

**Handgrip exercise using an elastic ball daily for three weeks could decrease the incidence of peripherally-inserted central catheter-related venous thrombosis. The method is simple, with no negative consequence reported. Further studies are required to confirm this conclusion and to explore the optimal frequency of handgrip exercise” Liu et al (2018).**

Abstract:

**BACKGROUND:** Peripherally-inserted central catheter-related venous thrombosis has serious complications including the loss of vascular access, recurrent venous thrombosis, and post-thrombotic syndrome. Current guidelines recommend non-pharmacological strategies to prevent peripherally-inserted central catheter-related venous thrombosis. There is little evidence for the effectiveness of handgrip exercise on the prevention of peripherally-inserted central catheter-related venous thrombosis.

**OBJECTIVES:** To examine the effectiveness of handgrip exercise using an elastic ball to prevent peripherally-inserted central catheter-related venous thrombosis in patients with solid cancers.

**DESIGN:** A randomized controlled trial.

**SETTINGS:**

One teaching hospital in Nanjing, China.

**PARTICIPANTS:** In total, 120 subjects with solid cancers were eligible; each had a new peripherally-inserted central catheter. They were recruited and randomly assigned into two exercise groups and one control group.

**METHODS:** Subjects from exercise groups 1 and 2 performed a 3-week, 25-repetition handgrip exercise, 3 and 6 times daily, respectively. The control group subjects performed a gentle limb exercise with no frequency and intensity requirements. Ultrasound was used to detect venous thrombosis development and examine axillary vein blood flow over the three points.

**RESULTS:** There were 32 cases of peripherally-inserted central catheter-related venous

thrombosis detected. Two venous thrombosis cases in the control group were symptomatic, but all venous thrombosis cases in the exercise groups were asymptomatic. All venous thromboses were partial. There were significant differences in the incidence of venous thrombosis among the three groups ( $\chi^2 = 12.813$ ,  $p = 0.002$ ;  $\chi^2 = 9.340$ ,  $p = 0.009$ ;  $\chi^2 = 11.480$ ,  $p = 0.003$ ; and  $\chi^2 = 10.534$ ,  $p = 0.005$ , respectively) at days 2, 3 and 21. The incidence of venous thrombosis in the two exercise groups was lower than that in the control group over the 3 time points (all,  $p < 0.05$ ). The between-group effects and interaction effect in vein maximum velocity and time-mean flow velocity showed significant differences ( $F = 4.180$ ,  $p = 0.025$ ;  $F = 4.010$ ,  $p = 0.045$ ; and  $F = 2.928$ ,  $p = 0.025$ ) at days 2, 3, and 21, respectively. The axillary vein blood flow parameters in the control group were lower than those in the two exercise groups at day 21 (all,  $p < 0.05$ ). However, no significant differences occurred in the incidence of venous thrombosis and axillary vein blood flow parameters between the two exercise groups.

**CONCLUSION:** Handgrip exercise using an elastic ball daily for three weeks could decrease the incidence of peripherally-inserted central catheter-related venous thrombosis. The method is simple, with no negative consequence reported. Further studies are required to confirm this conclusion and to explore the optimal frequency of handgrip exercise.

#### Reference:

Liu, K., Zhou, Y., Xie, W., Gu, Z., Jin, Y., Ye, X., Chen, X., Fan, B., Wang, H. and Cui, Y. (2018) Handgrip exercise reduces peripherally-inserted central catheter-related venous thrombosis in patients with solid cancers: A randomized controlled trial. *International Journal of Nursing Studies*. 86, p.99-106.

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