Visual image of prison health care

RESP

Interstitial glucose monitoring in people with diabetes

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Devices are now available that continuously measure the interstitial glucose of persons with diabetes. They have been shown to have a very positive impact on metabolic control of the disease, with blood sugar within acceptable ranges for a longer period and a significant reduction of low blood glucose, which makes for greater patient safety and comfort[1-4].

These monitors are included in the service portfolio of the National Health System in Spain, and are currently financed for patients with type 1 diabetes[5], type 2 diabetes[6] and other insulin-dependent patients (monogenetic diabetes, cystic fibrosis, pancreoprivic diabetes and hemochromatosis), as long as they are receiving intensive insulin therapy and require more than 6 finger pricks a day.

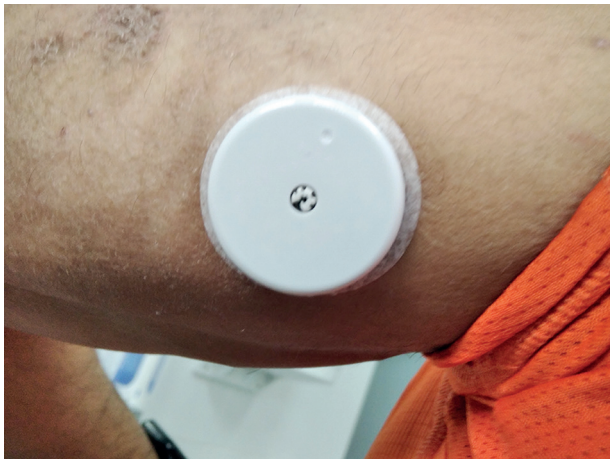

Figure 2. Sensor of flash monitoring system

Figure 1. Flash monitoring system kit.

Figure 3. Reader of flash monitoring system.

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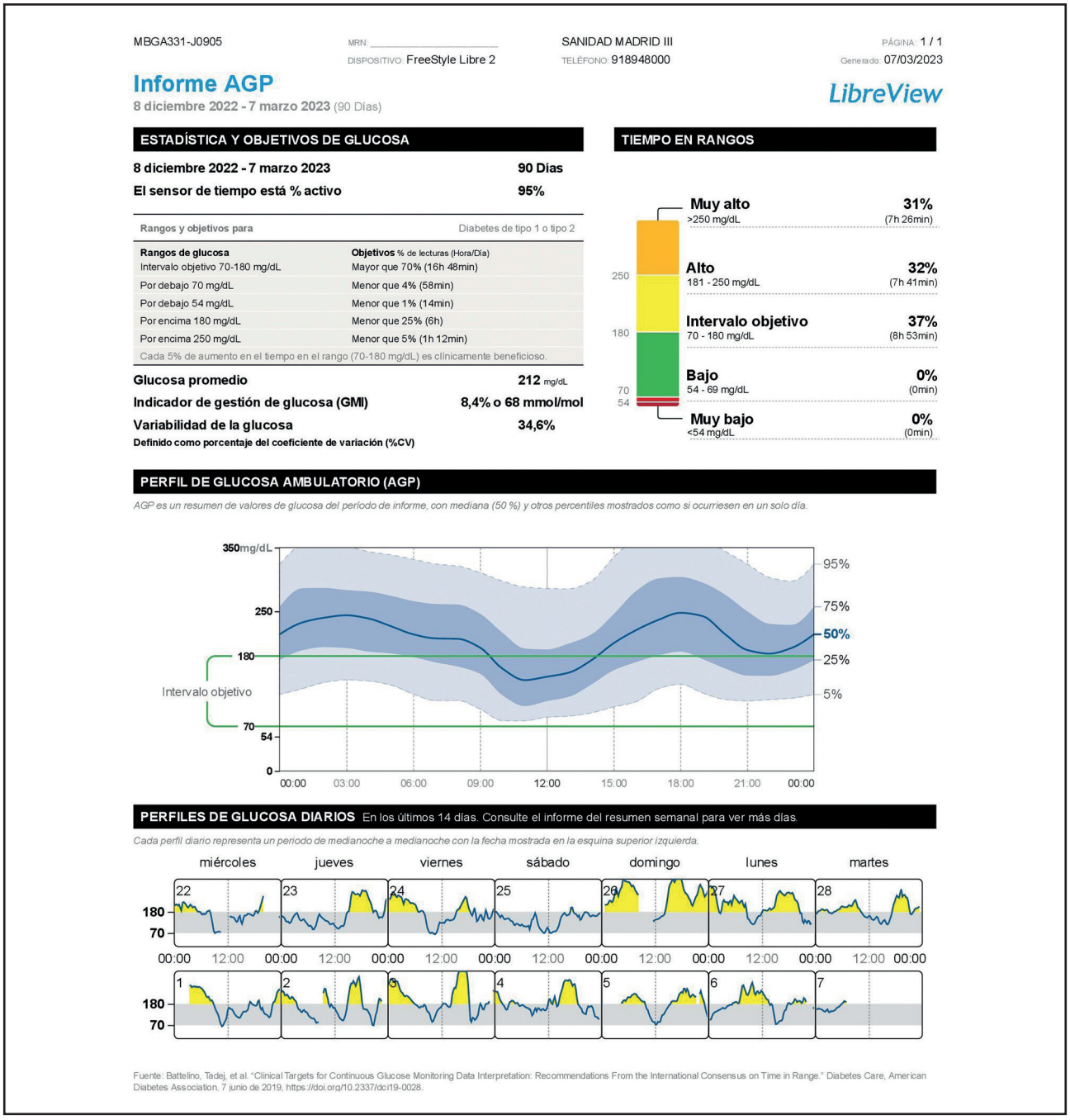
A growing number of people are entering prison with these devices, which obliges professionals to familiarise themselves with how they work.

There are two types of continuous interstitial glucose monitors:

- Real time continuous monitoring systems, with a sensor that includes a transmitter that continuously sends measurement data to the receiver, which is a mobile device, the use of which are restricted in prison.
- Flash monitoring systems (Figure 1), where the sensor (Figure 2) does not include a transmitter. To obtain the complete glucose history the sensor has to be scanned with the reader at least once every eight hours (Figure 3). This system is the one used in prisons.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DISPOSITIVO: FreeStyle Libre 2 TELÉFONO: 918948000 Generado: 07/03/2023

Informe AGP
8 diciembre 2022 - 7 marzo 2023 (90 Días)

LibreView

ESTADÍSTICA Y OBJETIVOS DE GLUCOSA

8 diciembre 2022 - 7 marzo 2023	**90 Días**
El sensor de tiempo está % activo	**95%**

Rangos y objetivos para	Diabetes de tipo 1 o tipo 2
Rangos de glucosa	**Objetivos** % de lecturas (Hora/Día)
Intervalo objetivo 70-180 mg/dL	Mayor que 70% (16h 48min)
Por debajo 70 mg/dL	Menor que 4% (58min)
Por debajo 54 mg/dL	Menor que 1% (14min)
Por encima 180 mg/dL	Menor que 25% (6h)
Por encima 250 mg/dL	Menor que 5% (1h 12min)

Cada 5% de aumento en el tiempo en el rango (70-180 mg/dL) es clínicamente beneficioso.

Glucosa promedio	**212** mg/dL
Indicador de gestión de glucosa (GMI)	**8,4% o 68 mmol/mol**
Variabilidad de la glucosa	**34,6%**

Definido como porcentaje del coeficiente de variación (%CV)

TIEMPO EN RANGOS

Muy alto	>250 mg/dL	**31%** (7h 26min)
Alto	181 - 250 mg/dL	**32%** (7h 41min)
Intervalo objetivo	70 - 180 mg/dL	**37%** (8h 53min)
Bajo	54 - 69 mg/dL	**0%** (0min)
Muy bajo	<54 mg/dL	**0%** (0min)

PERFIL DE GLUCOSA AMBULATORIO (AGP)

AGP es un resumen de valores de glucosa del período de informe, con mediana (50 %) y otros percentiles mostrados como si ocurriesen en un solo día.

PERFILES DE GLUCOSA DIARIOS En los últimos 14 días. Consulte el informe del resumen semanal para ver más días.

Cada perfil diario representa un periodo de medianoche a medianoche con la fecha mostrada en la esquina superior izquierda.

Fuente: Battelino, Tadej, et al. "Clinical Targets for Continuous Glucose Monitoring Data Interpretation: Recommendations From the International Consensus on Time in Range." Diabetes Care, American Diabetes Association, 7 junio de 2019, https://doi.org/10.2337/dci19-0028.

Figure 4. Log and graphs of interstitial glucose data.

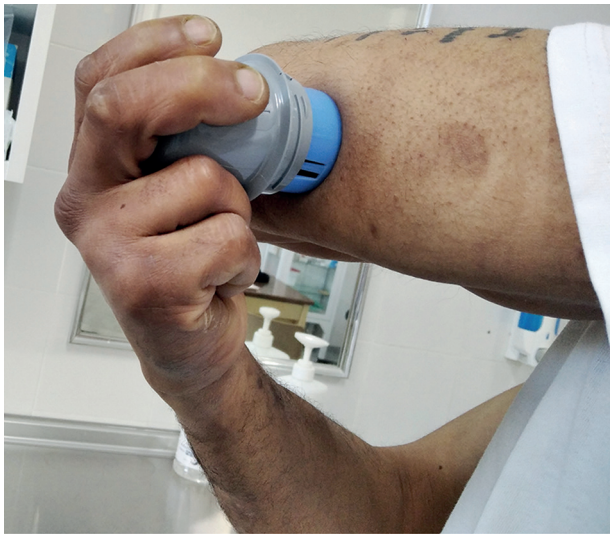

Figure 5. Insertion of monitoring sensor.

The data in both systems is downloaded to a digital platform where it is processed via logs and graphs (Figure 4). In both cases, a set of alerts can be programmed to warn the patient of hypoglycaemia and hyperglycaemia, amongst other options. This greatly improves patient safety.

The duration of the sensor is 6-14 days depending on the model. Wet skin and excess hair should be avoided when placing the sensor (Figure 5)[7], because they can make adhesion more difficult; areas with lipodostrophy, scars and moles should also be avoided. A dressing is recommended to ensure that the sensor sticks to the skin, thus preventing incorrect measurements. If the patient has contact dermatitis, a protective hydrocolloid dressing or Tegaderm® dressing can be applied to the skin before the sensor is inserted[8].

It should be borne in mind that when the blood glucose is stable for a period of time, there is a match in the readings for blood and interstitial glucose. If not, there is a delay between the interstitial and capillary of about 5-10 minutes. There are situations of greater instability in readings of interstitial glycaemia (postprandial period, exercise, first hours of sensor use, hypo and hyperglycaemia, etc.) that can lead to incorrect calculations of the insulin dose, and so a capillary glucose reading is recommended before making any further decisions. This measurement is also recommended in cases where symptoms appear that do not match the monitor reading.

Technological advances oblige us to keep constantly up to date. They also represent a challenge to the prison system, since there is the added obligation of making prison security compatible with the right of patients to receive the same services as persons in the community.

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REFERENCES

1. Bolinder J, Antuna R, Geelhoed-Duijvestijn P, Kröger J, Weitgasser R. Novel glucose-sensing technology and hypoglycaemia in type 1 diabetes: a multicentre, non-masked, randomised controlled trial. Lancet. 2016;388(10057):2254-63.
2. Kröger J, Fasching P, Hanaire H. Three European Retrospective Real-World Chart Review Studies to Determine the Effectiveness of Flash Glucose Monitoring on HbA1c in Adults with Type 2 Diabetes. Diabetes Ther. 2020;11(1):279-91.
3. Oskarsson P, Antuna R, Geelhoed-Duijvestijn P, Kröger J, Weitgasser R, Bolinder J. Impact of flash glucose monitoring on hypoglycaemia in adults with type 1 diabetes managed with multiple daily injection therapy: a pre-specified subgroup analysis of the IMPACT randomised controlled trial. Diabetologia. 2018;61(3):539-50. doi:10.1007/s00125-017-4527-5.
4. Liang B, Koye DN, Hachem M, Zafari N, Braat S, Ekinci EI. Efficacy of Flash Glucose Monitoring in Type 1 and Type 2 Diabetes: A Systematic Review and Meta-Analysis of Randomised Controlled Trials. Front Clin Diabetes Healthc. 2022;3:849725. doi:10.3389/fcdhc.2022.849725
5. Dirección General de Cartera Común de Servicios del Sistema Nacional de Salud y Farmacia. Resolución de 22 de julio de 2021 de la Dirección General de Cartera Común de Servicios del Sistema Nacional de Salud y Farmacia, por la que se hace público el acuerdo de la Comisión de prestaciones, aseguramiento y financiación de 29 de enero de 2021 sobre los sistemas de monitorización continua de glucosa intersticial en tiempo real en la cartera común de servicios del Sistema Nacional de Salud. [Internet]. Madrid: Ministerio de Sanidad; 2021. [Consultado el 21/04/23]. Disponible en: https://www.sanidad.gob.es/profesionales/prestacionesSanitarias/CarteraDeServicios/ContenidoCS/docs/Resol_MCG_TR.pdf

Rev Esp Sanid Penit. 2023;25(2):80-83
doi: 10.18176/resp.00071

6. Dirección General de Cartera Común de Servicios del Sistema Nacional de Salud y Farmacia. Resolución de 28 de octubre de 2022 de la Dirección General de Cartera Común de Servicios del Sistema Nacional de Salud y Farmacia, por la que se hace público el acuerdo de la Comisión de prestaciones, aseguramiento y financiación de 21 de julio de 2022 en relación a la priorización de pacientes con diabetes mellitus tipo 2 que realicen terapia intensiva con insulina y requieran realizar al menos seis punciones digitales al día para la auto-monitorización de la glucosa en sangre, a los que facilitar los sistemas de monitorización de glucosa.[Internet] Madrid: Ministerio de Sanidad; 2022. [Consultado el 21/04/23]. Disponible en: https://www.sanidad.gob.es/profesionales/prestacionesSanitarias/CarteraDeServicios/ContenidoCS/docs/Resolucion_Priorizacion_Colectivos_DM2.pdf
7. Tutoriales y descargables. Sistemas FreeStyle. [Internet]. En: FreeStyle.abbott/es. Abbott. Disponible en: https://www.freestyle.abbott/es-es/ayuda/tutoriales.html?gclid=EAIaIQobChMIiqb6nL6-_gIVgeh3Ch1eDA76EAAYASAAEgI04_D_BwE
8. Navarro-Triviño FJ. Reacciones cutáneas a sensores de glucosa: presente y futuro . Actas Dermosifiliogr. 2021;112(5):389-91. doi:10.1016/j.ad.2020.09.008