The distinct epidemiology of 'Type 3c' diabetes should prompt consideration of chronic pancreatic disease as the possible cause of a patient's diabetes

People with diabetes and chronic pancreatic disease 'look' different to those with type 1 or type 2

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Aim

The link between exocrine pancreatic disease and diabetes (termed Type 3c diabetes) has rarely been studied outside of selected secondary care populations and is probably underdiagnosed.[1] We identified people with co-existing pancreatic disease and diabetes from primary care data in order to characterise the demographic indicators of when diabetes may be due to chronic pancreatic disease.

Methods

We performed a retrospective cross-sectional survey of all patients with diabetes in the Royal College of General Practitioners Research and Surveillance Centre cohort (routine data collected from over one and a half million patients registered at primary care practices in England).[2] We compared the demographics of those with coexisting pancreatic disease and diabetes to those without.

Results

From within the RCGP database we identified 73,096 people with diabetes. Of these co-existing pancreatic disease was identified in 551 (0.75%). The most common cause of coexistent pancreatic disease was chronic pancreatitis (table 1).

The characteristics of people with co-existing diabetes and pancreatic were distinct from those with type 1 (n=4,836) and type 2 (n=67,478) diabetes (table 2).

People with co-existing diabetes and pancreatic disease developed diabetes at a significantly younger age than people with type 2 diabetes (prevalence under 40 years of 11% vs 4%; p<0.001), were more frequently of white ethnicity (94% vs 82%; p<0.001) and far more commonly of low or normal body mass index (prevalence of body mass index [BMI] less than 25kgm^{-2} of 44% vs 16%; p<0.001).

Those with pancreatic diabetes had similar BMI to those with Type 1 diabetes (mean 26.5kgm^{-2} vs 26.3kgm^{-2}; p=0.436), but were more commonly male (63% vs 55%; p<0.001) and lived in areas of greater deprivation (median index of multiple deprivation score 17.0 vs 14.8; p=0.049).

Aetiology	n (%)
All causes	551 (100.0%)
Chronic pancreatitis	276 (50.1%)
Cancer of the Pancreas	55 (10.0%)
Resection of the Pancreas	96 (17.4%)
Cystic Fibrosis	55 (10.0%)
Haemochromatosis	118 (21.4%)

Table 1. Aetiology of pancreatic disease in people with chronic pancreatic disease co-existing with diabetes. Some people had more than one aetiology and are therefore counted in multiple aetiology categories e.g. pancreatic cancer and surgical resection of the pancreas.

	Type 2 diabetes (n=67,478)	Type 1 diabetes (n=4,836)	Diabetes and pancreatic disease (n=551)
Age			
<40	2,385 (3.5%)	2,600 (53.8%)	58 (10.5%)
≥40	65,093 (96.5%)	2,236 (46.2%)	493 (89.5%)
Gender			
Male	37,478 (55.5%)	2,641 (54.6%)	347 (63.0%)
Female	30,000 (44.5%)	2,195 (45.4%)	204 (37.0%)
Ethnicity			
White	47,767 (70.8%)	594 (12.3%)	442 (80.2%)
Asian	6,480 (9.6%)	49 (1.0%)	15 (2.7%)
Black	2,673 (4.0%)	11 (0.2%)	12 (2.2%)
Mixed	597 (0.9%)	8 (0.2%)	2 (0.4%)
Other	574 (0.9%)	4 (0.1%)	1 (0.2%)
Missing	9,838 (14.6%)	115 (2.4%)	79 (14.3%)
BMI			
<18.5	450 (0.7%)	212 (4.4%)	29 (5.3%)
18.5-25	10,227 (15.2%)	1,821 (37.7%)	208 (37.7%)
25-30	22,458 (33.3%)	1,554 (32.1%)	171 (31.0%)
>30	32,988 (48.9%)	969 (20.0%)	129 (23.4%)
Missing	1,355 (2.0%)	280 (5.8%)	14 (2.5%)

Table 2. Clinical characteristics of people with coexisting pancreatic disease and diabetes compared to those with type 1 diabetes and type 2 diabetes.

Discussion

Where diabetes and pancreatic disease coexist there is a likelihood of type 3c diabetes being present. This requires a distinct clinical approach to treatment of either type 1 or type 2 diabetes.[3] Additional considerations such as treatment of the underlying pancreatic disease and problems with malabsorption.

No previous analysis has described the clinical characteristics of people with coexisting pancreatic disease and diabetes in an unselected primary care population. The identification of substantial differences between type 1, type 2, and pancreas related diabetes suggests that the presence of pancreatic disease substantially effects the diabetes phenotype. Further analysis is required to determine whether these people have type 3c diabetes or an altered phenotype of type 2 diabetes.

Conclusion

Specific attention should be paid to the possibility of underlying exocrine pancreatic disease when a patient presents with diabetes; particularly if they are younger, Caucasian, or of low or normal BMI.

Key findings

- People with coexistent diabetes and pancreatic disease are clinically distinct from both type 1 and type 2 diabetes.
- They were younger and of lower BMI than people with type 2 diabetes
- They are more likely to be male and from a lower socioeconomic background than those with type 1 diabetes.

References

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