Glycaemic Variability As Measured By The Magnitude Of Change Of Visit To Visit HbA1c Concentrations Over The 5 Years Prior To Presentation, Is Significantly Associated With Rate Of Wound Healing In The Diabetic Foot

Li Ping Wah-Pun Sin E¹, Cheng J¹, Li F¹, Yue A¹, Gooday C¹,², Nunney I¹, Dhatariya K¹,²

¹Norwich Medical School
²Norfolk and Norwich University Hospitals
Background

• Recent work has suggested that glycaemic variability – the visit-to-visit variation in HbA1c – plays a role in the development of micro and macrovascular disease in patients with diabetes\(^1\-4\).

• However, whether HbA1c variability is a factor determining wound healing in diabetes related foot ulcers remains unknown.

Aim

• To determine whether HbA1c variability is associated with wound healing time in patients presenting to our multidisciplinary specialist foot clinic
Methods

• A retrospective analysis

• Patients presenting between July 2013 and March 2015

• At least 3 HbA1c measurements 5 years prior to first presentation with a foot ulcer

• Must have at least 2 follow-up reviews within 1 year after first presentation were included

• HbA1c variation was measured by the magnitude of Standard Deviation (SD)
Total patients identified (n=629)

Excluded (n=327)
- Only 1 follow-up (n=103)
- No HbA1c data recorded (n=7)
- Insufficient data (n=111)
- Charcot foot (n=27)
- Surgical wound (n=6)
- Dermatological reason (n=30)
- Venous ulcer (n=7)
- Other (n=36)

Total patients included in study (n=302)

Patients with healed ulcers within 1 year follow-up (n=198)
- Healed without amputation (n=168)
- Healed after minor amputation (n=17)
- Healed after major amputation (n=13)

Patients with ulcers that were not healed within 1 year follow-up (n=104)
- Not healed without amputation (n=75)
- Not healed after minor amputation (n=9)
- Death with wound (n=20)
Results – Healing Times

• The overall geometric mean days to heal was 91.1 days (SD 80.8 to 102.7)

• In the low HbA1c variability group the geometric mean days to heal was 72.1 days (58.3 to 89.1)

• In the high Hb1Ac variability group the geometric mean days to heal was 106.5 days (89.4 to 126.9), (p<0.05)
Results - Other Factors

- Ulcer healing was significantly associated with duration of DM (p=0.0278)
  - The odds of healing for DM duration of 8-15 years was 2.56 (95 CI 1.25 to 5.139) cf DM <8 years

- Ulcer grade [Texas] (p<0.0001)

- Number of pulses (p<0.0001)

- ABPI (p=0.0208)

- Past foot problems (p=0.0453)

- T2DM patients on tablet or insulin OR for healing 2.6 (95% CI: 1.37 to 4.94) cf patients with T1DM or diet controlled T2DM
Conclusions

• Our novel data has shown that wound healing of a foot ulcer is significantly associated with HbA1c variability, with lower variability associated with shorter time to heal.

• These data confirm the importance of maintaining steady glycaemic control, but also emphasise that large variations in HbA1c over time lead to longer healing times.
Glycaemic Variability As Measured By The Magnitude Of Change Of Visit To Visit HbA1c Concentrations Over The 5 Years Prior To Presentation, Is Significantly Associated With Rate Of Wound Healing In The Diabetic Foot

www.norfolkdiabetes.com

ketan.dhatariya@nnuh.nhs.uk

@ketandhatariya