Upper airways obstruction in 153 consecutive patients presenting with thyroid enlargement

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Thyroid enlargement affects up to 10% of the British population. Surgery is indicated for severe tracheal compression, and assessment of a respiratory flow volume loop is regarded as the best method for evaluating upper airways obstruction. Upper airways obstruction is considered rare in patients with goitre and indicated by symptoms such as breathlessness and choking. To investigate the prevalence of this problem we performed a prospective study of euthyroid patients presenting with nodular or diffuse thyroid enlargement, including those with and without symptoms suggesting tracheal compression.

Patients, methods, and results

We studied 153 consecutive patients (134 female, 19 male) referred to our thyroid clinic because of thyroid enlargement. Clinical evaluation included completion of standardised questionnaires concerning breathlessness¹ and goitre symptoms. Plain radiography of the thoracic inlet was performed and flow volume loops were recorded.²

Flow volume loops showed upper airways obstruction in 51 of 153 patients (33%). Forced vital capacity, forced expiratory volume in one second (FEV₁), and peak expiratory flow (PEF) were expressed as standardised residuals³ to remove the effects of age and height. Standardised residuals for FEV₁ and forced vital capacity were not significantly different in those with and without upper airways obstruction, judged from flow volume loops. There were, however, significant differences between those with and without upper airways obstruction for PEF (expressed in standardised residuals): mean -1.86 (SD 1.36) *v* -0.89 (1.14), mean difference 0.98 (95% confidence interval 0.56 to 1.39), two sample *t* test; and for FEV₁:PEF ratio (a measure of upper airways obstruction⁴): mean 8.88 (1.52) *v* 7.09 (1.10), mean difference 1.79 (1.31 to 2.27). Twenty one patients with upper airways obstruction and three without proceeded to surgery; postoperatively the FEV₁/PEF ratios fell by 2.02 (2.01) *v* 0.35 (0.56), mean difference 1.68 (0.48 to 2.87), and symptom score fell by 5.5 (9.4) *v* 0.3 (0.6), mean difference 5.2 (0.5 to 9.9).

The groups with and without upper airways obstruction did not differ significantly in age (48.0 (16.4) *v* 46.0 (15.5) years) or sex (6.3 females to 1 male *v* 7.5:1). In addition there was no difference in the prevalence of symptoms (table 1) that might predict upper airways obstruction. Of those with obstruction, 21 (42% (28% to 56%)) had no symptoms at all and 37 (72% (60% to 84%)) had no breathlessness, results similar to those in subjects without upper airways obstruction (44 (43%; 33% to 53%) and 79 (78%; 70% to 86%) respectively). Plain radiographs showed tracheal deviation in 63% (32) of those with upper airways obstruction and 44% (45) without ($\chi^2=4.72$, $P<0.05$), while tracheal compression was found in 23% (12) of patients with upper airways obstruction and 5% (5) without ($\chi^2=11.94$, $P<0.005$).

The prevalence of upper airways obstruction was not significantly related to the type of goitre (table 1). Choking was experienced by only 14% (13) of those with solitary nodules compared with 34% (12) of

those with diffuse goitre ($\chi^2=6.83$, $P<0.05$). Otherwise there was no significant association between type of goitre and frequency of symptoms. Clinical assessment of thyroid size was not a good predictor of the presence of upper airways obstruction, which did not differ in patients with benign, suspicious, and malignant cytology.

Table 1—Prevalence of symptoms and type of goitre in subjects with (n=51) and without (n=102) upper airways obstruction (UAO) determined by examination of a respiratory flow loop. Values are numbers (percentages; 95% confidence intervals)

	Upper airways obstruction	No upper airways obstruction (n=102)
Symptom:		
Difficulty swallowing	15 (30; 17 to 43)	33 (32; 23 to 41)
Fullness	24 (48; 34 to 62)	41 (40; 30 to 49)
Noisy breathing	3 (6; 0 to 13)	2 (2; 0 to 5)
Choking	13 (26; 14 to 38)	16 (16; 8 to 23)
Breathlessness	14 (28; 16 to 40)	22 (22; 14 to 30)
Type of goitre:		
Diffuse	16 (32; 19 to 45)	21 (21; 13 to 29)
Multinodular	8 (16; 6 to 26)	12 (12; 6 to 18)
Solitary nodule	27 (52; 38 to 66)	68 (67; 58 to 76)

Comment

Our finding of upper airways obstruction in one third of a series of consecutive patients presenting with thyroid enlargement accords with previous reports.² The lack of difference between the frequency of symptoms in the groups with and without upper airways obstruction, and the absence of symptoms in patients with flow loop abnormalities, suggest that the clinical history predicts obstruction poorly. This conclusion is in agreement with a smaller study of 24 patients with "large" goitres in which computed tomography confirmed upper airways obstruction in only 71% of those with symptoms but showed tracheal obstruction in others with no symptoms.⁵

The lack of relation between the physical characteristics of the goitre or with thyroid size, judged clinically, and the likelihood of upper airways obstruction shows the limitations of physical examination of the thyroid.

Improvement in both the respiratory flow loop and in symptoms after surgery confirms that this is a specific means of identifying patients with functional tracheal compression,² but the importance of upper airways obstruction detected by examination of a flow volume loop remains unknown. Prospective studies are required to determine whether it is appropriate to manage patients with flow loop evidence of upper airways obstruction and few or no symptoms conservatively or whether such patients require surgical treatment.

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