Thyroid Scanning with Cesium-131

We have read with some consternation the recent article by Koutras et al. entitled "Thyroid Scanning with Gallium-67 and Cesium-131" (*1*). The authors appear to be unaware of our 1974 publication of extensive experience in the use of cesium-131 (*2*). The results of 416 cesium-131 scans were reported to the First World Congress of Nuclear Medicine in 1974, and we would like to draw their attention to this paper. Our results and conclusions confirmed our initial report (*3*) and are at marked variance with those of Koutras et al. The reasons for this discrepancy appear to lie both in technique and understanding the role of cesium-131 in scanning thyroid nodules.

In view of the pathophysiology involved in the cesium-131 scan, it is artificial to expect a differentiation of malignant nodules from other neoplastic lesions. The scan permits one rather to distinguish cellular nodules from noncellular ones. Thus, there is little value in performing cesium-131 scans on the "hot" or "warm" thyroid nodules revealed by ^{99m}Tc or ^{131}I scanning, and our series was restricted to the use of cesium in the differentiation of the "cold" or nonfunctioning solitary thyroid nodule.

Excluding patients with insufficient followup data, firm results were obtained from 343 patients with nonfunctioning solitary thyroid nodules, and the published results are summarized in Table 1. The figures speak for themselves. One should also note that only four of 197 ^{131}Cs-cold scans proved to be malignant; each was clinically malignant and underwent operation. These occurred early in the series, and in our continuing experience no similar false negatives have occurred since 1972.

Most of the other 34 cellular lesions in the ^{131}Cs-cold group were low-grade adenomata, often with colloid degeneration, cyst formation, central infarction, and/or hemorrhage. Since most of the nodular tissue was noncellular, it is not difficult to understand why a ^{131}Cs-cold scan resulted.

The value of the technique in our hands is beyond doubt: if the nonfunctioning nodule is ^{131}Cs-hot, there is a 93% probability of its being a solid cellular lesion and a 35% risk of malignancy. In either case the lesion will require surgery. On the other hand, a ^{99m}Tc-cold and ^{131}Cs-cold nodule has only a 19% risk of cellularity and a 2% (and probably lower) risk of malignancy. If the nonfunctioning nodule is clinically benign, a period of observation will serve to distinguish the low-grade adenomata from the other benign lesions, and no harm will come to the patient.

We also disagree with the third paragraph of their discussion of cesium-131 scanning. Apart from the policy consideration discussed above, we have found that certain aspects of the technique are critical to producing an interpretable result:

1. The cesium-131 emission is a 29.8-keV x-ray, and we employ a window of 20–40 keV.
2. The background cut-off of 70% used by Koutras et al. appears excessive; we use 30–40% on our instruments.*
3. Since the target-to-nontarget ratios are often small and considerable background is involved, rigid attention must be paid to accurate placement of anatomic landmarks (both of patient's neck and nonfunctioning nodule) if one is to detect preferential cesium uptake in a nonfunctioning nodule. This factor appears to have been neglected by Koutras et al.

TABLE 1. RESULTS OF ^{131}Cs SCANNING ON 343 SOLITARY NONFUNCTIONING THYROID NODULES

^{131}Cs scan	Patients	Cellular lesions		Noncellular lesions
Hot	66	62	23 Malignant 39 Benign	4
Warm	80	46	13 Malignant 33 Benign	34
Cold	197	38	4 Malignant 34 Benign	159

Finally, we would like to assure Koutras et al. that, at all stages, our cases have been totally nonselective: *all* patients with solitary nonfunctioning thyroid nodules are submitted to cesium scanning, regardless of the clinical impression. Occasionally, as mentioned in our paper (*2*), surprising results have been obtained; subsequent operations have almost universally confirmed the ^{131}Cs-scan result, thus reinforcing our belief in its value.

In short, our cesium-scanning results are at complete variance with those of Koutras et al., and we must firmly disagree with their conclusion: "It is therefore doubtful whether these procedures should be recommended for the routine work-up of patients with solitary thyroid nodules." Our experience since the preparation of the conference paper (*2*) has supported our conclusions, and a further paper with details of histologic groups is in preparation for publication.

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FOOTNOTE

* Searle 3-in. Pho/Dot, Picker 5-in. Magna Scanner 500, and Elscint 5-in. Dual-Detector Whole-Body Scanner.

REFERENCES

1. KOUTRAS DA, PANDOS PG, SFONTOURIS J, et al.: Thyroid scanning with gallium-67 and cesium-131. *J Nucl Med* 17: 268–271, 1976

2. BURKE JJ, MCKAY WJ, BRODERICK FL, et al.: The role of radiocesium in the differential diagnosis of the solitary nonfunctioning thyroid nodule. In *Proceedings of the First World Congress of Nuclear Medicine, Tokyo and Kyoto, 1974.* Tokyo, World Federation of Nuclear Medicine and Biology, 1974, pp 1341–1344

3. MURRAY IPC, STEWART RDH, INDYK JS: Thyroid scanning with ^{131}Cs. *Br Med J* 4: 653–656, 1970

Reply

The letter of Drs. Burke and Murray is not a surprise to us. As we stated in our paper, our results are not in full agreement with theirs, of which we are well aware, al-