

Basic Isotope thyroid Parameters in Zambia

by Dr. A.T. Mikolajkow, M.D., (Cracov) Ph.D. (Warsaw), IAEA Expert, Nuclear Medicine Unit.
University Teaching Hospital, Lusaka, Zambia.

(Received for Publication: 9th August 1977).

SUMMARY

The paper analyses basic isotope thyroid parameters in 20 normal Zambians. The results of tests (excluding uptake studies) do not differ from those established elsewhere but the range of thyroid radioiodine uptakes is wide. It may be explained by the mixed nature of the sample of patients with regard to iodine intake.

INTRODUCTION

Considering the high incidence of goitre in Zambia (Wenlock and Onushiko 1974, Nwokolo 1974a) very little has been published concerning the basic thyroid parameters (Bruce Edwards 1975). It should be appreciated that most of such parameters differ widely according to local circumstances (factors affecting this include the nature of the population being studied, feeding habits etc.). It is recommended that each laboratory establishes its own nor-

mal range for them. This paper analyses basic thyroid parameters in patients referred to the University Teaching Hospital in Lusaka.

METHOD AND MATERIAL

The patients studied were the Africans who reported to the Nuclear Medicine Unit of the University Teaching Hospital, Lusaka, over the period of September 1976 to April 1977, supplemented by the patients admitted to wards and by volunteers. Only patients with no thyroid dysfunction were included i.e. those with a final diagnosis of normal thyroid status, made on the basis of all available "in vitro" tests and clinical evaluation.

The uptake of radioiodine (^{131}I) by the thyroid, serum thyroxine level (Thyopac 4, Amersham) and thyroid hormone binding sites (Thyopac 3, Amersham) tests were chosen because they have been of much use and most commonly used.

To exclude improper results caused by abnormal thyroid binding globulin capacity, two-dimensional mapping procedures of the serum thyroxine level and thyroid hormone binding sites have been made.

The Free Thyopac Index (FTI) defined as:

$$FTI = \frac{\text{Thyopac 4 value}}{\text{Thyopac 3 value}} \times 100$$

has been calculated.

To gain more information, protein bound iodine ($PB^{131}I$) after 48 hours and measurements of the percentage of the dose taken up by the thyroid at 6, 24, and 48 hours have been carried out.

RESULTS

The analysis of the thyroid parameters examined are shown in Table 1.

Table 1

The norms of the basic thyroid parameters of Zambians.

Uptake of ^{131}I	6h %	24h %	48h %	$PB^{131}I$ %/1	Thyopac 3 un.	Thyopac 4 ug%	FTI
No. of cases	20	19	19	13	20	20	20
Mean	29,75	48,41	50,72	0,11	105,17	6,51	6,23
Standard deviation	13,9	12,8	11,4	0.05	7,6	1,51	1,39
Standard error	3,11	2,94	2,62	0,01	1,7	0,34	0,34
Range	9,7–6.0	25–70	32–70	0,07–0,2	91,3–112	23,5–8,7	3,1–8,2

DISCUSSION

Although the sample of patients was not homogeneous (considering income, feeding habits and place of origin) it was representative of a typical intake of patients in a large hospital like UTH.

As can be seen, the range of thyroid radioiodine uptakes is wide which may be explained by the mixed nature of the sample of patients with regard to iodine intake (Nwokolo 1974b). For that reason a single uptake result below 70% is worthless in establishing a diagnosis of thyrotoxicosis and a profile (after 6,24 and 48hrs.) or other tests are required. $PB^{131}I$ can be helpful, because in iodine deficiency, the iodine uptake may be in the hyperthyroid range but the $PB^{131}I$ will not be elevated.

Most useful are "in vitro" tests which are almost independent of the serum level of inorganic and organic iodine other than thyroid hormones.

Whilst Thyopac 3 and Thyopac 4 give valuable diagnostic information, a single value can be mis-

leading in cases of abnormal thyroxine binding protein levels. It has been shown (Clark 1970a) that an estimate of the free thyroxine level can be derived from the total thyroxine and thyroid hormone binding sites. The Free Thyopac Index is directly related to the free thyroxine serum level. It has been calculated and the derivation of it provides a more reliable index of thyroid function.

The results of tests (excluding uptake studies) do not differ from those established elsewhere (Clark 1970b, Badman and Plater 1973) but it can be expected that in a bigger sample the ranges will be wider than above.

REFERENCES

- Badman, H.G. and Platen A.F. (1973) *Annals of Clinical Biochemistry*, 10, 53.
- Bruce Edwards C. (1975) *Medical Journal of Zambia* 9, 131.
- Clark F. and Brown H.J. (1970a) *British Medical Journal* 1, 713.
- Clark F. and Brown H.J. (1970b) *British Medical Journal* 2, 543 and 672.
- Nwokolo U. (1974a) *Medical Journal of Zambia* 8,77.
- Nwokolo U. and Ekejiuba I. (1974b) *Medical Journal of Zambia* 8,82.
- Wenlock R.W. and Onushko K.G. (1974) *Medical Journal of Zambia* 8,75.