Vitamin C and the Common Cold

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Summary

A double-blind trial of the prophylactic effect of a large dose of vitamin C in upper respiratory tract infection in 2 groups of adult volunteers was carried out during a period of 3 months in 1973. No differences in the incidence of infection in vitamin C and control groups were detected.

Introduction

In the view of many, including the present authors, the effect of vitamin C as a prophylactic agent in upper respiratory infections has not been satisfactorily demonstrated in clinical trials. The subject has been reviewed over the years by many authors, notably Pauling (1970), who published a popular book based on selected trial results and his own experience with 'mega-dose therapy'. There is no consensus, however, and it is fair to say that the case for vitamin C is 'not proven' (Editorial, British Medical Journal, 1973). The controversy is likely to continue. The present situation has been succinctly stated by Tyrrell (1974). Anderson and his colleagues (1972) showed that a regular daily dose of 1 g vitamin C (as four 250-mg divided doses) had no effect on the incidence or severity of upper respiratory tract signs and symptoms, although his subjects in the vitamin C group had illnesses which were less severe and therefore caused less time off work and less time confined to bed.

Against this background we decided to investigate the effect of 1 g vitamin C daily (either as a single dose or 500 mg b.d.) on the incidence of upper respiratory tract infection in a group of healthy working adults. The results have already been briefly reported (Carson et al., 1974).

Method

The trial was carried out in two centres, Southampton and High Wycombe. At each, one firm with one part-time medical officer took part but the trials were run concurrently. The number of volunteers who took part was rather smaller than expected and although one group took 1 tablet daily and the other the same amount as 2 tablets, in all other respects the groups were comparable and have been combined for assessment of results.

The method of recruitment differed in the 2 centres but approximately 150 volunteers entered the trial at both. On entry, all subjects had to complete a card by giving not only their names and occupations but also their relevant medical history, average number of colds experienced in winter, smoking habits and some information on diet. They were then given sufficient tablets or matching lactose dummies for the 80-day period of trial according to a random sequence code. At Southampton subjects were given Redoxon effervescent tablets (1 g sodium ascorbate) or placebo and were instructed to take one tablet in water daily. At High Wycombe subjects were given Redoxon tablets (0-5 g sodium ascorbate) or placebo and instructed to take one twice daily.

Record Cards

In addition to the introductory card completed at the outset, monthly calendar cards were provided on which subjects had to tick a space daily if symptom-free or indicate any of 7 cardinal symptoms. The back of the card was to be used for recording any symptoms not listed and stating if at any time
medical advice had been sought. The symptom list was: running nose, sneezing, headache, sore throat, cough, fever, 'confined to bed'.

At both centres sufficient tablets and cards for the whole period were issued to each subject on the day he or she attended the works surgery to enter the trial. To judge by the drop-out rate, at least in Southampton, this was unwise. The alternative method of issuing sufficient tablets and cards for, say, 2 or 4 weeks at a time might have lessened the drop-out rate.

Results
With comparatively small numbers at each centre results were considered together and comparisons between centres made where appropriate.

One hundred and forty-seven subjects entered at High Wycombe (74 vitamin C; 73 dummy) and 148 at Southampton (79 vitamin C; 69 dummy). The proportion of males and females was very different at each centre—High Wycombe 110:37 and Southampton 73:75. In analysing results, however, males and females were considered together.

Drop-outs
Any subject failing to take tablets or keep records for a minimum of 40 days was considered a drop-out and excluded from statistical analysis. The proportion of drop-outs in Southampton (24 per cent of those who started) was significantly higher ($P<0.01$) than at High Wycombe (11 per cent of those who started). However, the relative proportions of drop-outs in the vitamin C and placebo groups did not differ (Table I).

<table>
<thead>
<tr>
<th></th>
<th>Dropped out</th>
<th>Completed at least 40 days</th>
<th>Total</th>
<th>Grand totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southampton</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>23</td>
<td>56</td>
<td>79</td>
<td>148</td>
</tr>
<tr>
<td>Placebo</td>
<td>12</td>
<td>57</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>High Wycombe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>9</td>
<td>65</td>
<td>74</td>
<td>147</td>
</tr>
<tr>
<td>Placebo</td>
<td>7</td>
<td>66</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>32</td>
<td>121</td>
<td>153</td>
<td>295</td>
</tr>
</tbody>
</table>

Table I. Proportion of drop-outs in both groups

Table II. W = Well;

Southampton  Active Placebo
High Wycombe Placebo

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Table III.

Southampton  Active Placebo
High Wycombe Placebo

Discussion
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Table II. Average number of days symptom reported

<table>
<thead>
<tr>
<th></th>
<th>No. in group</th>
<th>W</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>H</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southampton</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>56</td>
<td>65.52</td>
<td>3.46</td>
<td>3.96</td>
<td>2.66</td>
<td>2.41</td>
<td>2.11</td>
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<tr>
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<td>57</td>
<td>68.74</td>
<td>2.19</td>
<td>3.67</td>
<td>1.82</td>
<td>2.77</td>
<td>1.91</td>
</tr>
<tr>
<td>High Wycombe</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>65</td>
<td>67.75</td>
<td>3.54</td>
<td>3.18</td>
<td>1.68</td>
<td>1.31</td>
<td>2.52</td>
</tr>
<tr>
<td>Placebo</td>
<td>66</td>
<td>67.14</td>
<td>4.61</td>
<td>2.23</td>
<td>1.39</td>
<td>1.26</td>
<td>2.00</td>
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</tbody>
</table>

W = Well; R = Running Nose; S = Sneezing; T = Sore throat; H = Headache; C = Cough.

Table III. Episodes of ‘cold’, Definition 4

<table>
<thead>
<tr>
<th></th>
<th>No. in group</th>
<th>No. of episodes</th>
<th>Average per subject in group</th>
<th>No. of subjects experiencing ‘cold’</th>
<th>Average per subject experiencing cold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southampton</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>56</td>
<td>85</td>
<td>1.52</td>
<td>38</td>
<td>2.24</td>
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<td>57</td>
<td>84</td>
<td>1.47</td>
<td>38</td>
<td>2.21</td>
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<td>High Wycombe</td>
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<td></td>
</tr>
<tr>
<td>Active</td>
<td>65</td>
<td>121</td>
<td>1.86</td>
<td>47</td>
<td>2.57</td>
</tr>
<tr>
<td>Placebo</td>
<td>66</td>
<td>96</td>
<td>1.45</td>
<td>46</td>
<td>2.09</td>
</tr>
</tbody>
</table>

W = Well; R = Running Nose; S = Sneezing; T = Sore throat; H = Headache; C = Cough.

40 and 80 days. The Southampton vitamin C group and both groups at High Wycombe each included 9 or 10 subjects with an average of just over 15 missing days. The Southampton placebo group had 7 subjects with an average of just over 7 missing days. This is just significantly different from the others (t = 2.40, P < 0.05).

The number of episodes of Definition 4 colds is shown (Table III) together with the average incidence of episodes in the whole group and the number of subjects in each group who experienced at least one episode. The differences are remarkably small and are all non-significant.

Discussion

These two trials, considered here as one, are open to criticism in at least 3 respects.

First, the number of subjects who actually completed a minimum of 40 days' treatment was small for this type of investigation. Secondly, we cannot say for certain what proportion of subjects in either group actually took all the tablets handed out. No check was made on returned packs and none on random urine samples for vitamin C concentration. The subjects were volunteers and we have assumed that they were well motivated as a group. The assumption that tablet taking was conscientious is therefore not unreasonable. Thirdly, no extra vitamin C was taken during an episode of infection. That was a deliberate decision. We were interested solely in the possibility of there being an effect on incidence, not on symptomatology generally or severity of symptoms in particular. Subjective assessment of severity is unreliable; one man’s ‘throat tickle’ is another man’s ‘rashing pharyngitis’. Anderson’s first trial combined prophylactic and therapeutic vitamin C (Anderson et al., 1972). This not only complicates the day-to-day management but renders statistical analysis more complex. The Canadian workers in fact separated prophylactic and therapeutic groups in their second trial (Anderson et al., 1974).

Severity of symptoms and time off work were not recorded. The Canadian trial (Anderson et al., 1972) did show a statistically significant difference in favour of vitamin C in the number of days off work (not necessarily because the subjects had colds) but the second Canadian trial (Anderson et al., 1974) has not in fact confirmed those findings.
Conclusions
In spite of the shortcomings mentioned above, the results of this trial do not bear out the conclusions of others (Ritzel, 1961; Wilson and Loh, 1973; Coulehan et al., 1974) that a large dose of vitamin C taken daily by a group of healthy people is likely to reduce the incidence of upper respiratory infections, including the common cold.

Acknowledgements
Neither of these trials could have been carried out without the willing cooperation of medical and personnel staff of E. G. Gomme & Co Ltd at High Wycombe and Mullard Ltd at Southampton. Our thanks are due to them and to the employees of both companies who volunteered.

REFERENCES
Anderson T. W., Reid D. B. W. and Beaton G. H. (1972)


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PERMANENT COMMISSION AND INTERNATIONAL ASSOCIATION ON OCCUPATIONAL HEALTH

Professor Juan Kaplan, who died in 1973, was one of the outstanding pioneers of occupational health in Argentina. A Juan Kaplan Award has been established by his widow, Maria Elena Fingermeir de Kaplan. The award will be granted to a medical doctor for an individual paper recording an investigation in occupational medicine, preferably in connection with the prevention of occupational diseases and accidents. The paper should be either written especially for the award or be a paper presented at the International Congress on Occupational Health.

The award will consist of a gold medal, a diploma or certificate, and the sum of US $150. The award will be made at the closing session of the 18th International Congress on Occupational Health, which will be held in Brighton, England, from 14 to 19 September, 1975.

Applications and manuscripts should be sent before 1 September, 1975, to the Secretary General of the Permanent Commission and International Association on Occupational Health, Professor Enrico C. Vigliani, Via San Barnaba 8, 20122 Milano, Italy.

The President of the Permanent Commission and International Association on Occupational Health will nominate the adjudicating committee.

Summary
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