INDICAN, ETHEREAL AND OTHER FORMS OF S ELIMINATED IN 24 HOURS URINE BY ELDERLY INDIAN SUBJECTS

S. V. JOSHI AND J. D. PATHAK

Medical Research Centre,
Bombay Hospital, Bombay - 400 020

(Received on January 21, 1983)

Summary: Average daily excretion of Indican in urine of 42 healthy elderly men, av. age 69.9 ± 5.0 years, (60 observations) was 60.7 ± 17.4 mg/24 hrs. This is slightly higher than reported values for younger subjects.

Average ethereal S elimination by Indian subjects has varied from 72-150 mg/day. Indican is the chief ethereal S eliminated in urine. Other forms of S excreted by elderly subjects were: Inorganic S 720 ± 150 mg; Ethereal S 74 ± 22 mg. Indican in them was 53.8 ± 17.4 mg. This shows that the remaining 20 mg or about 1/4 of the ethereal S is eliminated in urine in other forms.

Relationship with age, diet, common disorders along with findings in literature etc. are discussed.

Key words: urinary indican ethereal S elderly

INTRODUCTION

While urine of a newly born child is free from indican, normal adults are reported to excrete about 40 mg (1,3,5,6,8,12) of indican per day. References are scanty regarding the amount of indican excreted by elderly Indians - as well as what proportion it contributes to the ethereal sulphates excreted in urine.

MATERIAL AND METHODS

Twentyfour hrs urine samples were collected by 42 healthy elderly men (age 69.9 ± 5.0 yrs) without any serious g.i. disorders, past or present. The subjects had discontinued drugs or vitamins for 3 days prior to collection of urine and also kept an account of the items of food and fluids taken by them. A fasting sample of blood was also obtained for Hb., urea, and creatinine, which were within normal limits.
RESULTS

These subjects excreted averagely $1592.0 \pm 609.3$ ml of urine with an indican output of $60.7 \pm 17.4$ mg in 24 hrs.

The average values of indican excreted by these elderly subjects (60+) was similar for 5 yearly age groups as shown in graph below:

![Graph showing indican in Mg in 24 hrs urine for 5 Yrly age groups.]

DISCUSSION

The aminoacid tryptophan in diet is converted to indole in the intestines and subsequently conjugated with $\text{H}_2\text{SO}_4$ to form indoxyl sulphuric acid i.e. Indican.

Human urine hardly shows any indican at birth, but soon after developing bacterial flora in the intestines, indican is detected in the urine (7). Some investigators (3,5,6, 8,12) have reported about 40-50 mg. as an average output in adults. In the present series, average indican value was $(60.7 \pm 17.4 \text{ mg})$ for elderly Indians. This is slightly higher than the literature values for younger subjects.

The amount of indican is a rough measure of the degree of decomposition in the intestines. Simple constipation may give rise to larger excretion of indican in urine. An attempt was made to correlate their output with some findings like mild constipation, diarrhoea, higher B.P., diabetes or raised cholesterol, etc. as obtained in some subjects, but no significant relationship could be found.
Average protein intake of the present group was about 56 g giving tryptophan value of 485 mg per day. Though the tryptophan consumption in European protein rich dietary is considerably larger, their average output of indican is reported to be similar to that of Indians, indicating that factors like bacterial activity are more important than the mere presence of precursor - tryptophan in diet.

Indican as a fraction of ethereal sulphates in urine: The inorganic and organic sulphur output of Indian subjects, reported in literature varies between 650-1030 mg and 72-150 mg respectively (2,9,10,11).

The output of S in Indians is less than 50% of that in Europeans (4). This could be understood since sulphur in urine is derived from proteins which are consumed in much higher amounts in the meat-rich European dietary.

Meagre data is available as regards the amounts of ethereal sulphates in urine. To satisfy this curiosity, 10 subjects were studied in details as regards the different forms of S in urine. The results are summarised in Table I.

<table>
<thead>
<tr>
<th>No. of subjects</th>
<th>Urine vol. ml</th>
<th>Inorg. Sulphate mg</th>
<th>Ethereal sulphate mg</th>
<th>Indican mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 men</td>
<td>1711.0±559.4</td>
<td>720.01±150.0</td>
<td>74.0±22.0</td>
<td>53.8±17.4</td>
</tr>
</tbody>
</table>

The values in above table show that about 75% of ethereal sulphate eliminated is in the form of indican.

REFERENCES

INFLUENCE OF THYROID HORMONE ON THE PHOSPHOLIPID COMPOSITION OF LUNG TISSUE AND SURFACTANT OF RATS

RATAN KUMAR* AND K. S. HEGDE

Defence Institute of Physiology and Allied Sciences,
Delhi Cantt. - 110 010

(Received on May 24, 1982)

Summary : Thyroid hormone is an important regulator of lipid metabolism in vivo. The effect of thyroid hormone on the phospholipid composition of lung tissue and surfactant has been studied in hypothyroid and hyperthyroid rats in comparison with the control rats. Rats were made hyperthyroid by administering 1 mg of L-thyroxine/kg body weight for six days. Another group of rats was rendered hypothyroid by injecting 1 mCi of Na¹³¹ to each rat. Phosphatidyl choline, lysophosphatidyl choline, lysophosphatidyl ethanolamine, phosphatidyl ethanolamine, and sphingomyelin, were estimated by thin layer chromatography. A decrease in phospholipids in hypothyroid and an increase in the hyperthyroid rats was observed. This can be attributed to the altered thyroid activity.

Key words : thyroid phospholipids lung tissue surfactant

INTRODUCTION

Lung performs active metabolic functions (9) in addition to its respiratory functions. One of its metabolic functions that has received special attention in recent years is the synthesis of fatty acids and phospholipids that are important constituents of the alveolar surfactant which is essential to maintain alveolar stability and normal fluid balance (3). The large alveolar cells in the alveolar epithelial lining are the active sites of the surfactant synthesis. The mitochondrial fraction of these cells contain the necessary enzymes for its synthesis and metabolism (11).

The thyroid gland is responsible for the optimal level of cellular metabolism, normal growth and maturation. Thyroid hormones stimulate the oxygen consumption and help in regulating lipid and carbohydrate metabolism. It is reported that in the rats, L-thyroxine may be a potent regulator of lung surfactant metabolism (10).

The present study was, therefore, undertaken to assess the phospholipid composition of lung tissue and surfactant in rats with altered thyroid activity.

*Present address: Institute of Nuclear Medicine and Allied Sciences, Probyn Road, Delhi-110 007.