

## The Circulatory Effect of Drug on Lymphedema

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### Summary

Various kinds of drugs are used to improve the lymphedema of the extremities. In this report, a dye transducer was applied on the site of edema of the leg, foot, or hand and indocyanine green was injected intravenously. The change of circulating dye was recorded by means of dye densitometer. The edematous tissue showed higher dye concentration with lapse of time, while drugs, i.e., Esberiven<sup>®</sup>, urokinase, kallikrein, etc., accelerated the dye dilution. These drugs have the effect to correct the stagnant microcirculation to a more steady flow in the region of edema.

Various kinds of drugs, and physical support are recommended to promote lymph circulation for those with secondary lymphedema.

The purpose of this communication is to report the circulatory effect of drugs in those with lymph stasis of the extremities measured by dye dilution method.

### I. Method

Ten cases with secondary lymphedema of the extremities were subjected to the study. The edema appeared following phlebo-thrombosis, and operation for cancer of the uterus, or breast. The edema lasted from 6 months to 5 years, average 2 years. All except one suffered from unilateral secondary lymphedema of the lower extremity. The age ranged from 51 years old to 78 years old.

The circulation was studied as follows: the patient was placed in a supine position. A reflecting type photoelectric transducer was applied on the edematous or asymptomatic area. It was connected to a densitometer (type EN-80) and recorder (OD-20). Indocyanine green 2.5 mg was injected from the cubital vein. Recording was made for 2 minutes and a half at 25 mV with a paper speed of 1.5 mm/sec.

The measurement was carried out before and after drug injection (Esberiven<sup>®</sup>, dexametha-

son, urokonase, cepharanthine and Kallikrein<sup>®</sup>) or mechanical massage. Mechanical massage was carried out by compressing 5 compartments of a boot alternatively with air pressure 80-200 mm Hg for 20 minutes (Hadomar<sup>®</sup>).

### II. Result

The dye at the site of edema showed a higher concentration with the lapse of time. Following injection of a drug, the dye concentration at a given time, 2 minutes and a half showed a gradual decrease. The pattern of curve showed earlier appearance of dye at the site of measurement, even level of dye concentration and faster dye dilution (Fig. 1). Measurements at different limbs in the same patient showed various degree of dye dilution. Injection of a drug caused a general effect on the body circulation, showing a tendency of balanced dye dilution (Fig. 2).

### III. Comment

In general, extremities with secondary lymphedema show that considerable time is required before dye becomes diluted. It indicates sluggish microcirculation (1). Such condition can be changed to a faster flow by administering drugs (2, 3). These drugs are not only effective on the site of edema but also to other sites of the limbs which are symptomless and good in appearance (4). Physically, external mechanical massage will shift the mass of edema, but drug is required to promote increased circulation to the tissue.

### IV. Conclusion

Ten patients with secondary lymphedema were subjected to the study of microcirculation of the limbs. Drug accelerated the microcirculation at the site of edema and other parts of the body at the same time. Mechanical massage

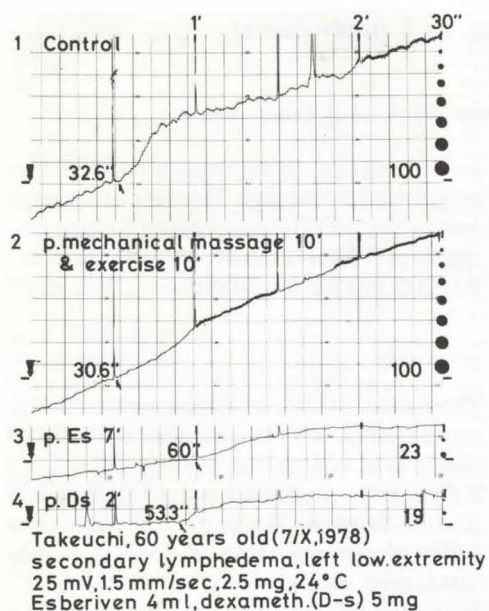


Fig. 1 The effect of mechanical massage and drugs on lymphedema of leg measured by dye dilution method. The dye dilution was measured at the site of edema of the left leg of a 60 year old woman. Dye concentration gradually increased with time, in the control study (1). Following mechanical massage for 10 minutes in the supine position and exercise for 10 minutes in the standing position, the dye showed earlier appearance and increased concentration (2). Intravenous injection of drugs (Esberiven® 4 ml or dexamethason 5 mg) caused acceleration of dye (3, 4)

helped to mobilize the bulk of edema, but tissue circulation itself didn't show a noticeable increase of flow.

### Reference

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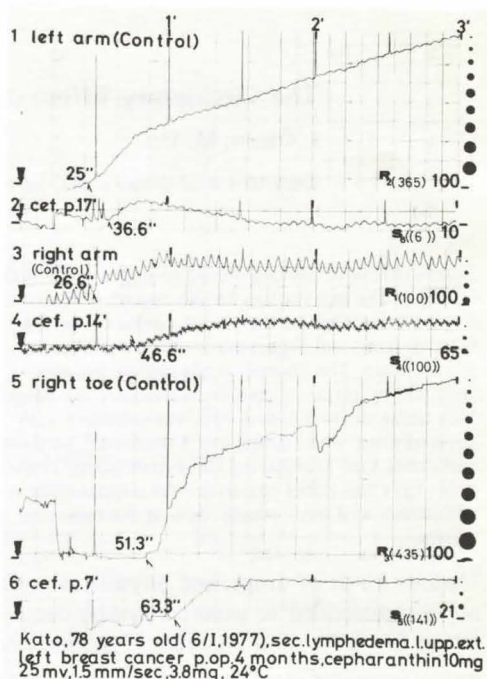


Fig. 2 General circulatory effect of drug in a case with lymphedema of the upper limb. Dye dilution curve was recorded at the left arm with edema 4 months following radical mastectomy and symptomless right arm and toe in a 78 year old male. Injection of cepharanthine 10 mg caused faster dye dilution not only of the edematous arm but also the symptomless toe.

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