A Preliminary Study of the Effect of Ingestion of Gold on Blood Chemistry

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Abstract Ten milligram of pure gold foil was given by mouth for 16 days. Routine blood chemistry was done before and after gold therapy and repeated after 3 weeks of cessation of therapy. All the blood values were well within normal range and variations, except the enzymes—creatine phosphokinase and lactate dehydrogenase, which decreased substantially on gold foil ingestion indicating possible inhibition of these blood enzymatic activity by gold.

Keywords Gold foil · Blood chemistry · CPK · LDH

Introduction

While gold therapy is only occasionally used in the west [1], in India the use of gold in the form of bhasma (oxide) and foil is quite extensive in the indigenous system of medicine [2]. In addition, many preparations are available in the market even without prescription which are widely consumed mainly as aphrodisiac tonic. With such a widely prevalent use of gold in India, it was natural to ask whether chronic gold ingestion affects blood chemistry. This information is very important to practicing clinicians as well as clinical chemists. The aim of this preliminary study was precisely to obtain information on this aspect.

Materials and Methods

For this one of us (DCS) volunteered for the study. Pure gold foil, available locally in the market, was used. Pure gold foil was preferred over other ayurvedic preparations, as their chemical composition is obscure, and it was expected to be less innocuous. One-fourth piece of foil, weighing ~10 mg, was taken every day by mouth using about 10 g of mawa sweet (milk cake) as a vehicle for 16 days. The therapy period was chosen arbitrarily. It is neither too brief nor too long. The longer duration was advertently avoided for fear of possible toxicity. Blood was collected in the beginning of the study, end of the study and again after a lapse of 3 weeks on completion of the study. All the tests routinely performed in a clinical chemistry laboratory (sugar, urea, creatinine, uric acid, cholesterol, HDL-cholesterol, triglycerides, bilirubin, total proteins, albumin and the enzymes—GOT, GPT, ALP, LDH, GGT, CPK and CPK-MB) were done in all blood samples immediately after collection on a Merck's autoanalyzer (Selectra) using Merck's own kits [3].

Result and Discussion

No toxic effect on kidney was seen on gold foil ingestion as evidenced by routine urine examination and kidney function tests, i.e., blood urea, creatinine, uric acid etc. The variation of blood values before or after taking gold was well within normal range (Table 1) which again indicated that gold foil was not harmful in the administered dose. The non-enzyme parameter either increased or decreased on gold ingestion but the variation was not significant. However, all the blood enzymes decreased on gold therapy. This may suggest inhibition of enzymatic activity by gold.

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Table 1 Effect of ingestion of gold foil on blood chemistry

Parameter	Pre-gold value	Post-gold value	Post post-gold value
Sugar (mg/dl)	83.3	81.2	83.8
Cholesterol (mg/dl)	210.3	203.0	208.9
HDL-cholesterol (mg/dl)	42.6	42.8	40.7
Triglycerides (mg/dl)	85.4	82.0	127.3
Urea (mg/dl)	24.7	27.0	22.1
Creatinine (mg/dl)	0.67	0.65	0.8
Uric acid (mg/dl)	5.5	5.8	5.2
Bilirubin (mg/dl)	0.4	0.4	0.4
SCOT (U/L)	21.0	18.0	19.0
SGPT (U/L)	16.5	14.0	14.0
Alkaline phosphatase (U/L)	175.6	166.0	186.8
Total proteins (g/dl)	7.1	7.2	7.2
Albumin (g/dl)	4.6	4.7	4.5
A.G. ratio	1.8	1.9	1.7
CPK (U/L)	101.6	78.4	136.8
CPK-MB (U/L)	8.6	7.5	15.6
LDH (U/L)	389.0	285.0	295.0
GGT (U/L)	23.0	22.8	23.2

The decrease in some of the serum enzymes (CPK, LDH) was substantial, i.e., as much as 25 %. If this is a typical effect, it may suggest that the biochemical values of a person taking gold may sometimes be misleading.

Many drugs are known to affect clinical chemistry values in blood [4] but this is the first report on the effect of gold foil. Considering the widespread use of gold preparations in India, this preliminary study is published in the hope that it will stimulate others for a larger study comprising of people taking much higher doses for much longer period in other forms.

References

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