

Drug Interferences in Clinical Analyses

PREVECAL DEPARTMENT

Nº 1

TRIGLYCERIDES

This is the first in a series of Bulletins on the interferences caused by drugs in clinical trials that the Prevecal Department at BioSystems is going to issue for laboratory professionals. Given the large number of active compounds interfering with results, each bulletin will deal with a single test so that the information given can be as detailed as possible.

The diagnosis of a patient should not only be based on the findings of one trial but also include clinical and laboratory data. There are many variables conditioning analytical results and these must always be borne in mind in order to give a correct diagnosis. These variables can be divided into three main categories.

1. Preanalytical
2. Interference
3. Illness

Preanalytical variables are a long list of conditions that take into account a patient's characteristics and lifestyle. Some of these factors are age, gender, race, diet, alcohol, tobacco and coffee consumption, obesity, physical exercise, etc. It is also of basic importance to take into

account a patient's clinical history as well as their current state of health, since underlying illnesses may affect analytical results.

Interferences are also an important cause of the poor interpretation of a patient's analytical results. There are two main types:

1. Methodology interferences
2. Drug interferences

In this bulletin we are going to focus on drug interferences although mention will also be made of those concerning methodology. The total number of drugs or active compounds producing effects on laboratory tests is too large for them to be rigorously set out in this bulletin. The intention of the Prevecal Department at BioSystems is to boil down all the most active compounds to those that have a greater relationship with a specific test. There is an excellent reference book on the subject, *Young DS. Effects of drugs on clinical laboratory tests, 5th ed. AACC Press, 1999*, which contains the greatest number of drug interferences. This book is a must for any clinical laboratory professional.



TRIGLYCERIDES

(Glycerol Phosphate Oxidase/Peroxidase)

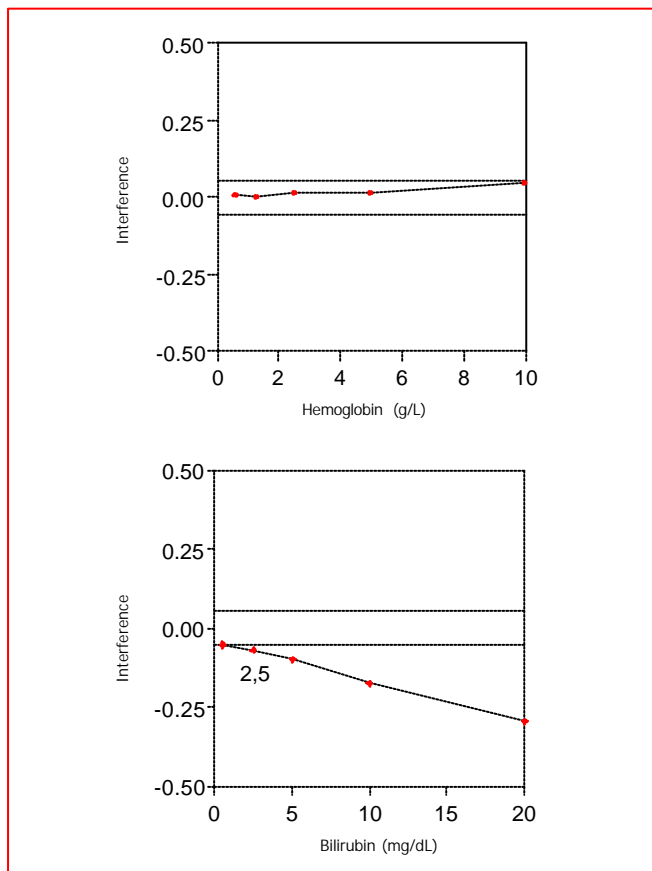
CLINICAL SIGNIFICANCE

Triglycerides are glycerol and fatty acid esters that come from a dietary source or are synthesised mainly in the liver. They are transported in plasma in the lipoproteins and are used by adipose tissue, muscles and others. Their main function is to provide energy to cells. High serum concentrations of triglycerides may be due to hepatobiliary disorders, diabetes mellitus, nephrosis, hypothyroidism, alcoholism, familial hyperlipoproteinemia type IV and V and others.

METHODOLOGY INTERFERENCES

Each point is the average of three. Horizontal lines show the tolerance for the value obtained in the presence of interferent, calculated as: the average in the absence of interferent $\pm 3 \times$ interseries standard deviation.

Sample: human serum without (a) and with growing concentrations of interferent (b).



As can be seen in the graphs, hemoglobin (10 g/L) does not interfere while bilirubin (2.5 mg/dL) does.

DRUG INTERFERENCES

ARTERIAL HYPERTENSION

ACETYLCHOLINESTERASE (AChE) INHIBITORS

4.2 mg/dL average decrease occurs with regard to reference values in treatments lasting 12 months, especially in patients with hypercholesterolemia

CAPTOPRIL

Moderate to average hypertense patients treated with 100 mg/day for 24 weeks caused 10.6% average reduction. Patients with essential hypertension treated with 75 mg/day showed average reduction from 181.8 ± 26.4 mg/dL to 154.6 ± 18.8 mg/dL.

ENALAPRIL

Patients with grade 1 diastolic hypertension treated with 5 mg/day caused average change from 1.6 ± 1.16 mmol/L to -0.36 ± 0.06 mmol/L after 12 months treatment and to -0.14 ± 0.08 mmol/L after 48 months. Significant reduction of average from 1.74 ± 1.04 mmol/L to 1.63 ± 0.054 mmol/L reported for patients with essential hypertension treated with Enalapril for 6 months.

ATENOLOL

Serum triglyceride concentration increase reported. Non uniform increase with variations depending on hypertension type and patient's history.

BISOPROLOL

Plasma triglyceride concentration increase reported. Increase more acute in average, moderate and essential hypertense patients than in patients with hypercholesterolemia and normocholesterolemia.

BETA BLOCKERS

Triglyceride concentration increase in hypertense patients treated with beta blockers as opposed to those not treated reported.

HYPERLIPEMIAS

ATORVASTATIN

Serum triglyceride concentration baseline decrease between 17% and 27% reported.



BEZAFIBRATE

Clear reduction of serum triglycerides reported. Range oscillates between 27% and 58% depending on pathology type and length of treatment.

FLUVASTATIN

Triglyceride concentration reduction between 3% and 9% reported depending on pathology type and length of treatment.

GEMFIBROZIL

Triglyceride concentration reduction between 30% and 60% reported depending on pathology type and length of treatment.

PRAVASTATIN

Triglyceride concentration reduction between 12% and 25% reported depending on pathology type and length of treatment.

DIABETES (NIDDM)

INSULIN

Triglyceride concentration baseline decrease from 5.02 ± 1.22 mmol/L to 2.16 ± 0.46 mmol/L after 3 months and to 2.0 ± 0.30 mmol/L after 6 months treatment reported.

METFORMIN

Significant reduction of triglyceride serum concentration between 15% and 26% reported.

OTHERS

LEVOTHYROXINE

Patients treated for hypothyroidism show acute reduction of serum triglyceride concentration. Baseline reduction may be higher than 30%.

ORAL CONTRACEPTIVES

Over 40% above baseline serum triglyceride concentration increase when oral contraceptives administered.

ESTROGENS

Estrogens reported to increase triglyceride concentration in postmenopausal women from 15% to 20% above the baseline.

LOW MOLECULAR WEIGHT HEPARIN

Significant triglyceride concentration reduction in patients with chronic dialysis reported after 4 months treatment.

GLUCOCORTICOIDS

16% triglyceride concentration increase with a low dosage reported.

NON INTERFERING DRUGS

The following drugs do not interfere at therapeutic concentrations:

Acetylsalicylic acid, Amphotericin B, Ampicillin, Ascorbic acid, Barbitol, Bromazepam, Chloroquine, Codeine, Diazepam, Gentamicin, Ibuprophen, Morphine, Penicillin G, Phenobarbital and Sulphanilamide.



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