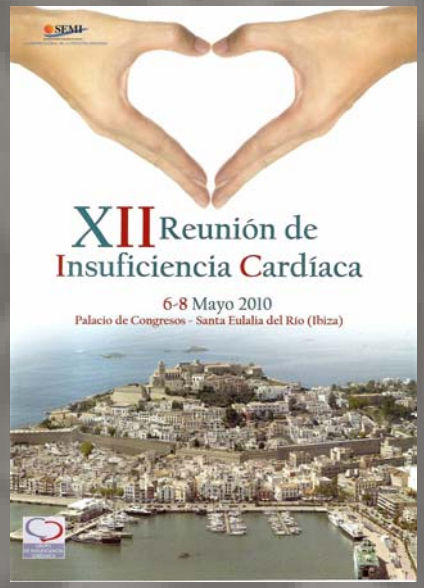

Comorbilidad en insuficiencia cardiaca: osteoporosis

Jesús Díez Manglano
Medicina Interna. Hospital Royo Villanova. Zaragoza

Osteoporosis e insuficiencia cardiaca

17 abril 2010

Google → 50.500

Google Académico BETA → 3.460

Osteoporosis AND heart failure

MeSH → 50

PubMed → 224

Osteoporosis e IC

- ¿Es un problema? **PREVALENCIA**
- ¿Tiene relevancia? **CONSECUENCIAS**
- ¿Con qué se asocia? **FACTOR DE RIESGO**
- ¿Cómo la tratamos? **TRATAMIENTO**
- ¿Cómo la diagnosticamos? **PRUEBAS**
- ¿Hay que buscarla? **DESPISTAJE**

Prevalencia

Rev Clin Esp. 2010;210(4):149–158

Revista Clínica Española

www.elsevier.es/rce

ORIGINAL

Comorbilidad de los pacientes ingresados por insuficiencia cardiaca en los servicios de medicina interna

M. Montero Pérez-Barquero[a,*], P. Conthe Gutiérrez[b], P. Román Sánchez[c], J. García Alegría[d], J. Forteza-Rey[e] y Grupo de Trabajo de Insuficiencia Cardiaca de la Sociedad Española de Medicina Interna (estudio SEMI-IC)[♦]

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Recibido el 16 de abril de 2009; aceptado el 27 de septiembre de 2009
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PALABRAS CLAVE
Insuficiencia cardiaca;
Comorbilidad;
Medicina interna;
Índice de Charlson

Resumen

Antecedentes y objetivos: Los pacientes con insuficiencia cardiaca (IC) presentan con frecuencia patologías asociadas. Se desconoce en toda su extensión la influencia de estas comorbilidades en la mortalidad y otras variables clínicas. Hemos analizado la comorbilidad de los pacientes ingresados por IC en los servicios de medicina interna de hospitales de España y su relación con diversas variables sociodemográficas y clínicas.

Pacientes y métodos: Estudiamos de forma prospectiva 2.127 pacientes (desde el 1 de octubre del año 2000 al 28 de febrero del año 2001) con IC, ingresados en 51 hospitales de diferentes categorías (comarcales–hospitales universitarios), en los que un internista se ofreció a colaborar. La comorbilidad se calculó con el índice de Charlson.

Resultados: La edad media fue de 77 años (mujeres, el 57%). El 45% había tenido al menos un ingreso en el último año. El 41% tenía una clase funcional III/IV de la New York Heart Association. La fracción de eyección se halló conservada en el 53% de los enfermos. Se identificaron patologías asociadas en el 60% de los pacientes (diabetes mellitus, el 39%; enfermedad pulmonar obstructiva crónica, el 31%). El índice de Charlson medio fue de 5,4 puntos (rango: 2–11 puntos). La mortalidad intrahospitalaria global fue del 6,1%. Durante el ingreso hospitalario fallecieron más pacientes en el grupo de mayor comorbilidad (Charlson ≥3 puntos, el 8,4%) que entre los enfermos con menor índice de Charlson (1–2 puntos, el 5,2%; p<0,01). Los tratamientos prescritos fueron similares en ambos grupos. En el análisis multivariante, la comorbilidad se asoció de forma independiente con

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♦El listado de participantes en el estudio SEMI-IC se presenta en el Anexo 1

Estudio SEMI-IC

10 patologías asociadas
No hay datos de osteoporosis

Prevalencia

665

HEART REVIEW

Non-cardiac comorbidities in chronic heart failure

Chim C Lang, Donna M Mancini

Non-cardiac comorbidity complicates heart failure care and is prevalent in one form or another for the majority of elderly patients with heart failure. This wide range of comorbidities, which includes respiratory comorbidities, renal dysfunction, anaemia, arthritis, cognitive dysfunction and depression, contributes to the progression of the disease and may alter the response to treatment. Polypharmacy is inevitable in these patients. Cardiologists and other physicians caring for patients with chronic heart failure (CHF) need to be vigilant to comorbid conditions that may complicate the care of these patients. Future trials should focus on optimal strategies for the comprehensive management of the elderly patients with CHF with multiple comorbidities rather than the isolated effects of single drugs in younger patients with few or no comorbidities.

Chronic heart failure (CHF) is the leading diagnosis at hospital discharge for elderly patients. In these elderly patients, CHF is often accompanied by a range of comorbidities that play an integral role in its progression and response to treatment. Comorbidity is defined as a chronic condition that coexists in an individual with another condition that is being described. A distinction is made between non-cardiac comorbidities and cardiac conditions that are directly related to the presence of CHF such as arrhythmias as well conditions that predate and contribute to its aetiology such as hypertension, diabetes mellitus and hyperlipidaemia. This article will focus largely on non-cardiac comorbidities in CHF.

EPIDEMIOLOGY OF NON-CARDIAC COMORBIDITIES IN CHF

Previous data on the presence and effect of comorbidities on CHF were derived from clinical trials and geographically limited studies of relatively small numbers of patients such as the Framingham cohort.[1] However, data from CHF trials are not reflective of the real-world situation as these are largely derived from younger patients with few or no comorbidities. Lately, studies have utilised databases to examine the impact of comorbidity in larger groups of elderly patients with CHF. Utilising data from 27 477 Scottish morbidity records listing CHF, Brown and Clelland[2] reported that 11.8% of CHF admissions were associated with chronic airways obstruction, 8.3% with chronic or acute renal failure and 5.3% with cerebrovascular accident. In the US, the National Heart Failure project, an effort by the Centers for Medicare and Medicaid Services, found that comorbidity was common among 34 587

See end of article for authors' affiliations

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Heart 2007;93:665–671. doi: 10.1136/hrt.2005.068296

Medicare elderly patients aged ≥65 years, hospitalised with a principal diagnosis of CHF.[3] About a third (32.9%) had chronic obstructive pulmonary disease (COPD), 18% had a history of stroke and 9.2% had dementia. More recently, Braunstein and colleagues[4] reported the findings of a cross-sectional analysis of 122 630 individuals aged ≥65 years with CHF identified through a 5% random sample of all US Medicare beneficiaries. Nearly 40% of patients with CHF had ≥5 non-cardiac comorbidities, and this group accounted for 81% of the total inpatient hospital days experienced by patients with CHF. The top 10 most common non-cardiac conditions were COPD/bronchiectasis (26%), osteoarthritis (16%), chronic respiratory failure or other lower respiratory disease excluding COPD/bronchiectasis (14%), thyroid disease (14%), Alzheimer's disease/dementia (9%), depression (8%), chronic renal failure (7%), asthma (5%), osteoporosis (5%) and anxiety (3%). The risk of hospitalisation and potentially preventable hospitalisations strongly increased with the number of chronic conditions (fig 1). After controlling for demographic factors and other diagnoses, comorbidities that were associated consistently with higher risks for CHF hospitalisations and mortality included COPD/bronchiectasis, renal failure, diabetes, depression and lower respiratory diseases. Several reasons may explain why older patients with CHF with greater comorbidity may experience more adverse events that lead to preventable hospitalisations. These include underutilisation of effective CHF treatments in the presence of other conditions because of safety concerns (eg, use of β-blockers in asthma or ACE inhibitors in renal insufficiency), patient non-adherence to or inability to recall complex medication regimens, inadequate post-discharge care, failed social support and failure to promptly seek medical attention during symptom recurrence. Psychological stress from chronically poor health may also predispose to bad outcomes. Finally, elderly patients with multiple comorbidities and polypharmacy are also susceptible to poor coordination of care and are also at an increased risk for experiencing adverse drug reactions from drug–drug interactions. The association between comorbidity and healthcare costs has also been examined in a Medicare healthcare expenditure study.[5] Patients with CHF having expensive

Abbreviations: BNP, brain natriuretic peptide; CHF, chronic heart failure; COPD, chronic obstructive pulmonary disease; CPAP, continuous positive airway pressure; CSA, central sleep apnoea; HF, heart failure; NYHA, New York Heart Association; OSA, obstructive sleep apnoea; rHuEPO, recombinant human erythropoietin; SDB, sleep-disordered breathing; TNF, tumour necrosis factor

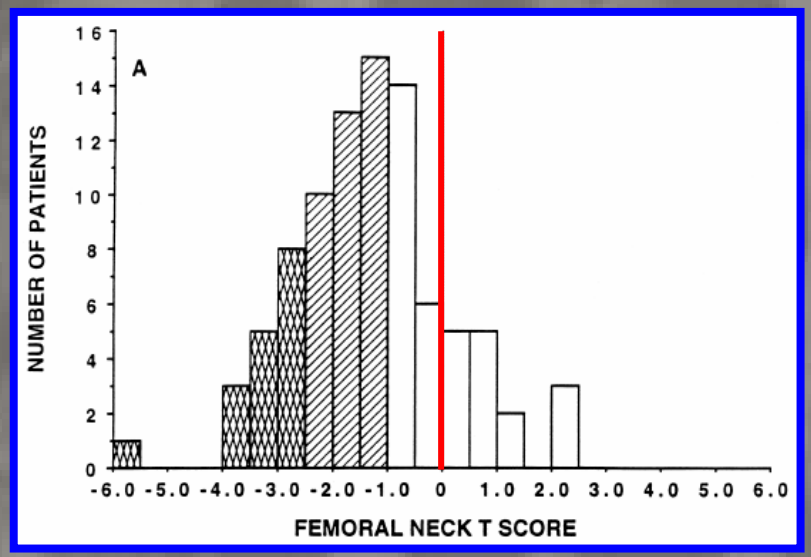
Comorbilidad	%
EPOC/bronquiectasias	26
Artrosis	16
Insuf respiratoria crónica no EPOC	14
Enfermedad tiroidea	14
Alzheimer/demencia	9
Depresión	8
Insuf renal crónica	7
Asma	5
Osteoporosis	5
Ansiedad	3

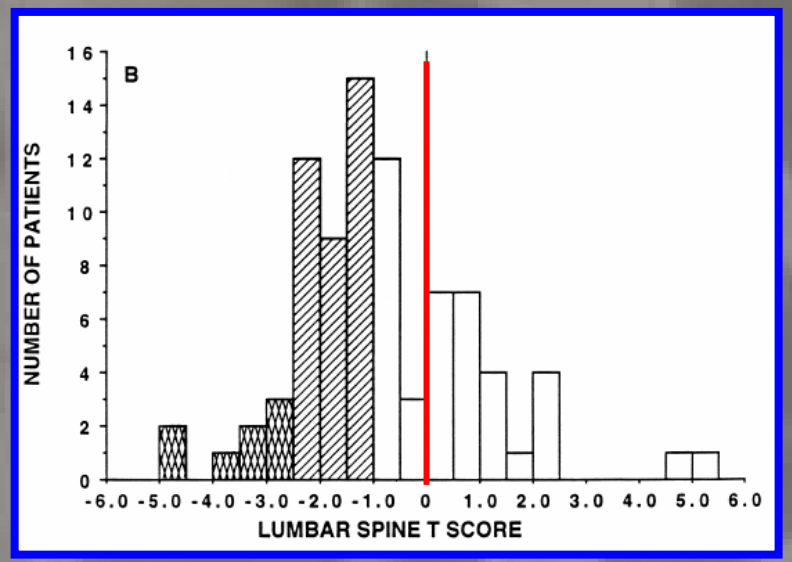
Enfermedades respiratorias
Enfermedad renal
Anemia
Disfunción cognitiva
Depresión
Artritis

Prevalencia

Estudio	Osteopenia (%)	Osteoporosis (%)	
PROYECTO PROFUND		7,34	PPP, no BMD
Shane	47	19	Clase III-IV
Frost	33	15	Varones

Prevalencia





101 pacientes, 79 varones y 22 mujeres, clase funcional III y IV

Shane E et al. Am J Med 1997; 103: 197.

Prevalencia

Table 5
BMD characteristics of the study population.

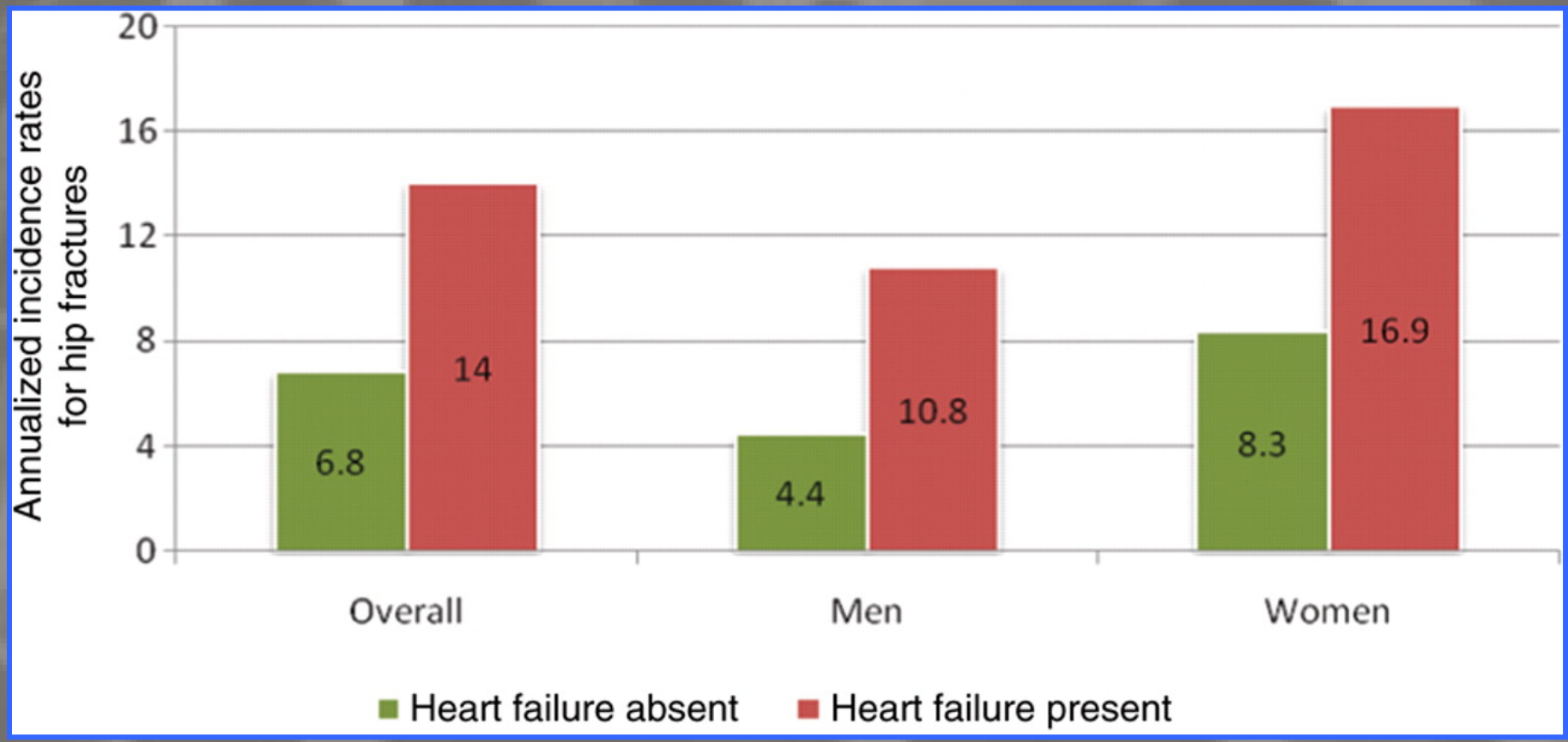
Skeletal site	CHF ($n = 83$)	Controls ($n = 54$)	p
FN BMD (g/cm^2)	0.748 ± 0.16	0.792 ± 0.15	0.08
FN *T*-score	-1.894 ± 0.843	-2.499 ± 0.898	0.005
FN *Z*-score	-0.255 ± 1.324	0.793 ± 1.227	0.03
LS BMD (g/cm^2)	1.023 ± 0.013	1.977 ± 0.010	0.06
LS *T*-score	-1.789 ± 0.767	-2.456 ± 0.713	0.005
LS *Z*-score	-0.211 ± 1.399	0.771 ± 1.351	0.05

between −1.0 and −2.5). Analysis of individual scores revealed that osteopenia at the FN was present in 46% of CHF patients compared to 39% of the control subjects and at the LS in 43% of CHF patients compared to 37% of the controls. Osteoporosis was present in 20.5% at the FN in CHF patients compared to 6% of controls and in 18% at the LS in CHF patients versus 3.7% of control subjects. A significant correlation was found between low EF and BMD-Z-scores for FN and LS, $r = 0.556$ and $r = 0.533$, respectively. There was also a significant correlation between frailty scores and BMD; higher frailty scores were associated with lower BMD.

Abou-Raya S et al. Arch Gerontol Geriatr 2009; 49: 250-4.

Incidencia

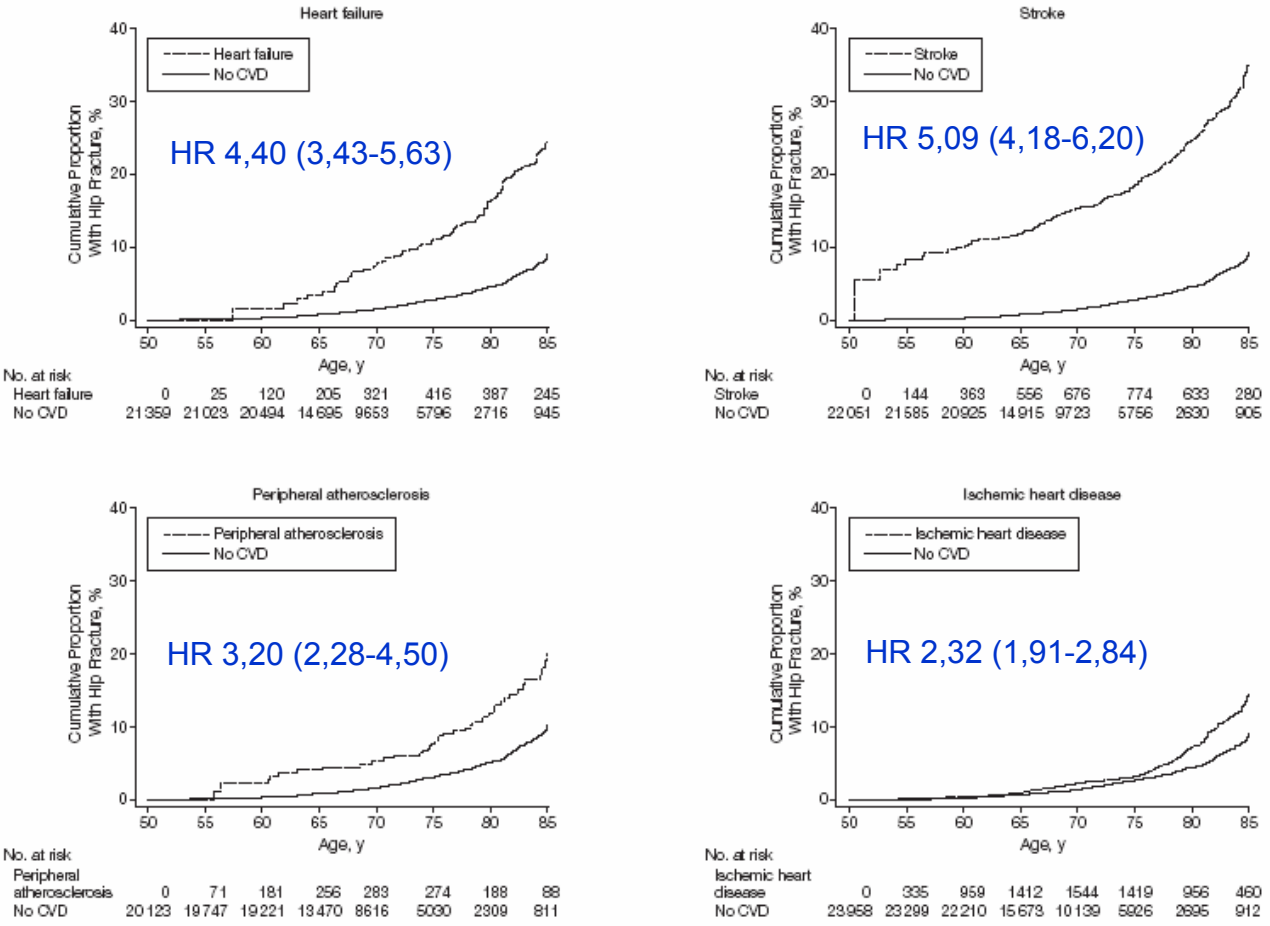
Tasa de incidencia anual (1000 pers/año) de fractura de cadera por sexo y presencia de IC



Carbone L et al. Eur Heart J 2010;31:77-84

Incidencia

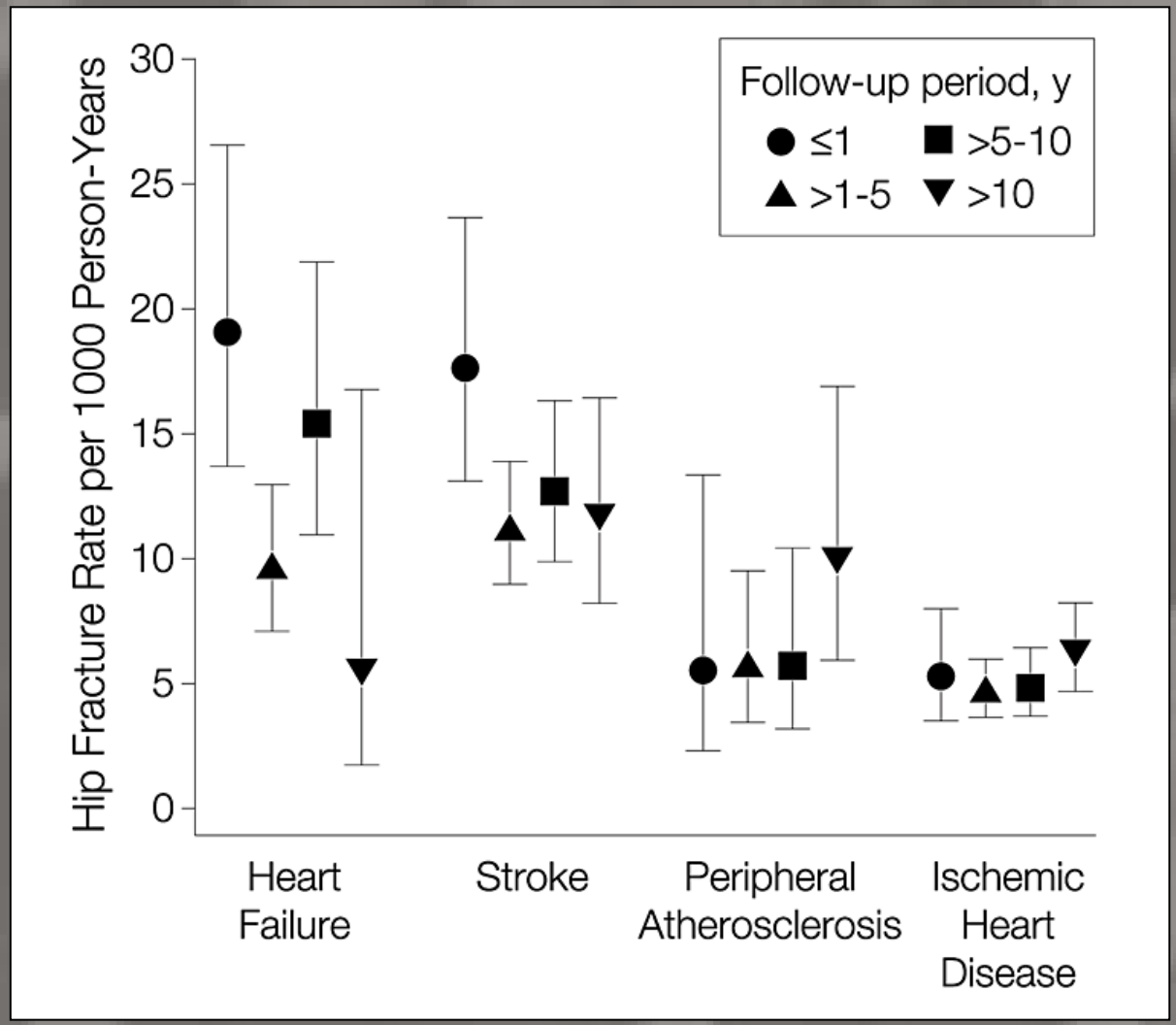
Figure 2. Cumulative Proportion of Hip Fracture by Cardiovascular Disease Status



Kaplan-Meier curves of hip fracture for twins with and without cardiovascular disease (CVD).

Sennerby U et al. JAMA 2009; 302 : 1666-73.

Incidencia

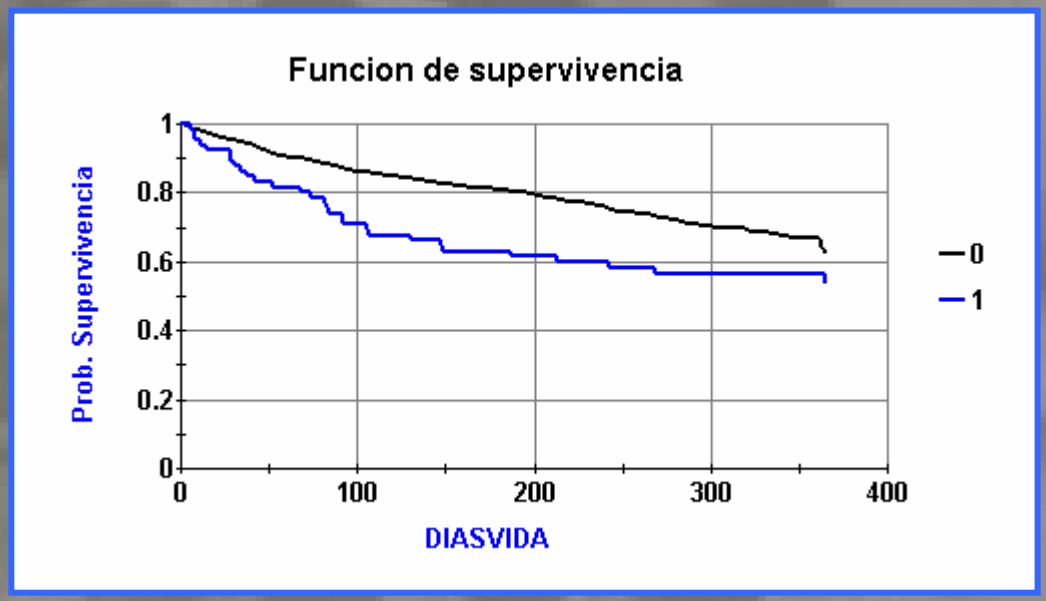


Sennerby U et al. JAMA 2009; 302 : 1666-73.

Osteoporosis e IC

- ¿Es un problema? PREVALENCIA
- ¿Tiene relevancia? CONSECUENCIAS
- ¿Con qué se asocia? FACTOR DE RIESGO
- ¿Cómo la tratamos? TRATAMIENTO
- ¿Cómo la diagnosticamos? PRUEBAS
- ¿Hay que buscarla? DESPISTAJE

Consecuencias



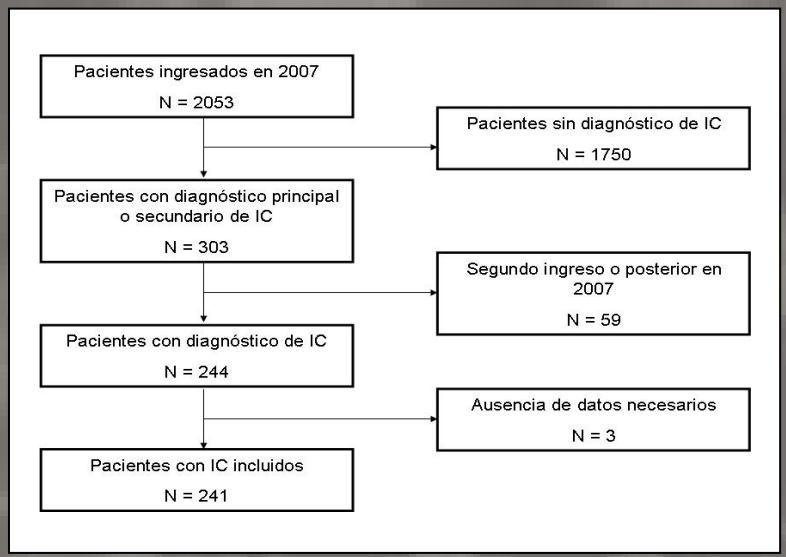
Regresión de Cox
HR 1,45 (0,9994-2,1152) p=0,0504

Probabilidad supervivencia a los 6 meses	
Osteoporosis	Sin osteoporosis
0,61	0,80

Indice PROFUND		
Osteoporosis	Sin osteoporosis	p
0,43 (0,22)	0,32 (0,18)	0,02

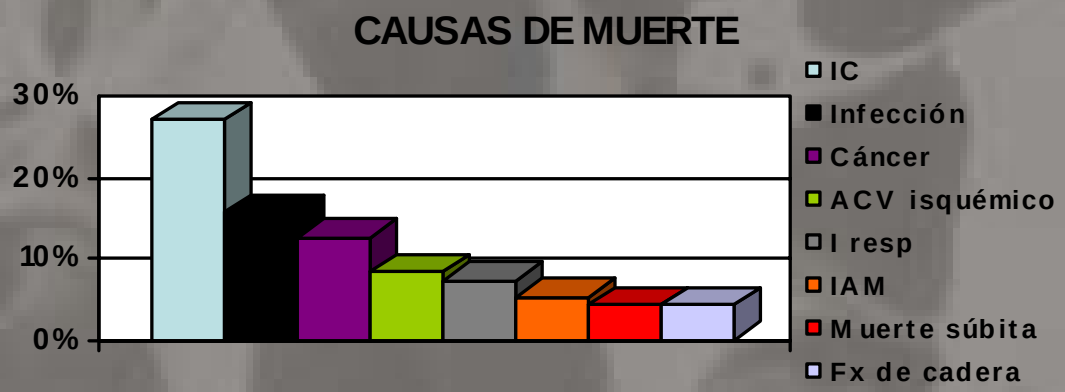
PROYECTO PROFUND

Consecuencias



Se incluyeron 241 pacientes, 89 varones y 152 mujeres, con una edad media de 79 ± 10 años (36-100).

Durante el seguimiento fallecieron 121 pacientes. Las causas más frecuente de muerte fueron la IC (27%), infección (15%), cáncer (12,5%), ACV isquémico (8,3%), insuficiencia respiratoria (7,3%), IAM (5%), muerte súbita (4,2%), fractura de cadera (4,2%).



Díez Manglano J et al. Póster IC-006. XXX Congreso de la SEMI, 2009.

Osteoporosis e IC

- ¿Es un problema? PREVALENCIA
- ¿Tiene relevancia? CONSECUENCIAS
- ¿Con qué se asocia? FACTOR DE RIESGO
- ¿Cómo la tratamos? TRATAMIENTO
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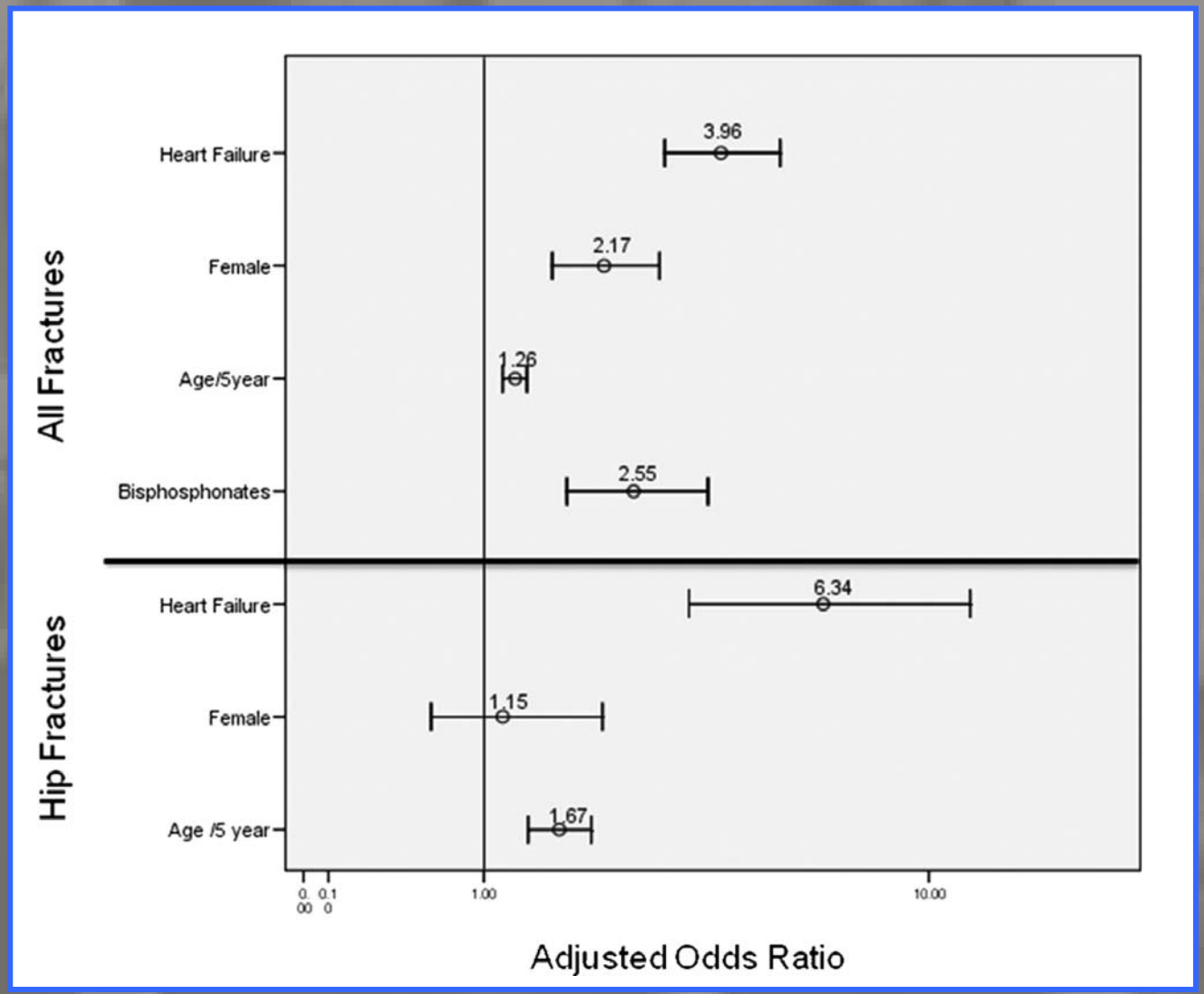
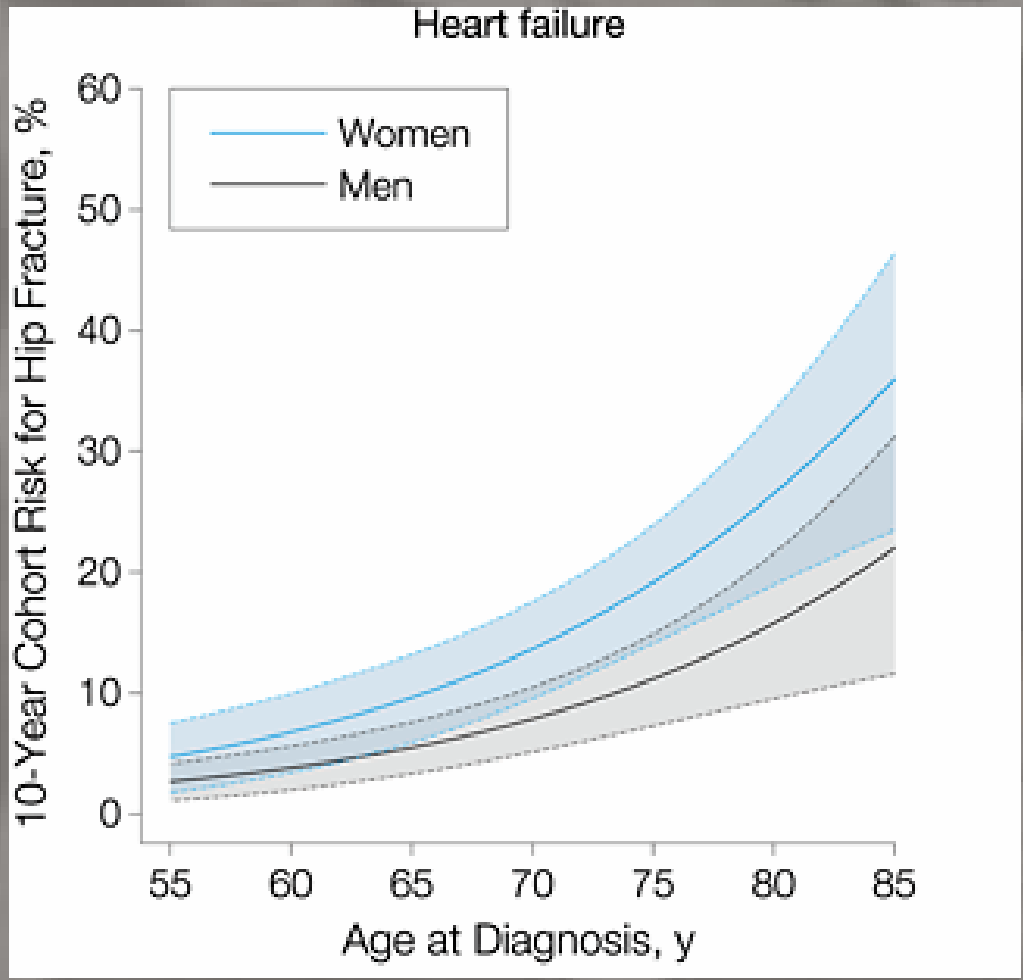
Factores de riesgo



van Diepen, S. et al. Circulation 2008;118:1946-1952

Factores de riesgo



Sennerby U et al. JAMA 2009; 302 : 1666-73.

Factores de riesgo

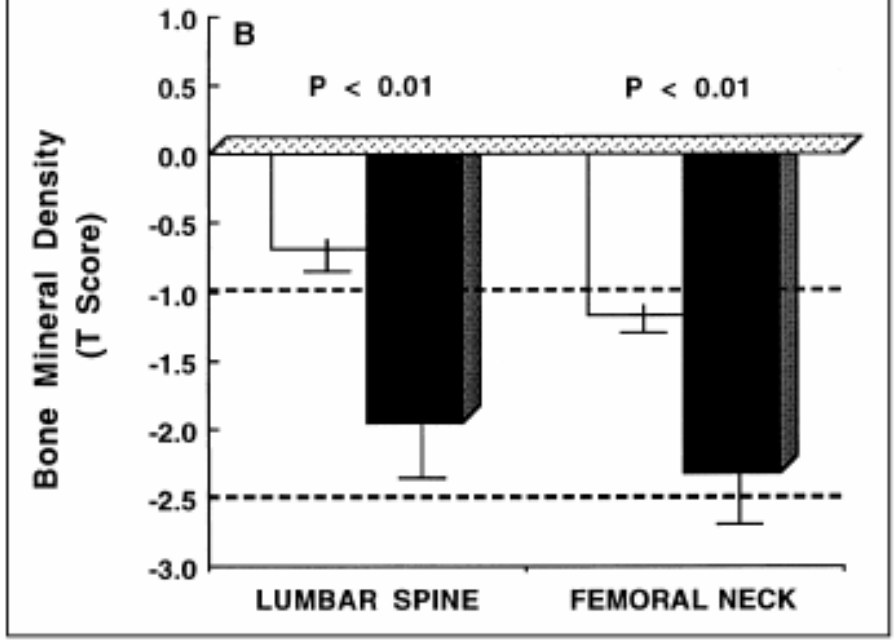


Figure 2. Bone mineral density of the lumbar spine and femoral neck in men (white bars) and women (black bars) with congestive heart failure. The data, expressed as T scores, indicate that women with congestive heart failure have significantly lower bone mass than men. The horizontal dashed lines delineate T scores of −1.0 and −2.5.

Shane E et al. Am J Med 1997; 103 : 197-207.

Factores de riesgo

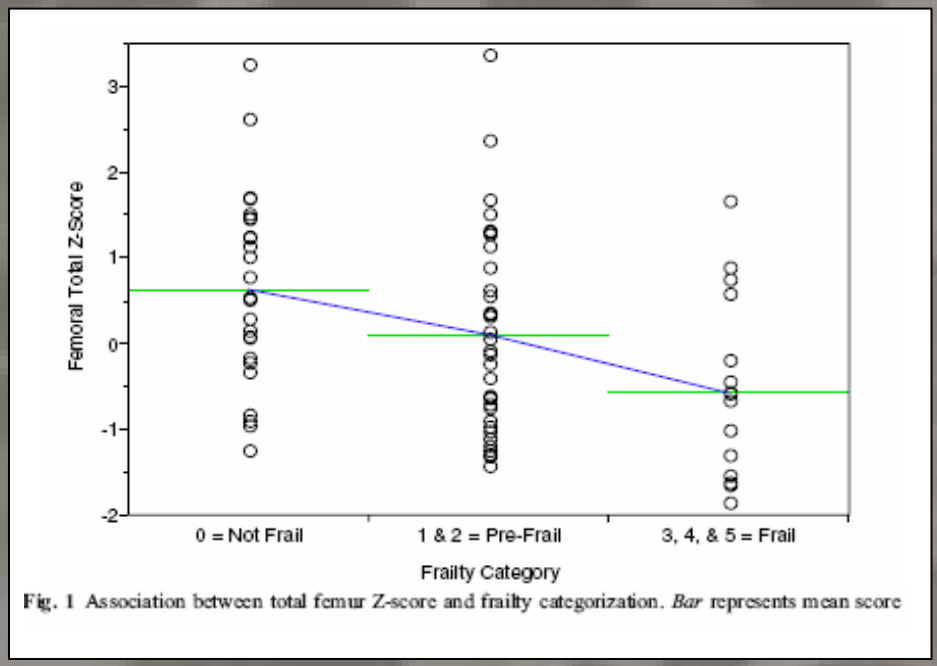


Fig. 1 Association between total femur Z-score and frailty categorization. *Bar* represents mean score

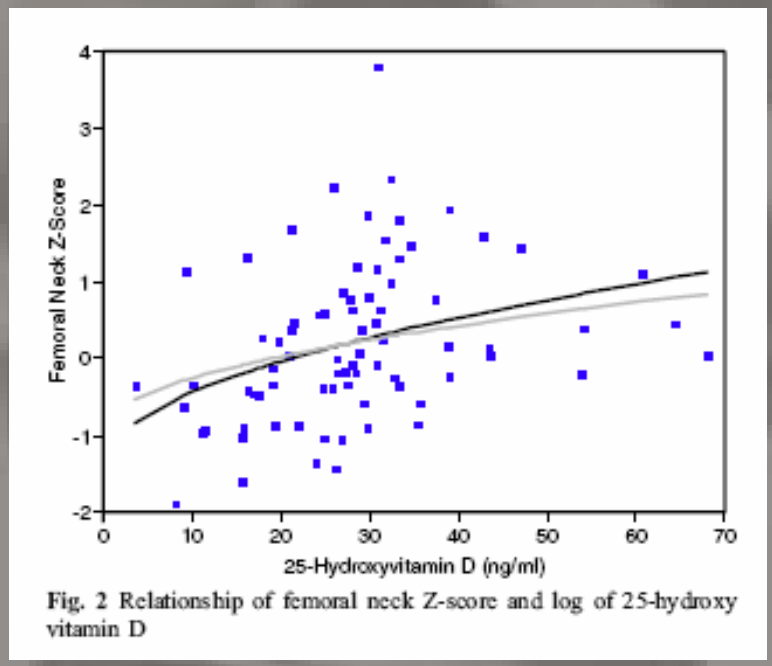
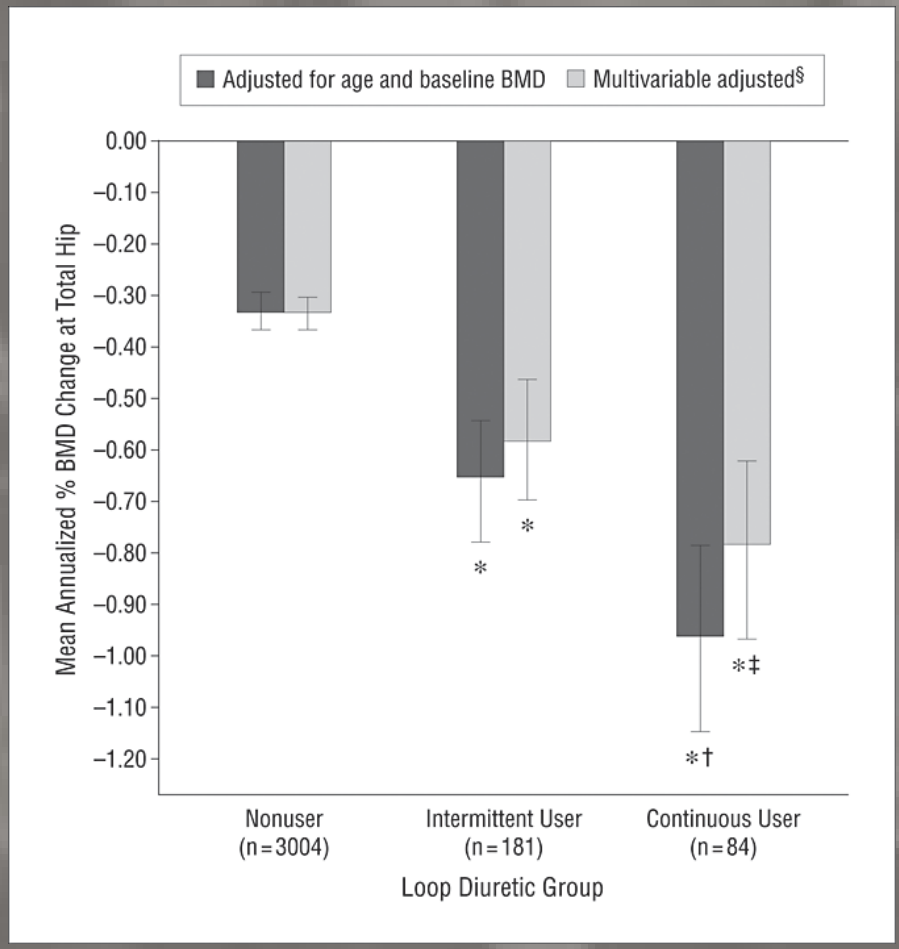


Fig. 2 Relationship of femoral neck Z-score and log of 25-hydroxy vitamin D

Kenny AM et al. Osteoporos Int 2006; 17: 1420-7.

Factores de riesgo



Lim LS et al. Arch Intern Med 2008;168:735-740.

Factores de riesgo

PROYECTO PROFUND	Osteoporosis	Sin osteoporosis	p
Edad	81,53 (7,83)	79,45 (9,34)	0,08
IMC	29,62 (7,62)	29,23 (9,86)	0,70
Barthel	63,1 (30,6)	71,8 (28,7)	0,02
Lawton	3,79 (6,44)	3,43 (2,62)	0,37
Pfeiffer	3,50 (3,13)	2,56 (2,94)	0,02
Gijón	10,59 (2,93)	10,42 (3,34)	0,70
Charlson	4,14 (2,34)	4,06 (2,00)	0,75
Nº fármacos	9,87 (3,54)	8,29 (3,09)	0,0001

No hay diferencia en los niveles de Hb, eGFR, albúmina

Factores de riesgo

Factor	OR	p
Mujer	3,34 (1,82-6,13)	<0,0001
Dependencia ABVD	1,60 (0,94-2,70)	0,07
Neurolépticos	2,47 (1,20-5,11)	0,01
Antidepresivos	2,14 (1,12-4,08)	0,02

Clase NYHA	Prevalencia osteoporosis (%)
I	0,00
II	7,71
III	7,13
IV	10,53

PCRu		
Osteoporosis	Sin osteoporosis	p
37,0 (66,8)	20,2 (36,9)	0,01

PROYECTO PROFUND

Factores de riesgo

Betabloqueantes y fractura osteoporótica

Table I. Cross-sectional studies and risk of fracture.

Reference	Population	Number	Effect
Pasco JA et al[23]	Postmenopausal women	1344	Decreased fracture risk
Schlienger RG et al[24]	General population	150420	Decreased fracture risk
De Vries F et al[25]	General population	77598	Decreased hip fracture risk
Rejnmark L et al[26]	General population	498617	Decreased fracture risk
Schoo M et al[27]	General population	7892	Decreased fracture risk
Bonnet N et al[28]	Postmenopausal women	499	Decreased fracture risk

Table II. Longitudinal studies and risk of fracture.

Reference	Population	Number	Effect
Rejnmark L et al[29]	Perimenopausal women	2016	Increased fracture risk
Lavasseur R et al[30]	Postmenopausal women	7598	No effect
Reid IR et al[31]	Postmenopausal women	8142	Decreased hip fracture risk
Meisinger C et al[32]	General population	1793	Decreased fracture risk

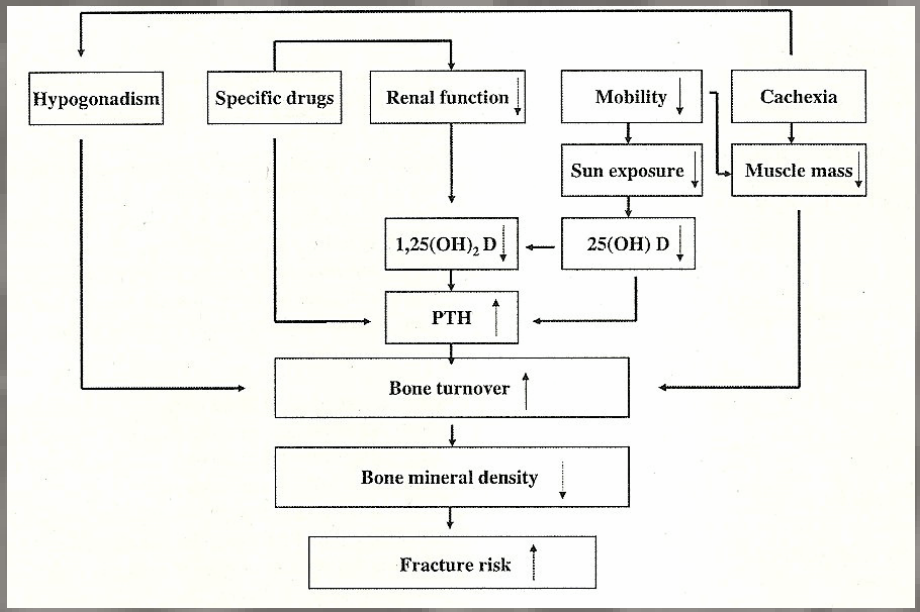
Pérez-Castrillón JL et al. Eur Rev Med Pharmacol Sci 2009; 13: 157-62.

Factores de riesgo

Factores de riesgo de OP en IC
Edad
Sexo femenino
FEVI
Clase funcional NYHA
Fragilidad
Diuréticos de asa
Deficiencia de vitamina D

Factores de protección de OP en IC
¿Betabloqueantes?

Factores de riesgo



Zittermann A et al. Clin Chim Acta 2006; 366: 27-36.

Table 3
Biochemical characteristics of the study population, mean ± S.D.

Parameter	CHF (n = 83)	Controls (n = 54)	p
Calcium (mg/dl)	9.3 ± 0.2	9.5 ± 0.3	0.084
Phosphorus (mg/dl)	3.8 ± 0.2	3.9 ± 0.1	0.086
1,25$(OH)_2$D (pg/ml)	24.1 ± 1.1	34.7 ± 1.7	0.005
IL-6 (pg/ml)	7.6 ± 0.6	2.9 ± 0.2	0.005
TNF-α (pg/ml)	21.1 ± 1.6	8.9 ± 1.1	0.001
Serum creatinine (mg/dl)	1.49 ± 0.2	1.10 ± 0.3	0.05
BUN (mg/dl)	26.8 ± 5.9	18.3 ± 6.3	0.01
Creatinine clearance (ml/min)	67.6 ± 11.4	68.1 ± 10.7	0.47

Abou-Raya S et al. Arch Gerontol Geriatr 2009; 49: 250-4.

Osteoporosis e IC

- ¿Es un problema? PREVALENCIA
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- ¿Hay que buscarla? DESPISTAJE

Tratamiento

The Effects of Vitamin D Supplementation on Physical Function and Quality of Life in Older Patients With Heart Failure

A Randomized Controlled Trial

Miles D. Witham, BM, BCh, PhD, MRCP; Linda J. Crighton, RN;
Neil D. Gillespie, MB, ChB, MD, FRCP; Allan D. Struthers, MB, ChB, MD, FRCP, FESC;
Marion E.T. McMurdo, BM, BCh, FRCP, CBiol, FIBiol

Background—Low 25-hydroxyvitamin D levels, commonly found in older patients with heart failure, may contribute to the chronic inflammation and skeletal myopathy that lead to poor exercise tolerance. We tested whether vitamin D supplementation of patients with heart failure and vitamin D insufficiency can improve physical function and quality of life.

Methods and Results—In a randomized, parallel group, double-blind, placebo-controlled trial, patients with systolic heart failure aged ≥70 years with 25-hydroxyvitamin D levels <50 nmol/L (20 ng/mL) received 100 000 U of oral vitamin D2 or placebo at baseline and 10 weeks. Outcomes measured at baseline, 10 weeks, and 20 weeks were 6-minute walk distance, quality of life (Minnesota score), daily activity measured by accelerometry, Functional Limitations Profile, B-type natriuretic peptide, and tumor necrosis factor-α. Participants in the vitamin D group had an increase in their 25-hydroxyvitamin D levels compared with placebo at 10 weeks (22.9 versus 2.3 nmol/L [9.2 versus 0.9 ng/mL]; $P<0.001$) and maintained this increase at 20 weeks. The 6-minute walk did not improve in the treatment group relative to placebo. No significant benefit was seen on timed up and go testing, subjective measures of function, daily activity, or tumor necrosis factor. Quality of life worsened by a small, but significant amount in the treatment group relative to placebo. B-type natriuretic peptide decreased in the treatment group relative to placebo (−22 versus +78 pg/mL at 10 weeks; $P=0.04$).

Conclusions—Vitamin D supplementation did not improve functional capacity or quality of life in older patients with heart failure with vitamin D insufficiency.

Clinical Trial Registration—www.controlled-trials.com. Identifier: ISRCTN51372896.

(*Circ Heart Fail.* 2010;3:195-201.)

Tratamiento

Effects of calcium supplementation on bone loss and fractures in congestive heart failure

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(Correspondence should be addressed to H-U Stempfle; Email: u.stempfle@asklepios.com)

Abstract

Background: Cross-sectional studies have shown that more than 50% of patients with congestive heart failure (CHF) have decreased bone mineral density (BMD). There is limited knowledge about the longitudinal changes of BMD and how to treat bone loss in patients with CHF.

Methods: The present study was a prospective, longitudinal trial in which 33 male patients with CHF (ejection fraction (EF): 30±11%) were assigned to 1000 mg calcium supplementation or no supplementation. BMD was measured at the lumbar spine (LS) and the femoral neck (FN) by dual-energy X-ray absorptiometry at baseline and after 12 months.

Results: Osteopenia (LS 33% and FN 36%) and osteoporosis (LS 15% and FN 6%) were frequently seen in these patients; 70% showed impaired renal function, 42% secondary hyperparathyroidism, and 33% hypogonadism. Bone resorption markers were strongly elevated and correlated negatively with the EF. Patients without calcium supplementation revealed a reduction of BMD (LS 1.7% and FN 1.9%) within 12 months. The fracture incidence was 6%. Patients with calcium supplementation also demonstrated a 6% fracture incidence and a decrease in BMD (LS 1.2% and FN 1.6%), which was not significantly different from the untreated group. Loss of BMD at FN was only seen in patients with impaired renal function.

Conclusions: Patients with CHF demonstrate a progressive decrease in BMD when compared with age-matched healthy individuals. Increased bone resorption due to renal insufficiency with consecutive secondary hyperparathyroidism is a main reason for BMD loss in CHF. Calcium supplementation alone cannot sufficiently prevent the decrease in BMD.

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Tratamiento

ORIGINAL RESEARCH ARTICLE

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Bisphosphonates and Atrial Fibrillation

Systematic Review and Meta-Analysis

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statistic. Bisphosphonate exposure was significantly associated with risk of atrial fibrillation serious adverse events in a meta-analysis of four trial datasets (OR 1.47; 95% CI 1.01, 2.14; p=0.04; I^2=46%). However, meta-analysis of all atrial fibrillation events (serious and non-serious) from the same datasets yielded a pooled OR of 1.14 (95% CI 0.96, 1.36; p=0.15; I^2=0%).

We identified two case-control studies, one of which found an association between bisphosphonate exposure (ever users) and atrial fibrillation (adjusted OR 1.86; 95% CI 1.09, 3.15) while the other showed no association (adjusted OR 0.99; 95% CI 0.90, 1.10). Both studies failed to demonstrate a significant association in 'current' users.

We did not find a significant increase in the risk of stroke (three trial datasets; OR 1.00; 95% CI 0.82, 1.22; p=0.99; I^2=0%) or cardiovascular mortality (three trial datasets; OR 0.86; 95% CI 0.66, 1.13; p=0.28; I^2=31%).

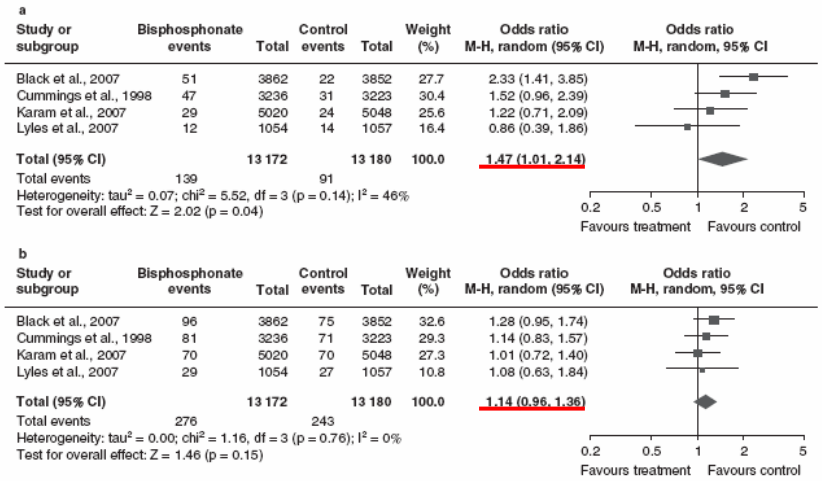

Fig. 2. Meta-analysis of odds ratio for (a) atrial fibrillation serious adverse events and (b) all atrial fibrillation adverse events (serious and non-serious) with bisphosphonates. Studies: Black et al.,[8] Cummings et al.,[7,16] Karam et al.,[17] and Lyles et al.[9] **df** = degrees of freedom; **M-H** = Mantel-Haenszel.

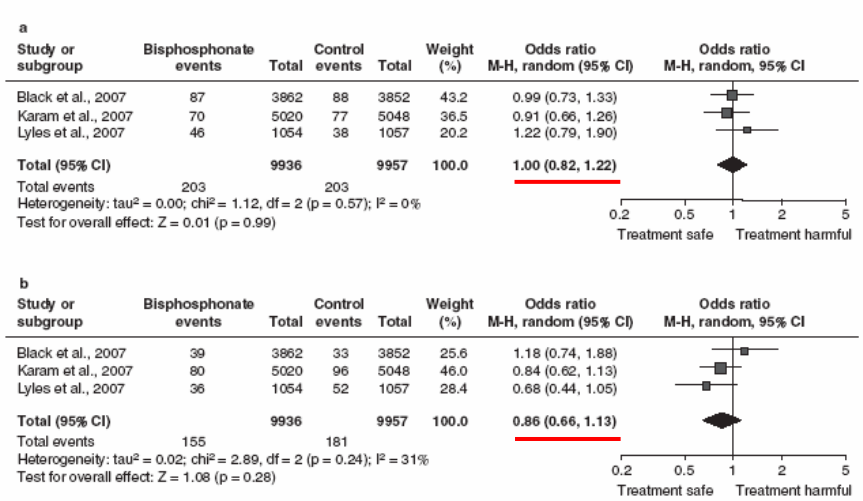

Fig. 3. Meta-analysis of stroke, and death from cardiovascular causes with bisphosphonate versus placebo. Studies: Black et al.,[8] Karam et al.,[17] and Lyles et al.[9] **df** = degrees of freedom; **M-H** = Mantel-Haenszel.

Osteoporosis e IC

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Diagnóstico

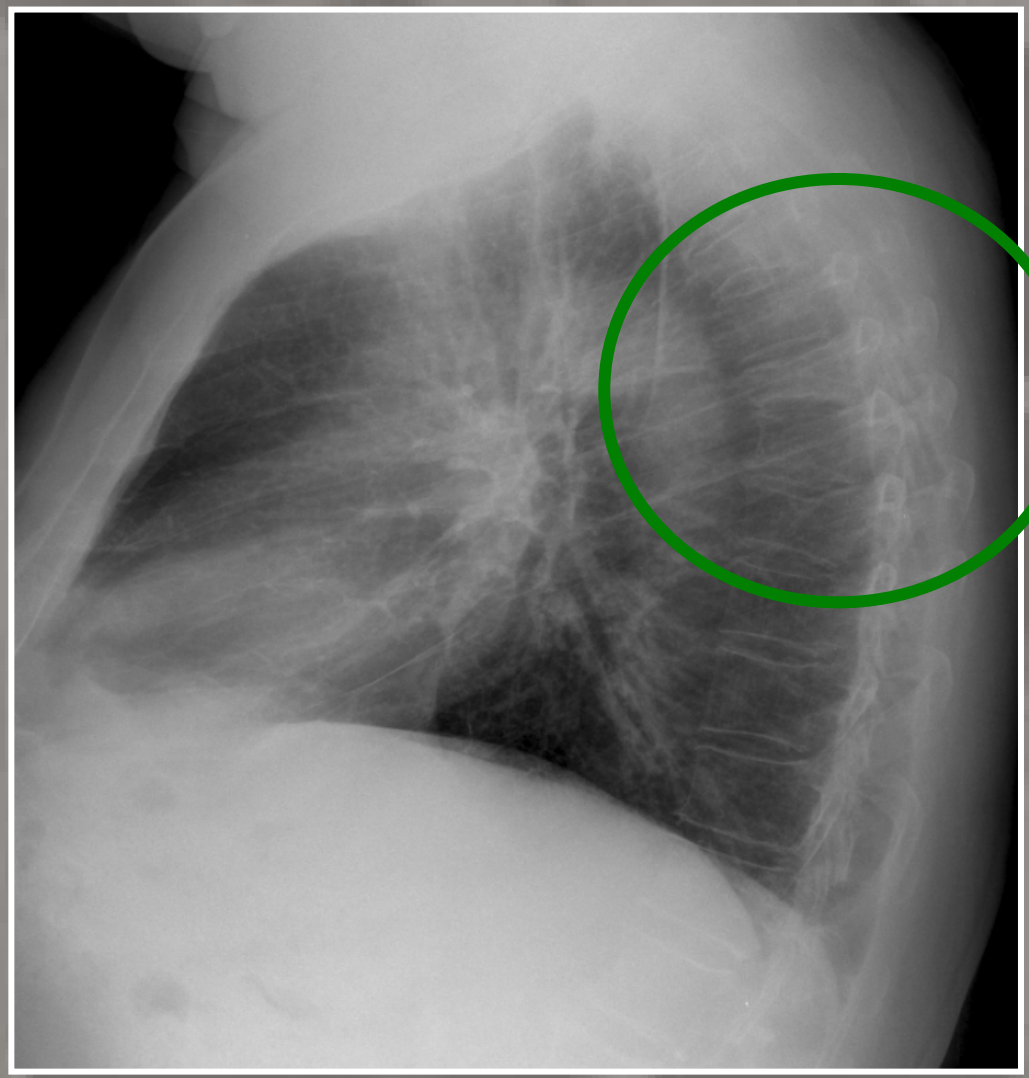
- Anamnesis
- Revisión sistemática de la Rx de tórax
- Indice de FRAX
- Densitometría

Diagnóstico

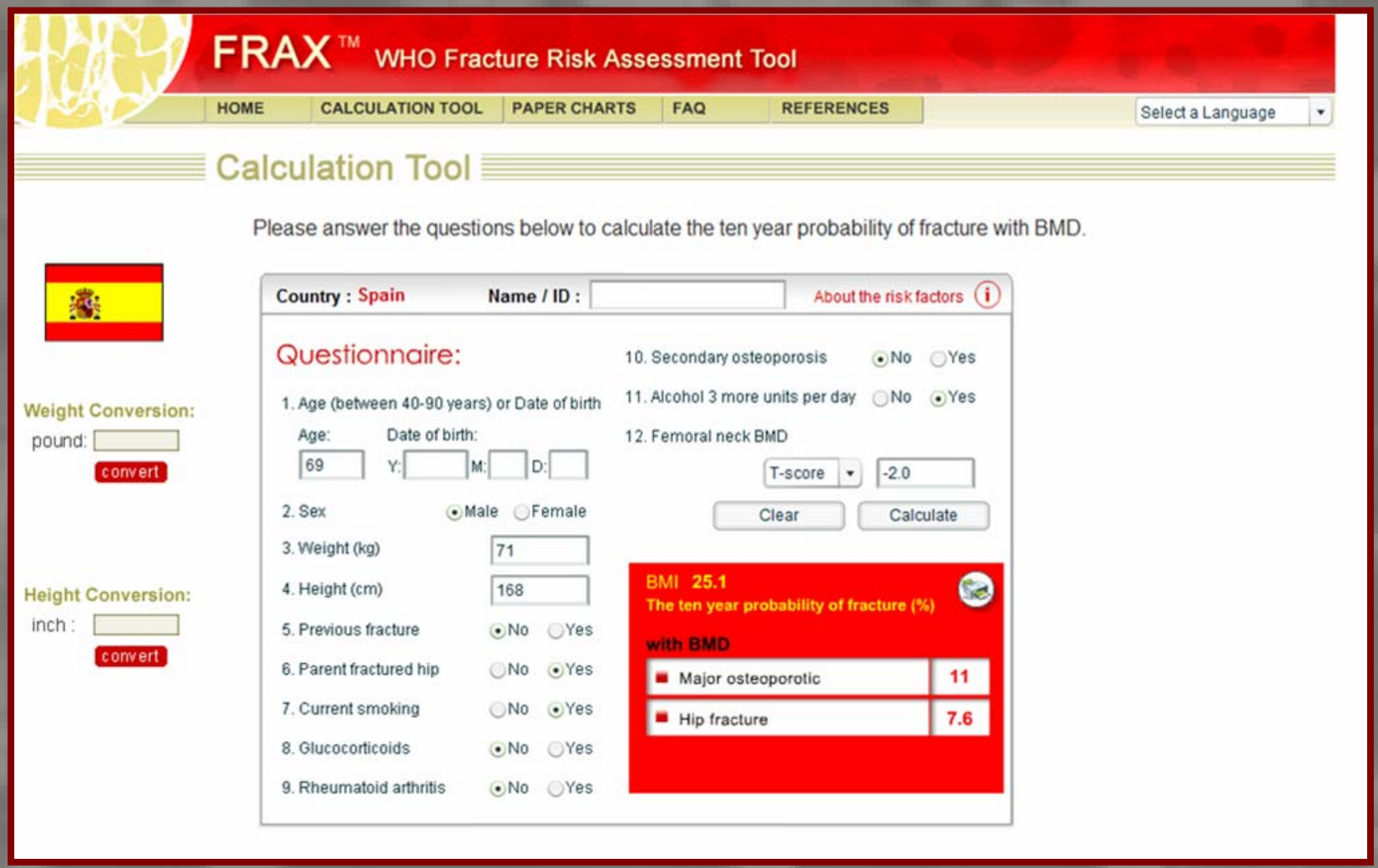
Antecedentes personales de fractura de
- Cadera
- Vertebral
- Muñeca
- Costal

Factores de riesgo:
- Fractura de cadera en los padres
- Tabaquismo-EPOC
- Alcoholismo
- Hepatopatía
- Corticoterapia
- Artritis reumatoide
- Desnutrición

Diagnóstico



Diagnóstico



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Diagnóstico

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Diagnóstico

FRAX™ WHO Fracture Risk Assessment Tool

Ten-year probability of osteoporotic fracture (%) according to BMD, the number of clinical risk factors (CRF) and age in men from Spain.

Age = 50 years

Number of CRFs	BMD T-score (femoral neck)										
	-4.0	-3.5	-3.0	-2.5	-2.0	-1.5	-1.0	-0.5	0	0.5	1.0
0	10	6.4	4.2	2.9	2.1	1.7	1.4	1.2	1.1	1.0	1.0
1	16 (13-21)	10 (8.8-13)	6.4 (5.7-8.3)	4.4 (3.6-5.7)	3.3 (2.5-4.1)	2.6 (1.8-3.2)	2.1 (1.4-2.8)	1.8 (1.2-2.4)	1.6 (1.0-2.2)	1.5 (1.0-2.1)	1.5 (0.9-2.0)
2	24 (18-34)	15 (12-22)	9.8 (7.7-14)	6.7 (5.0-9.5)	4.9 (3.3-7.2)	3.8 (2.4-6.0)	3.1 (1.8-5.2)	2.7 (1.5-4.5)	2.4 (1.3-4.1)	2.2 (1.2-3.9)	2.2 (1.1-3.8)
3	34 (24-47)	22 (16-30)	15 (10-20)	10 (6.8-15)	7.3 (4.5-12)	5.6 (3.2-9.6)	4.6 (2.4-8.3)	3.9 (1.9-7.2)	3.5 (1.6-6.6)	3.3 (1.5-6.3)	3.1 (1.4-6.1)
4	47 (33-60)	32 (21-41)	21 (14-26)	15 (9.5-19)	11 (6.9-15)	8.2 (5.3-12)	6.6 (3.9-11)	5.6 (3.1-9.3)	5.0 (2.7-8.4)	4.7 (2.4-8.1)	4.5 (2.3-7.8)
5	61 (51-71)	43 (34-51)	30 (23-34)	21 (16-24)	15 (11-19)	12 (8.7-15)	9.4 (7.0-13)	7.9 (5.9-11)	7.0 (5.0-10)	6.6 (4.6-9.5)	6.3 (4.3-9.1)
6	75	57	41	29	21	16	13	11	9.7	9.1	8.7

Age = 55 years

Number of CRFs	BMD T-score (femoral neck)										
	-4.0	-3.5	-3.0	-2.5	-2.0	-1.5	-1.0	-0.5	0	0.5	1.0
0	12	7.9	5.3	3.7	2.8	2.2	1.8	1.5	1.3	1.3	1.2
1	19 (16-23)	12 (11-15)	8.0 (7.1-9.8)	5.6 (4.7-6.9)	4.2 (3.3-5.1)	3.3 (2.4-4.1)	2.6 (1.9-3.5)	2.2 (1.5-3.0)	2.0 (1.3-2.8)	1.9 (1.2-2.6)	1.8 (1.1-2.5)
2	27 (21-36)	18 (14-24)	12 (9.6-16)	8.4 (6.3-11)	6.2 (4.3-8.9)	4.8 (3.1-7.4)	3.9 (2.3-6.3)	3.3 (1.8-5.4)	2.9 (1.6-5.0)	2.7 (1.5-4.7)	2.6 (1.3-4.5)
3	38 (28-48)	26 (19-33)	17 (13-23)	12 (8.7-18)	9.1 (5.8-14)	7.0 (4.1-12)	5.7 (3.1-9.9)	4.7 (2.4-8.6)	4.3 (2.1-7.9)	4.0 (1.9-7.5)	3.7 (1.7-7.1)
4	50 (38-61)	35 (25-43)	25 (17-30)	18 (12-23)	13 (8.9-18)	10 (6.8-15)	8.1 (5.1-13)	6.7 (4.0-11)	6.0 (3.4-10)	5.6 (3.0-9.6)	5.3 (2.8-9.1)
5	63 (55-71)	47 (39-54)	34 (27-38)	25 (19-29)	18 (14-22)	14 (11-18)	11 (8.8-15)	9.4 (7.2-13)	8.4 (6.1-12)	7.8 (5.5-11)	7.4 (5.0-11)
6	75	60	45	33	25	19	16	13	12	11	10

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Diagnóstico

La OMS ha establecido las siguientes definiciones basadas en la medida de la densidad de masa ósea (DMO) en la columna, cadera o antebrazo por densitometría ósea (absorciometría de Rx de energía dual, DXA).

Normal

DMO dentro de una desviación estándar de un adulto normal joven (T-score superior o igual a -1,0)

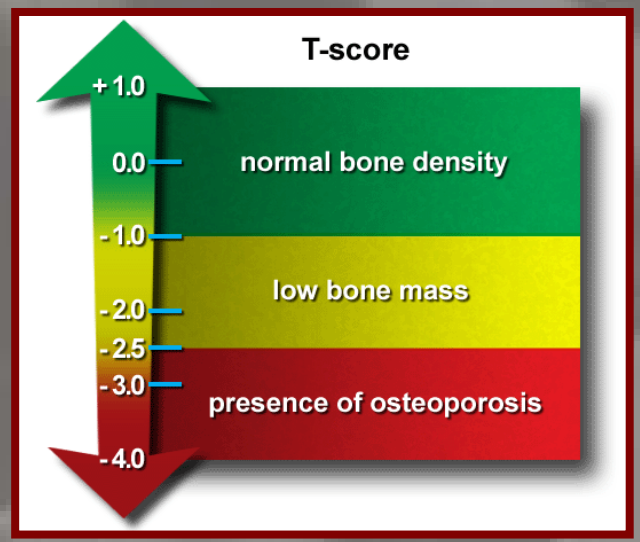
Osteopenia (masa ósea baja)

DMO entre 1,0 y 2,5 desviaciones estándar por debajo de un adulto normal joven (T-score entre -1,0 y -2,5)

Osteoporosis

DMO es 2,5 o más desviaciones estándar por debajo de un adulto normal joven (T-score menor o igual a -2,5).

Los pacientes de este grupo que ya han tenido una o más fracturas tienen una osteoporosis grave establecida.



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Screening

Male Osteoporosis Risk Estimation Score (MORES)	
Factor de riesgo	Puntuación
Edad	
≤ 55 años	0
56-74 años	3
≥ 75 años	4
Peso	
≤ 70 kg	6
70-80 kg	4
> 80 kg	0
EPOC	3

Shepherd AJ et al. Ann Fam Med 2207; 5: 540-6.

Hacer screening si ≥ 6 puntos

Sensibilidad	0,93 (0,85-0,97)
Especificidad	0,59 (0,56-0.62)
Area bajo la curva	0,832 (0,807-0,858)

Osteoporosis e IC

- La osteoporosis es una comorbilidad frecuente en la IC.

- En los pacientes con IC la aparición de osteoporosis se asocia con
    - la edad,
    - el sexo femenino,
    - la fragilidad,
    - la FEVI disminuida,
    - y el uso de algunos fármacos.

- Hay que tener un alto índice de sospecha de la osteoporosis en la IC.

•No sabemos si la masa ósea se comporta igual en la ICFED y en la ICFEP.