

Background: The achievement of the A1C goals in the US did not improve in 2017 compared to 2014. Guidelines for which patients with T2DM to refer to an endocrinologist are not well defined. Furthermore, there is no consensus about how long patients should be followed by an endocrinologist. Experts have recommended referral to an endocrinologist for new diagnosis, acute hyperglycemia, A1C > 7.0, > 8.0 for 6 months, or A1C 1.4 times the upper limit of normal. However, with the current number of board-certified endocrinologists in the US, it would be impossible for patients with those criteria to be seen even once. To determine which patients should be followed by an endocrinologist, it would help to know which patients are most likely to achieve ongoing benefit. To focus on patients that have a higher chance of improvement, it is important to know the average time it would take to reach an individualized A1C goal and focus on patients more likely to improve. **Objective:** We performed this quality improvement assessment to 1) determine the percentage of patients with T2DM who achieved their individualized A1C goals (Age 18–55: 7.0% +/- .5%, 55–75: 7.5% +/- .5%, >75: 9.0% +/- .5%) at 12 months after their initial endocrinologist visit and 2) compare characteristics of patients who achieved A1C goals by 12 months versus those who did not achieve goals. **Material and Methods:** We performed a retrospective chart review of patients with T2DM who had an initial visit at an academic endocrinology clinic between 10/1/2017 and 05/31/2018 (N= 48, 52% female, baseline 9.6%, 48% male, baseline [BL] HbA1c 9.9%). Data for 12 months following the initial visit were collected. **Results:** Following their initial visit, 21/48 (44%, BL A1c 10.3%) were lost to follow-up. Of those with at least one additional visit, 12/27 (44%, BL A1c 11.3%, P<0.05) achieved A1C goal by the 12-month period. Of those, 6/12 (50%, BL A1c 10.3%), 1/12 (8%, BL A1c 9.9%), 4/12 (25%, BL A1c 9.0%), 1/12 (8%, BL A1c 8.8%) achieved goals by 3, 6, 9, and 12 months respectively. Those who did achieve their goals were slightly older (52 +/- 25yrs) than those who did not (50 +/- 12yrs), p< 0.05. No significant differences between those who were lost to follow-up, achieved goals, or who did not achieve goals with respect to gender, insurance coverage, or regimen. However, those who did continued care had a worse A1c of 11.3%. **Conclusion:** Of patients with T2DM and uncontrolled hyperglycemia presenting to an academic endocrine clinic, nearly half are lost to follow-up after the initial visit. Future efforts should be made to better understand and potentially improve this. Of additional concern, only about half of patients with at least one additional visit achieved their A1C goal after 12 months, and 91% of those achieved their goals by 9 months. Further study will be needed to determine whether patients who are uncontrolled after 9–12 months will have any further benefit from endocrine follow-up.

Diabetes Mellitus and Glucose Metabolism

TYPE 2 DIABETES

Trajectory of Glycated Hemoglobin Over Time Among Obese Type 2 Diabetes Patients on U-100 Basal-Bolus Insulin Regimen Using Real-World Data

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Introduction: There is a consistent increase in prevalence of obese type 2 diabetes (T2D) patients, many of whom require insulin treatment. As endogenous insulin secretion dwindles and progressively increasing body weight worsens insulin resistance, exogenous insulin doses can be quite high. This presents unique disease management challenges to patients, treating physicians, and the health systems. These challenges could lead to therapeutic inertia and result in poor glycemic control (continuous increase or persistently high glycated hemoglobin [A1c]). Therefore, examining the A1c trajectory over a significant period could detect the existence and magnitude of therapeutic inertia. Further segmenting the patients based on their A1c trajectory over time would help formulate management strategies with tailored interventions to targeted patient segments with signs of therapeutic inertia. **Objective:** To segment obese patients with T2D on U-100 basal-bolus regimen based on A1c trajectory over a 3-year period. **Methods:** Adults with ≥2 T2D claims who were on U-100 basal-bolus regimen and with body mass index ≥30 kg/m² or diagnosis codes for obesity during the identification period (APR2014-SEP2015) in the Veterans Health Administration database were included. The study period was OCT2013-SEP2018 and patients were required to have continuous enrollment for ≥6 months pre- and ≥3 years post-index periods. We captured the A1c pattern at 6-month intervals over a 3-year period. Only patients with A1c in at least 4 of the 6 time periods were included. A longitudinal unsupervised trajectory clustering method using the *traj* R package was implemented. Twenty-four features of A1c trajectory were examined followed by feature reduction using factor analysis. Based on the selected features, K-means clustering was used to identify patient segments based on the A1c trajectory. We extended the approach by repeating the same process as above among patient cluster with stable A1c trajectory to detect further A1c patterns. **Results:** A total of 45,520 patients were included. Four patient clusters were identified based on distinct patterns of A1c trajectory. The first cluster has descending A1c over time (N=8,325; 18.3%) while the second one has ascending A1c over time (N=8,123; 17.8%). Among patients with stable A1c trajectory, two more clusters were identified: stable high (N=10,654; 23.4%) with persistently high A1c around 9.0% and stable low (N=18,378; 40.4%) with persistently low A1c around 7.2%. **Conclusions:** By applying an unsupervised machine learning algorithm on A1c trajectory over time, this study identified over 40% of obese T2D patients on basal-bolus regimen belong to segments with poor A1c control during a three-year period, suggesting the significant existence of therapeutic inertia. Further research is planned to identify various forms of therapeutic inertia associated with these segments.