Longitudinal clinical trajectory analysis of individuals before and after diagnosis of Type 2 Diabetes Mellitus (T2DM) indicates that vascular problems start early

Adrian Heald[1], Kai Chang[2], Ting Jia[3], Hailong Sun[2], Qiguang Zheng[2], Xinyan Wang[2], Jianan Xia[2], Mike Stedman[4], Helene Fachim[1], Martin Gibson[5], Xuezhong Zhou[2], Simon Anderson[6], Yonghong Peng[7], and Bill Ollier[6]

[1]Salford Royal Hospitals NHS Trust
[2]Affiliation not available
[3]Beijing Jiaotong University
[4]Res Consortium
[5]Salford Royal Hospital
[6]University of Manchester
[7]Manchester Metropolitan University

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Abstract

Introduction Type 2 diabetes mellitus (T2DM) frequently associates with increasing multi-morbidity/treatment complexity. Some headway has been made to identify genetic and non-genetic risk factors for T2DM. However longitudinal clinical histories of individuals both before and after diagnosis of T2DM are likely to provide additional insight into both diabetes aetiology/further complex trajectory of multi-morbidity. Methods This study utilised diabetes patients/controls enrolled in the DARE (Diabetes Alliance for Research in England) study where pre- and post-T2DM diagnosis longitudinal data was available for trajectory analysis. Longitudinal data of 281 individuals (T2DM n=237 vs matched non-T2DM controls n=44) were extracted, checked for errors and logical inconsistencies and then subjected to Trajectory Analysis over a period of up to 70 years based on calculations of the proportions of most prominent clinical conditions for each year. Results For individuals who eventually had a diagnosis of T2DM made, a number of clinical phenotypes were seen to increase consistently in the years leading up to diagnosis of T2DM. Of these documented phenotypes, the most striking were diagnosed hypertension (more than in the control group) and asthma. This trajectory over time was much less dramatic in the matched control group. Immediately prior to T2DM diagnosis a greater indication of ischaemic heart disease proportions was observed. Post-T2DM diagnosis, the proportions of T2DM patients exhibiting hypertension and infection continued to climb rapidly before plateauing. Ischaemic heart disease continued to increase in this group as well as retinopathy, impaired renal function and heart failure. Conclusion These observations provide an intriguing and novel insight into the onset and natural progression of T2DM. They suggest an early phase of potentially-related disease activity well before any clinical diagnosis of diabetes is made. Further studies on a larger cohort of DARE patients are underway to explore the utility of establishing predictive risk scores.

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