

\*

\*

= =

:

: 22 9 31

7.5MHz (linear probe) 10 MHz

sestamibi (15 ) 99mTc-

:

city 9 , 5 , 4 , 3 , 22 23

가 10 , 가 4 , echogeni-

2 , 가 1 . 5 가 1 가

가 3 , (posterior acoustic enhancement) 3 ,

(lateral shadowing) 4 , 가 4 .

23 4 82.6%

<sup>99m</sup>Tc-sestamibi 가

(67%) 36 15 9 6 가 가

sestamibi 24 6 가 (41.7%) <sup>99m</sup>Tc-

가 (25%).

:

<sup>99m</sup>Tc-sestamibi 가

: Parathyroid, hyperparathyroidism  
 Parathyroid, US  
 Parathyroid, radionuclide studies



. 22 23 19 (82.6 %) 5  
 . 1cm 4 3 1  
 (75%), 1-2cm 12 9 (75%) 2cm  
 7 가 (Table 1).  
 가 0.72cm 가 16 , 6 1  
 14 5 Table 2  
 3 가 53.6  
 (Fig. 2) 7 1.88cm ,  
 9 2  
 10  
 (Fig. 2) 2  
 4 , 1  
 (Fig. 3). (posterior acoustic enhancement)  
 3 8  
 8 (lateral shadowing) 2  
 23 18

**Table 1.** Comparison of Size and Detection Rate in Primary and Secondary HPT

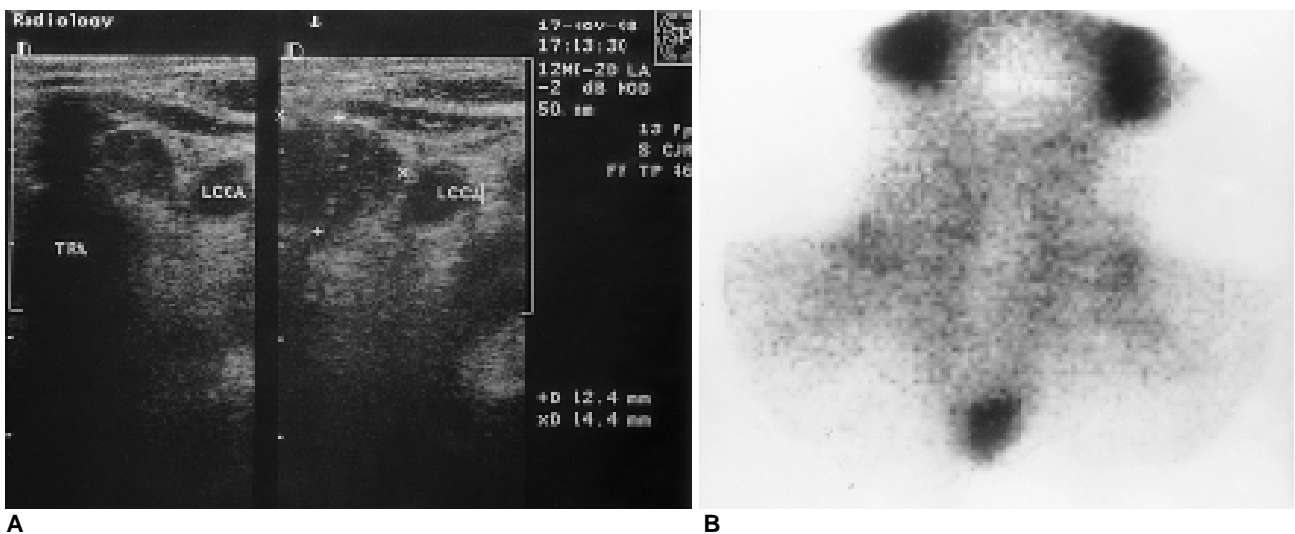
| Size  | Primary HPT |             | Secondary HPT |             |
|-------|-------------|-------------|---------------|-------------|
|       | D/T, DR (%) | D/T, DR (%) | D/T, DR (%)   | D/T, DR (%) |
| < 1cm | 3/4         | 75          | 2/15          | 13.3        |
| 1-2cm | 9/12        | 75          | 7/15          | 46.7        |
| 2-3cm | 4/4         | 100         | 2/2           | 100         |
| >3cm  | 3/3         | 100         | 4/4           | 100         |
| Total | 19/23       | 82.6        | 15/36         | 41.7        |

HPT : hyperparathyroidism D : detected number, T : total number, DR : detection rate

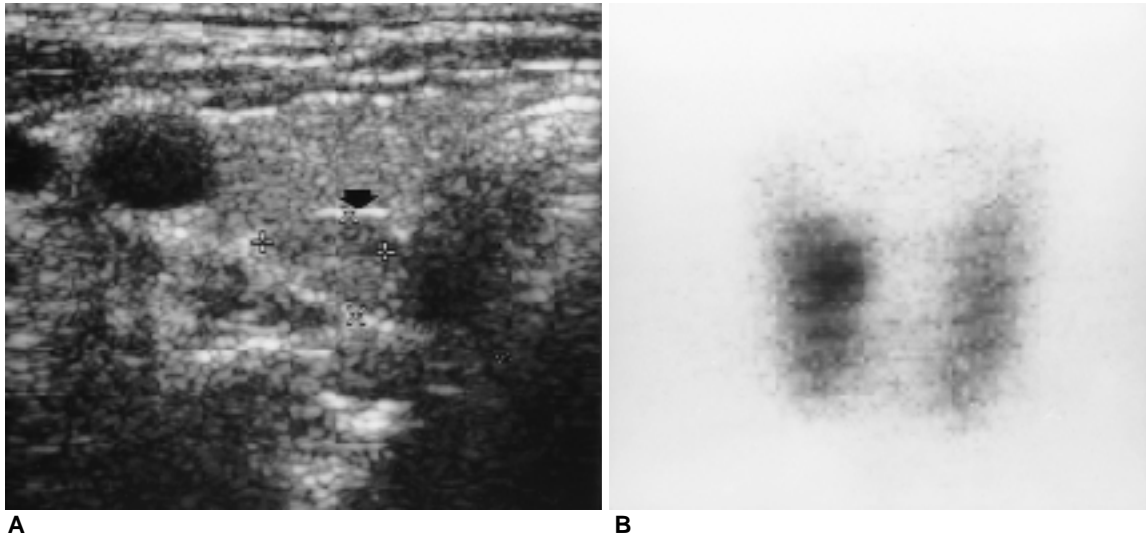
**Table 2.** Ultrasonographic Findings of Primary and Secondary HPT

|               | Primary HPT (n = 19) |    | Secondary HPT (n = 15) |    |
|---------------|----------------------|----|------------------------|----|
|               |                      |    |                        |    |
| Margin        | Good                 | 14 | Good                   | 13 |
|               | Poor                 | 5  | Poor                   | 2  |
| Capsule       | Definite             | 3  | Definite               | 0  |
|               | Partial              | 7  | Partial                | 1  |
|               | No                   | 9  | No                     | 14 |
| Echogenicity  | Mild L               | 2  | Mild L                 | 0  |
|               | Mod L                | 10 | Mod L                  | 13 |
|               | Very L               | 2  | Very L                 | 2  |
|               | Iso                  | 4  | Iso                    | 0  |
|               | Hetero               | 1  | Hetero                 | 0  |
| PE            | Definite             | 3  | Definite               | 0  |
|               | Mild                 | 8  | Mild                   | 3  |
| LS            | Definite             | 2  | Definite               | 0  |
| Inhomogeneity | 5                    |    | 0                      |    |

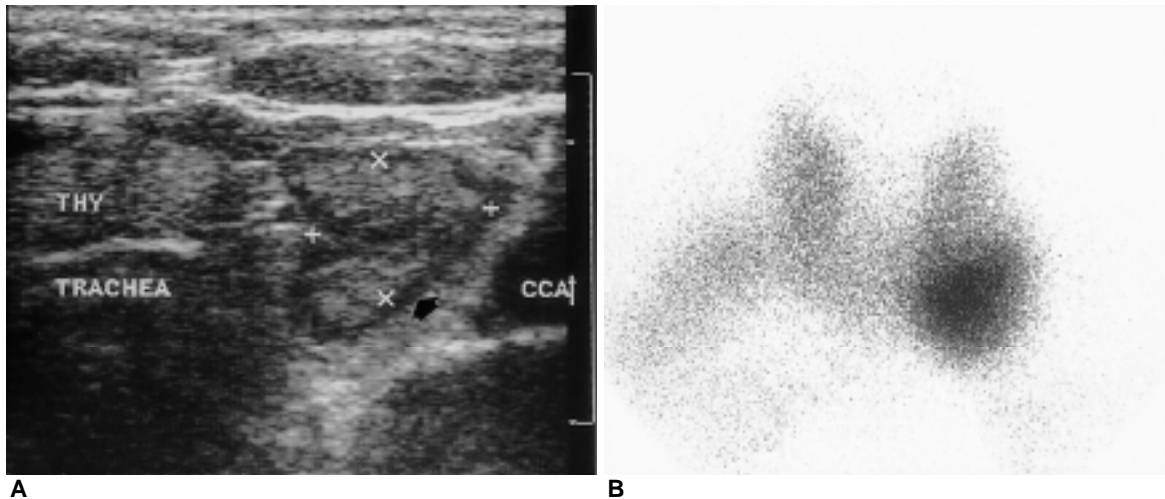
HPT : Hyperparathyroidism, L : low echoic, Mod: moderate, Iso : isoechoic, Hetero : heterogeneous echo, PE : posterior enhancement, LS : lateral shadowing



**Fig.1.** A. Sonogram just above the sternal notch shows a well defined solid nodule with moderate low echo in the superior mediastinum. B. Tc-99m-sestamibi scan also shows a focal hot uptake in corresponding area .



**Fig. 2. A.** Axial sonogram reveals a well defined solid nodule with moderate low echo posterior to the thyroid gland and this lesion have echogenic rim (arrow). **B.** Tc-99m-sestamibi scan shows focal hot uptake in the right upper medial portion of the thyroid gland.



**Fig. 3. A.** Axial sonogram shows a lobulated solid mass with heterogeneous internal echo but most portion of this lesion is isoechoic comparing to thyroid echo. It has low echoic rim like halo (arrow). **B.** Tc-99m-sestamibi scan shows large hot uptake in the left lower portion of the thyroid gland.

|      |                   |      |              |     |       |        |   |                             |                 |
|------|-------------------|------|--------------|-----|-------|--------|---|-----------------------------|-----------------|
|      | 가                 | 57.7 | 1.72cm       |     |       |        |   |                             | 0.5 -           |
|      | Mann-Whitney test |      | p-value 0.53 | 95% | 3.2cm | 1.35cm |   |                             | unpaired t-test |
|      |                   |      |              | 9   |       |        |   |                             |                 |
|      |                   |      |              | 1cm | 14    | 9      | 6 | 가                           | (66.7%)         |
|      | , 1-2cm           | 13   | 9            | 2cm |       |        |   | 2                           |                 |
|      | 1                 |      | 가            |     |       | 4      |   | 3                           | 가 1, 2          |
|      | (Fig.4).          |      |              | 1   |       | 가 1, 1 |   | 가 2                         | 36              |
|      |                   |      |              |     |       |        |   |                             | 15              |
|      |                   |      |              | 15  |       |        |   |                             |                 |
| 13 가 |                   |      | 2 가          |     |       |        |   | <sup>99m</sup> Tc-sestamibi |                 |
|      |                   |      |              |     |       | 9      | 7 | 가                           | (cor-           |
|      |                   |      |              |     |       |        |   |                             | 2               |
|      |                   |      |              |     |       |        |   |                             |                 |



가 가  
 (forearm)  
 가  
 (posterior acoustic enhancement)  
 3 (15.8%),  
 8 (53.3%),  
 8 (53.3%)  
 가  
 (specimen)  
 가  
 5 가 1  
 debris  
 36%-76%  
 가 [11-13]  
 23 19 82.6%  
 100% Gofrit [14]  
 1cm 1-2cm 83%  
 2cm 75%  
 2cm 가 , 가  
 가 4 1  
 가  
<sup>99m</sup>Tc-sestamibi  
 9 7 2  
 가  
 가  
 가

<sup>99m</sup>Tc-sestamibi 6 routine  
 가  
<sup>99m</sup>Tc-sestamibi  
 가  
 가  
 1cm  
 가  
 가  
 Doppler  
 가 <sup>99m</sup>Tc-sestamibi  
 가  
 가  
 가

(chief cell)  
 가 [1]  
 가 1.35cm 1.84cm  
 unpaired t-test p = 0.066  
 가 가  
 가 9 6  
 가 6 4  
 2

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**= Abstract =**

## **Usefulness of Ultrasonographic Evaluation in Primary and Secondary Hyperparathyroidism**

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**PURPOSE :** To evaluate the accuracy and ultrasonographic findings of primary and secondary hyperparathyroidism (HPT) and correlate them with pathologic results.

**MATERIALS and METHODS :** We reviewed 31 cases of surgically confirmed primary (n=22) and secondary (n=9) hyperparathyroidism. We used 10 or 7.5 MHz linear transducer and reviewed the location, contour, size and echogenicity of lesions. Then we evaluated the detection rate of parathyroid lesions based on surgical result and compared the result of <sup>99m</sup>Tc-sestamibi scan (15 cases).

**RESULTS :** Location of primary HPT was left lower in 9, left upper in 5, right lower in 4, right upper in 3, left mid portion in 1 and superior mediastinum in 1. Lesions showed variable echogenicity -- mild low echo (2), moderate low echo (10), severe low echo (2), isoecho (4) and heterogeneous echo pattern (1). All the lesions except 5 were well defined and 3 lesions had echogenic rim. Posterior enhancement and lateral shadowing were noted in 3 and 4 lesions, respectively. Nineteen of 23 primary lesions were detected by ultrasonography (82.6%) and well correlated with sestamibi scan. In cases of secondary HPT, most were well defined low echoic nodular lesions, and we could detect 6 of 9 patients (67%) and 15 of 36 lesions (41.7%). Only 6 of 24 secondary lesions were detected by sestamibi scan (25%).

**CONCLUSION :** The detection rate of ultrasonography in primary HPT was fairly good and well correlated with the result of the <sup>99m</sup>Tc-sestamibi scan, but both diagnostic modalities were not promising in secondary HPT.

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