DIAGNOSTIC POSSIBILITIES OF ELECTROROENTGENOGRAPHY IN POSTPHLEBITIC SYNDROME

H. Popmihaylova, M. Manolova, S. Stoychev, Tz. Yankov

The postphlebitic syndrome (PPS) is a concept unifying differing in severity and localization hemodynamic disturbances, occurring after a past history of thrombosis of the deep lower-limb veins. This syndrome is a complex, progressive process within the venous system of the limbs, characterized by constantly changing hemodynamic conditions, which in turn determine the diversity of clinical forms.

Clinical and some paraclinical investigations of patients enable us to make a more or less reliable judgement as to the localization and distribution of pathological changes in the major veins, as well as about the degree of hemodynamic impairment in the extremities. Of all available methods of investigating PPS patients, the most reliable data are obtained from phlebography — a basic diagnostical method for deep and superficial veins' patency determination. However, phlebography is a painful procedure, by no means safe in terms thrombophlebitis development and recurrence. Many authors point out (3, 5) that using contrast media for phlebography, at concentration exceeding 50 per cent, leads to changes not merely in the intima of veins, but also in other layers of the vascular wall.

Having in mind the problems regarding the application of phlebography in postthrombophlebitis patients outlined, we made it our aim to assess the diagnostical possibilities offered by survey radiography of the lower limbs, and accordingly its superiority over conventional, plain film roentgenography. The exact topical diagnosis of changes in the deep veins is established through contrast medium introduction — xerophlebography — performed on surgical indications.

Electroroentgenography (xerophlebography) is a prompt method of obtaining radiograms where the roentgen film is replaced by a selenium semiconductor plate, and the image developed by dusting with a powder, is transferred from the plate on a sheath of paper. The chief advantage of the method lies in its diagnostical value, which is conditioned by the high topical contrast of the images outlined, as well as by the possibility to demonstrate equally well in the same xerogram tissues substantially differing in terms of density and thickness (bone structures and soft tissues), and tissues with close coefficients of taking up X-rays (skin, subcutis, muscles, fascia and other structures) (1, 2, 4).

Against the background of the listed above graphic superiorities of the method, as well as the promptness and readiness of executing survey electroroentgenography and preparation of the photographic images, we set out to analyze the data from survey electrograms in eighty patients with PPS in order to estimate:

1. To what extent is this method capable to supplement the other examinations of the patients.

2. To what extent and where is electroroentgenography capable to substitute contrast study of veins in PPS patients.

3. To estimate the degree of injury to the soft tissues of lower limbs (skin, subcutis, fascia, muscle, superficial venous network, presence of insufficient perforating veins) in PPS.

4. To what extent are changes in the bones recorded.

The series of patients under study comprises 32 men and 48 women, with age distribution as follows:

from 21 to 30 y. — 3 patients
„ 31 to 40 y. — 8 „
„ 41 to 50 y. — 27 „
from 51 to 60 y. — 28 patients
above 60 y. — 14 „

According to duration of the disease, the patients are distributed as follows:

up to 1 year — 17 patients
from 2 to 5 y. — 27 patients
from 6 to 10 y. — 14 patients
above 10 y. — 22 patients

In 56 patients the process is located in the leg, and in 24 it involves the whole extremity. In 43 patients the disease is in a compensation stage. Decompensation is recorded in 37 patients; of them 25 are with trophic changes. Distribution according to form of the disease: edematous form is present in 52, and edematous varicose — in 28 cases. The criteria for classifying the patients in the various groups are based on clinical observations, laboratory examinations, functional tests, and on some instrumental methods of examination in part of the patients. Nevertheless, the systematization is not devoid of subjective elements in the assessments made.

— Group One. It comprises patients with a history of deep thrombophlebitis dating up to one year back. The electroroentgenograms disclosed clearly outlined edema, involving both subcutaneous tissue and muscles, the latter being with marked striation and thinned fasciae. Occasionally, in these patients a sharper, intensified structure of the superficial venous network was recorded. In other cases, although with a rather shorter duration of the condition, and higher location of the thrombus in the ileofemoral segment, the survey xerogram showed dilatation of the femoral veins. Among patients with clinical evidence of pre-thrombophlebitis or secondary varices, a picture of strongly dilated veins of varying caliber or convolutions was visible. Using this method of examination, apart from the good visualization of soft tissues, the bones with their proper structure, contours and eventual presence of periostosis, the so-called varicose periostitis manifested in varying degree, were also clearly outlined. In individual cases we succeeded in locating the presence of insufficient perforating veins, and an attempt was made at tracing down their course. At some places they were visible, but elsewhere they hardly lent themselves to differentiation. Further researches of communicating veins, supported by phlebography, are required.

— Group Two. This includes patients with varicose and edematous varicose forms. Here phlebosclerotic changes in the superficial veins were discovered. They were visible as denser shadows, yielding a stronger contrast in comparison with other tissues.

— Group Three. It consists of patients with decompensation and trophic, changes (pigmentations, dermatitis, ulcerations). The finding was very rich: the survey xerogram showed edema of the skin, especially in the distal third of the leg. The subcutaneous tissue was narrowed with fibrous-sclerotic changes, and radially arranged trabeculae (Fig. 1). At many points micro- and macrocalcifications were observed in the form of phleboliths, lympholiths, and occasionally larger calcified thrombi. In this group of patients the fascial shadow was rather loosened at some places. In their neighbourhood, denser parallel shadows run along forming meatuses, interpreted as the X-ray image dilated lymph channels — a supplementary drainage of the lymph return. The latter hypothesis was corroborated by the fact that similar shadows, marking passages, were often observed in PPS cases, as well as in patients with marked lymphedema — elephanthiasis. Our presumption is liable to further clarification by lymphography. Changes in the lower limb bones, more particularly in the tibia, were much more frequently observed among the patients with PPS included in this group. Among elder patients, along with other variations, xerograms showed more clearly additional atherosclerotic changes in the vessels.

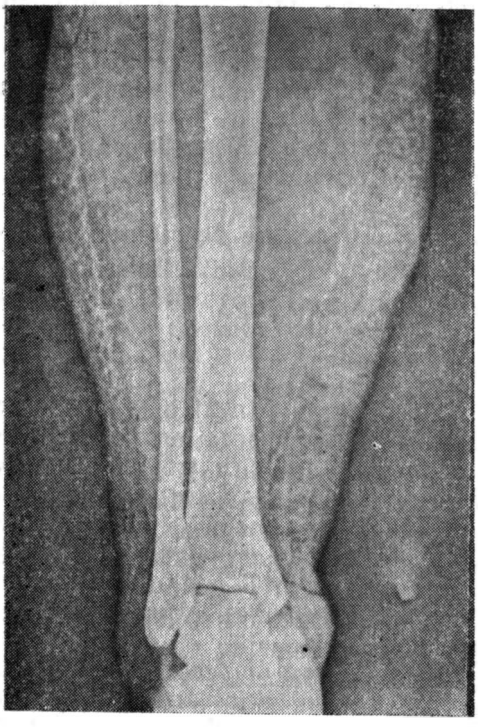

Fig. 1: A prevailingly sclerotic form of PPS. Densification of subcutis shadow, displaying a reticular and "spicular" appearance with mild varices and microcalcifications.

To perform accurate preoperative assessment of the state of deep veins, the application of phlebography proves absolutely mandatory.

The rich xerographic information concerning the character and degree of changes in the soft tissues and bones of PPS patients contributes greatly to the indirect judgement about the state of deep veins. In these cases the good visibility of superficial, varicose dilated veins of the lower limb, without using contrast medium, warrants the coining of xerography with the term "non-contrast phlebography".

In conclusion, it should be stressed that survey electroroentgenography is a very valuable, prompt and effective method of examination of the lower limbs in PPS patients, and also that it could be extensively employed in the complex investigation of these patients in the daily outpatient practice.

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ДИАГНОСТИЧЕСКИЕ ВОЗМОЖНОСТИ ЭЛЕКТРОРЕНТГЕНОГРАФИИ ПРИ ПОСЛЕТРОМБОФЛЕБИТНОМ СИНДРОМЕ

Хр. Попмихайлова, М. Манолова, Ст. Стойчев. Ц. Янков

РЕЗЮМЕ

Сообщаются результаты проведенных электрорентгенографических исследований нижних конечностей у 80 пациентов с послетромбофлебитным синдромом (ПТФС). Больные распределены на группы, в зависимости от: возраста и длительности заболевания, а также и от локализации и формы (отечная и отечно-варикозная) изменения. Учитываются и стадии заболевания (стадии компенсации и декомпенсации), с и без трофических нарушений.

Авторы подчеркивают, что возможности электрорентгенографии бесконтрастного выявления состояния поверхностных вен и изменений кожи, подкожия, фасций и костей нижних конечностей при послетромбофлебитном синдроме позволяют косвенно судить о состоянии глубоких вен.

Эти преимущества метода определяют его как удобный для применения в ежедневной клинической практике.