



Roma,  
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# **Endocrinologo e Cardiologo: Ipertiroidismo e Dolore Toracico**

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# Aspetti epidemiologici

- **Elevata prevalenza del dolore toracico:**  
in Inghilterra in uno studio condotto su 7735 uomini, il 14% soffriva di angina pectoris o aveva una storia di possibile pregresso IMA e un ulteriore 24% lamentava dolore toracico atipico  
Shaper AG et al. Br Heart J 1984; Lampe FC et al. Eur Heart J 1998
- **Prevalenza ipertiroidismo/tireotossicosi:**  
0.4-2% nelle donne (F:M=5:1) per la forma clinicamente evidente, e 0.5-6.3% per la forma subclinica, in circa la metà dei casi in relazione alla terapia con levotiroxina

# Possibili scenari

- Dolore toracico in ipertiroidismo già noto
- Riscontro di ipertiroidismo (ev. subclinico) in soggetto valutato per dolore toracico
- Ipertiroidismo e dolore toracico da patologia cardiaca/cardiopolmonare:
  - Cardiopatia ischemica
  - Dolore toracico + ipertensione polmonare (sospetta embolia polmonare)
- Ipertiroidismo e dolore toracico da altre cause

Malattia	Sintomi e segni differenziali
Esofagite da reflusso, spasmo esofageo	Non modificazioni dell'ECG Pirosi Peggiora in posizione supina, ma anche durante lo sforzo della defecazione, come l'angina Causa comune di dolore toracico
Embolia polmonare	Tachipnea, ipossiemia, ipocapnia Non congestione polmonare alla radiografia del torace Può somigliare all'infarto della parete inferiore: ST sopraslivellato (II, III, aVF) Iperventilazione
Iperventilazione	Diminuzione di $PCO_2$ e $PCO_2$ Sintomo principale la dispnea, come nell'embolia polmonare Spesso pazienti giovani Formicolio e intorpidimento agli arti, capogiro $PCO_2$ ridotta e $PO_2$ aumentata o normale Una malattia organica può causare un'iperventilazione secondaria
Pneumotorace spontaneo	Sintomo principale la dispnea Auscultazione e radiografia del torace
Dissezione aortica	Dolore monolaterale e legato ai movimenti respiratori Dolore intenso e migrante Nella dissezione di tipo A talvolta ostruzione dell'ostio coronarico, di solito il destro, con segni di infarto postero-inferiore Talvolta mediastino allargato alla radiografia del torace Nuova insufficienza aortica
Pericardite	Dolore influenzato da cambiamenti di postura e respirazione Possono essere sentiti sfregamenti Sopraslivellamento di ST senza sottoslivellamento reciproco
Pleurite	Dolore trafittivo con gli atti respiratori Tosse come sintomo più comune Radiografia del torace
Costo-condrale	Dolorabilità alla palpazione Movimenti del torace influenzano il dolore
Herpes zoster iniziale	Non modificazione dell'ECG Eruzione cutanea Parestesie localizzate prima dell'eruzione cutanea
Battiti ectopici	Transitori, a livello dell'apice cardiaco
Ulcera peptica, colecistite, pancreatite	Esame clinico (l'ischemia della parete inferiore può somigliare all'addome acuto)
Depressione	Sensazione continua di pesantezza nel torace Nessuna relazione con lo sforzo ECG normale
Alcool-dipendente	Ragazzi in pronto soccorso, in stato di ebbrezza

# Aspetti caratteristici dei vari tipi di dolore toracico

Causa di dolore	Tipo di dolore	Dolore riferito	Risposta a postura/ movimento	Risposta a cibo/ liquidi	Dolorabilità	Risposta a nitrati
Dolore cardiaco ischemico	Viscerale	Sì	No	No	No	Sì
Dolore cardiaco non ischemico	Viscerale	Sì	No	No	No	No
Malattia polmonare	Viscerale/cutaneo	Di solito no	No	No	No	No
Pneumotorace	Viscerale/cutaneo	No	Sì	No	Di solito no	No
Muscolo-scheletrico	Cutaneo	No	Sì	No	Sì	No
Gastrointestinale	Viscerale	A volte	No	Sì	No	No
Aneurisma aortico	Viscerale	Sì	No	No	No	No
Psichiatrico	Viscerale/ cutaneo variabile	No	No	No	No	No

# Rischio elevato

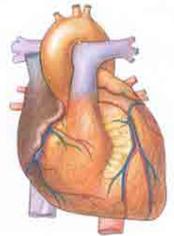
## Caratteristiche

Rischio elevato - obbligatoria una risposta urgente

### Sintomo

Dolore toracico continuo e in progressione, possibilmente associato a qualsiasi dei seguenti sintomi:

- dispnea
- sudorazione fredda
- senso di costrizione
- senso di oppressione
- irradiazione alla gola, alle spalle, alle braccia o all'epigastrio
- ripetizione del dolore



### Respiro

Aumento della frequenza respiratoria (> 24/min), dispnea grave, uso dei muscoli respiratori ausiliari

### Coscienza

Depressione del livello di coscienza

### Circolazione

Frequenza cardiaca (< 40 b/min o > 100 b/min)

Pressione arteriosa sistolica (< 100 mmHg o > 200 mmHg)

Estremità fredde

Pressione venosa giugulare elevata

### ECG

ST sopraslivellato/sottoslivellato; ECG non diagnostico per aritmie o disturbi della conduzione; blocchi di conduzione atrioventricolare di grado elevato; tachicardia ventricolare

### Ossigenazione del sangue- saturazione emoglobinica di O<sub>2</sub>

< 90%

# Chest pain of recent onset

Assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin



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**NHS**

National Institute for  
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Percentage of people estimated to have coronary artery disease according to typicality of symptoms, age, sex and risk factors

Age (years)	Non-anginal chest pain				Atypical angina				Typical angina			
	Men		Women		Men		Women		Men		Women	
	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi
35	3	35	1	19	8	59	2	39	30	88	10	78
45	9	47	2	22	21	70	5	43	51	92	20	79
55	23	59	4	25	45	79	10	47	80	95	38	82
65	49	69	9	29	71	86	20	51	93	97	56	84

For men older than 70 with atypical or typical symptoms, assume an estimate > 90%.

For women older than 70, assume an estimate of 61–90% EXCEPT women at high risk AND with typical symptoms where a risk of > 90% should be assumed.

Values are per cent of people at each mid-decade age with significant coronary artery disease (CAD)<sup>1</sup>.

Hi = High risk = diabetes, smoking and hyperlipidaemia (total cholesterol > 6.47 mmol/litre).

Lo = Low risk = none of these three.

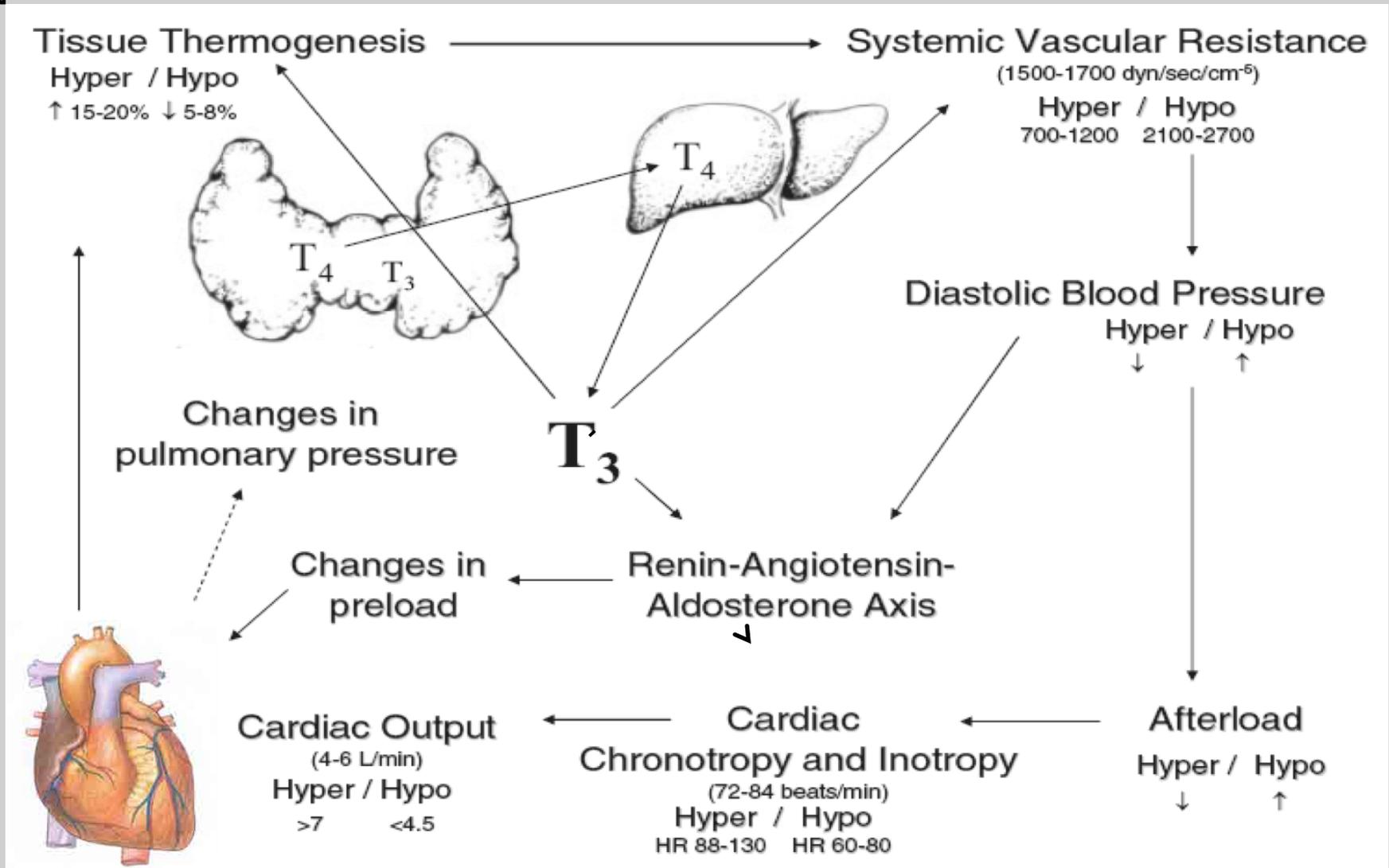
The shaded area represents people with symptoms of non-anginal chest pain, who would not be investigated for stable angina routinely.

Note:

These results are likely to overestimate CAD in primary care populations.

If there are resting ECG ST-T changes or Q waves, the likelihood of CAD is higher in each cell of the table.

# Effetti degli ormoni tiroidei sul sistema cardiovascolare





# Chest pain of recent onset

Assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin



National Institute for  
Health and Clinical Excellence

## Definition of significant coronary artery disease

Significant coronary artery disease (CAD) found during invasive coronary angiography is  $\geq 70\%$  diameter stenosis of at least one major epicardial artery segment or  $\geq 50\%$  diameter stenosis in the left main coronary artery:

- Factors intensifying ischaemia.

Such factors allow less severe lesions (for example  $\geq 50\%$ ) to produce angina:

- Reduced oxygen delivery: anaemia, coronary spasm
- Increased oxygen demand:
- Large mass of ischaemic myocardium
- Longer lesion length.

**hyperthyroidism**

- Factors reducing ischaemia.

Such factors may render severe lesions ( $\geq 70\%$ ) asymptomatic:

- Well developed collateral supply.
- Small mass of ischaemic myocardium: distally located lesions, old infarction in the territory of coronary supply.

# Tireotossicosi e spasmo coronarico

**Table 1.** Reported Cases of Thyrotoxicosis and Coronary Artery Spasm

Author	Year	Age	Gender	Diagnosis	Diagnosis Thyroid	Angiographic Findings	Time to Diagnosis	TSH Level	Endocrine Therapy	Cardiac Therapy
Current Case	2009	51	M	Variant angina	Graves disease	RCA and LCX spasm	2 months	<0.1 mIU/mL	Neomercazole, potassium iodide solution Thyroidectomy	CCB nitrates, stent to RCA
Romero-Rodriguez et al <sup>5</sup>	2008	75	M	Rest angina	Amiodarone-induced thyrotoxicosis Graves disease	Spasm of LAD	Few days	Undetectable	Methimazole Thyroidectomy	CCB, nitrates
Patel et al <sup>6</sup>	2008	50 40	M F	MI NSTEMI	Graves disease Graves disease	Spasm of (M) LAD Ostial spasm of left main and RCA	4 months 3 weeks	Undetectable <0.1 mIU/mL	Methimazole	CCB, nitrates Nitrates, CCB
Lee et al <sup>7</sup>	2007	47	F	Rest angina	Graves disease	Stenosis of both right and left main ostium	2 weeks	0.06 mU/L	Propylthiouracil, lugols solution	CABG
Chudleigh et al <sup>8</sup>	2007	36	F	MI	Graves disease	Left main stem stenosis	1 day	<0.02 mU/L	Propylthiouracil	Propranolol CCB
Casini et al <sup>9</sup>	2006	59 47	F F	MI ACS	Graves disease Toxic nodular goiter	Normal coronaries	1 day 1 year	<0.02 mU/L 0.099 mIU/mL	Carbimazole Propylthiouracil	Aspirin, verapamil atenolol CCB, long-acting nitrates
Pavlicek et al <sup>10</sup>	2005	56	F	Prinzmetal angina	Graves disease	Normal coronaries	Few months	Less than 0.1 mU/L	Propylthiouracil	CCB, long-acting nitrates
Choi et al <sup>11</sup>	2004	37-65	F-5; M-3	Resting angina	Graves disease	Coronary vasospasm, left main spasm in 3 patients, Ostial left main spasm, left circumflex spasm	1-6 months	0.01-0.21 mU/L	NA	Left main stent
Bassi et al <sup>12</sup>	2004	45	F	Cardiac arrest with v fib	NA	Ostial left main spasm, left circumflex spasm	8 months	Less than 0.1 mU/L	Carbimazole, radio-iodine, Dexamethasone, Sodium iodopodate Thiamazol	NA
Lassnig E et al <sup>13</sup>	2002	66	F	MI, cardiogenic shock, death	NA	total occlusion of LAD and LCX due to vasospasm	NA	0.01 mU/mL	Propylthiouracil	β-blocker, ACE inhibitor
Tumurkayanak et al <sup>14</sup>	2002	28	F	MI, pulmonary embolism	NA	Normal left coronary arteries	6 hours	0.01 mU/L	Propylthiouracil	Propranolol
Morelli et al <sup>15</sup>	1999	54	F	Graves disease	Unstable angina	Normal coronaries	5 months before angina	Less than 0.15 mU/mL	Methimazole, total thyroidectomy and a substitutive therapy	Propranolol; nitrates; aspirin
Das et al <sup>16</sup>	1998	42	M	Graves disease	Angina and Atrial fibrillation	Normal coronaries	6 weeks	Less than 0.08 mIU/mL	Propylthiouracil	Propranolol
Masani et al <sup>17</sup>	1995	48	F	MI, post mi angina	Multinodular goitre	LM and proximal LAD spasm	2 months	Undetectable	Carbimazole	NA
Phull et al <sup>18</sup>	1993	48; 28; 30; 40	F-4	Variant angina	NA	1 female had normal coronaries	NA	Less than 0.1 mU/L; less than 0.09 mU/L	Carbimazole	Propranolol; nifedipine
Molitermo et al <sup>19</sup>	1992	45	F	Angina at rest	Graves disease	LAD spasm	1 month	1.6 mU/mL	Propylthiouracil	Nitrates, β-blockers
Carey et al <sup>20</sup>	1992	52	F	Cardiac arrest following angiography	Graves disease	RCA spasm	NA	Undetectable	NA	NA
Glikson et al <sup>21</sup>	1991	40	F	Unstable angina, pulmonary edema	NA	Normal	NA	NA	NA	Nifedipine propranolol, nitrates
Nakano et al <sup>22</sup>	1987	57 44	M-1; F-1	Rest angina	Graves disease	Severe spasm of LCA, RCA, LAD spasm	3 months	NA	Methimazole	Propranolol, nitrates
Featherstone et al <sup>23</sup>	1982	57	M	Rest angina	Graves disease	Spasm of LAD.	6 months	NA	Radioactive iodine	Quinidine, nitrates
Wei et al <sup>4</sup>	1979	55	F	Angina pectoris, ventricular fibrillation	NA	Total block at the ostium and midway down the artery/RCA/	7 days	NA	Methimazole, radio-active iodine	Nitrates, quinidine

NOTES: NA = not available, MI = myocardial infarction, NSTEMI = non-ST-elevation myocardial infarction, ACS = acute coronary syndrome, RCA = right coronary artery, LAD = left anterior descending coronary artery, LCX = left circumflex coronary artery, CCB = calcium channel blockers, ACE = angiotensin-converting enzyme inhibitor.

# L'ipertiroidismo può favorire eventi trombotici: ipercoagulabilità e ipofibrinolisi

**Table-3. Summary of Evidence Related to Alterations of Secondary Haemostasis and Fibrinolysis in Overt Hyperthyroidism.**  
**Summary of Results**

Authors	Hypercoagulation	Hypocoagulation
Erem <i>et al.</i>	Reduced fibrinolytic capacity	
Ozcan <i>et al.</i>	Increased free TFPI	
Simone <i>et al.</i>	Normal levels	
Hume	NS	
Bennett <i>et al.</i>	Hypofibrinolysis	
Rogers <i>et al.</i>	Increased factor VIII activity	
Rennie <i>et al.</i>	Reduced fibrinolytic activity	
Arnaout <i>et al.</i>	Increased vWF and fibronectin	
Farid <i>et al.</i>	Hypofibrinolysis	
Dorr <i>et al.</i>	Increased fibrinogen	
Marongiu <i>et al.</i>		Activation of coagulation and fibrinolysis
Marongiu <i>et al.</i>	Increased levels of fibrinogen and B beta 15-42	
Akinci <i>et al.</i>	Increased PAI-1 Ag	
Li <i>et al.</i>	Hypofibrinolysis	
Walrenberg <i>et al.</i>	Increased plasma PAI activity	
Morishita <i>et al.</i>	Increased total and free TFPI	
Morikawa <i>et al.</i>	Increased thrombomodulin levels	
Graninger <i>et al.</i>	Increased fibronectin, and F VIII	
Burggraaf <i>et al.</i>	No evidence	
Panchenko <i>et al.</i>		
Loeliger <i>et al.</i>		Increased turnover of factor II, VIII, IX and X
Kelleff <i>et al.</i>		Decreased FII, increased sensitivity to warfarin
Self <i>et al.</i>		Warfarin-induced hypoprothrombinemia

# Ipertiroidismo subclinico e rischio trombotico

Summary of Studies Investigating Alterations of Secondary Haemostasis and Fibrinolysis in Subjects with Subclinical Hyperthyroidism.

## Summary of Results

Authors	Hypercoagulation	Hypocoagulation
Dorr <i>et al.</i>	Increased fibrinogen	
Erem	Increase in FX activity	
Akinci <i>et al.</i>	Increased PAI-1, NS decrease in TAFI Ag levels	
Coban <i>et al.</i>	Increased vWF	

# Altri fattori di rischio



- Anche nell' ipertiroidico vanno valutati fattori di rischio e comorbidità (fumo, dislipidemia, diabete mellito, ipertensione...)
- Nel soggetto ipertiroidico può essere sottovalutata l' importanza della dislipidemia, dato che l' ipertiroidismo determina una riduzione contingente soprattutto di colesterolo totale, LDL e trigliceridi.

# Iper-tiroidismo e rischio di embolia polmonare

Crude and adjusted hazard ratios for pulmonary embolism during the 5-year follow-up period for patients in Taiwan with hyperthyroidism and patients in the comparison group ( $n = 53\,418$ )

Presence of pulmonary embolism	Total sample		Comparison		Patients with hyperthyroidism	
	No.	%	No.	%	No.	%
Five-year follow-up period						
Yes	41	0.08	27	0.06	14	0.16
No	53 377	99.92	44 488	99.94	8889	99.84
Crude HR (95% CI)	—		1.0		2.60† (1.36–4.95)	
Adjusted* HR (95% CI)	—		1.0		2.31‡ (1.20–4.45)	

CI, confidence interval; HR, hazard ratio. \*Stratified Cox proportional hazard regressions (stratified by sex and age) were performed to adjust for patients' hypertension, diabetes, hyperlipidemia, peripheral vascular disease, coronary heart disease, cancer, recent surgery, recent trauma, pregnancy, the use of oral anticoagulants, monthly income and geographic region; † $P < 0.01$ ; ‡ $P < 0.05$ .

# Iper-tiroidismo e ipertensione polmonare

**Chart 1** - Clinical classification of pulmonary hypertension established at the consensus meeting held in 2003 in Venice, Italy.<sup>(1,2)</sup>

**Group 1. Pulmonary arterial hypertension**

Idiopathic (primary)

Familial

Associated with: collagen vascular disease, congenital systemic-pulmonary shunts, portal hypertension, HIV infection, drugs and toxins (anorectic drugs, L-tryptophan, methamphetamine, cocaine); others: thyroid disease, glycogen storage disease, Gaucher's disease, hereditary hemorrhagic telangiectasia, hemoglobinopathies, myeloproliferative disorders, splenectomy.

Associated with significant capillary or venous involvement

Pulmonary veno-occlusive disease

Pulmonary capillary hemangiomatosis

Persistent pulmonary hypertension of the newborn

**Group 2. Pulmonary venous hypertension**

Left ventricular or left atrial heart disease

Left valvular heart disease

**Group 3. Pulmonary hypertension accompanied by hypoxemia**

COPD

Interstitial lung disease

Sleep-disordered breathing

Alveolar hypoventilation

Chronic exposure to high altitudes

Growth-related abnormalities

**Group 4. Pulmonary hypertension due to chronic thrombotic disease, embolic disease, or both**

Thromboembolic obstruction of proximal pulmonary arteries

Thromboembolic obstruction of distal pulmonary arteries

Pulmonary embolism (tumor, parasites, foreign body)

**Group 5. Miscellaneous**

Sarcoidosis, Langerhans cell histiocytosis, lymphangiomyomatosis, compression of pulmonary vessels (adenopathy, tumor, fibrosing mediastinitis)

# Iperitiroidismo e ipertensione polmonare

Principal characteristics of studies that evaluated the prevalence of pulmonary arterial hypertension in patients with thyroid diseases and the prevalence of thyroid disease in patients with pulmonary arterial hypertension.

Study	Year	n of patients	Definition of PAH (echocardiography)	Prevalence of PAH
Marvisi et al. <sup>(9)</sup>	2002	17	PASP > 30 mmHg	35%
Mercé et al. <sup>(11)</sup>	2005	39	PASP > 35 mmHg	41%
Marvisi et al. <sup>(10)</sup>	2006	114	PASP > 30 mmHg	43%
Armigliato et al. <sup>(12)</sup>	2006	23	PASP > 35 mmHg	65%
Pires et al. <sup>(13)</sup>	2006	20	PASP > 35 mmHg	50%
Siu et al. <sup>(14)</sup>	2007	75	PASP > 35 mmHg	47%
Study	Year	n of patients	Definition of PAH (catheterization)	Prevalence of thyroid disease
Curnock et al. <sup>(7)</sup>	1999	41	MPAP > 25 mmHg	22.5% hypothyroidism
Chu et al. <sup>(15)</sup>	2002	63	MPAP > 25 mmHg	49% AITD
Li et al. <sup>(16)</sup>	2007	356	MPAP > 25 mmHg <sup>a</sup>	24% hypothyroidism

PAH: pulmonary arterial hypertension; PASP: pulmonary artery systolic pressure; MPAP: mean pulmonary artery pressure; and AITD: autoimmune thyroid disease. <sup>a</sup>In the Li et al. study, 65% of the patients underwent right heart catheterization; in the remaining patients, MPAP was estimated by echocardiography.

# Iperitiroidismo e ipertensione polmonare

Possible pathogenetic mechanisms involved in the combination of pulmonary arterial hypertension and thyroid disease.

## Hyperthyroidism

- Autoimmune phenomenon associated with endothelial damage or dysfunction
- Increase in cardiac output resulting in endothelial damage
- Increased metabolism of intrinsic pulmonary vasodilators (prostacyclin and NO)
- Decreased metabolism of vasoconstrictors (serotonin, endothelin-1 and thromboxane)
- Stimulation of the sympathetic nervous system, causing pulmonary vasoconstriction

## Hypothyroidism

- Autoimmune phenomenon associated with endothelial damage or dysfunction
- Vascular reactivity caused by a decrease in the levels of thyroid hormone (vascular stabilizing effect of the thyroid hormone)
- Inflammation

# Iperitiroidismo e scompenso



- Non bisogna interpretare segni di ipertensione polmonare (turgore giugulari, congestione epatica, eventuale edema delle caviglie...) come segni di scompenso cardiaco.
- Lo scompenso cardiaco è riportato solo nel 6% circa dei pazienti ipertiroidei, per lo più in anziani con fa o con marcata e prolungata tachicardia, spesso con ipertiroidismo di lunga durata e non ben trattato.
- Lo scompenso può spesso regredire con la correzione dell'aritmia, la riduzione della frequenza, il ripristino dell'eutiroidismo, in particolare laddove non vi sia una cardiopatia sottostante.

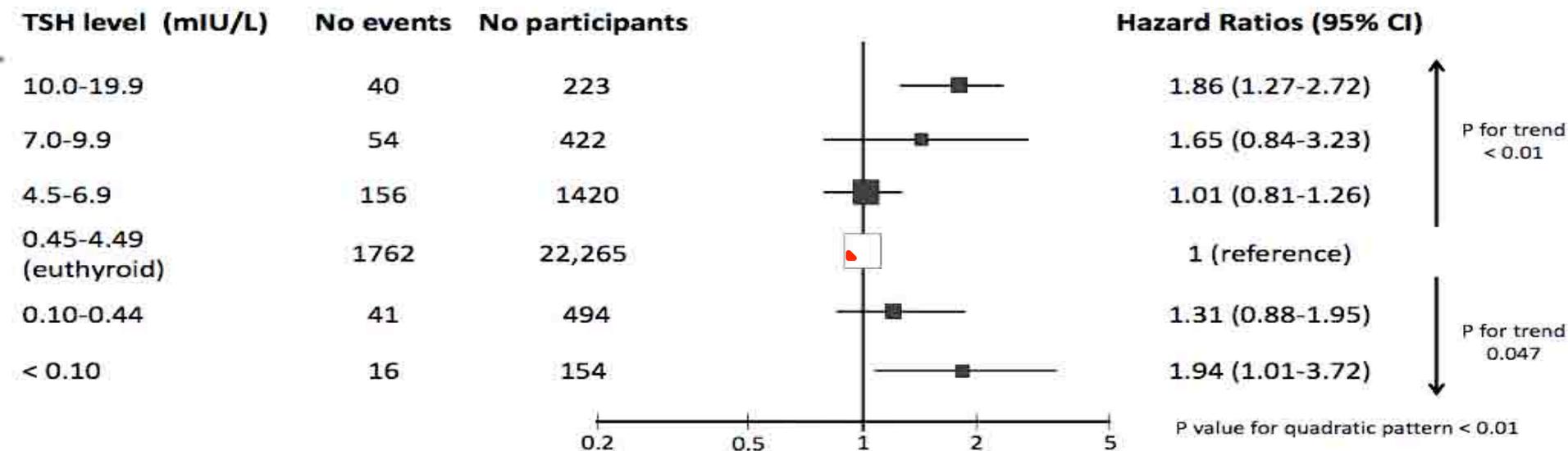
## Subclinical Thyroid Dysfunction and the Risk of Heart Failure Events: An Individual Participant Data Analysis from Six Prospective Cohorts

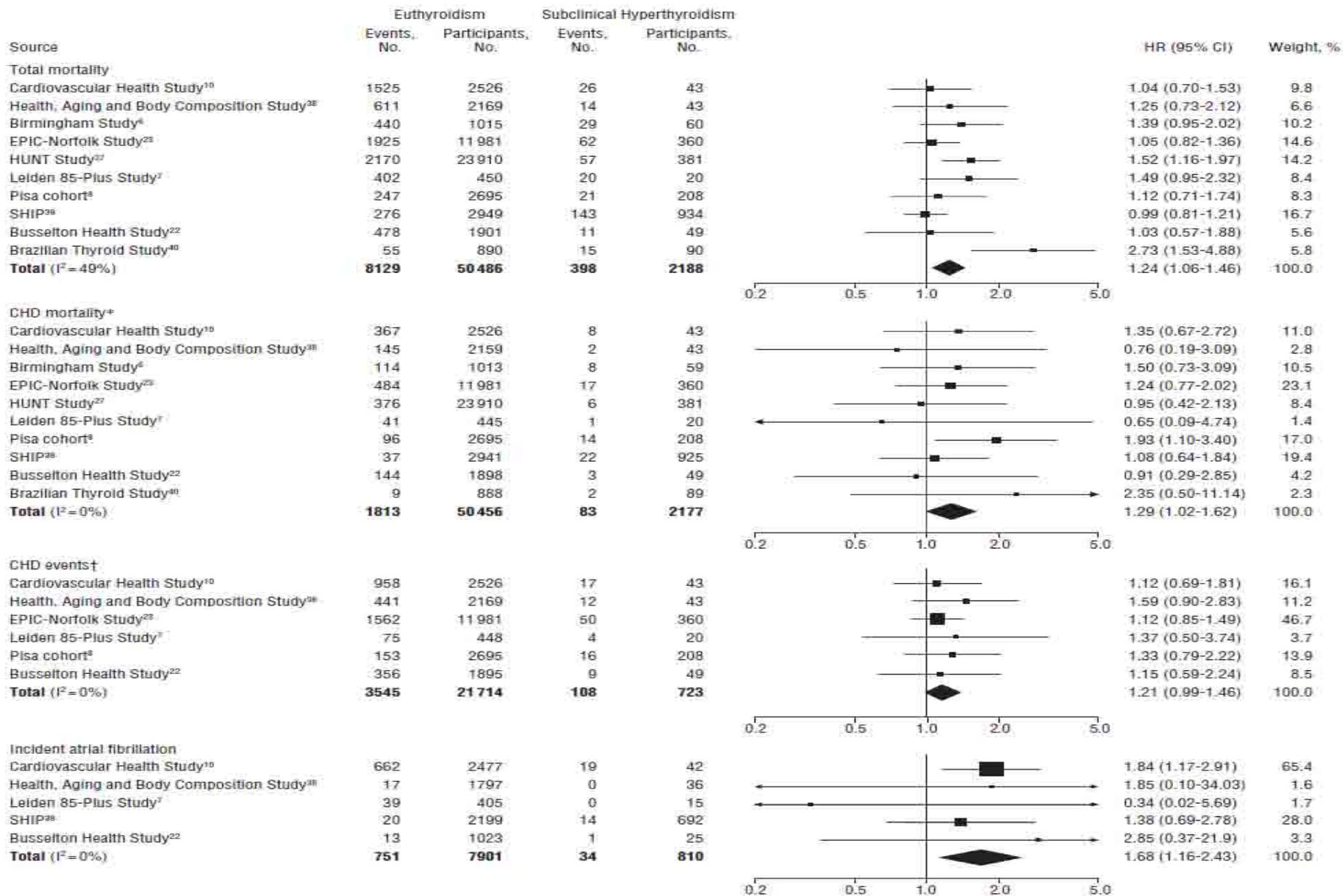
Baris Gencer, Tinh-Hai Collet, Vanessa Virgini, Douglas C. Bauer, Jacobijn Gussekloo, Anne R. Cappola, David Nanchen, Wendy P. J. den Elzen, Philippe Balmer, Robert N. Luben, Massimo Iacoviello, Vincenzo Triggiani, Jacques Cornuz, Anne B. Newman, Kay-Tee Khaw, J. Wouter Jukema, Rudi G. J. Westendorp, Eric Vittinghoff, Drahomir Aujesky and Nicolas Rodondi

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 Coordinating center	No events	No participants	Median age	Women	Sub Hypo	Sub Hyper	Person-years
 Cardiovascular Health study	831	3064	71	60%	16.2%	1.4%	34,531
 Health, Aging and Body Composition study	366	2762	74	51%	12.1%	3.0%	17,869
 EPIC-Norfolk study	474	13,066	58	54%	5.5%	2.8%	143,694
 Leiden 85-plus study	92	514	85	65%	6.8%	4.5%	1861
 Bari study	77	335	66	23%	11.6%	2.1%	370
 PROSPER	229	5649	75	51%	7.9%	2.3%	17,923
<b>Overall</b>	<b>2069</b>	<b>25,390</b>	<b>70</b>	<b>53.8%</b>	<b>8.1%</b>	<b>2.6%</b>	<b>216,248</b>

### Hazard Ratios for Heart Failure (HF) Events according to Thyroid-Stimulating Hormone (TSH) levels





**Figure.** Total mortality, coronary heart disease (CHD) mortality, CHD events, and atrial fibrillation in endogenous subclinical hyperthyroidism vs euthyroidism. Age and sex-adjusted hazard ratios (HRs) and their 95% confidence intervals (CIs) are represented by squares or diamonds, those to the right of the solid line indicate increased risk. The sizes of data markers are proportional to the inverse of the variance of the HRs. \*Forty-one participants were excluded from the analyses of CHD mortality because of missing cause of death. †The Birmingham Study,<sup>6</sup> HUNT (Nord-Trøndelag Health Study),<sup>27</sup> SHIP (Study of Health in Pomerania),<sup>30</sup> and Brazilian Thyroid Study<sup>40</sup> were not included because follow-up data were only available for death. EPIC indicates European Prospective Investigation of Cancer.

# Iperitiroidismo e mortalità CV



- È stato riscontrato un significativo aumento della mortalità in ipertiroidi subclinici con malattia ischemica cardiaca. Iervasi et al. Arch Intern Med 2007
- Per prevenire eventi e mortalità CV (coronarica in particolare), è importante correggere l'ipertiroidismo (anche subclinico) in tempi brevi e in maniera adeguata, particolarmente nei soggetti più a rischio.
- Valutare i soggetti in terapia TSH soppressiva per l'esistenza di altre condizioni pro-trombogene che potrebbero aggiungersi all'effetto dell'eccesso di ormone tiroideo favorente la trombosi.



# 12° Congresso Nazionale AME

Associazione Medici Endocrinologi



Roma,  
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***Grazie per  
l'attenzione***

**Update in Endocrinologia  
Clinica**

7-10 novembre 2013  
Barl