Role of Magnesium plus Selenium in Management of Viral Pneumonia in Asthmatic Child

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Abstract:

Background: Magnesium control different enzyme and is smooth muscle relaxation at the bronchia. Infection decrease selenium level which are of significance since of relationship among selenium and immunity.

Objective: Assess role of magnesium plus selenium in management of viral pneumonia in asthmatic child.

Material and Methods: 300 Asthmatics Child under 15 year present with viral pneumonia record in a period of 56 month starting from April 2009 to April 2014, Sub classified as 150 Asthmatics Child magnesium plus selenium group and 150 Asthmatics Child control. Magnesium 200mg plus selenium (tab) 200mcg were schedule to receive magnesium plus selenium single dose per day for 7 days While control (supportive) group received supportive treatment.

Results: The estimates of magnesium plus selenium (tab) group significant improvement in heart rate (P= 0.001), rapid respiration (P=0.003), hs-CRP (P = 0.001), ESR (P =0.005), Radiological (P = 0.003), serum interleukin-2 receptor (P = 0.0002). Less than in control.

Conclusions: This study indicates benefit of magnesium plus selenium supplementation in management of viral pneumonia in asthmatic child

Keywords: Magnesium, Selenium, Viral pneumonia, Asthma, Pulse Oximetry.

Introduction:

Community-acquired Virus pneumonia is acute infection of the lungs develops in infants and young children [(1)]. Pneumonia can present in children as fever, Dyspnea, cough, shortness of breath, hypoxia [(2)]. Magnesium has been unswervingly concerned in hypokalemia, hypocalcaemia, magnesium control different type of enzyme and is smooth muscle relaxation at the bronchia [(3)]. Selenium is a trace element necessary for humans participate as vital roles in thyroid hormone metabolism, and defense as antioxidant in infection [(4)]. Infection reduces serum selenium levels which are of significance because of connection between selenium and immunity [(5)]. Selenium decrease conflict toward disease by accent of interleukin (IL) [(6)]. Serum interleukin 2 receptor (sIL-2R) an indicator of T lymphocyte activation might be sensible in survey of asthma activity [(7)].

Aims:

The aim of this study is to assess role of magnesium plus selenium in management of viral pneumonia in asthmatic child.

Material and Methods:

Patient's selection:

300 Asthmatics Child under 15 year present with viral pneumonia who visit private clinic and/or Tikrit teaching hospital record in a period of 56 month starting from April 2009 to April 2014,

Case Definition: According US Pharm update for Pneumonia [8].

Study procedures:

300 Asthmatics Child have viral pneumonia. Sub classified as 150 asthmatics Child magnesium plus selenium (tablet) group and 150 asthmatics. Child control (supportive). Magnesium 200 mg plus selenium (tab) 200 mcg were schedule to receive magnesium plus selenium single dose per day for 10 days with oxygen only (7days as inpatient and3days after discharge from hospital) while control group received supportive treatment & supplemental oxygen for two weeks.

Principally calculated review was used to accumulate information of viral pneumonia about role of both magnesium plus selenium (tablet) group and control group on course of pneumonia and in support of extra precise records classified Clinical manifestation as mean of heart rate, rabid respiration (corrected according to age), pulse oximetry saturation. All investigation and chest x-ray [9] for both group done for comparison at 1st day and 7th day. After cure Follow-up visits to private clinic and /or pediatrics outpatient's clinic of Tikrit teaching Hospital for completion & reviewing comprehensive questionnaire.

Laboratory Procedures:

Were done in the laboratory department of Tikrit teaching Hospital which includes CBP, ESR, high-sensitive C-reactive protein (hs-CRP), LFT, RFT, GUE, and chest x-ray while Nasopharyngeal tests for common viruses and serum interleukin-2 receptor level were done in privet Laboratories with magnesium serum level but actually selenium serum level estimation not available in hospital or in privet laboratories due to technical limitation.

Statistical Analysis:

It is accomplished by SPSS Version 19 [10] statistics and study through mean ±SD and P value, while binomial treatment group together estimated the mean of heart rate, mean of rabid respiration, pulse oximetry saturation mean.

Results:

The study results showed the following: - the mean±SD drop in heart rate, mean of rabid respiration of magnesium plus selenium group were 88.11 ±2.02 beat per minute 40.09±11.1 cycle per minute which more than in control group 110.74±1.72 beat per minute 60.49±1.16 cycle per minute (P= 0.001) (P=0.003) respectively. The mean±SD increment in mean of pulse oximetry saturation within Patients of magnesium plus selenium group was significantly higher (P = 0.001) compared to control group (98.6±1.43 vs. 53.4±1.7) respectively as in table (1) & figure (A).

The average Mean percent of (magnesium plus selenium) group for Heart Rate mean (88.0), Rabid Respiration mean (40) less than the average Mean percent of Control for HR mean (110), Rabid Respiration mean (60) while The average Mean percent of (magnesium plus selenium) group for Pulse Oximetry mean saturation (98) more than the average Mean percent of Control for Pulse Oximetry mean saturation (53) as shown in table (2).

The mean±SD of inpatient hospitalization time 7 days or less than 7 days was significantly higher (P =0.003) on magnesium plus selenium group (138 ±1.02) than in control group (21 ± 2.05), moreover , the mean±SD of inpatient hospitalization more than 7-

days was widely lower (P =0.004) on magnesium plus selenium patients (12 ±0.12) than control (129 ±1.11) as presented in table (3).

The mean±SD decrement of both hs-CRP and/or ESR improvement from 1st day up to 7th day were significant (P= 0.001) (P= 0.003) higher in Magnesium plus selenium (10.1 ± .02 mg/dL) (14.5± 2 .52 mg/dL) than in control subjects (65.24± 3.72 mg/dL) (44.1±2.06mg/dL) respectively. The mean±SD of Radiological improvement from 1st day up to 7th day was significant (P= 0.003) higher in Magnesium plus selenium (136.09±1.96 %) than in control subjects (25.09±1.16%).The mean±SD of serum sIL-2R from 1st day up to 7th day was extensively significant (P= 0.0002) lower in Magnesium plus selenium (122.5 ± 1.4 pg/mL) than in control subjects (374.2 ± 11.3 pg/mL) as obtainable in table (4).

Table (1): Comparison of mean±SD heart rate, rabid respiration, pulse oximetry saturation in magnesium plus selenium and control groups.

Clinical presentation and course of pneumonia	magnesium plus selenium (n=150) /mean±SD	Control (n=150) /mean±SD	P value
Heart Rate mean	88.11 ±2.02 beat per minute	110.74±1.72 beat per minute	0.001**
mean of Rabid Respiration	40.09±11.1 cycle per minute	60.49±1.16 cycle per minute	0.003*
mean of Pulse Oximetry saturation	98.6±1.43 SpO_2	53.4±1.7 SpO_2	0.001**

**The result very significant at $p < .05$

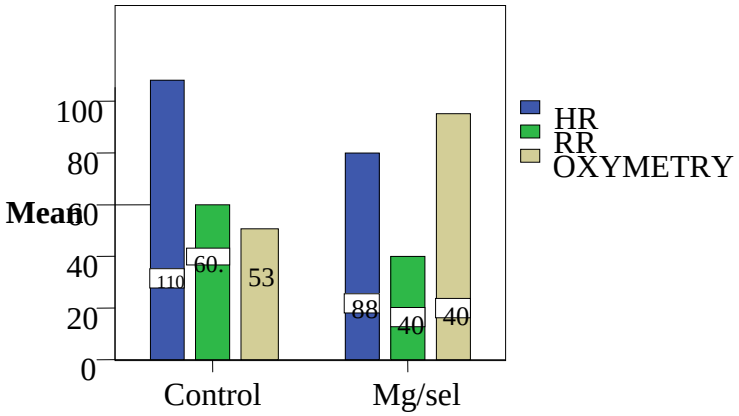

Figure -A-

Figure (A): Comparison of mean±SD heart rate, rabid respiration, pulse oximetry saturation in magnesium plus selenium and control groups.

Table (2): Binomial Comparison of heart rate, rabid respiration, pulse oximetry saturation in magnesium plus selenium and control groups.

Symptom		Frequency Rate
Heart rate mean	Magnesium plus selenium	88.11
	Control	110.0
Rabid Respiration mean	magnesium plus selenium	40
	Control	60
mean of Pulse Oximetry saturation Rate	magnesium plus selenium	98
	Control	53

Table (3): Comparison of inpatient hospitalization time in magnesium plus selenium and control groups.

inpatient hospitalization time	magnesium plus selenium (n=150) /mean±SD	Control (n=150) /mean±SD	P value
= Or < 7days (7 or less than 7 Day)	138 ±1.02	21 ±2.05	0.003*
>7days (more than 7 Day)	12 ±0.12	129 ±1.11	0.004*

P < 0.05 is considering significant *

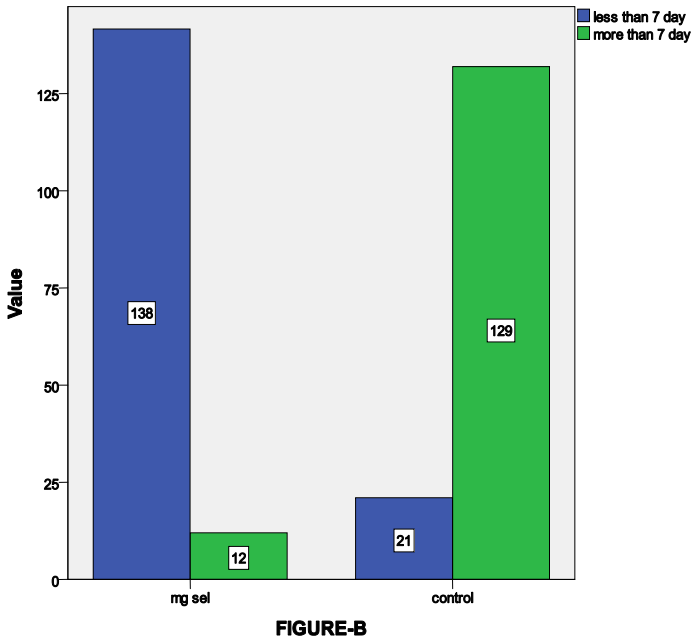

FIGURE-B

Figure (B): Comparison of inpatient hospitalization time in magnesium plus selenium and control groups.

Table (4): Comparison of mean±SD hs-CRP, ESR, and Radiological, serum interleukin-2 receptor improvement in magnesium plus selenium and control groups.

Time of sampling at 1st day and 7th day	Magnesium plus selenium (n=150) /mean±SD	Control (n=150) /mean±SD	P value
hs-CRP improvement	10.1 ± .02 mg/dL	65.24± 3.72 mg/dL	0.001*
ESR improvement	14.5± 2 .52 mg/dL	44.1±2.06mg/dL	0.005*
Radiological improvement	136.09±1.96 %	25.09±1.16%	0.003*
serum interleukin-2 receptor improvement	122.5 ± 1.4 pg/mL	374.2 ± 11.3 pg/mL	0.0002**

P < 0.05 is consider significant */ high significant**

Discussion:

This study is controlled & pharmacologic research in Tikrit hospital clarifies the role of magnesium plus selenium in treatment of viral pneumonia in asthmatic child. The application of this study is to decrease natural clinical course of pneumonia and hospitalization time. actually I am so distressing Because There is no similar comparison study for using together (specifically) magnesium plus selenium (tab) in medical journal and /or web site in Iraq, Egypt, Kuwait, Jordan, and Syria and even in Medill East so I could not able to evaluate my study with other researcher.

The estimates of magnesium plus selenium (tab) group HRmean, RRmean less than of control for HRmean, RRmean (P= 0.001) (P=0.003) respectively this can be due to the role of oral Mg intervenes in intracellular phosphorylation reactions, it constitutes an important determinant of the contraction/relaxation state of bronchial smooth muscle [3,11]. The magnesium plus selenium (tab) group Pulse Oximetry mean saturation, significantly important than control (P = 0.001) may be due magnesium adequacy affects immune task and reaction to oxidative strain which can give to the more regulation of immune dysfunction related to asthma [12, 13, 14].

This study showed that inpatient hospitalization time (P = 0.003) have been less in selenium cluster compare to control as resistant to infection was better in selenium cluster which agree with study in china and others area to evaluate effect of selenium [15, 16].

Selenium (Se) is an crucial part that adjust expression of elevated interleukin 2 receptors [17] in addition decrease serum levels of magnesium (Mg) that involve lymphocyte magnesium which in turn abnormally increase Interleukin 2 (IL-2) receptor [18] so in our study an inflammatory markers as hs-CRP (P = 0.001), ESR (P =0.005), Radiological [9] (P = 0.003*), serum interleukin-2 receptor [17,18]. (P = 0.0002) with significant improvement useful to offer precise image of the interrelation between magnesium plus selenium supplementation, viral pneumonia and immune responses in asthmatics child [19]. The Probable limit of the present study was that the prevalence of magnesium and selenium deficit in our study population was not conventional evaluated before the study. No adverse effect was encounter for both.

Conclusions:

This study indicates the most likely to benefit from magnesium plus selenium supplementation in management of viral pneumonia in asthmatic child. The product is intended to create novel theories for helpful magnesium plus selenium course in viral pneumonia.

Acknowledgments:

Thank all the doctors, pharmacy and healthcare workers & Clinical Bacteriology and family.

Abbreviations:

Mean of Heart Rate: HRmean, Rabid Respiration mean: RRmean, mean of Pulse oximetry saturation: Pulse oximetry mean saturation.

Reference:

[1]. Scott, J. Anthony G.; Wonodi, Chizoba; Moïsi, Jennifer C.; Deloria-Knoll et al; The Definition of Pneumonia, the Assessment of Severity, and Clinical Standardization in the Pneumonia Etiology

Research for Child Health Study, Clin Infect Dis. 2012; 54(Suppl 2):S109-S116
[2]. Lee N, Qureshi ST Other viral pneumonias: coronavirus, respiratory syncytial virus, adenovirus, Hantavirus. Crit Care Clin. 2013 Oct; 29(4):1045-68.
[3]. Arnaud MJ (2008). "Update on the assessment of magnesium status". Br. J. Nutr. 99 Suppl 3: S24–36.
[4]. Sunde RA. Selenium. In: Ross AC, Caballero B, Cousins RJ, Tucker KL, Ziegler TR, eds. Modern Nutrition in Health and Disease. 11th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2012:225-37
[5]. K. M. Brown and J. R. Arthur, Selenium, selenoproteins and human health: a review, Public Health Nutr. 2001, 5, 593–599
[6]. Baum MK[1], Miguez-Burbano MJ, Campa A, Shor-Posner G.Selenium and interleukins in persons infected with human immunodeficiency virus type 1. J Infect Dis. 2000 Sep; 182 Suppl 1:S69-73
[7]. Kim JT[1], Kim CK, Koh YY. Serum levels of soluble interleukin-2 receptor at acute asthma exacerbation: relationship with severity of exacerbation and bronchodilator response. Int Arch Allergy Immunol. 1998 Dec; 117(4):263-9.
[8]. Elias B. Chahine, M. Steven Mayberry, Update on the Treatment and Prevention of Community-Acquired Pneumonia in Children: US Pharm. 2012; 37(3): HS-12-HS-15.
[9]. Abigail Zuger, MD reviewing Bruns AHW et al. When Should X-Rays for Pneumonia Be Repeated .Clin Infect Dis 2007 Oct 15.
[10]. SPSS Computer software Version 19.
[11]. Ligia J. DOMINGUEZ, Mario BARBAGALLO, Gabriele Di LORENZO, Agata DRAGO, et al Bronchial reactivity and intracellular magnesium a possible mechanism for the bronchodilating effects of magnesium in asthma; Clinical Science .Aug 01, 1998,95(2)137-142;
[12]. Frank D. Gilliland Kiros T. Berhane Yu-Fen Li Deborah H. Kim Helene G. Margolis Dietary Magnesium, Potassium, Sodium, and Children's Lung Function Am J Epidemiol; (2002) 155 (2): 125-131.
[13]. Tong GM; Rude RK, Magnesium deficiency in critical illness, J Intensive Care Med. 2005; 20(1):3-17
[14]. Hill J, Micklewright A, Lewis S, et al. Investigation of the effect of short-term change in dietary magnesium intake in asthma. Eur Respir J 1997, 10:2225–9.
[15]. Liu X, Yin S, Li G.Effects of selenium supplement on acute lower respiratory tract infection caused by respiratory syncytial virus Zhonghua Yu Fang Yi Xue Za Zhi. 1997 Nov; 31(6):358-61.
[16]. K. Sammalkorpi, V. Valtonen, G. Alfthan, A. Aro, J. K. Huttunen, Serum selenium in acute infections July 1988, Volume 16, Issue 4, pp 222–224
[17]. Roy M[1], Kiremidjian-Schumacher L, Wishe HI, Cohen MW, Stotzky G. Selenium supplementation enhances the expression of interleukin 2 receptor subunits and internalization of interleukin 2. Proc Soc Exp Biol Med. 1993 Mar; 202(3):295-301.
[18]. McKee MD1, Cecco SA, Niemela JE, Cormier J, Kim CJ, Steinberg SM, Rehak NN, Elin RJ, Rosenberg SA. Effects of interleukin 2 therapy on lymphocyte magnesium levels. J Lab Clin Med. 2002 Jan; 139(1):5-12.
[19]. Lai CK[1], Chan CH, Leung JC, Lai KN. Serum concentration of soluble interleukin 2 receptors in asthma Correlation with disease activity. Chest. 1993 Mar; 103(3):782-6.