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BLOOD CIRCULATION IMPROVEMENT EFFECT AND SAFETY OF INTERMITTENT PNEUMATIC COMPRESSION DEVICE

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OBJECTIVE

Blood flow in the deep veins is thought to be one of the important factors of DVT. This study was conducted to investigate the blood circulation improvement effect and safety of the intermittent pneumatic compression(IPC) device in both the ordinary people and the DVT risk groups.

METHODS

The study was conducted on 59 adults without DVT history; experimental group(n=29) and control group(n=30). The IPC device was used for 36 minutes in both groups. Assessments were conducted before, during and after applying the IPC device(Figure 1).

Assessments included ultrasound-measured maximum AP diameter, maximum cross-sectional area, peak flow velocity of the right femoral vein(Figure 2) and both leg volumes and circumferences, edema index, and body mass index.

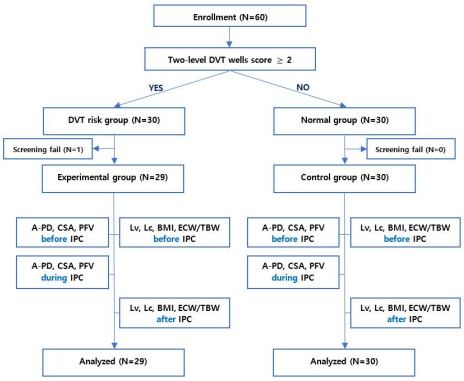

Figure 1. The flow diagram of the study

A-PD: AP diameter; CSA: Cross-sectional area; PFV: Peak flow velocity; Lv: Leg volume; Lc: Leg circumference; BMI: Body mass index; ECW/TBW: Extracellular water/total body water (=edema index)

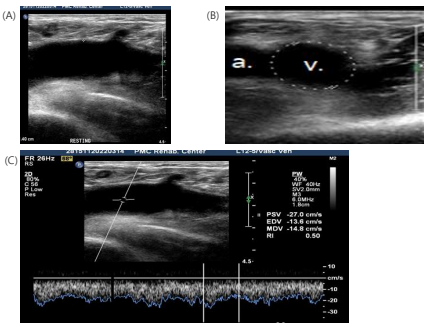

Figure 2. Assessments by using ultrasonography

Maximum AP diameter(A), maximum cross-sectional area(B) and peak flow velocity(C) of the femoral vein of the right lower extremity were compared before and during applying the IPC device.

In addition, the safety of the IPC device was evaluated by checking the physical examinations, vital signs, and side effects before and after applying the IPC device.

RESULTS

Blood flow volume and blood flow velocity increased during IPC in both groups(Figure 3). Edema index, leg volume and circumference decreased after IPC in both groups(Figure 4,5). There was no difference in the amount of change between both groups.

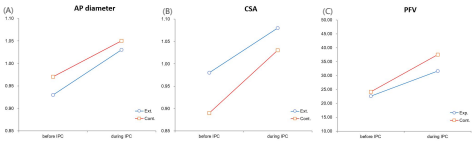

Figure 3. Comparison of AP diameter, CSA, PFV before and during IPC

In both groups, maximum AP diameter(A), maximum cross-sectional area(B) and peak flow velocity(C) in the right femoral vein increased during applying the IPC device ($p<0.05$).

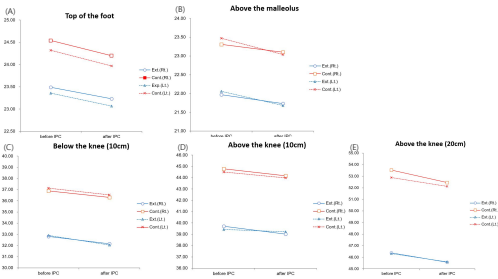

Figure 4. Comparison of leg circumference before and after IPC

In both groups, both leg circumference(A,B,C,D), excluding the leg circumference(E) measured at 20cm above the left knee, decreased after applying the IPC device ($p<0.05$).

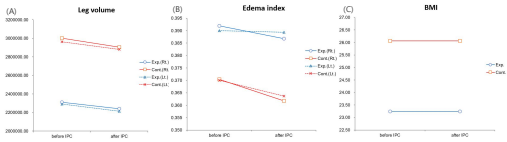

Figure 5. Comparison of leg volume, edema index, BMI before and after IPC

In both groups, both leg volume(A) and edema index(B) decreased after applying the IPC device ($p<0.05$), but body mass index(C) did not change.

After applying the device, no abnormal findings were observed on physical examination and vital signs.

CONCLUSIONS

The intermittent pneumatic compression(IPC) device is safe and effective in blood circulation. Therefore, the application of the IPC device is thought to be helpful in preventing deep vein thrombosis in both the ordinary people and the DVT risk groups.

REFERENCES

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2. Stone J, Hangge P, Albadawi H, Wallace A, Shamoun F, Knuttien MG, Naidu S, & Oklu R. Deep vein thrombosis: pathogenesis, diagnosis, and medical management. Cardiovasc Diagn Ther. 2017 Dec;7(Suppl 3): S276–S284.