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Does diabetes increase the risk of venous thromboembolism?

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Background and aims: The link between diabetes and venous thromboembolism (VTE) is unclear. Some studies have suggested that diabetes increases risk, whilst others have demonstrated that there is no association. Insulin resistance may directly increase risk. Many of these studies did not differentiate type 1 (T1DM) and type 2 diabetes (T2DM) as independent factors. We investigated whether diabetes is an independent risk factor for VTE, and whether the associations differ for T1DM and T2DM.
Materials and methods: A cross-sectional analysis was performed using a primary care database, the Royal College of General Practitioners (RCGP) Research and Surveillance Centre (RSC); a nationally representative sample of approximately 300 practices throughout England. The risk of VTE was compared in people with and without diabetes, and separately in those with T1DM or T2DM compared to no diabetes. The presence of diabetes was defined as known on or before the 31st December 2008. We identified presence of VTE using Read diagnosis codes. Follow-up started from the 1st January 2009 until the 31st December 2018. Hazard ratios (HRs) and 95% confidence intervals (CIs) were calculated for the association between diabetes and VTE using Cox regression. The model was adjusted to include covariates of: age, gender, body mass index, and smoking status. Patients with missing data were excluded from the analyses.
Results: 1,773,147 people were registered with a practice in the RCGP RSC network at the start of follow-up. Of these, 105,398 (5.9%) were identified with diabetes, and 31,163 (1.8%) people accrued codes consistent with VTE. In the unadjusted analysis, diabetes increased risk of VTE (HR 2.10, 95% CI 2.03-2.18). After adjusting for confounders there was no increased risk (HR 0.98, 95% CI 0.94-1.02). Similarly, no increased risk for VTE was found for T1DM and T2DM, HR 1.14 (95% CI 0.94-1.38) and HR 0.98 (95% CI 0.94-1.02) respectively (Table 1).
Conclusion: There was no association between diabetes and risk of VTE. Age and sex predominantly confounded the association. T1DM and T2DM were also not independently associated with VTE risk.

Covariates	Diabetes HR (95% CI)	T1DM HR (95% CI)	T2DM HR (95% CI)
Unadjusted	2.10 (2.03-2.18)	0.79 (0.65-0.96)	2.21 (2.13-2.29)
Age and gender	1.14 (1.10-1.18)	1.01 (0.90-1.33)	1.15 (1.10-1.19)
Age, gender, BMI, and smoking status	0.98 (0.94-1.02)	1.14 (0.94-1.38)	0.98 (0.94-1.02)

Table 1. Hazard ratios (HR) for VTE, by diabetes

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