Wheezing; Asthma; Reactive oxygen species; Ascorbic acid

Introduction:

Wheezing, the most common symptom of Asthma is usually described as a musical sound that is usually heard when child takes a breath out and sometimes also when he breathes in. This sound is caused by an obstruction to the regular flow of air from the lungs and is usually caused by inflammation resulting due to free radicals. Airway inflammation is important characteristic of asthma and the metabolism of oxygen radical is enhanced in symptomatic asthma in relation to clinical disease activity. Eosinophils, alveolar macrophages and neutrophils from asthmatic patients produce more oxygen species than do those from normal subject.

Vitamin C is a potent antioxidant known to protect from oxidative injury. Loading cells with vitamin C reduces oxidative cell death, inhibits Fas ligand induced apoptosis and confers genomic protection through the quenching of intracellular reactive oxygen species.

Consuming fruits rich in Vitamin C may reduce wheezing symptoms in childhood. Ascorbic acid is the most abundant water soluble antioxidant in lung tissue that directly neutralizes free radicals and is a part of Glutathione peroxidase pathway for repairing oxidative damage to the lipid membrane. In our present study we tried to find out plasma Ascorbic acid level in wheezing children which reflect their alveolar level.

Materials and Methods:

Present study was carried out in Dept. of Biochemistry. Blood samples of 50 (26 males, 24 females) children who came to pediatrics OPD with wheezing and shortness of breath were included in the study. Blood sample was collected and analyzed for plasma Ascorbic acid level photometrically using Backman’s spectrophotometer. Out of total 50 children 18 were having severe symptoms. Equal number of healthy age and sex matched controls (28 males, 22 females) were selected for comparison.

Results:

The total number of 50 wheezing children were in the age group of 2 to 12 years with similar age matched controls. It was observed that the plasma ascorbic acid concentration in the wheezing children (0.43 ± 0.12 mg/dl) was significantly decreased as compared to the normal controls (0.75 ± 0.18 mg/dl) P< 0.001. The highly significant low levels of plasma ascorbic acid level in wheezing children was irrespective of sex and severity of symptoms. Equal number of healthy age and sex matched controls were included in the study. Blood sample was collected and analyzed for plasma Ascorbic acid level photometrically using Backman’s spectrophotometer. Out of total 50 children 18 were having severe symptoms. Equal number of healthy age and sex matched controls (28 males, 22 females) were selected for comparison.

Table 1: Plasma Ascorbic level in wheezing children (in mean ± SD) in mg/dl

<table>
<thead>
<tr>
<th>Normal controls (n=50)</th>
<th>Wheezing children(n=50)</th>
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<tbody>
<tr>
<td>0.75±0.18</td>
<td>0.43±0.12*</td>
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<td>p&lt;0.001</td>
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vitamin C to the wheezing children might be considered role in wheezing children.

consumption of citrus fruit rich in vitamin C has a protective plasma ascorbic acid content. It has been also found that probably at the bronchial mucosal surface, thus reducing the episodes, ascorbic acid was being actively metabolized reduced. This would suggest that, during the asthmatic vitamin during the acute episode of asthma was significantly acid caused pulmonary dilation and urinary excretion of the McNally et al.

Important role of ascorbic acid in children with exercise induced asthma. Important role of ascorbic acid is the major antioxidant substance present in the airway surface lining of the lung, and may protect against endogenous as well as exogenous oxidants. Our present finding of low ascorbic acid in wheezing children could be attributed to its normal physiological function, elevated utilization to overcome continuous generation of oxidant radical and also to neutralize the exogenous oxidant. It has been suggested that ascorbic acid deficiency may be either an underlying factor in the pathophysiology of asthma or a response to asthmatic airways inflammation. Our findings of low ascorbic acid in wheezing children is in agreement with the earlier reports of Akinkuje et al who attributed such kind of lowering in ascorbic acid level in plasma to its normal physiological function, increased oxidative stress. Based on this findings, it can be suggested that to some extent decrease in the level of ascorbic acid may be due to increased utilization for the formation of Prostaglandin E2, a bronchodilator and not solely due to scavenging of free radicals. Vitamin C may have protective effect on the airway hyper reactivity in some patients with exercise induced asthma. Important role of ascorbic acid in the maintenance of pulmonary function has been reported by McNally et al who showed that administration of ascorbic acid caused pulmonary dilation and urinary excretion of the vitamin during the acute episode of asthma was significantly reduced. This would suggest that, during the asthmatic episodes, ascorbic acid was being actively metabolized probably at the bronchial mucosal surface, thus reducing the plasma ascorbic acid content. It has been also found that consumption of citrus fruit rich in vitamin C has a protective role in wheezing children. Thus the continuous supply of vitamin C to the wheezing children might be considered helpful.

References: