Recommended protocol for monitoring Copper, Zinc and Selenium:

1. Measure Zn on all patients about to start TPN. If deficiency of trace elements is suspected, Cu and Se should also be determined.

2. Patients who progress to normal diets after TPN for less than 5 days, and whose baseline levels were acceptable require no further trace element monitoring.

3. Patients on TPN for 5 – 10 days only, should be monitored for Cu, Zn and Se at the end of the TPN period.

4. Patients on TPN for more than 10 days should be monitored weekly until levels of trace elements stabilise at acceptable concentrations.

5. Patients on long term TPN (more than 30 days) should be monitored continuously at intervals of 1 – 2 months for these elements, and also for Al, Cr and Mn.

6. If changes in a patient's condition are suspected to be attributable to the prescribed regime, or which might influence trace element status, (e.g diarrhoea, sepsis) the trace element levels should be checked

Turnaround

We aim to analyse and report the results within 2 working days from receipt of the specimen.

Contact Points

Mr Ted Sheehan
Tel: 0121 507 6028
Email: ted.sheehan@swbh.nhs.uk

Ms Aleha Khan
Tel: 0121 507 5203
Email: aleha.khan@swbh.nhs.uk

Dr Jonathan Berg
Head of Department

Trace Elements (SAS) Laboratory
Dept of Clinical Biochemistry
City Hospital
Dudley road
Birmingham
B18 7QH

www.cityassays.org.uk

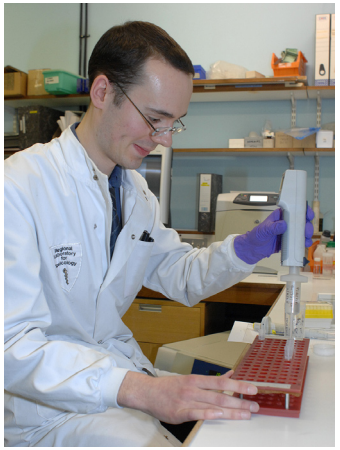
"Recommendations for analysis taken from Trace Element SAS Handbook, 4th Edition, 2006"

A Teaching Trust of The University of Birmingham
Incorporating City, Sandwell and Rowley Regis Hospitals

240309ML2545

Sandwell and West Birmingham Hospitals NHS
NHS Trust

Plasma / Serum Copper, Zinc and Selenium



Trace Elements Section
Dept of Clinical Biochemistry
City Hospital

Sending Specimens for Analysis

Sample requirement:
Minimum of 100 µl of serum/plasma

- Avoid blood collection tubes using gel-separation systems, and tubes with caps sealed by a rubber O – ring for plasma/serum storage; these tubes may be contaminated with zinc. Special trace elements tubes are recommended.
- Separate without delay to avoid haemolysis
- Samples should be stored at 4°C prior to dispatch.
- Send samples by first class post at ambient temperature to the address on the back of this leaflet

Analytical Technique:

Analysis is performed by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) which permits rapid and accurate determination of all three elements from a single specimen dilution. Performance is monitored through participation in International External Quality Assessment Schemes such as SAS and TEQAS schemes from Guildford and the Inter Laboratory Comparison Program from Quebec.

Copper:

Indications - Deficiency, hepato-biliary dysfunction (including Wilson's Disease), toxicity

Comment – raised values are seen in inflammatory states and with steroid hormone therapy. When investigating Wilson's Disease, plasma/serum Cu measurement is only of value as an addition to plasma caeruloplasmin concentration and 24 hour urinary Cu excretion.

Copper Reference Values:

Neonate 4 months:
0.1 - 0.7 mg/L 1.6 – 11 µmol/L

4 – 6 months:
0.3 - 1.1 mg/L 4.7 – 17 µmol/L

7 – 12 months:
0.5 – 1.3 mg/L 7.9 – 21 µmol/L

Children >12 months & adults:
0.7 – 1.6 mg/L 11 – 25 µmol/L

Pregnancy > 15/40:
1.6 - 2.5 mg/L 25 – 40 µmol/L

Zinc:

Indications – deficiency

Comments - A relatively crude index of zinc status. Exhibits diurnal variation in 'healthy' individuals and is affected by number of factors including acute phase reaction, certain drugs and pregnancy. Concomitant measurement of C-reactive protein may be useful in some circumstances as an aid to interpreting low Zn concentration.

Zinc Reference Values:

Deficiency May be indicated:
< 0.5 mg/L < 7.7 mol/L

May have no clinical significance:
0.5 - 0.7 mg/L 7.7 – 10.7 mol/L

"Normal" range for all ages:
0.7 - 1.6 mg/L 10.7 – 24.5 mol/L

Dietary supplement use (0r contamination):
> 1.6 mg/l > 24.5 mol/L

Selenium:

Indications - deficiency, toxicity
Comment - Plasma/serum Se is a good index of recent (months) changes in intake of or exposure to the element. However it is an acute-phase reactant and concomitant measurement of C-reactive protein may be useful in some circumstances as an aid to interpreting low Se concentrations.

Selenium Reference Values:

< 18 months:
30 – 50 µg/L 0.38 – 0.63 mol/L

18 months - 4 years:
45 – 90 µg/L 0.57 – 1.14 mol/L

5 years - 16 years:
55 – 115 µg/L 0.70 – 1.46 mol/L

Adults (> 16 years):
70 – 130 µg/L 0.89 – 1.65 mol/L