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Food Stimulated Lymph Flow in the Neck Region

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Summary

Food stimulated lymph flow in the neck region was studied in 8 patients. In each patient there was a significant increase in lymph flow during eating. Changes in lymph flow occurred rapidly and it is suggested that lymph transport is an active process.

Introduction

Lymph flow in man has been studied after cannulation of lymph vessels (3, 4, 5) and by indirect lymphography, lymph nodes have been visualized in various regions using either Lipoidol ultra fluid (6) or ^{99m}Tc antimony colloid (1, 2).
In this paper food stimulated lymph flow was studied employing the indirect method.

Method and material

After 2 hours of fasting 100 μCi ^{99m}Tc antimony sulfide colloid (Duphar Philips DRN 4333) in a volume of 0.2–0.3 ml (0.5% Lidocain non vasoconstringens, hyaluronidase 20 IE) was injected in the submucous tissue in one side of the tongue base. The patient was then placed in the supine position under a gamma camera (Ohio-Nuclear ON 100) covering the oral and neck region.
The registration of radioactivity was started immediately using a 18000 holes parallel collimator with an interphased mini-computer (Varian 620/L – 100).
A scintigram was registrated every one minute during a span of 50 minutes, 10 minutes in the basal state, during food intake (bread, butter and meat) and postprandial.
The sequence of scintigrams were summarized and from these summations "region of interest" (ROI) over the visualized lymph nodes were defined via a display oscilloscope.

From the sequence of registrated scintigrams, time function curves were generated. An attempt to describe flow conditions was done by calculation of slope (K counts/min. -1) on different curve locations by automatic linear regression analysis.

Patients studied

8 patients (4 women and 4 men) entered the trial. All suffering from malignant disease but with no evidence of metastases in the head and neck region.

Results

All patients acted similar with an increased lymph flow during food intake visualizing lymph nodes on the oscilloscope already 5–10 minutes after the start of the meal, see fig. 1.
In table I, the slope (K values) on normalized curves in the different phases of the trial in each patient can be checked and there was significant food stimulatory effect ($p < 0.01$) on the lymph low in each patient.

Table I Lymph flow over the neck region expressed by K-values/counts/min. (K) and standard deviation (SD).

Pt. no.	Basal K ± SD	Meal K ± SD	Postprandial K ± SD
1	– 6.1 ± 2.9	176.9 ± 17.2	–15.8 ± 1.6
2	6.4 ± 1.8	161.3 ± 9.0	– 3.6 ± 1.1
3	– 7.0 ± 4.0	186.4 ± 17.5	–18.6 ± 2.7
4	17.3 ± 20.7	194.2 ± 26.4	– 8.7 ± 1.6
5	10.3 ± 3.2	222.8 ± 7.6	– 3.4 ± 1.9
6	– 4.1 ± 16.8	189.8 ± 12.5	16.0 ± 1.4
7	1.8 ± 3.3	172.2 ± 32.9	13.6 ± 1.6
8	10.2 ± 2.4	182.7 ± 26.5	8.7 ± 2.0

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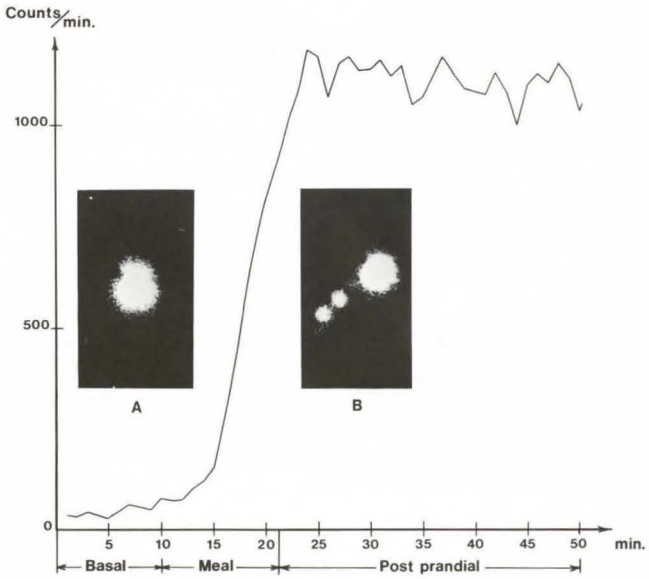

Fig. 1 Time function curve of flow condition in patient nr. 2.
A: Scintigram of the injected bolus of ^{99m}Tc antimony colloid in the tongue base during basal condition.
B: Postprandial scintigram, note visualization of 2 cervical lymph nodes.

Discussion

The results of this study indicate that food intake can accelerate lymph flow from the tongue base through the lymph node of the neck but apparently only during eating because there was a significant postprandial decrease in K values over the lymph node in each patient.

Furthermore changes in lymph flow can occur rather rapidly and this is in harmony with the conclusion put forward by *Cox* in 1974, where he stressed that the whole process was too rapid to satisfy the theory that lymph transport was a passive process facilitated by the contraction of skeletal musculature and the pulsation of the neighbouring blood vessels.

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