

THE EFFECT OF BETA GLUCAN TO THE FREQUENCY OF RESPIRATORY TRACT INFECTIONS IN CHILDREN

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Introduction:

Respiratory Tract Infections (RTI) are the most frequently occurring illness in childhood. On average, children acquire three to eight RTIs per year. RTIs are the most common medical reason for school or work absentees. Medications used for the symptoms of RTIs are the most common drugs used in childhood.

The immune system is important in determining the propensity of individuals to RTIs. Many components such as macrophages, secretory IgA, lysozyme, lactoferrin and interferon play a defensive role in RTIs. Glucan, a novel polyglucose compound isolated from *Saccharomyces cerevisiae*, has been demonstrated to be a potent reticuloendothelial stimulant and inducer of nonspecific host resistance. Glucan has been extensively studied with regard to its anti-tumor, antibacterial, antifungal and antiviral properties. But there is no study about its effect on respiratory infections in human.

The aim of this study is to investigate the effect of Beta Glucan to the frequency of respiratory tract infections in children.

Material and Methods:

Children attempted with recurrent respiratory tract infections to hospital between September 2003 and April 2004 was included into the study. Infections were not separated as upper and lower RTIs and all infections (rhinitis, tonsillopharyngitis, laryngotracheitis, bronchitis, bronchiolitis and pneumonia) were included. The ethological agent (bacterial, viral or other) was also not taken into account.

Because Beta Glucan is not paid by the health insurance companies in Turkey, most parents who were offered to give the drug to their child did not want to be included to the study. Children whose parents accepted were given Beta Glucan at a dose of 10 mg per day. The numbers of RTIs before and after Beta Glucan were compared. After the beginning of Beta Glucan therapy the children were followed until the end of April 2004. The infections occurred between September 2003 and the beginnings of the Beta Glucan therapy were named as "RTI before Beta Glucan", whereas infections occurred between the beginning of Beta Glucan and April 2004 were considered as "RTI after Beta Glucan".

Statistical comparison between infection numbers before and after therapy was performed employing Student's *t* test. A value of $p < 0.05$ was considered significant.

Results:

A total of 32 children were including into the study. The features of these children are shown in Table 1. The ages of the children were between 1 and 8 years (mean 3,4 years). In six of the 32 children, there was no significant decrease in the frequencies of RTIs but in the other 26 was. Over the whole group the fall in the frequency was statistically significant ($p < 0.01$).

Discussion:

Glucan treated animals show a hypertrophy of the major reticuloendothelial organs, with a concomitant increase in activation and proliferation of macrophages. There is also some evidence that glucan treatment primes granulocytes and macrophages for subsequent cytokine release (interleukin-1 and -2) when bacterial challenge occurs. The present study support the theory that immunotherapy with glucan may reduce the risk of infections.

In this study, the other factors that may play a role in reducing the numbers of the infections could not be investigated. That's why there is need for more extensive studies in that the other factors are also taken into consideration.

Table 1: The features of children

| Patient | Age of child (year) | Frequency of RTI before B. Glucan | Frequency of RTI after B. Glucan |
|-----------------------------------|---------------------|-----------------------------------|-----------------------------------|
| 1 | 1 | 4 times/2 months | 1 time/4 months |
| 2 | 3 | 5 times/3 months | 3 times/4 months |
| 3 | 4 | 3 times/1 month | none/5 months |
| 4 | 6 | 2 times/1 month | none/6 months |
| 5 | 3 | 3 times/1 month | 1 time/6 months |
| 6 | 4 | 4 times/2 months | 4 times/6 months |
| 7 | 7 | 5 times/2 months | 1 time/5 months |
| 8 | 1 | 4 times/2 months | none/5 months |
| 9 | 2 | 4 times/2 months | none/5 months |
| 10 | 5 | 3 times/1 month | none/4 months |
| 11 | 3 | 3 times/2 months | 4 times/4 months |
| 12 | 4 | 4 times/2 months | 2 times/6 months |
| 13 | 3 | 3 times/1 month | 1 time/6 months |
| 14 | 4 | 4 times/2 months | 1 time/5 months |
| 15 | 2 | 4 times/3 months | none/4 months |
| 16 | 4 | 5 times/3 months | 5 times/3 months |
| 17 | 3 | 5 times/2 months | 1 time/4 months |
| 18 | 3 | 5 times/3 months | None/4 months |
| 19 | 8 | 4 times/2 months | 1 time/4 months |
| 20 | 2 | 3 times/2 months | none/6 months |
| 21 | 3 | 3 times/1 month | none/7 months |
| 22 | 1 | 4 times/2 months | 1 time/4 months |
| 23 | 3 | 3 times/2 months | 1 time/5 months |
| 24 | 6 | 5 times/2 months | 5 times/5 months |
| 25 | 5 | 2 times/1 month | 1 time/6 months |
| 26 | 2 | 3 times/2 months | none/4 months |
| 27 | 2 | 3 times/2 months | none/5 months |
| 28 | 4 | 4 times/2 months | none/5 months |
| 29 | 5 | 2 times/1 month | none/6 months |
| 30 | 1 | 2 times/2 months | 5 times/4 months |
| 31 | 4 | 3 times/2 months | 1 time/5 months |
| 32 | 3 | 2 times/1 month | 1 time/6 months |
| Total: 113 times/59 months | | | Total: 40 times/158 months |
| Nf: Not found | | | P<0.01 |