4% to 21%, while for sonographically diagnosed nodules it varies from 21% to 67%.

On the other hand, thyroid carcinoma is relatively rare since it constitutes only 1% of all carcinomas encountered in humans. Therefore the possibility that a thyroid nodule may harbor a carcinoma is relatively small (5%). Moreover, most thyroid carcinomas are of a papillary type, which usually has a good prognosis. The pre-operative management of thyroid nodules is a relatively strenuous process because there is no method with 100% sensitivity and specificity for the identification of thyroid cancer. The examinations usually performed are biochemical tests, such as the measurement of TSH, calcitonin and thyroid autoantibodies, which offer little, however, in the diagnosis of the common types of thyroid cancer. Furthermore, isotopic scintiscan differentiates cold from hot nodules with a high specificity but low sensitivity, since nearly all the malignant nodules are cold but only 10-15% of cold nodules are malignant. Fine Needle Aspiration (FNA) biopsy has the highest sensitivity (85-95%) and specificity (85-95%); however, it is interventional and not always accepted by patients. Ultrasonography provides information on the size and the location of the nodules and additionally helps in performing ultrasound-guided aspiration biopsy in small non-palpable ones. Moreover, it has been reported, and we have also confirmed this in a previous study, that, with the new generation high-resolution ultrasound machines, it is possible to obtain useful information for the differential diagnosis between benign and malignant thyroid nodules.

Today the use of color flow Doppler sonography (CFDS) is more widely applied for the assessment of suspected malignant tumors. However, there is significant disagreement among specialists concerning the validity of the method in the differential diagnosis of benign and malignant thyroid nodules. Some researchers claim that it is of great value while others do not agree with this notion. The aim of our study was to evaluate the role of CFDS in the preoperative management of cold thyroid nodules.

**Patients and Methods**

Between 1997 and 2004 we examined more than 1000 patients with thyroid nodules of different sizes using CFDS. In this retrospective study we included 85 patients with solitary and multiple thyroid nodules larger than 10mm, who were submitted to thyroidectomy after the sonographic examination. All the nodules included in this evaluation were cold on the isotopic scintigram. They underwent surgical resection owing to risk of malignancy (82 patients), compressive symptoms (2 patients) and cosmetic reasons (1 patient). We considered a nodule as being high risk for malignancy if it had clinical or sonographic characteristics predictive for malignancy (firm nodule, irregular shape, rapid growth, abnormal contour, hypoechogenicity, microcalcifications), as well as if the FNA biopsy was suspicious for malignancy. Certainly, the patient selection for surgery was not based on the preoperative CFDS findings. The histological examination revealed that 18 patients (15 women and 3 men between the ages of 20 and 86) had malignant nodules (11 papillary, 4 follicular, 2 Hurthle cell, 1 undifferentiated carcinoma). The remaining 67 (53 women and 14 men aged 27 to 75 years) had benign nodules (60 hyperplastic nodules and 7 follicular adenomas) (Table 1). Twenty-six out of 67 benign and 5 out of 18 malignant nodules were solid with cystic degeneration and the remaining were pure solid. We did not include any pure cyst in our material. Moreover, in one previous study we did not find any correlation between cystic degeneration and the malignant feature of a nodule. The sonographic examinations

<table>
<thead>
<tr>
<th>Nodule type</th>
<th>n</th>
<th>Female/Male</th>
<th>Age (years) (range)</th>
<th>Histology</th>
</tr>
</thead>
</table>
| Benign      | 67| 53/14       | 27-75               | hyperplastic nodules: 60  
follicular adenomas: 7  
papillary: 11  
folicular: 4  
Hurthle cell: 2  
non differentiated carcinomas: 1 |
| Malignant   | 18| 15/3        | 20-86               |           |