**Long term complications of childhood-onset type 1 diabetes and age at diagnosis**

Timothy C Nielsen1,2, Natasha Nassar1,2,3, Maria E. Craig2,4, Kirstine Bell2,3, Heather Baldwin1,2,3, Alicia J. Jenkins5, Gerald Liew2, Kim C. Donaghue2,5, Samantha J. Lain1,2,3

1TheUniversity of Sydney, The Leeder Centre for Health Policy, Economics and Data, New South Wales, Australia.

2The University of Sydney, The Children's Hospital at Westmead Clinical School, New South Wales, Australia.

3The University of Sydney, Charles Perkins Centre, New South Wales, Australia

4The University of New South Wales, School of Clinical Medicine, New South Wales, Australia.

5Baker Heart and Diabetes Institute, Melbourne, Victoria, Australia

Aim: Recent studies hypothesised that onset of type 1 diabetes (T1D) before age 7 indicates more severe disease. This study examines incidence of long-term complications amongst people with childhood-onset T1D, and association between age-of-onset and risk of complications.

Methods: People diagnosed with T1D aged <16 years old (y.o). in New South Wales (NSW) between 1990-2009 were identified from the Australasian Paediatric Endocrine Group (APEG) dataset. APEG data were linked to NSW Hospital, Emergency Department and Medicare Benefit Schedule data from 2001-2019 to identify cardiac, eye, lower limb and kidney complications. Age-of-onset of T1D was categorised: <7, 7-12, 13-16 years. Cox regression models were used to calculate Hazard ratios (HR) and 95% confidence intervals (95%CI) for the risk of complications from age 16-34 years, adjusting for year of diagnosis, socio-demographics and acute complications.

Results: Of 5,202 people with T1D; 1,694 (32.6%) were diagnosed age <7y.o., 2,537 (48.8%) 7-12y.o. and 971 (18.7%) 13-16y.o. Median follow-up was 15 years. Incidence of complications between 16-34y.o. (per 10,000 person-years) was 14.9 for cardiac, 107.9 for eye, 70.5 for severe retinopathy, 59.3 for lower limb and 73.8 for kidney complications. T1D-onset <7y.o. was associated with increased risk of severe retinopathy (aHR 1.60; 95%CI 1.13-2.25), vs T1D-onset 13-16y.o. (see Table).

**Table: Association between age at onset of T1D and risk of long-term complications**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Age T1D onset (years)** | **Cardiac complications** | **Eye Complications** | | **Lower limb complications** | | **Kidney complications** |
| ***Any retinopathy*** | ***Severe Retinopathy*** | ***Vascular Complications*** | ***Peripheral Neuropathy*** |
| **Adj HR**  **(95%CI)** | **Adj HR (95%CI)** | **Adj HR (95%CI)** | **Adj HR (95%CI)** | **Adj HR (95%CI)** | **Adj HR**  **(95%CI)** |
| **<7 yrs** | 0.93 (0.43-2.03) | 1.26 (0.95-1.67) | **1.60 (1.13-2.25)** | 0.88 (0.46-1.68) | 1.17 (0.65-2.13) | 1.06 (0.77-1.47) |
| **7-12** | 1.06 (0.63-1.80) | 1.12 (0.90-1.39) | 1.24 (0.95-1.62) | 1.09 (0.72- 1.64) | 1.17 (0.77-1.77) | 0.86 (0.67-1.10) |
| **13-16** | Reference | Reference | Reference | Reference | Reference | Reference |

Conclusion: People diagnosed with T1D <7y.o had increased risk of severe retinopathy before 35y.o. This may be due to more severe disease or longer duration T1D and requires additional complication-related screening and support.