

Is there a difference in observed bone mineral density at diagnosis of overt or subclinical thyrotoxicosis?



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Introduction

Both overt and subclinical thyrotoxicosis is associated with loss of bone mineral density and osteoporosis^{1,2}. The occurrence in both disorders has led to the belief that it is related to the low TSH levels. TSH intermittent administration has been shown to improve bone mineral density in rats³.

Aims

The aim of this study is to determine any difference between bone mineral density in those presenting with overt or subclinical thyrotoxicosis.

Methods

This study is a retrospective observational study of bone mineral density in all individuals presenting to a secondary care facility in Ireland for management of thyrotoxicosis from February 2008 to July 2013. Bone mineral density was assessed by bone densitometry with estimation of T in those ≥ 50 years of age and Z scores in those < 50 years of age.

Definition:

Overt thyrotoxicosis was defined as free T4 > 19.0 pmol/L, TSH < 0.35 uIU/ml, subclinical thyrotoxicosis was defined as free T4 < 19.0 pmol/L, TSH < 35 uIU/ml at diagnosis.

Inclusion and exclusion criteria

Inclusion criteria

- TSH < 0.35 uIU/ml within 1 year of the DEXA scan date.

Exclusion criteria

- Osteoporosis or osteopenia on DEXA prior to the first low TSH.
- History of thyroid cancer with pharmacologically induced TSH suppression
- Hyperparathyroidism or other illness that may induce osteoporosis
- Pituitary pathology requiring steroid supplementation
- Antithyroid medication for 2 years or more prior to scan

Results

91 people were included: 64 women, 27 men.

49 had overt thyrotoxicosis at diagnosis (n=15 aged 20-50 years, n=34 aged > 50 years), 40 had subclinical thyrotoxicosis (5 aged 20-50 years, 35 aged > 50 years).

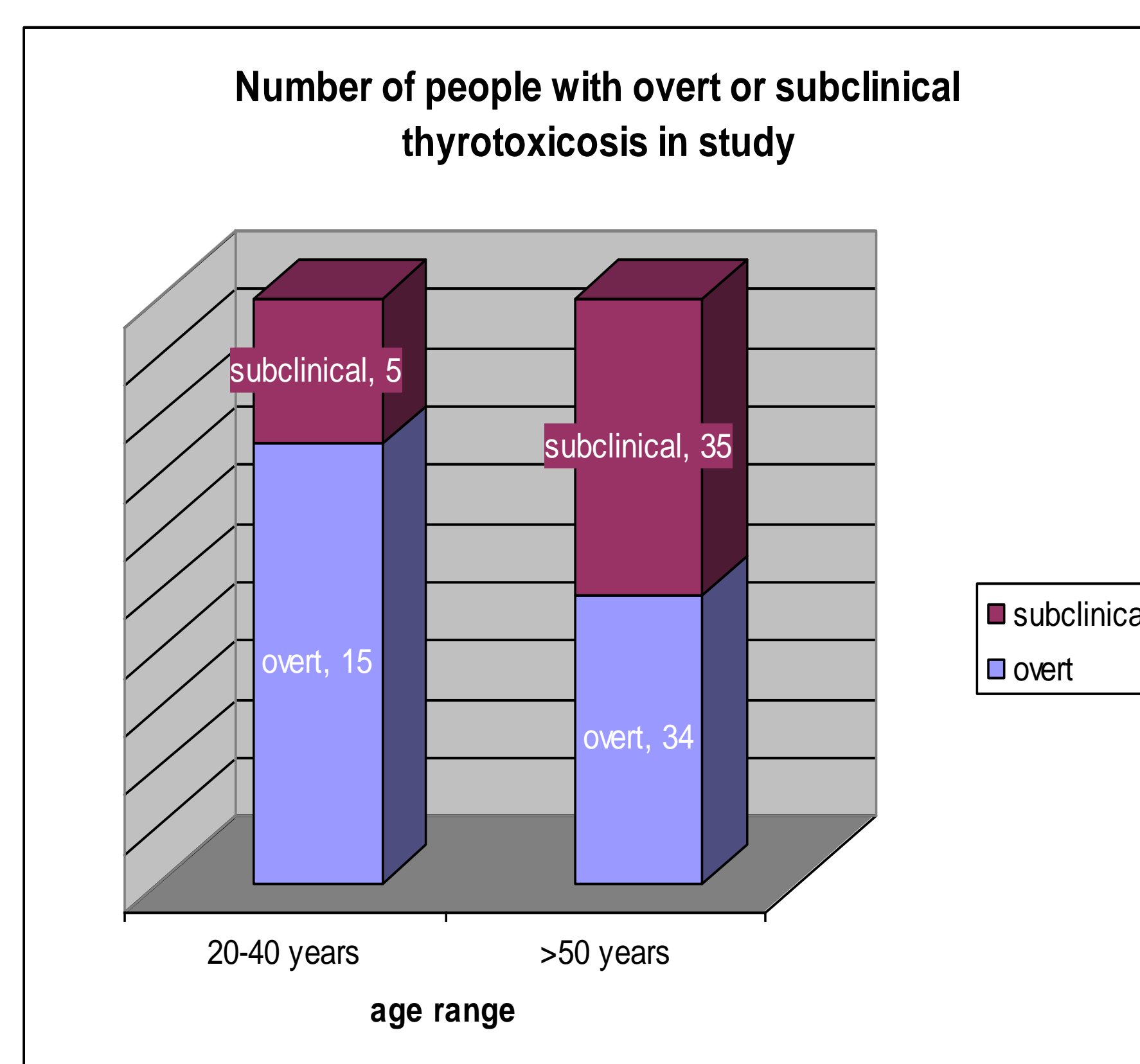


Figure 1 Number of people in the study with overt and subclinical hyperthyroidism

Age range

The median age was 43 years (overt), 42 years (subclinical) aged 20-50 years, 58.5 (overt), 70 years (subclinical) in the > 50 years group.

TSH

In those aged 20 to 40 years the mean TSH at diagnosis (n=20) was 0.03 ± 0.02 uIU/ml, fT4 27.17 ± 2.5 pmol/L.

In the > 50 years age (n=69) mean TSH was 0.16 ± 0.04 pmol/L, fT4 21.46 ± 1.34 pmol/L.

BMD

There was no difference in BMD in overt or thyrotoxic patients in any of the age ranges.

Age 20 to 50 years L1 L4 p=0.3, Left neck of femur p=0.6, right neck p= 0.5. Aged 50 years 20 to 50 years L1 L4 p=0.4, Left neck of femur p=0.4, right neck p= 0.3, radius p=0.2.

T,Z scores

In the 20-50 years age group 4 had a Z score < -2.5 , 2 in L1L4 and 2 femoral neck (all subclinical). 12 had Z scores between -2.5 and -1.0 (2 in L1L4 (2 overt) and 10 femoral neck (7 overt, 3 subclinical)).

Aged > 50 years 30 had T scores < -2.5 (L1L4 (10 overt, 6 subclinical) 12 femoral neck (6 overt, 6 subclinical), 2 radius (subclinical), 84 had T scores -1.0 to -2.5 (L1L4 (7 overt, 12 subclinical), 64 femoral neck (35 overt, 29 subclinical) and 1 radius (subclinical)).

age 20 to 50 years		L1L4	right femur neck	left femur neck
		n	n	n
overt	Z < -2.5	0	0	0
	Z -1.0 to -2.4	2	3	4
	Z > 0.9	13	12	11
Sub clinical	Z < -2.5	2	1	1
	Z -1.0 to -2.4	0	1	2
	Z > 0.9	3	3	2

Table 1. Z scores for the overt and subclinical thyrotoxicosis groups aged 20 to 50 years

age > 50 years		L1L4	right femur neck	left femur neck	radius
		n	n	n	n
overt	T < -2.5	10	3	3	0
	T -1.0 to -2.4	7	17	18	0
	T > 0.9	17	13	13	1
Sub clinical	T < -2.5	6	5	1	2
	T -1.0 to -2.4	12	11	18	1
	T > 0.9	17	17	14	0

Table 2. T scores for the overt and subclinical thyrotoxicosis groups aged > 50 years.

Conclusion

There is no difference in Z score and T score between those who presented with overt thyrotoxicosis and those with subclinical thyrotoxicosis. There were a number with Z scores -2.5 to -1.0 which merit rescanning but overall the prevalence of lower T scores in those aged > 50 years presenting with thyrotoxicosis was high (30 of the 50 patients) and this was their first DEXA. This study highlights the importance of DEXA scanning in this age group.

References

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