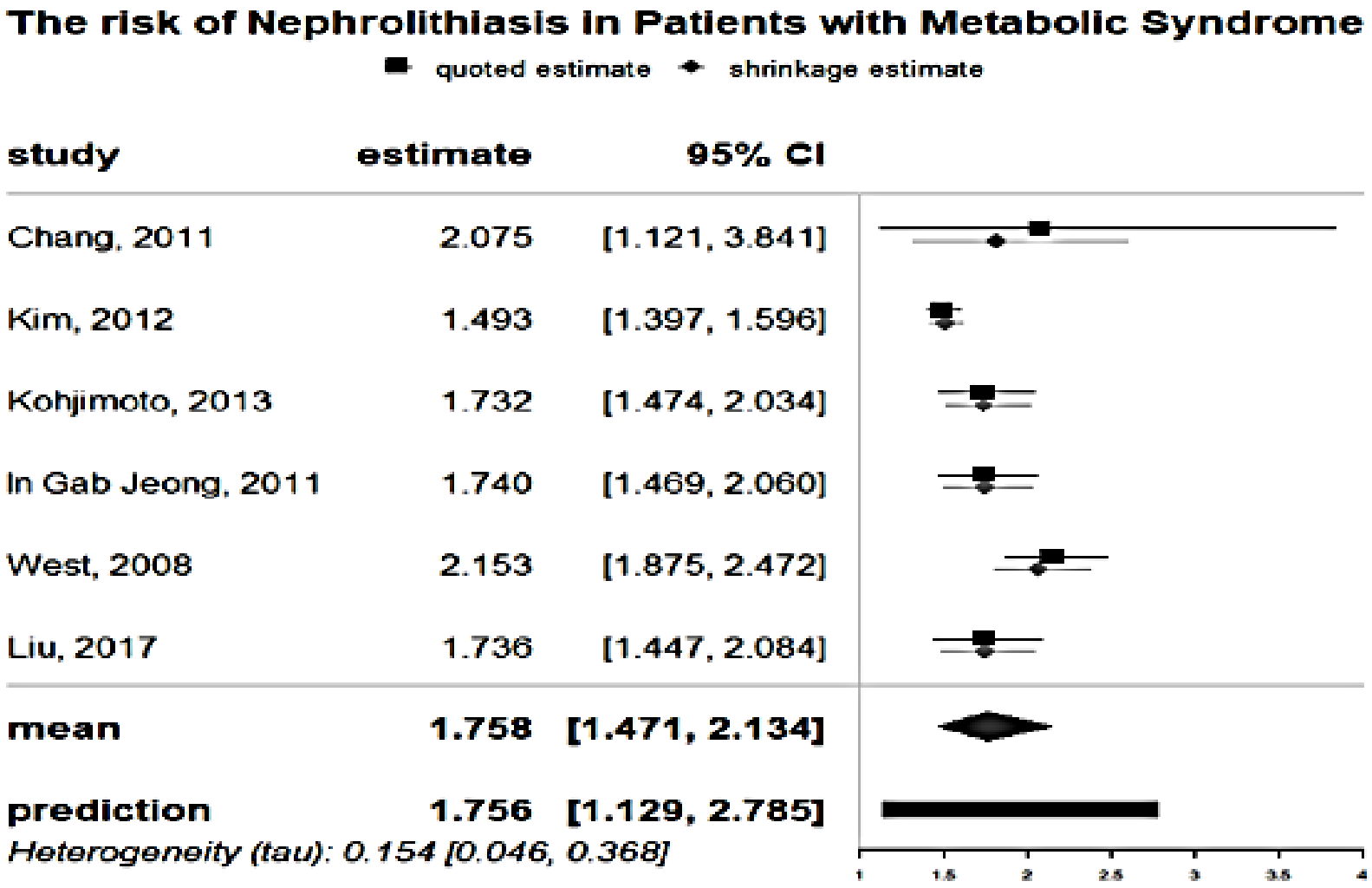
Ma, D. Calcif. Tissue Int. 2004, 75, 286–291

Riesgo relativo de cálculos renales según categorías de consumo de diferentes bebidas

						Trend
Sugar-sweetened cola						
Cases (IR)	2962 (149)	555 (193)	443 (236)	117 (262)	385 (287)	
Age-adjusted HR (95% CI)	1.00 (reference)	1.20 (1.00 to 1.44)	1.41 (1.27 to 1.57)	1.52 (1.18 to 1.95)	1.77 (1.40 to 2.22)	<0.001
Multivariate HR (95% CI)	1.00 (reference)	1.07 (0.89 to 1.27)	1.19 (1.06 to 1.34)	1.28 (1.09 to 1.50)	1.23 (0.98 to 1.55)	0.02
Artificially sweetened cola						
Cases (IR)	2381 (174)	454 (166)	564 (170)	181 (174)	882 (158)	
Age-adjusted HR (95% CI)	1.00 (reference)	0.93 (0.75 to 1.14)	0.98 (0.82 to 1.17)	0.94 (0.80 to 1.12)	0.87 (0.76 to 1.00)	0.05
Multivariate HR (95% CI)	1.00 (reference)	1.01 (0.85 to 1.21)	1.05 (0.95 to 1.17)	1.03 (0.87 to 1.21)	0.91 (0.78 to 1.06)	0.08

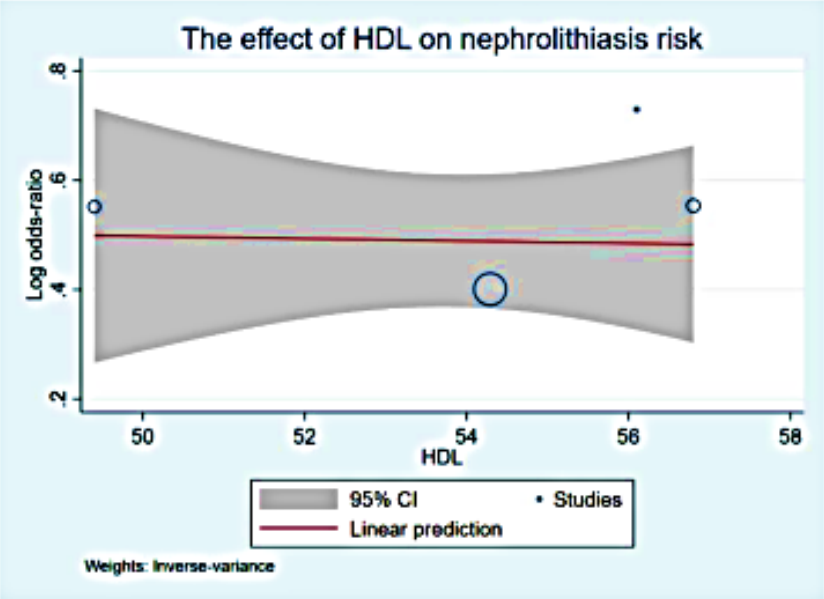
Ferraro, P.M. Clin. J. Am. Soc. Nephrol. 2013, 8, 1389–1395

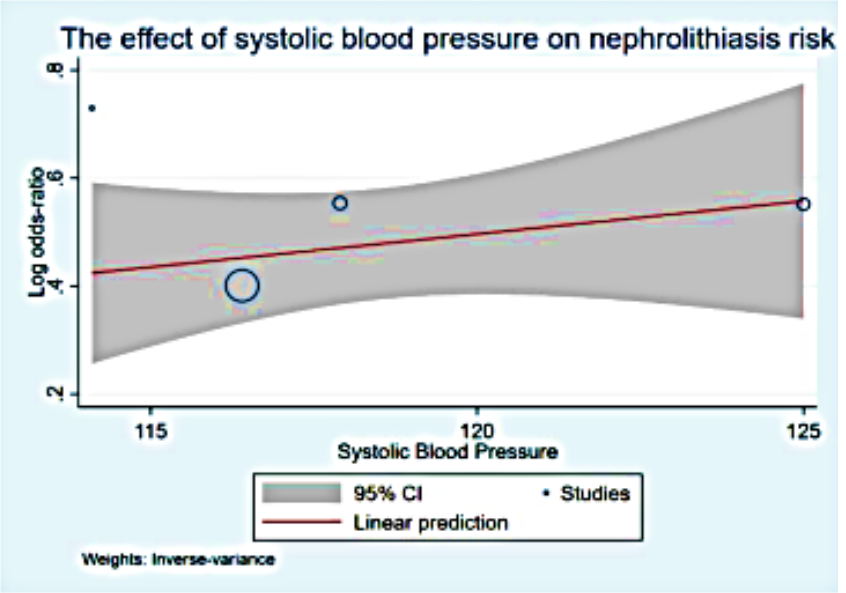
SINDROME METABOLICO

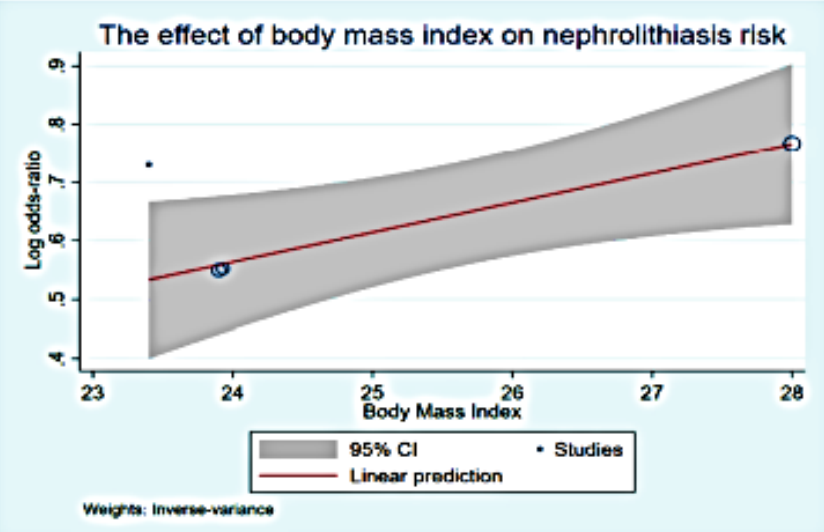


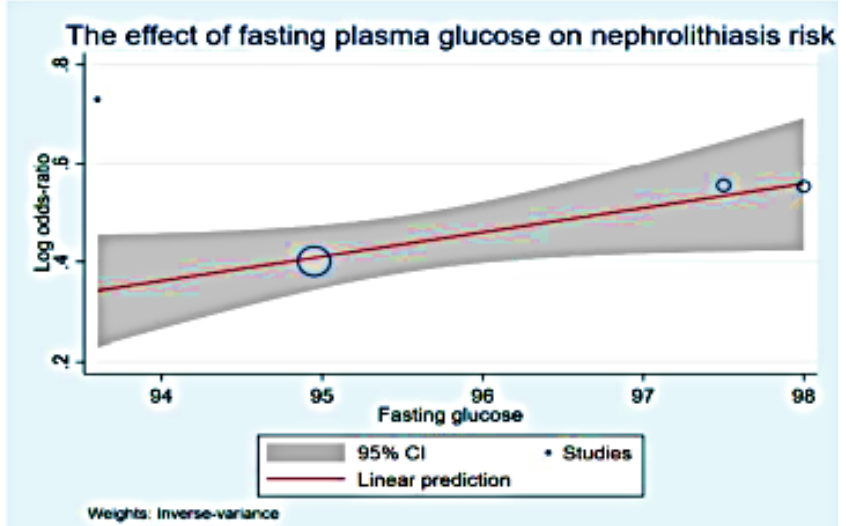
Rahman IA. F1000Research 2021, 10:104 Last updated: 08 NOV 2021.

SINDROME METABOLICO



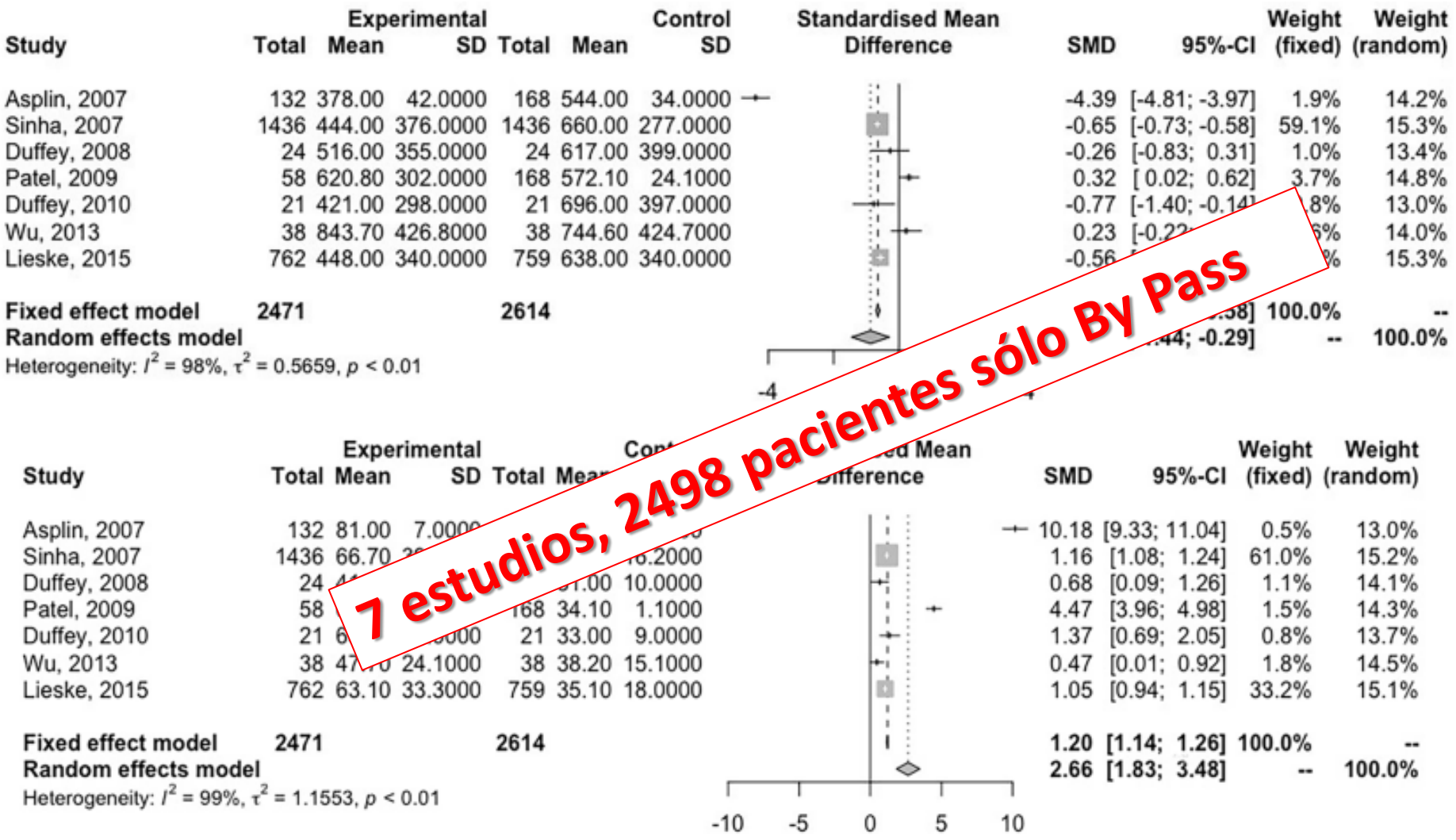






Rahman IA. F1000Research 2021, 10:104 Last updated: 08 NOV 2021.

CIRUGIA BARIATRICA Y UROLITIASIS



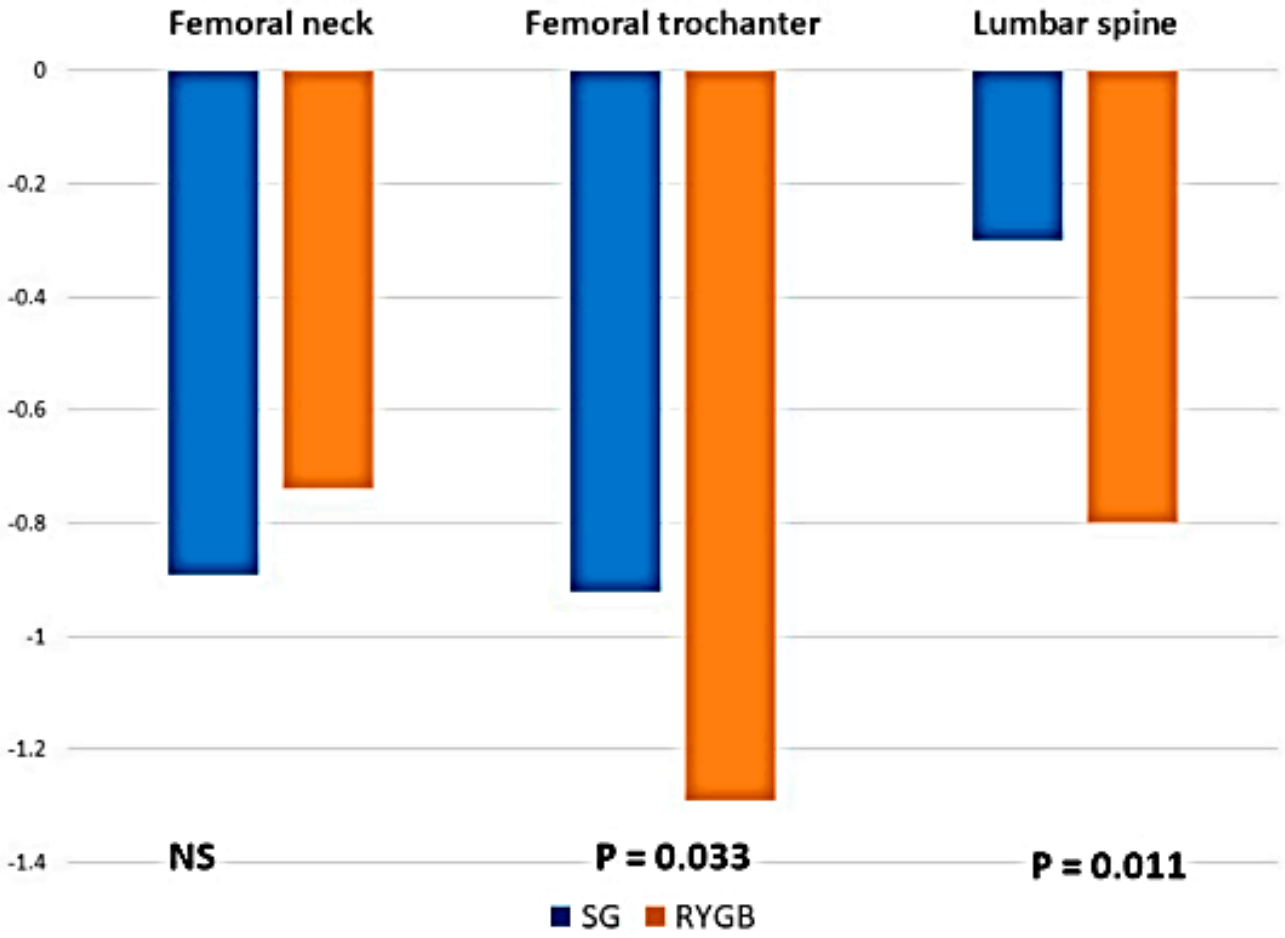
7 estudios, 2498 pacientes sólo By Pass

Citrato orina 24 h

Oxalato orina 24 h

Gadiyar N. Current Urology Reports (2022) 23:279–295

CIRUGIA BARIATRICA Y DMO



Diferencias medias entre los valores basales y postoperatorios de densidad mineral del hueso

Castro MJ. Nutrients 2022, 14, 3056. https://doi.org/10.3390/nu14153056

PATRONES DE ALIMENTACION
ACEITE DE OLIVA, VINO y UROLITIASIS

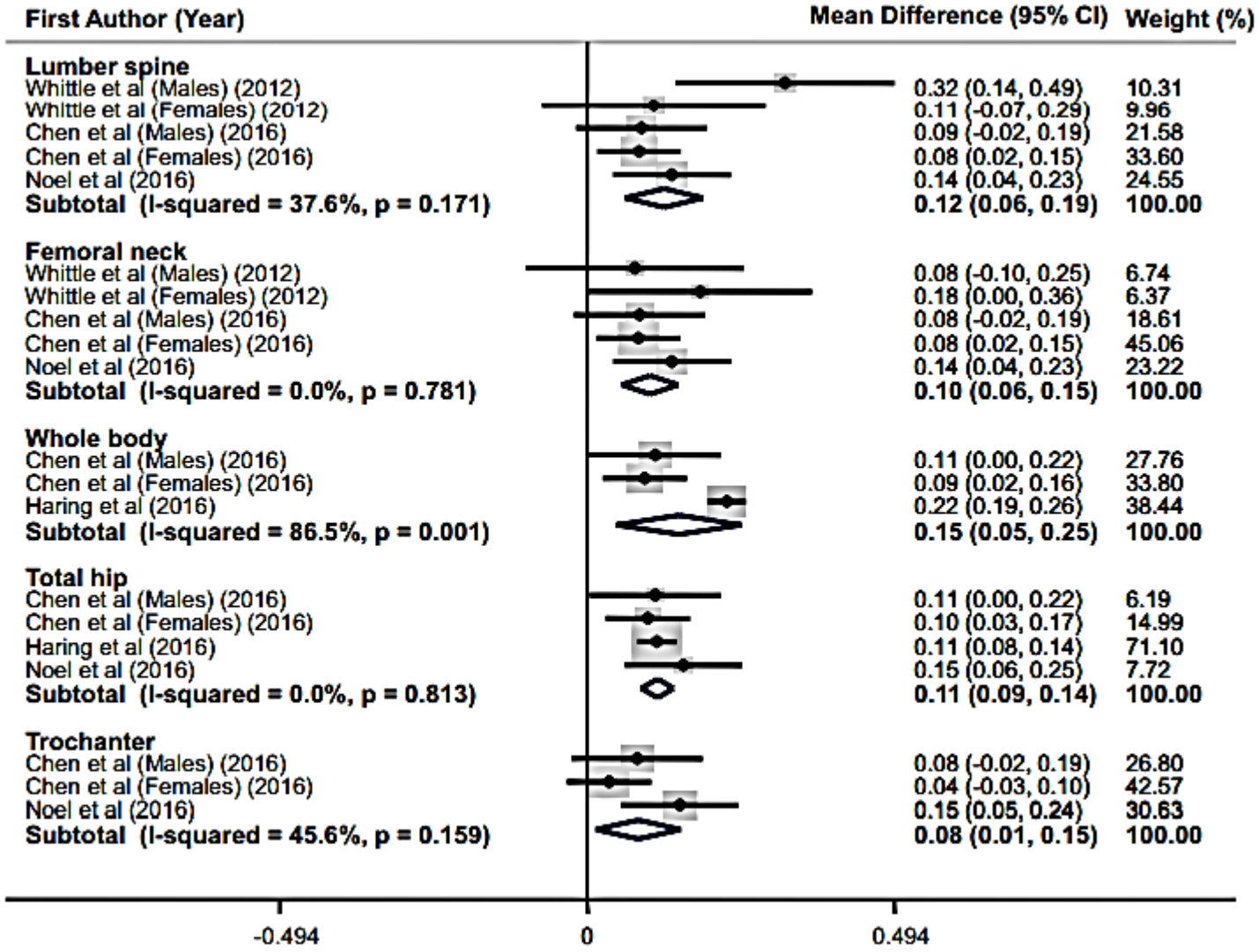
	Score 1 <1 spoon/day	Score 2 1-3 spoons/day	Score 3 or 4 ≥4 spoons/day	
Olive oil				
Stone formers	6 (13.3)	28 (62.2)	11 (24.4)	
Non-stone formers	33 (7.5)	221 (50)	188 (42.6)	
OR	1	0.7	0.32	
95% CI		0.3-1.8	0.1–0.9	
p		0.46	0.036	
	Score 1	Score 2	Score 3	Score 4
	No consumption	1–2 glasses/week	3–7 glasses/week	>7 glasses/week
Wine				
Stone formers	13 (30.2)	4 (9.3)	16 (37.2)	10 (23.3)
Non-stone formers	189 (42.9)	115 (26.1)	83 (18.8)	54 (12.2)
OR	1	0.51	2.8	2.7
95% CI		0.2–1.6	1.3–6.1	1.1–6.5
p		0.24	0.009	0.027

Análisis de regresión multinomial del consumo de aceite de oliva y vino en formadores y no formadores de cálculos

Soldati, L. J. Transl. Med. 2014, 12, 34

PATRONES DE ALIMENTACION
DIETA MEDITERRANEA y OSTEOPOROSIS

Diagrama de bosque de las diferencias medias en la densidad mineral ósea (DMO) en cinco sitios diferentes, comparando la adherencia más alta y más baja a la dieta mediterránea



Malmir, H. Eur. J. Nutr. 2018, 57, 2147–2160

PATRONES DE ALIMENTACION
DIETA MEDITERRANEA y FRACTURAS

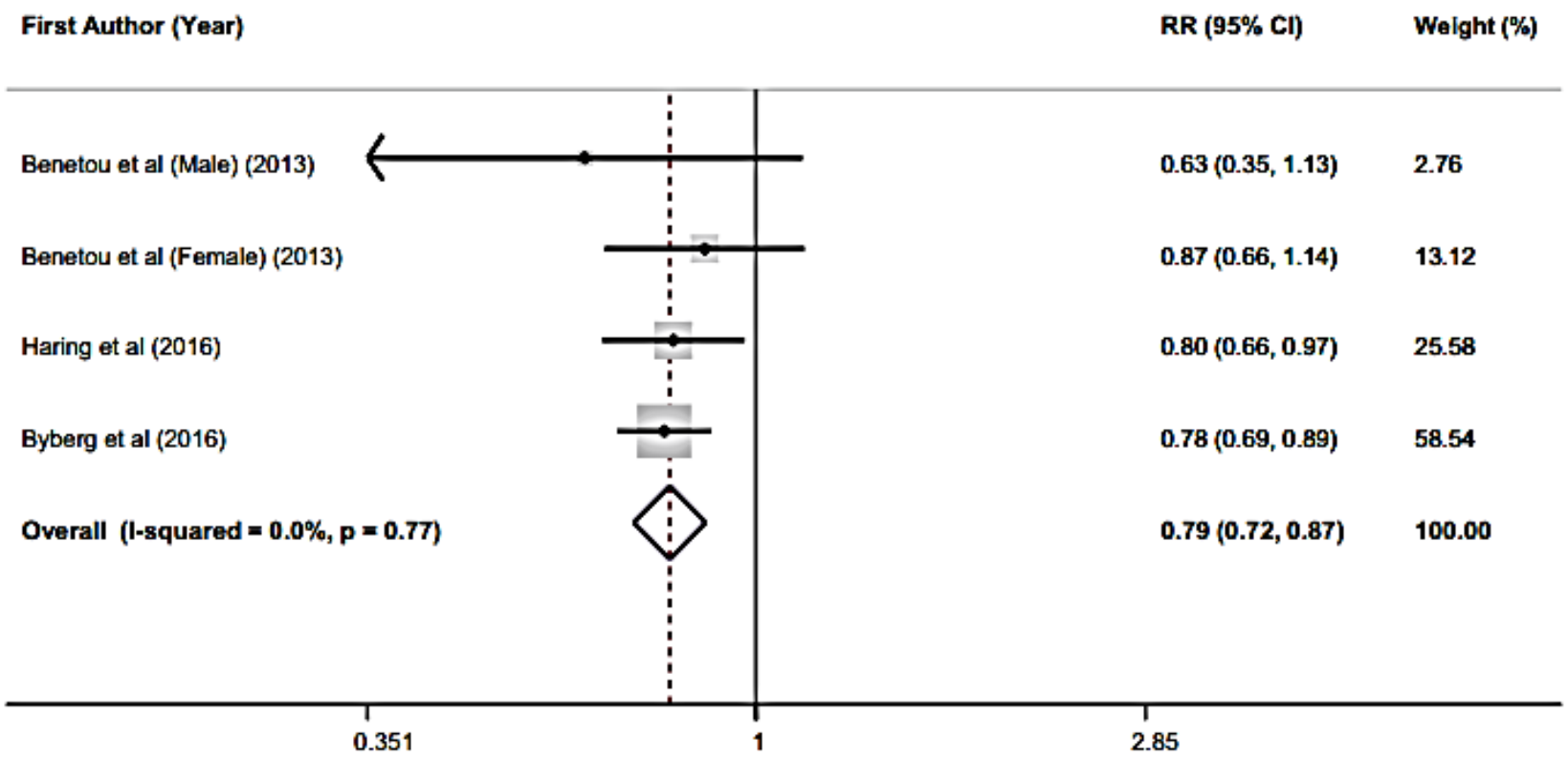


Diagrama de bosque de la asociación entre la adherencia a la dieta mediterránea y el riesgo de fractura de cadera

Malmir, H. Eur. J. Nutr. 2018, 57, 2147–2160

EJERCICIO FISICO

	Physical activity (METs/week)					p-value for trend
	< 5	5 – 9.9	10 – 19.9	20 – 29.9	≥30	
HPFS						
cases	367	205	356	250	663	
person-years	136,789	79,675	130,804	99,102	263,469	
age-adjusted HR	1.00	0.94 (0.79, 1.12)	0.99 (0.86, 1.15)	0.93 (0.79, 1.09)	0.92 (0.80, 1.04)	0.26
first multivariate HR	1.00	0.94 (0.79, 1.12)	0.99 (0.85, 1.14)	0.92 (0.78, 1.08)	0.93 (0.81, 1.06)	0.38
second multivariate HR	1.00	0.96 (0.81, 1.15)	1.03 (0.88, 1.19)	0.97 (0.82, 1.15)	1.00 (0.87, 1.14)	0.94
NHS I						
cases	563	243	275	141	217	
person-years	456,604	213,348	264,921	153,582	218,050	
age-adjusted HR	1.00	0.92 (0.79, 1.07)	0.84 (0.73, 0.98)	0.75 (0.62, 0.90)	0.81 (0.69, 0.95)	0.003
first multivariate HR	1.00	0.96 (0.82, 1.11)	0.91 (0.79, 1.05)	0.84 (0.69, 1.01)	0.94 (0.80, 1.10)	0.27
second multivariate HR	1.00	0.99 (0.85, 1.15)	0.95 (0.82, 1.10)	0.89 (0.74, 1.08)	1.01 (0.85, 1.19)	0.88
NHS II						
cases	600	382	441	245	407	
person-years	383,275	251,592	321,629	185,592	310,258	
age-adjusted HR	1.00	0.94 (0.82, 1.07)	0.85 (0.75, 0.96)	0.82 (0.71, 0.95)	0.81 (0.71, 0.92)	0.001
first multivariate HR	1.00	1.00 (0.88, 1.13)	0.95 (0.84, 1.07)	0.95 (0.81, 1.10)	0.99 (0.87, 1.12)	0.81
second multivariate HR	1.00	1.01 (0.89, 1.15)	0.97 (0.86, 1.10)	0.98 (0.84, 1.14)	1.03 (0.90, 1.18)	0.64

HR e IC 95 % de cálculos renales incidentes por categoría de actividad física en 3 estudios

Sorensen, M.D. J. Am. Soc. Nephrol. 2014, 25, 362–369

TABAQUISMO, ALCOHOL Y OBESIDAD

Characteristics	N of Nephrolithiasis (Exposure/Total, %)	N of Control (Exposure/Total, %)	Odd Ratios for Nephrolithiasis (95% Confidence Interval)			
			Crude †	*p*-Value	Adjusted †,‡	*p*-Value
Smoking status	4887/28,395 (17.2)	18,944/113,580 (16.7)	1.04 (1.01–1.08)	0.023 *	1.03 (1.00–1.07)	0.102
Alcohol consumption	9955/28,395 (35.1)	42,361/113,580 (37.3)	0.90 (0.87–0.92)	<0.001 *	0.89 (0.86–0.92)	<0.001 *
Obesity				<0.001 *		<0.001 *
<18.5 (underweight)	392/28,395 (1.4)	2691/113,580 (2.4)	0.70 (0.63–0.78)	<0.001 *	0.70 (0.63–0.78)	<0.001 *
18.5 to 23 (normal)	8016/28,395 (28.2)	38,969/113,580 (34.3)	1.00		1.00	
23 to 25 (overweight)	8189/28,395 (28.8)	31,561/113,580 (27.8)	1.27 (1.22–1.31)	<0.001 *	1.27 (1.22–1.31)	<0.001 *
25 to 30 (obese I)	10,728/28,395 (37.8)	37,052/113,580 (32.6)	1.42 (1.37–1.46)	<0.001 *	1.42 (1.37–1.46)	<0.001 *
30 (obese II)	1070/28,395 (3.8)	3307/113,580 (2.9)	1.58 (1.47–1.70)	<0.001 *	1.59 (1.47–1.71)	<0.001 *

Razones de probabilidad brutas y ajustadas (intervalos de confianza del 95%) de tabaquismo, consumo de alcohol, y obesidad por nefrolitiasis.

Yoon, V. Osteoporos. Int. 2012, 23, 2081–2092

VITAMINA D

	Group 1	Group 2	*p*
Serum parameters			
Creatinine	0.85 ± 0.15	0.87 ± 0.23	n.s.
Sodium	141.81 ± 2.07	141.58 ± 2.24	n.s.
Potassium	4.45 ± 0.41	4.52 ± 0.41	n.s.
Chloride	103.74 ± 2.61	102.37 ± 2.97	0.0001
Uric acid	4.76 ± 1.27	5.11 ± 1.34	0.01
Calcium	9.43 ± 0.41	9.58 ± 0.42	0.001
Phosphorus	3.35 ± 0.54	3.03 ± 0.51	0.0001
iPTH	50.21 ± 17.68	48.78 ± 22.21	n.s.
25-OH-vitamin D	28.48 ± 9.49	25.71 ± 10.18	0.02

Group 1: 127 controls with no history of kidney stones
Group 2: 239 patients with a history of calcium kidney stones

Girón-Prieto, M.S. Int. Urol. Nephrol. 2016, 48, 1243–1246

FACTORES DE RIESGO NO MODIFICABLES

Gene	*HGNC Symbol*	*Location*	Ref.
Calcium-sensing receptor	*CASR*	*3q13.3-q21.1*	[124–126]
Vitamin D receptor	*VDR*	*12q13.11*	[127–132]
Alkaline phosphatase	*ALPL*	*1p36.12*	[133,134]
Osteopontin	*SPP1*	*4q22.1*	[135,136]
Claudin 14	*CLDN14*	*21q22.13*	[137–139]
Type 2a sodium–phosphate cotransporter	*SLC34A1*	*5q35.3*	[140]
Fibroblast growth factor 23	*FGF23*	*12p13.32*	[141]
25(OH)D-24-hydroxylase	*CYP24A1*	*20q13.2*	[142]

HGNC: Human Genome Organisation (HUGO) Gene Nomenclature Committee.

Genes asociado con la ocurrencia de osteoporosis y urolitiasis

Howles, S.A. Nat. Rev. Urol. 2020, 17, 407–421

FACTORES DE RIESGO NO MODIFICABLES
POLIMORFISMOS DE CASR Y OSTEOPOROSIS

Comparación de las características clínicas y bioquímicas entre pacientes con genotipos AA y AS/SS del SNP A986S

	A986S		
Patients characteristics	AA ($n = 206$)	AS + SS ($n = 38$)	p[a]
Testosterone (nM)	15.72 ± 4.95	15.02 ± 4.46	0.362
Serum creatinine (μmol/L)	82.48 ± 20.41	88.33 ± 20.20	0.210
Serum calcium (mM)	2.36 ± 0.08	2.44 ± 0.12	0.001
Serum phosphorus (mM)	0.87 ± 0.15	0.87 ± 0.15	0.298
Urinary calcium (mmol 24 h)	8.54 ± 3.30	8.12 ± 3.15	0.883
Urinary phosphate (mmol 24 h)	22.46 ± 11.79	22.11 ± 12.11	0.491
25(OH)-vitamin D (nM)	47.81 ± 19.13	43.76 ± 18.93	0.363
PTH (ng/dL)	53.11 ± 19.11	67.43 ± 14.12	0.007
BMD LS (g/cm^2)	0.95 ± 0.17	0.91 ± 0.15	0.366
BMD FN (g/cm^2)	0.94 ± 0.15	0.90 ± 0.18	0.048
Osteoporosis, n (%)[b]	16 (7.8%)	10 (23.8%)	0.005[c]

Di Nisio, A. Endocrine 2018, 61, 349–352

FACTORES DE RIESGO NO MODIFICABLES
POLIMORFISMOS DE CASR Y UROLITIASIS

SNP	Allele	Genotype	Controls n (%)	Stone Formers n (%)	Odds Ratio (95% CI)	*P*
rs7652589	G		305 (73.3)	204 (61.8)	1	
	A		111 (26.7)	126 (38.2)	1.69 (1.2–2.3)	.0012
rs7648041	C		291 (69.9)	232 (70.3)	1	
	T		125 (30.1)	98 (29.7)	1.02 (0.7–1.4)	.906
rs7648044	C		361 (86.8)	269 (81.5)	1	
	T		55 (13.2)	61 (18.5)	1.49 (1–2.2)	.049
rs6776158	A		306 (73.6)	205 (62.1)	1	
	G		110 (26.4)	125 (37.9)	1.7 (1.2–2.3)	.0008
rs1048213	T		310 (76)	262 (79.4)	1	
	C		98 (24)	68 (20.6)	0.82 (0.6–1.2)	.269
rs1501899	G		312 (75)	204 (61.8)	1	
	A		104 (25)	126 (38.2)	1.87 (1.4–2.6)	.0001

Frecuencia de alelos y genotipos en los SNP del gen CaSR ubicados en la región reguladora de genes en formadores de cálculos y controles sanos

Vezzoli, G. J. Clin. Endocrinol. Metab. 2013, 98, 3839–3847

FACTORES DE RIESGO NO MODIFICABLES
POLIMORFISMOS DE VDR Y UROLITIASIS

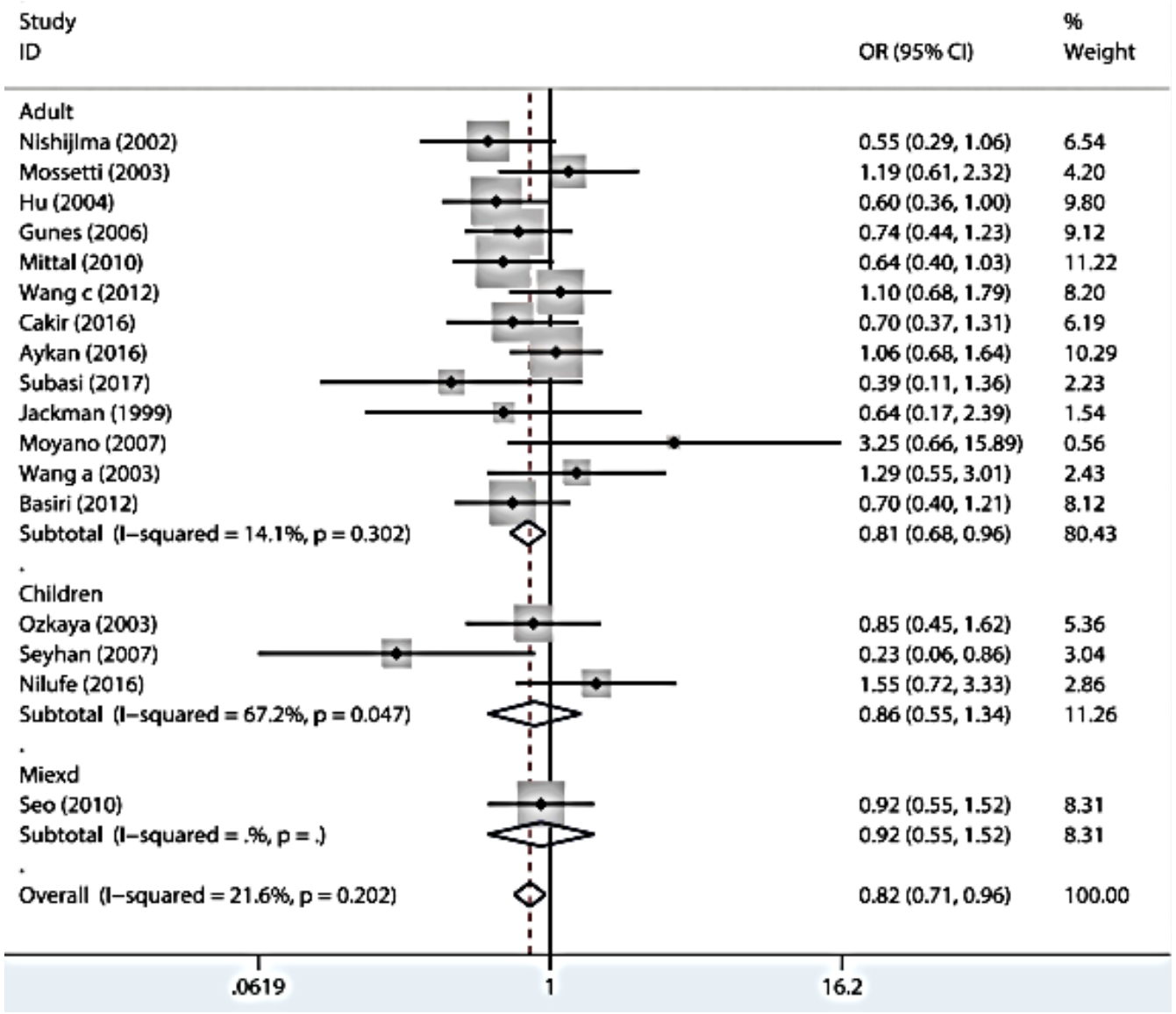


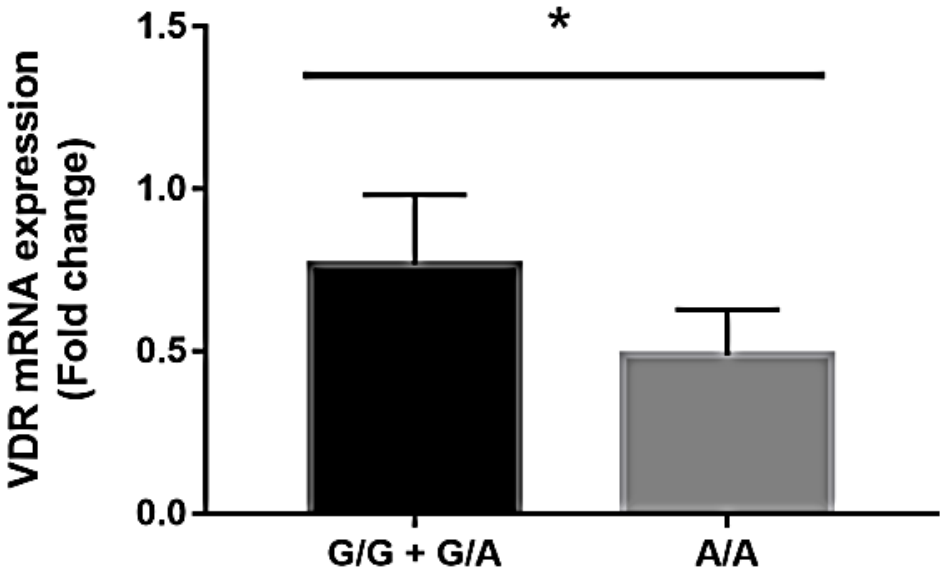
Diagrama de bosque de variante VDR TaqI y urolitiasis: TT vs. Tt+tt.

González-Castro, T.B. Gene 2019, 711, 143936

FACTORES DE RIESGO NO MODIFICABLES
POLIMORFISMOS DE VDR Y OSTEOPOROSIS

rs731236 A > G *Taq1*	TOT	T/T	T/C	C/C	*p* [a]	OR (95% CI)
OP	139	41	69	29	0.48	1.25 (0.68–2.28)
OPE	54	16	26	12	0.58	1.24 (0.58–2.64)
CTR	73	25	34	14		
rs2228570 C > T *Fok1*	TOT	C/C	C/T	T/T	*p* [a]	OR (95% CI)
OP	135	54	62	23	0.54	1.25 (0.68–2.28)
OPE	54	17	29	8	0.8	1.24 (0.58–2.64)
CTR	73	25	34	14		
rs11568820 G > A *Cdx2*	TOT	G/G	G/A	A/A	*p* [a]	OR (95% CI)
OP	139	78	52	9	*0.05*	1.81 (0.99–3.31)
OPE	54	35	18	1	0.55	1.26 (0.6–2.66)
CTR	73	51	19	3		

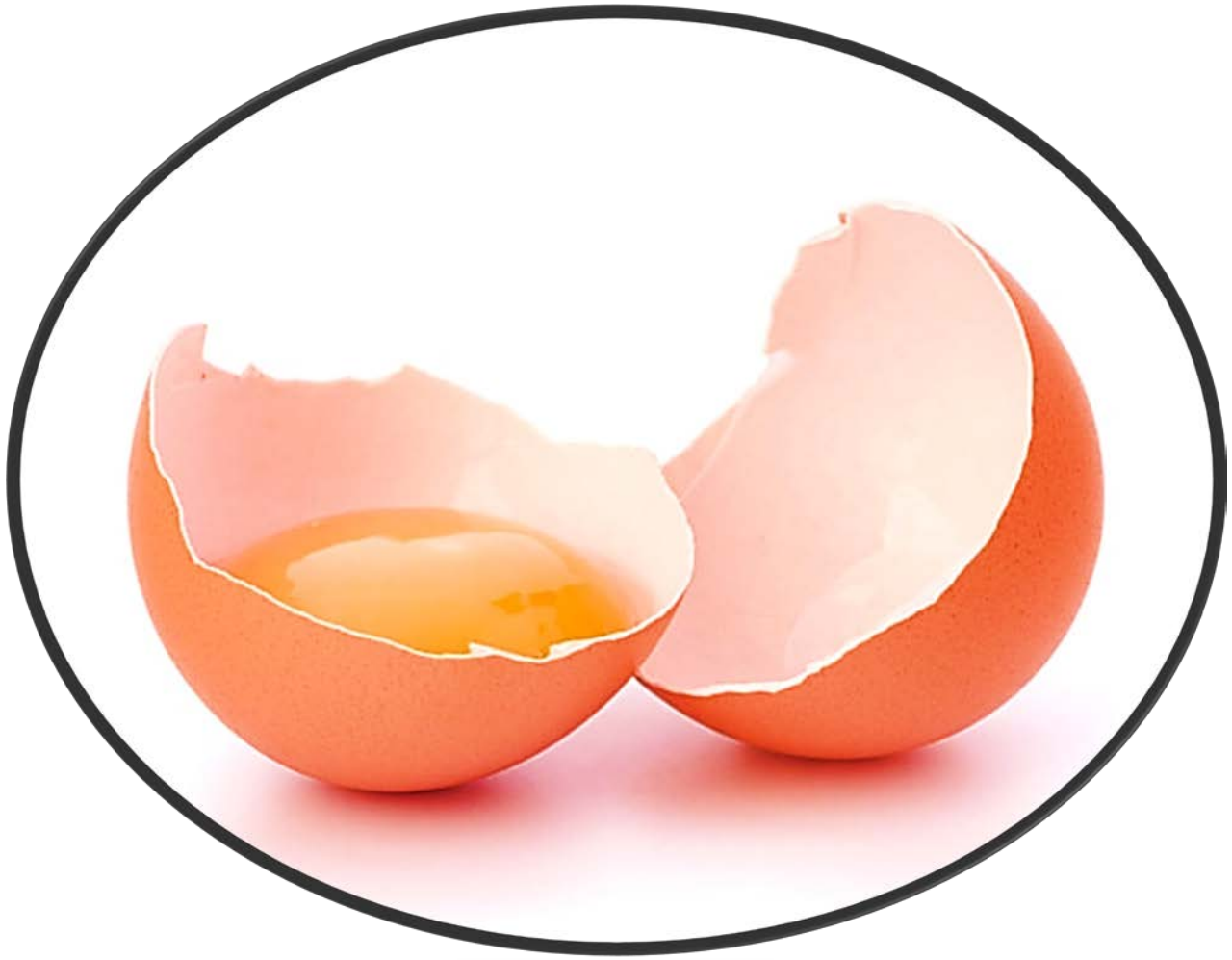
p [a] value represents the analysis based on the dominant model (heterozygous and homozygous variant genotypes were grouped in a single class)). OR: odds ratio; CI: confidence interval. Significant associations are reported in italics.



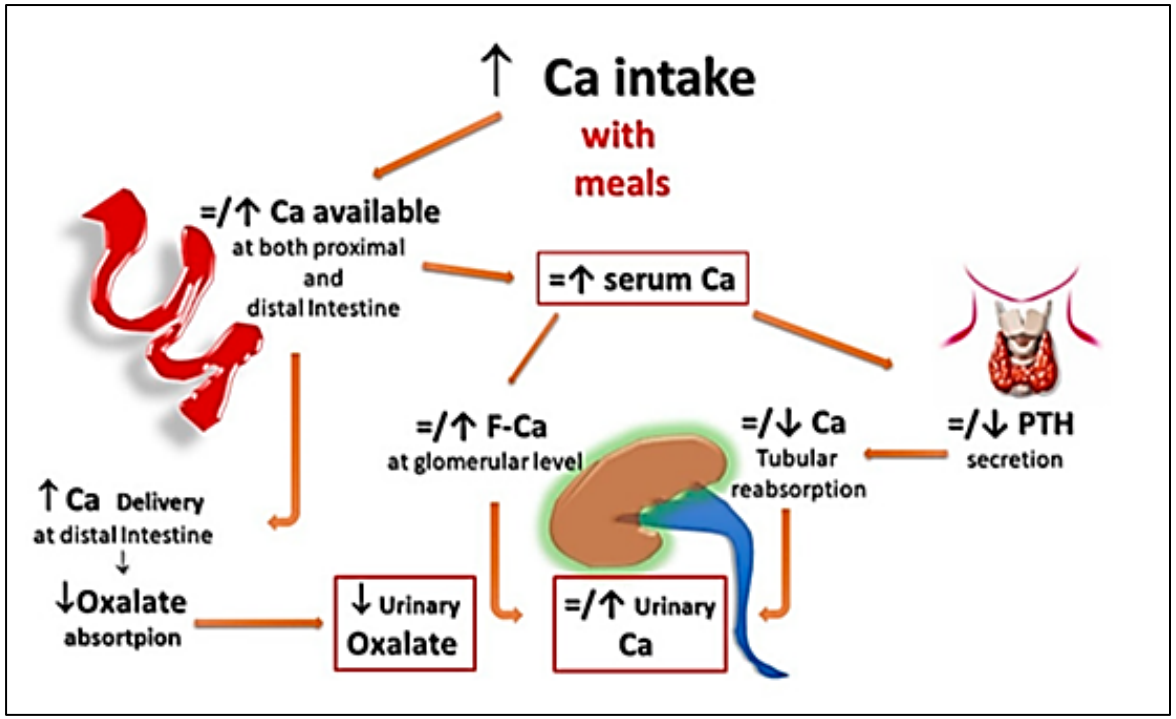
Distribución de genotipos de polimorfismos VDR

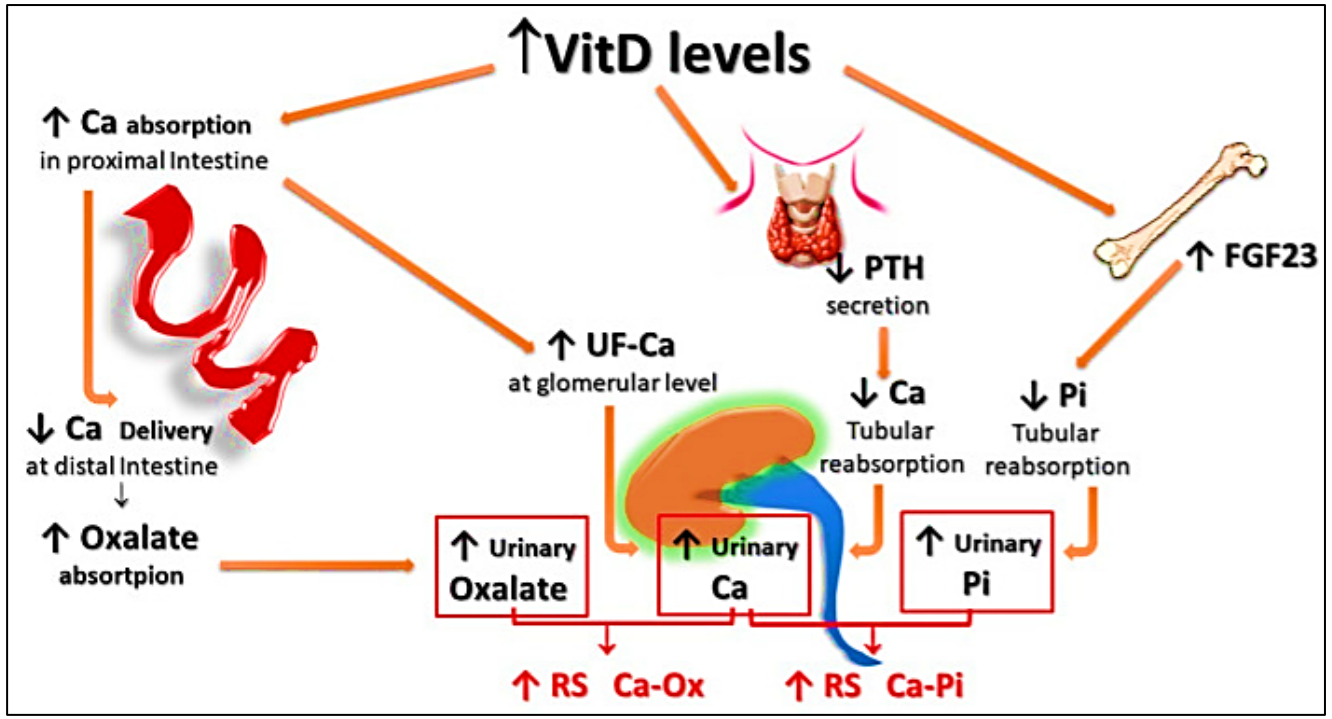
Gasperini G. Genes 2023, 14, 542. https://doi.org/10.3390/genes14030542

ASPECTOS CONTROVERSIALES



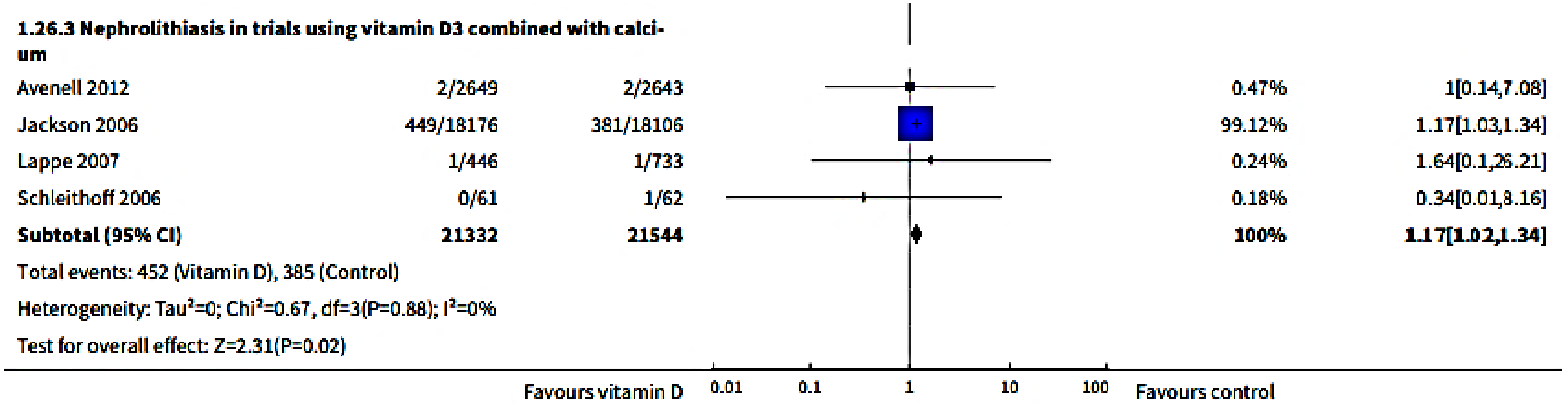
SUPLEMENTACIÓN CON VITAMINA D-CALCIO Y UROLITIASIS





Messa P. Nutrients. 2023 Mar 31;15(7):1724. doi: 10.3390/nu15071724

SUPLEMENTACIÓN CON CALCIO Y VITAMINA D/UROLITIASIS



Bjelakovic, G. Cochrane Database Syst. Rev. 2014, 10, CD007470

SUPLEMENTACIÓN CON VITAMINA D/UROLITIASIS

	Baseline	Follow-Up	*P* Value
24-hour urine studies			
calcium (mg)	257±54	255±88	0.91
oxalate (mg)	42±18	41±15	0.84
citrate (mg)	696±383	701±320	0.92
uric acid (g)	0.77±0.26	0.77±0.20	0.96
pH	6.3±0.5	6.2±0.4	0.31
sodium (mmol)	228±94	202±65	23
potassium (mmol)	72±33	68±28	53
phosphorus (g)	1.0±0.3	1.0	91
urea nitrogen (g)	13±4		0.69
sulfate (mEq)	47±19		0.38
creatinine (mg)	1896±479		0.74
volume (L)	1.7 (1.5–2.5)	2.7)	0.50
Supersaturation			
calcium oxalate		7±3	0.34
calcium phosphate		1.2 (0.8–1.6)	0.17
uric acid		0.6 (0.3–0.8)	0.20
Serum studies			
25(OH)D	17±6	35±10	<0.001
calcium	9.3±0.4	9.4±0.4	0.69
PTH (pg/ml)	43 (27–60)	39 (28–59)	0.71

Values shown are mean ± SD for normally distributed data and median (interquartile range) for skewed data. 25(OH)D, 25-hydroxyvitamin D; PTH, parathyroid hormone.

29 sujetos con urolitiasis, con calciuria entre 150-400 mg/día. Recibieron ergocalciferol 50.000 U semanales por 8 semanas

Leaf DE. Clin J Am Soc Nephrol 7: 829–834, 2012. doi: 10.2215/CJN.11331111

CONCLUSIONES

- La evidencia epidemiológica respalda una asociación entre urolitiasis y osteoporosis.
- Ambos trastornos comparten factores patogénicos ambientales y genéticos.
- Se podría considerar que en muchos casos la urolitiasis y la osteoporosis son expresiones de un síndrome clínico único.

RECOMENDACIONES

- Evaluación de factores de riesgo metabólicos para la nefrolitiasis en pacientes con osteoporosis.

  Medición de calcio en orina de 24 horas (UK clinical guideline for the prevention and treatment of osteoporosis)

- Evaluación de DMO por DPX en pacientes con antecedentes de urolitiasis.

  Considere la posibilidad de determinar densidad mineral ósea (DMO) en formadores de cálculos con evidencia de hipercalciuria y/o acidosis tubular renal distal (NE 2–3, Recomendación de grado C) (Canadian Urological Association Guideline, 2022)

- Realizar ultrasonido de abdomen después del diagnóstico de osteoporosis para evaluar la presencia de cálculos renales.