

Comparative Thiamine Saturations in Women with Uterine Cancer and in Normal Women*

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THE estrogens, when supplied to the female genital tract, are the most potent growth-promoting substances that regulate cell division and metabolism. The stimulating action of the estrogens appears necessary for the development of genital tumors in certain strains of genetically susceptible animals. There is also circumstantial evidence that estrogenic steroids play a part in human genital tumors as well.⁵

Ayre has recently utilized this background of information and opinion to formulate a theory to explain the etiology of carcinoma of the cervix uteri. His concept is that women with this carcinoma show evidence of thiamine deficiency and of hyperestrinism as evidenced by vaginal smears. He then postulates that, in the presence of chronic vitamin-B deficiency, the liver cannot inactivate endogenous estrogen. This excess estrogen is localized in the cervix, which is often somewhat inflamed as a result of chronic cervicitis. The presence of estrogen stimulates the epithelium to metaplastic and finally carcinomatous changes.

He bases the above thesis on the work of Biskind, Sagaloff, Singher et al., and others who have shown that, in the rat, the liver loses its ability to inactivate estrogen when there is a deficiency in dietary thiamine and riboflavin. It has been shown that patients with severe liver damage excrete greater amounts of endogenous estrogen⁶ and excrete

a higher percentage of administered estrogen.⁷

Consequently, it would appear that if chronic thiamine or riboflavin deficiency were present in women with uterine carcinoma, they should be expected to excrete more of an administered dose of estrogen than women without cancer. In a concomitant study of the estrogen tolerance of women with carcinoma of the uterus, we have found that such women tend to excrete *less* of an administered dose than do normal women of the same age group.¹⁰

In view of these results, it was thought necessary to investigate the thiamine saturation of patients on the gynecological service of Sloane Hospital for Women.

METHODS AND MATERIALS

The women studied were all ward patients and came from comparable economic strata and geographic locality. Nationalities and strains indigenous to New York City were included. A total of thirty-seven tests were done, eighteen on women admitted for various gynecological disorders, eleven on those with carcinoma of the cervix or fundus, and seven on normals.

The technique proposed by Holt for collecting urine was followed, and the urinary thiamine was determined by the thiochrome method as modified by Bessey, Lowry, and Davis. The patients were fasted from 5 P.M. the previous evening. On arising in the morning, they voided, the specimen was discarded, and the exact time noted. They were given two glasses of water to drink and the urine voided one and a half hours later was analyzed for thiamine. The values are expressed in terms of micrograms of thiamine per hour and represent the "Fasting Hour" specimen.

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RESULTS

According to Holt, the presence of thiamine in the "Fasting Hour" specimen is indicative of adequate thiamine stores. Those patients suffering from deficiency of thiamine will excrete none during this period. It is readily seen from Table 1 that there is no difference in thiamine excretion in any of the three groups. None of the eleven patients with carcinoma of the uterus showed any evidence of thiamine deficiency. In fact, the greatest excretion found occurred in one of the carcinoma group (patient 6).

TABLE 1
"FASTING HOUR" THIAMINE LEVELS
ACCORDING TO THE METHOD OF HOLT

Noncancer gynec. patients		Cancer gynec. patients		Normal controls	
No.	µg./hr.	No.	µg./hr.	No.	µg./hr.
1.	4.1	1.	3.8	1.	1.7
2.	3.1	2.	0.5	2.	3.3
3.	2.5	3.	1.1	3.	2.6
4.	1.0	4.	5.3	4.	1.8
5.	0.0; 0.9	5.	1.0	5.	1.4
6.	1.7	6.	16.7	6.	2.5
7.	0.7	7.	3.8	7.	4.7
8.	2.7	8.	8.7		
9.	1.0	9.	1.0		
10.	2.2	10.	3.6		
11.	2.9	11.	0.5		
12.	2.8				
13.	1.4				
14.	0.8				
15.	2.2				
16.	2.2				
17.	3.5				

One instance of thiamine deficiency did occur in a patient with meno- and metrorrhagia. In a repeat test, however, she

excreted 0.9µg. per hour (patient 5).

DISCUSSION

These data are not in agreement with those of Ayre and Bauld. The estimation of the thiamine status in these studies is based on the "Fasting Hour" method of Holt, as contrasted to those of Ayre that were on the thiamine tolerance test. However, there is usually good agreement between the two techniques.⁸

As a result of the discrepancies between these two studies, the role of vitamin-B deficiency in the inactivation of estrogens by the rat was re-investigated. These studies showed that it was not thiamine deficiency per se, but the concomitant inanition, that was responsible for the breakdown in the estrogen-degradation mechanism.⁹ If this is so, it is difficult to see how chronic avitaminosis B could play any role in the etiology of carcinoma of the cervix, assuming that it did exist in these patients. Since the underlying factor was shown to be inanition and not vitamin-B deficiency, one would have to assume that patients with carcinoma of the uterus had been suffering from chronic inanition. There is no evidence for this, at least early in the course of the disease.

SUMMARY

The thiamine saturation status of patients with carcinoma of the uterus was studied. Contrary to the hypothesis of Ayre, there appears to be no significant difference between these patients and noncancer controls. No instance of thiamine deficiency was noted.

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