CLINICAL STUDY

Could deep vein thrombosis be safely treated at home?

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Abstract

Background: **The aim of this prospective study was to analyse the group of patients with DVT (deep vein thrombosis) treated at home with LMWH (low-molecular weight heparin), compression, intensive mobilization.**
Methods: **106 consecutive patients with the diagnosis of DVT were treated at home with enoxaparin (Clexane Rhône-Poulenc) administered subcutaneously (1 mg/kg) b.i.d. for a minimum of 7 days. All patients wore elastic second degree compression stockings during the whole treatment and for further 12 months, and were encouraged to walk 1—2 kms daily. In this group of 106 patients the upper limit of thrombosis was iliofemoral vein — 45 pts (42.4 %), femoral or popliteal vein — 33 pts (31 %), crural veins — 28 pts (26 %). The diagnosis was done by compression ultrasonography, by contrast phlebography, platelet scintigraphy (Tromboscint test).**
Results: **Perfusion gammagraphy of the lungs was done in 54 patients where thrombosis was localised in the popliteal and iliofemoral veins. In 28 patients there were signs of non-fatal pulmonary embolism (52 %), but only 7 pts (25 %) suffered from mild non-specific clinical signs; 21 pts (75 %) with the diagnosis of pulmonary embolism were symptom-free. 8—12 weeks after this treatment, control sonography and phlebography were done in 75 pts (71 %), in 53 % (40 pts), we found partial, and in 32 % (24 pts) total recanalisation. In the rest of 11 pts (15 %) there were no signs of recanalisation. Compared with the group of patients treated by the classical method (UH, immobilisation) in the period from January 1995 to February 1997, out of 48 pts where the recanalisation was retrospectively analysed, 17 pts (36 %) did not show any signs of recanalisation. The difference is significant ($p<0.01$). In this group of 54 pts, 4 died of PE (post mortem verified) compared with no death in the group treated with LMWH and mobilisation. The difference is not significant ($p<0.9$). Eighty six patients (81 %) out of 106 were satisfied and pleased with home treatment and mobilization. From this group of patients treated with LMWH and forced mobilisation 46 were investigated after one year by duplex scan. None of these patient had recurrence, but 7 pts (15 %) had pathological reflux (more than 0,5 s) in the deep venous system, majority of them — 5 pts on the popliteal vein.**
Conclusion: **Home treatment of DVT is possible and effective, safe and cost-effective. On the average, 40 percent of expenses per patient were saved when compared with hospital stay in spite of more expensive LMWH. The patients who received LMWH spent a mean of 1.2 days in the hospital, as compared with 12.7 days for the standard-heparin group. A long-term (12 months at minimum) of compressive stocking (45 mmHg) with activation of the muscle-venous pump by forced mobilisation can prevent recurrence and decrease the percentage of the post-thrombotic syndroms.** ***(Ref. 15.)***
Key words: low-molecular weight heparin, ambulatory treatment of deep vein thrombosis, pulmonary embolism, radiopharmaceutics, diagnosis of deep vein thrombosis.

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It is common that the patients with acute proximal deep vein thrombosis are treated at hospital with unfractionated heparin (UH) and immobilisation because of the risk of pulmonary embolism, discomfort and pain. The efficacy and safety of bed-rest are doubtful, and its necessity has never been proved (10). The objective of this prospective study was to analyse a group of patients with acute DVT (deep vein thrombosis) treated at home with LMWH (low-molecular weight heparin), compression, intensive mobilisation and evaluation of the feasibility, efficacy of such home treatment and safety as to the possible risks of pulmonary embolism.

Materials and methods

From March 1997 to February 2001, 106 consecutive patients with diagnosed DVT were enrolled in a prospective study and treated at home with enoxaparin (Clexane Rhône-Poulenc) administered subcutaneously at doses depending on body weight (1 mg/kg) b.i.d. for a minimum of 7 days. Oral anticoagulants were started two days before discontinuing LMWH and given later for three months according to their haemocoagulation parameters (9). All patients wore elastic second degree compression stockings during the whole treatment and for further 12 months and were encouraged to walk 1—2 kms daily.

We allowed the patients to go home immediately after the diagnosis had been established or they were discharged after a short hospital stay lasting not more than 24 hrs.

The main causes of admission and hospital treatment were the inability to state the diagnosis, the severity of symptoms in the involved leg (phlegmasia coerulea or alba dolens), the presence of associated disease, serious comorbid conditions, concomitant pulmonary embolism and high haemorrhagic risk.

In this group of 106 patients, the upper limit of thrombosis was iliofemoral vein — 45 patients (42.4 %), femoral or popliteal vein — 33 patients (31 %), crural veins — 28 patients (26 %).

Iliofemoral thrombosis	45 pts (43 %)
Popliteal thrombosis	33 pts (31 %)
Crural thrombosis	28 pts (26 %)

Only three patients to whom the possibility of home therapy was offered, desired to remain at hospital (one was scared of his general practitioner, one was a social homeless case and one developed phlegmasia coerulea dolens). The diagnosis was done by compression ultrasonography using a colour duplex scanner (Acuscan 128), by contrast phlebography, platelet scintigraphy (Tromboscint test) using 418 MBq ^{99}Tc-HMPAO-Trc, MS2 Icon, 5—5—3/cm/min 90 min, 3 hrs, 24 hrs in AP and PA projection. Contrast venography was available in order to document the presence or absence of DVT. Contrast venography was performed using the standard tilt-table technique with tourniquets at the ankle and above the knee. The contrast medium, 80 ml, was manually injected through a 21- or 23-gauge butterfly needle placed in the dorsal pedal vein. Normal saline — 100—200 ml — was then infused to flush out residual contrast medium. The venography was always done in patients with post-thrombotic syndrome to detect acute or recurrent active DVT.

Perfusion-ventilation scintigraphy of the lungs was performed only in cases of clinical signs or even suspicion of pulmonary embolism and in all patients with iliofemoral thrombosis. We used ^{99}Tc-MAA 6O MBq LYO MAA and six projections were taken.

Statistical analysis. We used computer program Mikulecky et al. 1998 (8). The program includes the test of homogenity, test of differences, chi-square test with Yates correction. Statistical results were considered significant when p value was greater than 0.05.

Results

The diagnosis and localisation of thrombosis were performed in all cases with at least two objective diagnostic methods. By:

phlebography plus compression ultrasonography	45 pts (42 %)
tromboscint test ^{99}Tc plus compression ultrasonography	50 pts (47 %)
phlebography plus Tromboscint test ^{99}Tc	11 pts (10 %)

Perfusion gammagraphy of the lungs was done in 54 patients where thrombosis was localised in the popliteal and iliofemoral veins. In 28 patients, there were signs of non-fatal pulmonary embolism (52 %), but only 7 patients (25 %) suffered from mild non-specific clinical signs; 21 patients (75 %) with diagnosed pulmonary embolism were symptom-free.

Out of 106 patients, 3 were admitted to hospital (3 %), 70 (66 %) injected themselves LMWH and felt comfortable.

8—12 weeks after this treatment control sonography and phlebography were done in 75 patients (71 %) to assess the localisation and progression of thrombosis, in 53 % (40 patients) we found partial and in 32 % (24 patients) total recanalisation. In the rest of 11 patients (15 %) there were no signs of recanalisation.

partial recanalisation	40 pts (53 %)
total recanalisation	24 pts (32 %)
no recanalisation	11 pts (15 %)

Compared with the group of patients treated by the classical method (UH, immobilisation) in the period from January 1995 to February 1997, out of 48 patients where the recanalisation was retrospectively analysed, 17 patients (36 %) did not showing signs of recanalisation. The difference is significant ($p<0.01$).

Fatal PE:

LMWH + forced mobilization	0/90 pts
UH + immobilisation	4/54 pts ($p<0.9$)

In this group of 54 patients, 4 died of PE (post mortem verified) compared with no death in the group treated with LMWH and mobilisation. The difference is not significant ($p<0.9$).

Eighty six patients (81 %) out of 106, were satisfied and pleased with home treatment and mobilization. Seven out of 106

complained of minor bleeding (6.6 %). No thrombocytopenia was noticed. The first five days of home treatment were crucial. On the fifth day, pain, discomfort and oedema subsided in 76 % of patients. All patients were able to walk and stay at home without any difficulties.

Out of this group of patients treated with LMWH and forced mobilisation, 46 were investigated after one year with duplex scan. None of these patients had recurrence, but seven patients (15 %) had pathological reflux (more than 0.5 s) in the deep venous system, majority of them — 5 patients on the popliteal vein.

Discussion

From the pathophysiological point of view, immobilisation and bed-rest have several negative consequences especially in older patients. Prolonged stasis in the veins is one of the most important Virchow's factors of thrombogenesis. Haemoconcentration, inactivity of the muscle-venous pumping mechanism of the legs and depressed fibrinolytic activity are other factors supporting thrombus propagation, and therefore, immobilisation is not only irrational, but could even be dangerous for patients suffering from deep vein thrombosis.

Out-patient treatment is associated with less well-being and more pain than the in-hospital treatment. The discrepancy is explained by external leg compression by stockings, forced walking and the important role is played by anxiety brought on by the information that the potentially lethal pulmonary embolism could occur despite the anticoagulant therapy (3).

Out-patient treatment is less costly on the average and per patient. We saved 40 % of costs compared with hospital treatment in spite of more expensive LMWH.

Thrombosis is a common and potentially life endangering condition; objective diagnosis is highly desirable prior to the institution of anticoagulant therapy.

The diagnosis of deep vein thrombosis in out-patients is difficult to establish. The classical clinical signs are unspecific and are also found in several other conditions (7). Therefore an objective test is needed.

Existing modalities, such as contrast venography and ultrasonography can image venous morphology. Radiopharmaceutics that bind specifically to fibrin or platelets afford the ability to determine as to whether the thrombus is haematologically active and therefore likely to propagate and / or embolise.

The sensitivity of ultrasonography for small non-occlusive thrombi was poor (2).

In acute thrombosis, labelled platelets have high sensitivity of 93 % and specificity of 97 %, but in the case of thrombosis lasting for several weeks, their sensitivity is 42 % and specificity 67 % (14).

The only problem is that heparin and warfarin can prevent platelet uptake and therefore they have to be discontinued at least four hours before the injection of radiopharmaceutic.

False positive results can occur in cases of huge varicose veins, phlebitis without deep vein thrombosis and in inflammation of soft tissue. If there is a thrombotic total vein occlusion or the heparin treatment is in progress, the result can be by false negative (14).

The advantage resides in fast diagnosis (within two hours), and the diagnosis of acute deep vein thrombosis is reliable in all parts of the deep venous system including the pelvis.

Perfusion gammagraphy of the lung using ^{99}Tc can be done on the next day with the Tromboscint test as it is used in our out-patient practice.

External compression of the limbs is a mode of therapy that has been enjoyed for a long period of history. Evidence suggests that its beneficial effects are mediated through enhancement of venous blood flow, promotion of vasodilatation and enhancement of fibrinolysis (15). Potential benefits to patients of external limb compression therapy include its non-invasive nature, its ability to be applied in an out-patient setting, and it is long-term cost-saving by avoiding hospitalisation and invasive procedures (11).

About 60 % of patients with the history at one episode of proximal deep vein thrombosis develop post-thrombotic syndrome within two years. Compression stockings have reduced this rate by about 50 %. Most cases of post-thrombotic syndrome occurred within 24 months of the acute thrombotic event (6).

The post-thrombotic syndrome occurs in almost one third of patients, and it is strongly related to recurrent ipsilateral deep vein thrombosis (1). Prandoni et al. (1997) (13) found recurrence after two years in 17 %, after 5 years 24.3 % and after 8 years 29 %. Surgery and trauma were associated with a diminished risk of recurrent deep vein thrombosis (1).

LMWH can be given subcutaneously and without laboratory control using a dose that is determinated by body weight (12).

There is a consensus that subcutaneously given LMWH is almost as effective and safe as the continuous intravenous infusion of unfractionated heparins. No agreement was obtained as to whether out-patient can be recommended to ise LMWH (5).

A reduction in thrombocytopenia and bleeding complications with LMWH have been reported and laboratory monitoring is unnecessary (15).

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