A STUDY ON SPECIFICITY OF BLOOD ANALYSIS FOR HEAVY METAL COMPARE WITH URINE ANALYSIS

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ABSTRACT

Background: In human life has many kind of heavy metals are involve such as lead and mercury. Human always have risk of heavy metals exposure pass through the body in different way .In every year has a reported show heavy metal toxicity in the environment. Therefore it has to early detect about heavy metal toxicity which a key factor in successful treatment. Live blood analysis is screening test for early detect about heavy metal. In this research use live blood analysis technique which has screening test for heavy metals compare with urine heavy metal.

Objectives: A study on specificity of live blood analysis for heavy metal measurement compare with urine heavy metal.

Materials and Methods: The study design was a retrospective study from secondary data. Collect secondary data from 99 Patients in **TRIA Integrative Wellness** at Piyavate hospital who have to receive assessment for live blood analysis and urine heavy metal. Sixty-two patients who have crystals in live blood analysis and thirty-three patients who have no crystals in live blood analysis. Then analyze the collection form result by Statistics analysis.

Result: The statistical analysis of the data for compare between live blood analysis and urine heavy metal, the results shows a group with crystal of five heavy metals such as lead, cadmium, manganese, nickel, arsenic has significantly high level of heavy metals in urine than those without crystal. Second, after the statistical analysis of the data for correlation between crystal in live blood and higher level of heavy metals in urine shows four heavy metals have statistically significant difference such as cadmium, manganese, nickel, arsenic Furthermore the statistical analysis of the age and sex has not statistically significant difference for correlation between live blood analysis and urine heavy metal.

Conclusion: The result from live blood analysis that appears to have crystal could be a good indication that the following five heavy metals are lead, cadmium, manganese, nickel, manganese will be found in urine.

Introduction: In human life has many kind of heavy metals are involve such as lead and arsenic Human always have risk of heavy metal exposure pass through the body in different way such as inhalation or oral. In every year can be detect heavy metal toxic in environment

For each year, Bureau of Epidemiology, Department of Disease Control, Ministry of Public health has the surveillance reports from the hospital about patients who have disease from toxic of heavy metals. In year of 2011, about lead poisoning found 15 patients from 6 provinces. Manganese, mercury, arsenic poisoning found 24 patients from 9 provinces. It has to early detect about heavy metal toxicity. The screening test is appropriate for early detection of disease for rapidly and effective treatment. The one of screening test is live blood analysis which can screening for many disease such as heavy metals. When result in live blood present that indicate a patient has an

abnormal symptom. After that patient has to check in lab testing and continue to treatment. In this research is interesting in live blood analysis for heavy metal testing. In live blood analysis present crystal which indicate to heavy metals. In this research use live blood analysis technique which has screening test for heavy metals compare with urine heavy metal. The aim of current study is study specificity of live blood analysis for screening test in heavy metals

Objectives: A study on specificity of live blood analysis for heavy metal measurement compare with urine heavy metal

Materials and Methods: The study design was a retrospective study from secondary data. Collect secondary data from 99 Patients in **TRIA Integrative Wellness** at Piyavate hospital, male and female, who have to receive assessment for live blood analysis and urine heavy metal. Sixty-two patients who have crystals in live blood analysis and thirty-three patients who have no crystals in live blood analysis. The assessment of results based on clinical features by Physicians

Statistics: First, Use descriptive statistics to demonstrate characteristics demography. Second, compare result in blood analysis and result in urine heavy metal which characteristic in number that could be indicate each heavy metal level by using t-test analysis. Third, Correlation between crystal in live blood and high level of heavy metal in urine by using Pearson correlation test

Results: Demography: In this study have 99 patients in **TRIA Integrative Wellness** at Piyavate hospital were included 62 patients with have crystals and 37 patients with have no crystals in live blood analysis.

Table 1   Demographic Data

Variables	Patients	
	Sample	**percentage**
Age (years)		
0-20	19	19.19
21-40	28	28.28
41-60	42	42.42
61-80	9	9.09
>80	1	1.01
Mean±S.D = 40±18.18, Min = 3, Max = 87		
Gender		
Female	54	54.5
Male	45	45.5
Crystals in Live Blood		
Yes	62	62.6
No	37	37.4

Table 2 **Compare Between Live Blood Analysis and Urine Heavy Metal**

The statistical analysis of the data for compare between live blood analysis and urine heavy metal, the results shows a group with crystal of five heavy metals such as lead, cadmium, manganese, nickel, arsenic (mean10.14±16.57, 0.56±0.87, 12.80±32.79, 1.73±2.36, 86.28±133.24, respectively) has significantly high level of heavy metals in urine than those without crystal(mean5.42± 6.89, 0.26± 0.25, 1.38± 0.79, 0.63± 0.87, 23.28±16.87, respectively), p value P<0.001, P=0.003, P<0.001, P<0.001, P<0.001, respectively**.**

Crystal in Live Blood	Samples (n)	Mean	SD	t test	p-value
LEAD No Crystal	37	5.42	6.89	11.09	0.001
Crystal	62	10.14	16.57		
MERCURY No Crystal	37	3.54	2.88	1.58	0.212
Crystal	62	4.48	3.96		
CADMIUM No Crystal	37	0.26	0.25	9.03	0.003
Crystal	62	0.56	0.87		
MANGANESE No Crystal	37	1.38	0.79	13.53	0.000
Crystal	62	12.8	32.79		
CHROMIUM No Crystal	37	1.10	0.97	1.60	0.209
Crystal	62	1.32	1.63		
COBALT No Crystal	37	0.24	0.64	0.56	0.456
Crystal	62	0.26	0.37		
NICKEL No Crystal	37	0.63	0.87	20.30	0.000
Crystal	62	1.73	2.36		
ARSENIC No Crystal	37	23.28	16.87	11.40	0.001
Crystal	62	86.28	133.24		
AGE No Crystal	37	40.54	18.00	0.03	0.870
Crystal	62	39.03	18.42		

Table 3 Correlation between Crystal in Live Blood and High Level of Heavy Metal in Urine

The statistical analysis of the data for correlation between crystal in live blood and higher level of heavy metals in urine shows four heavy metals have statistically significant difference such as cadmium, manganese, nickel, arsenic ($p = 0.039$, $p = 0.037$, $p = 0.008$, $p = 0.005$, respectively

Variable	Crystal Live Blood	
	r	p-value
LEAD	0.16	0.103
MERCURY	0.13	0.211
CADMIUM	0.21	0.039
MANGANESE	0.21	0.037
CHROMIUM	0.08	0.443
COBALT	0.01	0.880
NICKEL	0.27	0.008
ARSENIC	0.28	0.005
AGE	0.04	0.692
SEX	0.03	0.736

Discussion : From the statistical analysis of the data for compare between live blood analysis and urine heavy metal, the results shows five heavy metals have statistically significant difference such as lead, cadmium, manganese, nickel, arsenic. The result shows the effectiveness of live blood analysis can have specificity for heavy metal measurement. When you use live blood analysis technique and its present crystal which indicate to heavy metal, you can find about five heavy metals. Why you can found them because heavy metals can be found in general environment and in daily life such as in food, drinking water such as Lead is a metal in the order of 2 in top 10 Hazardous substances ATSDR (Agency for toxic substances and disease registry) has ranked them. You can found them in manufacture such as storage batteries (Janine, 2005). In general environment such as all people have the opportunity to lead exposure from food and drinking water, Cadmium is a metal in the order of 7 in top 10 Hazardous substances and present in construction industry (Janine, 2005) Food contaminated with cadmium

The results of this study shows three heavy metals have not statistically significant difference such as mercury, chromium, cobalt because

1. 99 patients in this study found in small amount of mercury, chromium, cobalt.
2. They have general occupations and live in city areas, not the people who work and live in industrial factory areas.
3. Some people cannot found high level of heavy metal because they already did chelation technique before. The efficacy of DMSA can remove lead which studying in human by use DMSA 30 mg/kg/day and results show significantly increases urine lead elimination in lead poison patients (Liu, Heitz & Bradberry, 2009) . For mercury, some study shown it can increase excretion of mercury though urine about 6o% efficient. (Juresa, 2005) For cadmium, animal studies have shown removing cadmium from the kidneys. Finally, animal research has shown removing arsenic from not only the blood but also the brain. (Flora, Bhadauria, Pant & Dhaked, 2005) Some study in human research has shown removing arsenic more effective in cases of acute poisoning than in those of long-term exposure.
4. Another reason for mercury cannot found in this study because Mercury urine testing can be indicates exposure to an elemental or inorganic source of mercury, such as from a job that uses mercury. Mercury blood testing can be indicates exposure to all three type of mercury (organic, elemental and inorganic mercury), such as eating fish and other seafood because fish may containing methyl-mercury or recent exposure to high level of mercury .From mentioned above, patients in this study live in the city and not to work with mercury so that why it cannot found in urine. But they probability eat fish or seafood, if we change to blood testing, it may be found. But another author said that measurements of blood and urine from thousands of people have never shown high levels of mercury in the general population but shown only workers with high work exposure have shown abnormal levels in blood and urine (Baratz, 2005)

Conclusion: The research hypothesis is the live blood analysis has specificity for heavy metal measurement. First, after the statistical analysis of the data for compare between live blood analysis and urine heavy metal, the results shows five heavy metals have statistically significant difference such as lead, cadmium, manganese, nickel, arsenic and three heavy metals have not statistically significant difference such as mercury, chromium, cobalt. Second, after the statistical analysis of the data for correlation between crystal in live blood and higher level of heavy metals in urine shows four heavy metals have statistically significant difference such as cadmium, manganese, nickel, arsenic and four heavy metals have not statistically significant

difference such as lead, mercury, chromium, cobalt. <u>Furthermore</u> the statistical analysis of the age and sex has not statistically significant difference for correlation between live blood analysis and urine heavy metal.

Suggestion:

5.3.1 Next study, it should be assessment in industrial areas or factory areas and should be increase the number of patients for found various number of heavy metals.

5.3.2 It should be increase number of heavy metals because actually have a lot of heavy metals in environment but in this study select 8 heavy metals. Although live blood analysis may not specific for some heavy metals in this study but it may specific in other heavy metals

5.3.3 It should be use hair testing because it is more accuracy and can assessment for chronic disease and should be use teeth testing for assessment about amalgam which can indicate for mercury.

5.3.4 It should be to do the experiment research, not retrospective study. In the further study should be grading crystal in live blood analysis. It may count amount of crystals in live blood for indicate to level of heavy metals or type of heavy metals

5.3.5 It should be to analyze about specificity and sensitivity for live blood analysis

Keywords: Live Blood Analysis/Heavy Metal/Urine Heavy Metal

References:

Baratz, R. (2005). **Dubious Mercury Testing.** Retrieved February 19, 2005, From
    http://www.quackwatch.com/01QuackeryRelatedTopics/Tests/mercurytests.html

Berthon, G. (1995). Handbook of Metal-Ligand Interactions in Biological Fluids. **Marcel Dekker, 2**, 1486.

BioRay, Inc. (n.d.). **A Summary of Lab Tests for Heavy Metal Testing**. Retrieved Sepetmber 20,
    2011, From http://www.bioraynaturaldetox.com/content/
    SummaryOfLabTestsforHeavyMetals1-08.pdf

BRiA Health Center. (2004). **Instruction manual for live cell analysis, transformation**.
    Bankkok: BRiA Health Center.

Davydova, S. (2004). Heavy metals as toxicants in big cities. **Microchemical Journal, 79**(1-2)
    13-136.

Dean, K. L. (2001). Recognizing and verifying heavy metal toxicity. **<u>Alternative and Complementary Therapies</u>, 7**(4), 203-208

EPA's. (2007a). **Manganese TEACH Chemical Summary**. Retrieved Sepetmber 20, 2011,
    From http://www.epa.gov/teach/chem_summ/manganese_ summary.pdf

EPA's. (2007b). **Report on the Environment: Science report** (SAB review draft). Retrieved
    Much 20, 2011, From http://cfpub.epa.gov/ncea/cfm/ recordisplay.cfm?deid=140917