EDITORIAL

Physical inactivity raises risk of pulmonary embolism in women

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PULMONARY EMBOLISM IS A COMMON CAUSE OF CARDIOVASCULAR MORBIDITY AND MORTALITY AND the annual incidence is similar to that of stroke and MI. Inactivity is associated with an increased risk of poor health and in particular can increase the risk of arterial disease. A recent study in the *BMJ* investigating a link between these two has shown an increase in the risk of pulmonary embolism with physical inactivity.[1]

The Nurses' Health Study, an American longitudinal cohort study, was established in 1976. At baseline, questionnaires were sent to registered nurses living in one of 11 states. For the purposes of this particular study 69,950 female nurses completed biennial questionnaires from 1990 to 2008.

Physical inactivity was measured as hours of sitting each day and physical activity was measured in metabolic equivalents a day. The primary outcome measure was the incidence of idiopathic pulmonary embolism confirmed in medical records. Multivariant Cox proportional hazards models controlled for age, BMI, energy intake, smoking, race, spouse's educational attainment, parity, menopause, NSAIDs, warfarin, multivitamin supplements, hypertension, CHD, rheumatological disease, and diet.

Over the 18 year study period there were 268 cases of incident idiopathic pulmonary embolism. The authors found a significant association ($p<0.001$) between physical inactivity and the risk of idiopathic pulmonary embolism; 16/14,565 cases/person-years in the most inactive (>41 hours sitting a week outside work) vs 41/104,720 in the least inactive (<10 hours sitting a week outside work). This translates into more than a two-fold risk of pulmonary embolism in women who spent the most time sitting compared with those who spent the least time, hazard ratio 2.34 (95% CI: 1.30 - 4.20). The absolute risk increase was 0.07% a year or seven additional cases per 10,000 person-years. [2]

Those at highest risk sat, on average, for six hours a day outside work but only about 5% of the nurses studied fell into this group. There was no association between physical activity and pulmonary embolism. The study also showed that physical inactivity correlated with CHD and hypertension which supports our current knowledge base.

The authors conclude that physical inactivity is associated with pulmonary embolism in women and that interventions to decrease the time spent sitting could reduce this risk. The study therefore identifies another possible adverse health outcome associated with physical inactivity. This finding is also interesting in that it suggests that physical inactivity could be one of the links between arterial and venous disease.

'Increased sitting may promote venous stasis and activation of the coagulation cascade which could lead to clot formation'

The link between venous thromboembolism and inactivity is certainly plausible as increased sitting may promote venous stasis and activation of the coagulation cascade which could lead to clot formation. The study also shows a graded association between activity levels and VTE. However, can it be assumed that the initial baseline inactivity levels at entry into the study were consistent over the 18 year follow-up period? This and other potential confounders such as the presence of varicose veins and oestrogen derived from the combined contraceptive pill must be taken into consideration when interpreting the findings. The authors acknowledge that >95% of the cohort were white and this limits generalisation of the results to other ethnic groups.

Furthermore, as the author of an accompanying editorial comments, the absolute increase in risk seen in this study is only marginally higher than the three to five additional cases of VTE a year seen in users of combined oral contraceptives but if deep vein thrombosis had been documented the incidence of VTE associated with inactivity may well have been higher.[2]

In summary, this study suggests that prolonged inactivity increases the risk of VTE and therefore supports the use of preventive interventions for individuals at risk with prolonged immobility. However, for otherwise healthy people the absolute risk remains small but it does provide further impetus to embrace a more active lifestyle which has benefits far beyond reducing the risk of venous thromboembolism.

REFERENCES
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