

ASCORBIC ACID: EFFICACY IN THE PREVENTION OF SYMPTOMS OF RESPIRATORY INFECTION ON A POLARIS SUBMARINE

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To determine if ascorbic acid (AA) in doses of 2 grams/day has any value in preventing respiratory symptoms a double blind study was initiated on a Polaris submarine. Each ship has two crews and as the one on patrol returns, the off-crew is flown from the United States to meet the ship. When this second crew arrives they are exposed to new respiratory viruses and a large outbreak of colds occurs which has been documented by a review of 360 patrol reports.

Volunteers were asked to participate in a double blind study in which venous blood would be drawn for viral serology studies, and either 500 mgs of AA or a citric acid placebo would be taken four times a day. Seventy out of a 140 man crew volunteered and were randomly placed in treatment or placebo groups. Berthing on the ship was determined by seniority, and non-participants, placebo, and AA groups were intermingled. Both AA and placebo capsules looked identical and when opened the contents were similar in taste and appearance.

The first sample of blood was drawn and the men given their medication one day prior to the crew being flown to Europe. From this time until the end of the study all participants were seen by the author at least weekly so respiratory symptoms could be recorded, and the people reminded to take their capsules regularly. The second set of bloods were drawn three weeks into the study and a final venipuncture was done at the end of the tenth week when the study was terminated.

There were 37 and 33 participants in the AA and placebo groups respectively, and the groups were similar with respect to age and smoking habits. Five dropouts occurred in the placebo group, and in the vitamin group two men did not take the capsules as directed for a short period of time. Data from the drop-outs and above two are included for the weeks they were fully participating in the study.

There was no consistent difference between groups in the incidence of runny nose or sneezing. Man-days of morbidity for hoarseness, sore throats, non-productive coughs, and productive coughs was 36, 107, 42 and 72 in the placebo group with only 37%, 28%, 40% and 31% as much morbidity in the AA group. The Wilcoxon Sequence Test with a one tailed test rejected the null hypothesis of equal effectiveness of the AA and placebo for sore throats and productive coughs ($P=.0155$ and $.0327$) but not for hoarseness or non-productive coughs. Complement fixing titers for influenza, parainfluenza types 1,2, and 3, *M. pneumoniae*, and adenovirus antigens did not reveal any difference between groups.

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1. Wilkens, D. D. (1969), Navy Submarine Medical Center, Groton, Conn., Report #560.

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A marked increase in the mortality from lung cancer has been shown in all countries where reliable statistics are available. In England and Wales over 30,000 people die of it each year. The possible ways of controlling this disease are (1) to prevent it by removing the known causative factors; (2) to detect or diagnose the disease at an early stage before widespread dissemination has occurred and (3) to improve the results of treatment. We know something of the causative agents, the most important being tobacco smoking; but human beings, being human, refuse to accept the advice of the medical profession. Even if they did stop smoking now it would be many years before there was a marked reduction in the incidence of the disease. Radical ablative treatment can only be effective if the disease is confined to the chest and therefore every attempt must be made to diagnose the malignancy at an early stage or even to detect it before symptoms develop. (1). Unfortunately most clinicians are presented with an established disease and in these patients we can only use the existing methods of treatment and attempt to improve these or find new ones.

There are three alternatives to be considered; we can give radical treatment aimed at a cure; palliative treatment to relieve distressing symptoms in those patients where a cure is not possible; and where there is no chance of a cure and no distressing symptoms, no active treatment is given. Only about 12% of patients seen in the hospital outpatient department are suitable for surgical eradication of their tumours.

Radical treatment

In patients with operable lesions it has been established that surgery is the preferred method of treatment where a bronchoscopic biopsy has revealed a squamous tumour and that radiotherapy gives slightly better results with anaplastic lesions. (2). In oat cell tumours the results are better with radiotherapy. (3).

Radical radiotherapy can be given when the tumour is still confined to the chest. Deeley and Singh (4) reported an 8%, 3 year survival rate in 513 inoperable lesions; in squamous tumours it was 10%. The development of megavoltage radiation techniques makes it possible to give cancericidal doses to larger tumours in the chest. However, the policy of radiotherapy is to kill malignant tumours and to cause as little damage as possible to normal tissues. (5, 6). Radiation techniques have been developed largely by trial and error but further work must make use of controlled clinical trials. We have carried out a progressive series of small carefully controlled trials using a pairing system (7, 8), each patient being paired with another having exactly the same combination of factors known to affect the prognosis. The series has investigated or is in the course of investigating:-

Total tumour dose

In anaplastic lesions a tumour dose of 3,000 rads given in 20 treatments over 28 days was found to give better results than 4,000 rads given with the same factors. Likewise in squamous lesions 4,000 rads was preferable to 5,000 rads. There was a higher incidence of radiation fibrosis in the high dose groups. (9).

Fractionation

The next step was to change the fractionation regime, twice weekly treatment being compared with daily treatment for 5 days per week. To achieve the same biological effect the total overall

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