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# The Influence of Atropine and Adrenaline on Basal Lymph Flow in the Neck Region

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**Summary**

The effect of atropine (0.5 mg/i.v.) and adrenaline (5 pg/min.) on basal lymph flow in the neck region was studied in 15 patients. No significant stimulatory effect of these drugs on basal lymph flow was registrated.

In a previous study (2), we have observed rapid changes in lymph flow after food stimulation. Based on these observations we suggested that lymph transport during these conditions could be an active rather than a passive process facilitated by the contraction of the musculature and the pulsation of neighbouring blood vessels.

These considerations found support in the results reported by *Deysine* et al. (1) where atropinization increased thoracic duct lymph flow after intravenous infusion of calcium whereas a significant decrease was observed after sympathetic blockage.

The purpose of this study has been to investigate the effect of atropine and adrenaline on basal lymph flow.

## *Material and Method*

Patients studied: 15 patients without clinical sign of cardiac failure or diseases in the cervical lymph nodes entered the trial.

## *Method*

All patients had ECG performed to secure cardial sinus rhythm and pulse rate was registrated continuously during the trial by a pulse meter (San-El, Tokyo, Japan). – After 4 hours of fasting, 100 $\mu$C $^{99}$Tc antimony sulfide chloride in a volume of 0.2 – 0.3 ml was injected in the submucous tissue in one side of the tongue base as previously described. The patients were then placed supine with the head in the oblique position under the gamma camera covering the oral and neck region. The registration of radioactivity was started immediately using a 18,000 holes parallel collimator with an interfaced minicomputer. A scintigram was registrated every one minute during a span of 45 minutes.

Ten minutes in the basal state, 12 minutes after intravenous injection of 0.5 mg atropine or infusion of adrenaline 5 pg/min (continuing throughout the test period), then 12 minutes during food intake (all patients were issued a 300 g solid test meal consisting of beef, butter and potatoes (31 g protein, 30 g carbohydrate and 20 g fat)). Finally the activity was registrated postprandially up to 45 minutes.

The sequence of scintigrams were summarized and from these summations, "regions of interest" over the visualized lymph nodes were defined via display oscilloscope.

From the sequence of registrated scintigrams time function curves were generated. Flow condition was described by calculating the slope (K min$^{-1}$) on different curve location by automatic time regression analysis.

Finally delta values were calculated in each patient: K values obtained from stimulation with atropine or adrenaline was subtracted from K-values obtained from food stimulation.

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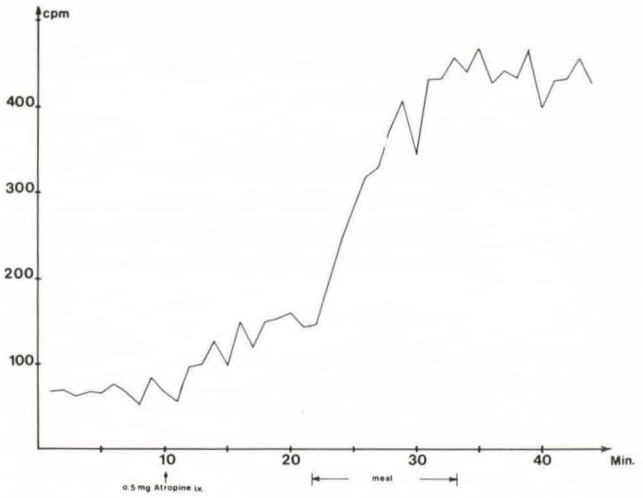


Fig. 1 The time function curve from the patients where atropine had a significant influence on basal lymph flow

These delta values in patients receiving either atropine or adrenaline were then compared and analyzed by the Mann-Whitney test at the 5 per cent level.

*Results*

There was an increase in basal pulse rate (range: 60–80 to range 100–120 after administration of atropine or adrenaline). Based on K-values in the individual patient, adrenaline had no significant effect on basal lymph flow but in two patients a stimulatory effect was registrated. In patients receiving atropine, a stimulatory effect was only noticed in one patient (see Fig. 1), time funtion curve from a patient receiving 0.5 mg atropine i.v.).

As appears from Table 1, a significant food stimulatory effect on lymph flow was noticed in all patients and based on delta values (given as means and ± standard error of the mean) there was no difference between the influence of atropine (mean 137.5 ± 24.4) or adrenaline (mean 126.1 ± 16.9) on food stimulated lymph flow.

*Discussion*

In this study, an increase in basal pulse rate was registrated in all patients after administration of atropine or adrenaline indicating that all patients responded to the received drugs.

No significant effect on basal lymph flow was noticed after administration of atropine or adrenaline. However, an increase in 3 patients occurred and this could indicate blockage of lymph nodes or vessels in other patients. We have observed this phenomenon after food stimulation in patients with tumour replacement in the cervical lymph nodes (unpublished data). This possibility however, can be excluded as there was an equal food stimulatory effect on lymph flow in all patients.

So this study failed to confirm the effect of atropine on lymph flow as reported by *Deysine* but they studied lymph flow in the thora-

Table 1

| Patients No. | Basal | Atropine | Meal | Postprandial |
|---|---|---|---|---|
| 7 | 14 ± 4.7 | 12.3 ± 4.9 | 152.7 ± 21.2 | −18.2 ± 5 |
| | | *Adrenaline* | | |
| 8 | 9.8 ± 4.7 | 17.1 ± 7.3 | 143.1 ± 11.1 | −19.2 ± 4.4 |

K values min −1 are given as means and ± standard error of the mean

cic duct in dogs after administration of calcium intravenously which makes a comparison difficult.

## *References*

*Deysine, M., M. Mader, E. Rosario, A. Aufses:* Lymph Flow Augmentation Secondary to Rises in Serum Calcium. J. of Clin. Pharm.: 1975, 7: 558

*Thommesen, P., F. Taagehøj-Jensen:* Food stimulated lymph flow in the neck region: Lymphology (in press)

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