The Dakota Diabetes Coalition is proud to offer a regular column on diabetes and elated concerns every other Friday.

	Dr. Johnson is a family practice doctor in Grand Forks with a special interest in diabetes -- and a special knack for writing. As a member of the Dakota Diabetes Coalition, he has generously made himself available to answer questions through our listserv. If you have comments, or questions for Dr. Johnson to address in future columns, please contact gailhand@qwest.net Visit the Coalition's website! http://www.ndhealth.gov/diabetescoalition/

Diabetes and Driving

Test first, monitor often and keep those carbs handy

Clinicians frequently deal with the question of driving by their diabetes patients. As the number of diabetes patients increases, and the number of patients using insulin increases, the questions become more common.

Data going back to the 1970's present some conflicting results about impairment in persons with diabetes who drive, usually focusing on hypoglycemia episodes. More recent data suggest an association between acute and chronic hyperglycemia and impaired cognitive function. Many of these issues are common to all drivers with chronic health conditions and the changes associated with aging. Drivers with diabetes have three potential issues for possible impairment: 1) hypoglycemia, 2) hyperglycemia, and 3) diabetes complications, such as heart disease, retinopathy, or stroke.

Since the publication of both the DCCT in 1993 and the UKPS in 1998, the treatment of diabetes in both type 1 and type 2 diabetes has

trended toward normoglycemia in patients for whom it is appropriate. With this has come an increase in hypoglycemia, particularly among patients with type 1 diabetes. Compounding the problem is the estimated ~25% of type 1 patients who experience hypoglycemia unawareness, the loss of ability to recognize low blood sugar consistently. For the driver with diabetes, this can have disastrous consequences.

Different data collection methods have been used in different published studies looking at this issue. In the outstanding review by Stork, et al in Diabetes Care in 2006, an overview of these methods was considered:

1) Office based surveys and questionnaires
2) Hospital based registries
3) Insurance based records
4) Traffic authority research
5) Driving simulator studies

Studies going back to 1970 may not have shown a difference in accident rates between type 1 and type 2 drivers, but more recent data, in particular Cox, et al from Diabetes Care in 2003, showed much higher incidence rates of motor vehicle accidents among type 1 patients with regard to hypoglycemia compared to type 2 patients, regardless of whether insulin was part of the type 2 regimen.

Type 1 patients who did more frequent glucose monitoring and used insulin pumps were less likely to be involved in motor vehicle accidents as a result of hypoglycemia than type 1 patients who used injections and monitored blood sugars infrequently. (Sensor augmented pumps were not in routine use at the time of this study and would need to be studied separately to determine any possible additional benefit from 24-hour continuous monitoring.)

Overall, the data point toward a trend of minor -- but real -- increases in motor vehicle accidents among drivers with diabetes compared to subjects without diabetes. Confounding the question for clinicians is the variance of standards and regulations for driving with diabetes in different states. For example, Minnesota requires periodic (anywhere from 6 months to 4 years) certification for drivers with diabetes, whereas North Dakota has no set standard for these drivers.

For future research, more controlled data using driving simulators may yield better insight into the roles of both hypo- and hyper-glycemia in driving by persons with diabetes. It's a question that needs definitive answers as the number of drivers with diabetes increases, and diabetes treatment becomes more intense. In the meantime, the best advice we can give our diabetes patients who drive is to test blood sugar before driving and periodically while on the road, to have a good understanding of their diabetes program and medications, and to *always* carry a ready source of carbohydrates.

Blood glucose awareness training, developed by Cox et al (Journal of Psychosomatic Medicine, 1991), where patients with diabetes are trained to estimate and recognize blood glucose levels through monitoring and feed back has been shown to reduce motor vehicle accident rates in persons with diabetes. It can be difficult as a clinician to approach a patient about any potential driving restrictions, but safety for all involved is a worthy goal, and a few simple steps can improve outcomes.

Next: Handling diabetes for commercial drivers

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