
CONGRESSO REGIONALE
CONGIUNTO SID-AMD
PIEMONTE | VALLE D'AOSTA 2023
SID
Società Italiana di Diabetologia
AMD
ASSOCIAZIONE MEDICI DIABETOLOGI
SINFONIA 2.0
PER IL DIABETE:
prove d'orchestra
TORINO | Centro Congressi Unione Industriali Torino
27-28 ottobre 2023
Focus 2 Diabete 3C
S. Bertaina

la Dr.ssa Silvana Bertaina dichiara di NON aver ricevuto negli ultimi due anni compensi o finanziamenti da Aziende Farmaceutiche e/o Diagnostiche

Dichiara altresì il proprio impegno ad astenersi, nell'ambito dell'evento, dal nominare, in qualsivoglia modo o forma, aziende farmaceutiche e/o denominazione commerciale e di non fare pubblicità di qualsiasi tipo relativamente a specifici prodotti di interesse sanitario (farmaci, strumenti, dispositivi medico-chirurgici, ecc.)

Prevalence (**9%**) and causes of type 3c diabetes mellitus

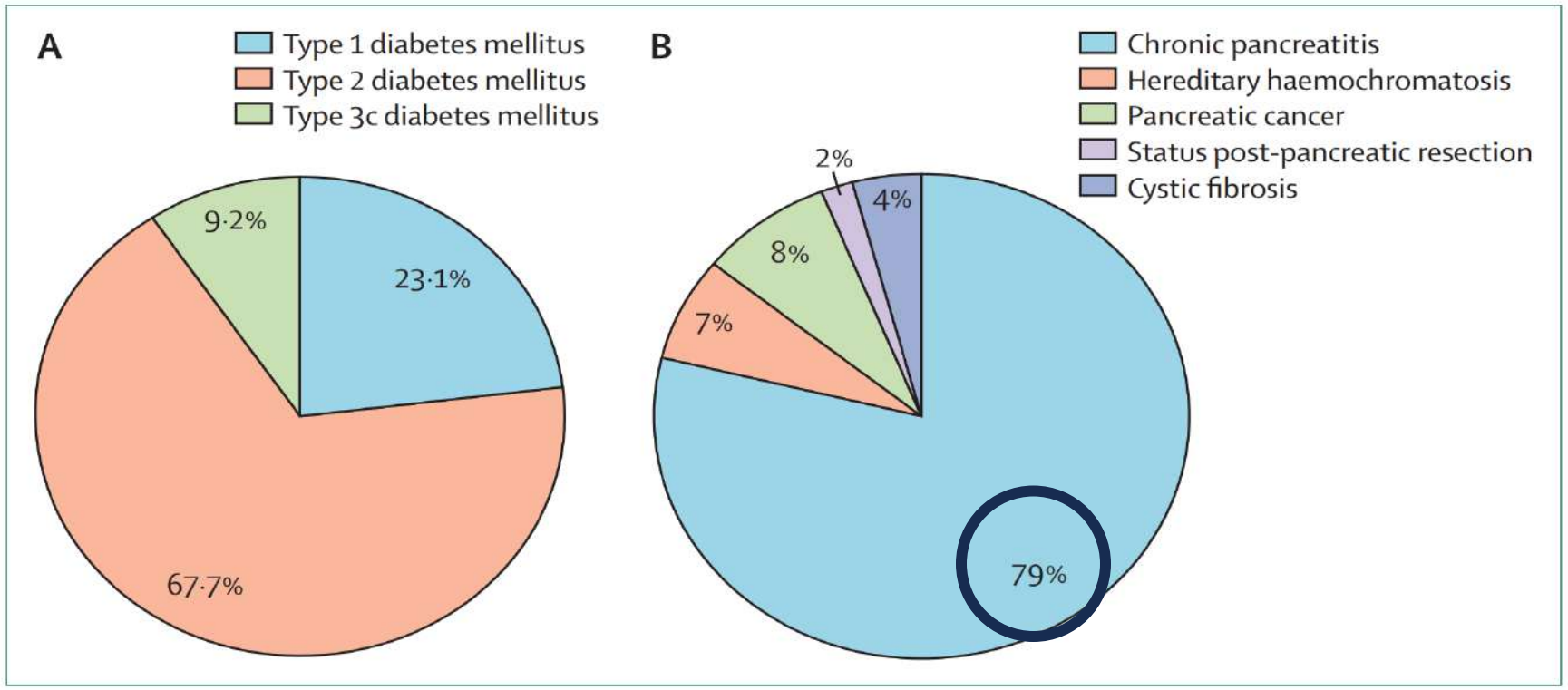
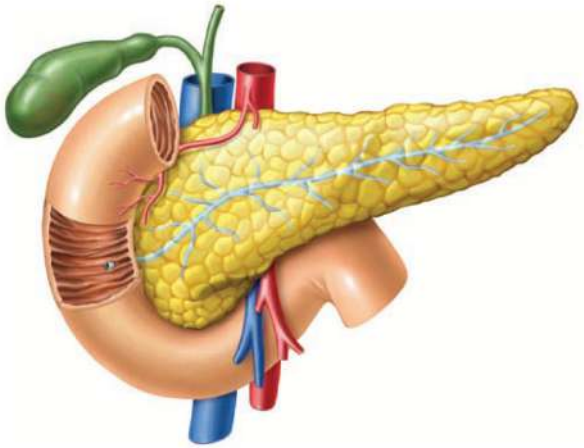


***Figure:* Prevalence and causes of type 3c diabetes mellitus**
(A) Prevalence of type 3c diabetes in a cohort of 1868 participants with diabetes. (B) Frequency of different causes in the 117 participants with type 3c diabetes. Reproduced from Ewald and colleagues,[3] by permission of John Wiley and Sons.



Meccanismi fisiopatologici dell'iperglicemia nel DM tipo 3c

Panel: **Subclassifications of causes of type 3c diabetes grouped according to their potential mechanisms**

Congenital or acquired complete absence of islets

- Pancreatic agenesis
- Pancreatectomy (total)

Acquired partial absence of functional islets

- Chronic pancreatitis*
- Pancreatectomy (partial)
- Severe acute pancreatitis
- Cystic fibrosis
- Haemochromatosis

Paraneoplastic

- Pancreatic ductal adenocarcinoma

Other

- Transient† hyperglycaemia of acute pancreatitis

*Includes tropical pancreatitis, which was previously referred to as fibrocalculous pancreatopathy. †Hyperglycaemia secondary to acute pancreatitis can persist for weeks.

DMT2 vs DMT3c : trova la differenza

TABLE 2. - Diagnostic features of diabetes by type[3,7]

Parameter	Type 1	Type 2	Type 3c
A1C	>6.5%	>6.5%	>6.5%
Fasting glucose	>126 mg/dL	>126 mg/dL	>126 mg/dL
Fasting C-peptide (0.5 to 2.0 ng/mL)	Very low: <0.2 ng/mL	Normal to high	Low to normal
Ketoacidosis	Common	Rare	Rare
Hypoglycemia (glucose <69 mg/dL)	Common	Rare	Frequent
Islet autoantibodies	Positive	Negative	Negative
Exocrine insufficiency (fecal elastase <200 mcg/g)	Negative	Negative	Positive
CGM	Hyperglycemia and reactive hypoglycemia	Hyperglycemia	Alternate hyperglycemia and hypoglycemia

Secondo ADA ,in aggiunta ai criteri diagnostici per diabete,la diagnosi di DMT3c richiede :

Table 3. Criteria for diagnosing T3cDM proposed by Ewald and Bretzel [32,54,56].

	Major Criteria (All Must Be Fulfilled):
1	Evidence of exocrine pancreatic insufficiency (faeces elastase 1 (FE1) < 200 µg/g or incorrect direct function testing)
2	Pathological pancreatic imaging (endoscopic ultrasound, magnetic resonance imaging, and computed tomography)
3	Absence of type 1 diabetes mellitus-associated autoimmune markers.
	Minor Criteria:
1	Impaired beta cell function (e.g., HOMA-B, C-peptide/glucose-ratio)
2	No excessive insulin resistance (e.g., HOMA-IR)
3	Impaired incretin secretion (e.g., GLP-1, pancreatic polypeptide)
4	Low serum levels of lipid soluble vitamins (A, D, E, and K)

Attenti a quei due : associazione tra diabete e carcinoma del pancreas

Il diabete è un fattore di rischio per carcinoma pancreatico

e

un potenziale precoce segnale di allerta di un tumore che sta crescendo (attenzione a new onset diabetes)

Linee guida NICE

For people aged 60 and over presenting with weight loss and new-onset diabetes, follow recommendations on assessing for pancreatic cancer in the section on pancreatic cancer in the NICE guideline on suspected cancer: recognition and referral. [2022]

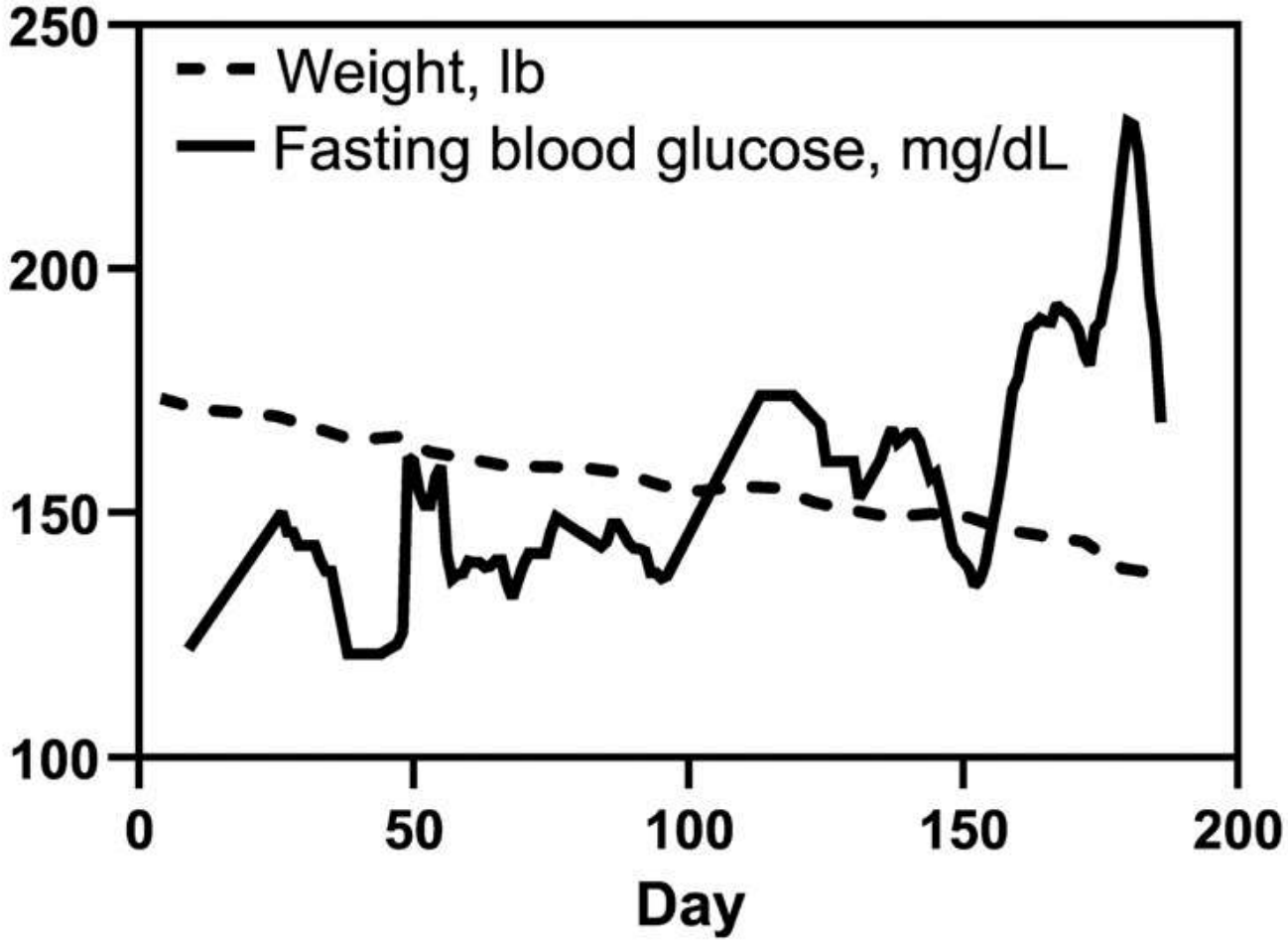
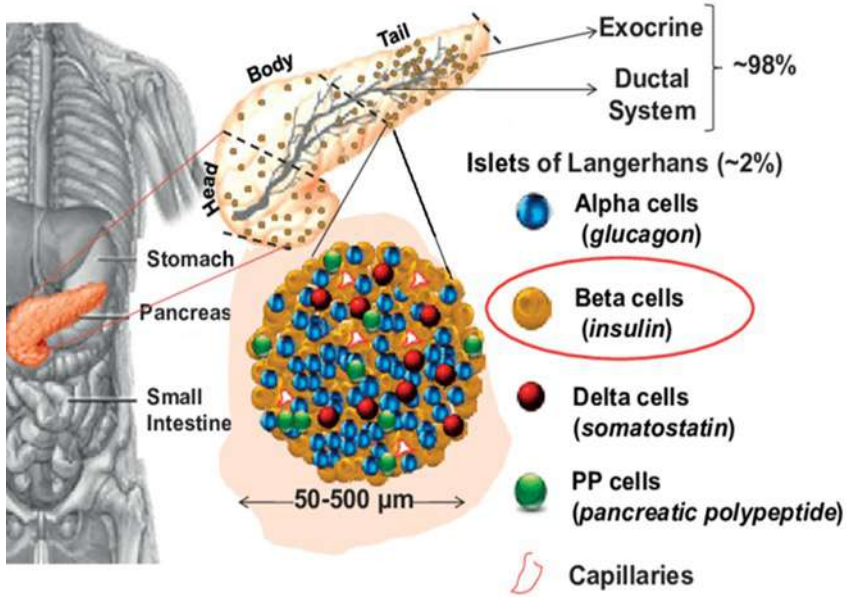


FIGURE 1 Weight and fasting blood glucose trends from day of initial presentation (day 0). Blood glucose trendline represents 7-day running average.

Pancreasectomia e incidenza di DMT3c

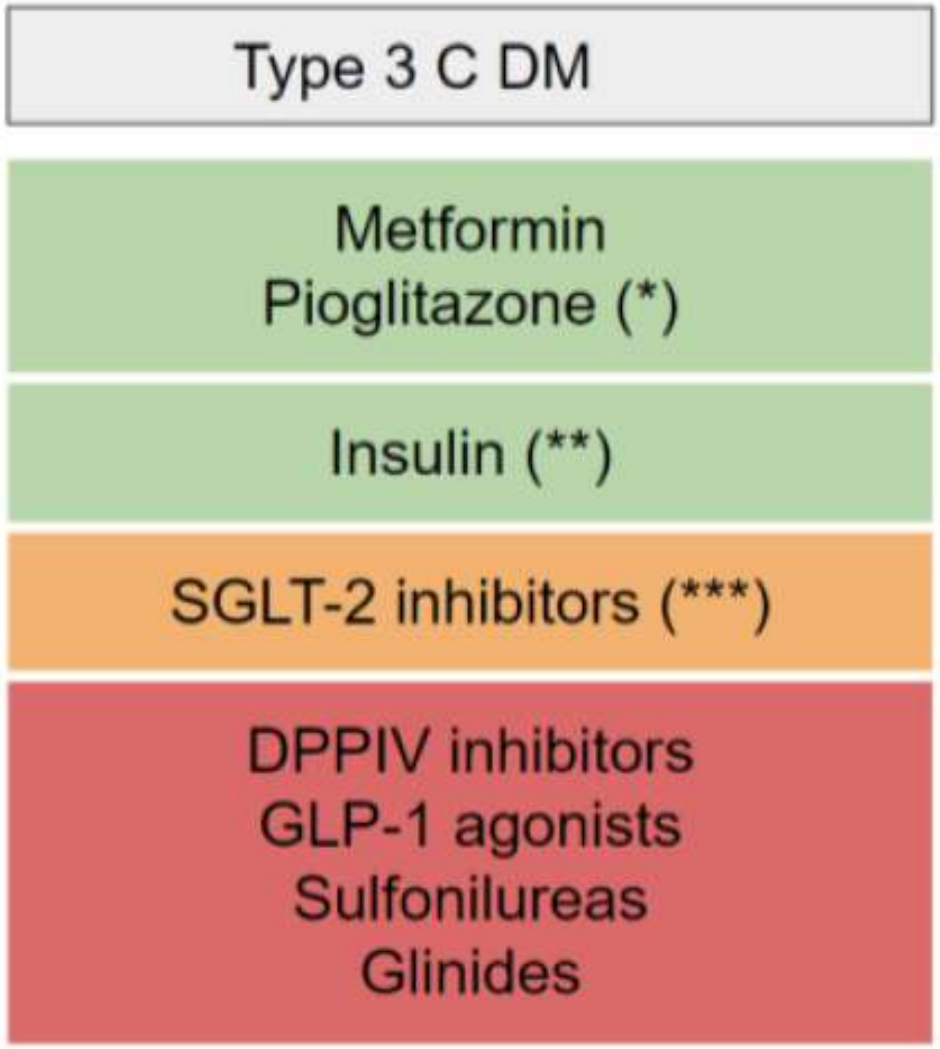
Distal pancreatectomy resulted in the highest incidence of new-onset DM (21%), followed by pancreaticoduodenectomy (16%) while central pancreatectomy presented the lowest incidence of DM (6%). In one study, the median time to develop diabetes was up to 15 months,indicating the need for ongoing screening for T3CDM. Higher preoperative HbA1C (>5.7%),lower remnant pancreatic volume, and fasting plasma glucose were the risk factors with the strongest associations with the onset of T3CDM [25].



Differenze cliniche tra DMT1 e DM secondario a pancreasectomia

	DMT1	Diabete apancreatico
Instabilità glicemica	++	+++
Fabbisogno insulinico	+++	+
ipoglicemia	++	+++
chetoacidosi	+++	+
Complicanze vascolari	+++	+
Livelli ormonali		
Insulina	Bassa	Bassa/assente
Glucagone	**Normale/alto**	**Basso /assente**
PP	Normale/basso	Basso
GIP	Normale/basso	Basso (duodenectomia)
GLP1	Normale	Normale/alto

Trattamento



Treatment includes both management of hyperglycemia and exocrine pancreatic insufficiency.

The aim of treatment is not only to control hypoglycemia and hyperglycemia but also malabsorption, malnutrition, and chronic DM complications

Basso fabbisogno insulinico (media 0.50 UI/KG body weight)

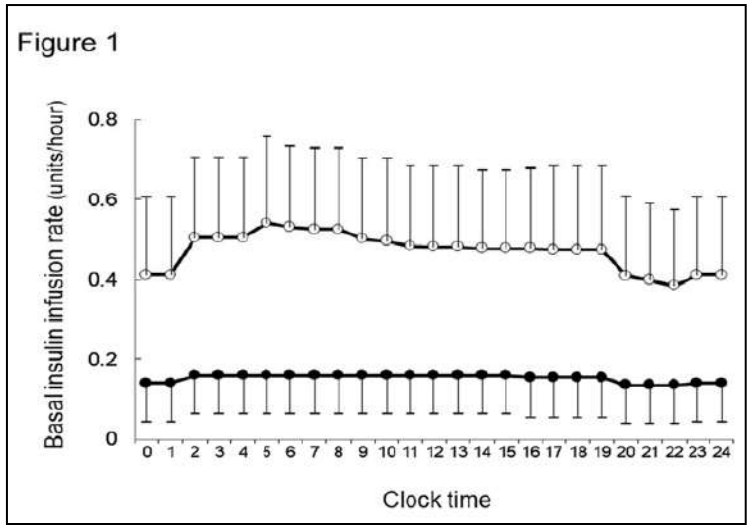


Figure 1. Basal insulin requirements (units/h) in patients with total pancreatectomy (closed circle) and type 1 diabetes (open circle), whose glycemic control was optimized by using an insulin pump.

Data are expressed as the means ± SD.

Table 2 Number of hypoglycemic episodes and predicted daily insulin requirements after total pancreatectomy

Author	Number	Episodes of hypoglycemia	HbA1c levels (%)	Median insulin requirement, U/day (range)
Crippa et al. [78]	65	0–5/week	56% between 7 and 9% 11% > 9%	32 (18–52)
Billings et al. [73]	99		5.0–11.3%	32 (2–66)
Casadei et al. [80]	20	1–10/week	5.2–10.3%	25 (20–52)
Muller et al. [25]	147	–	6.7–7.5%	–
Barbier et al. [79]	56	1–36/month	6.3–10.3%	16 (7–48) long acting and 21 (7–70) rapid acting
Watanabe et al. [81]	44	12/week	6.2–11.2%	6 (0–16) long acting and 17 (10–28) rapid acting

Langenbecks Arch Surg (2017) 402:873–883

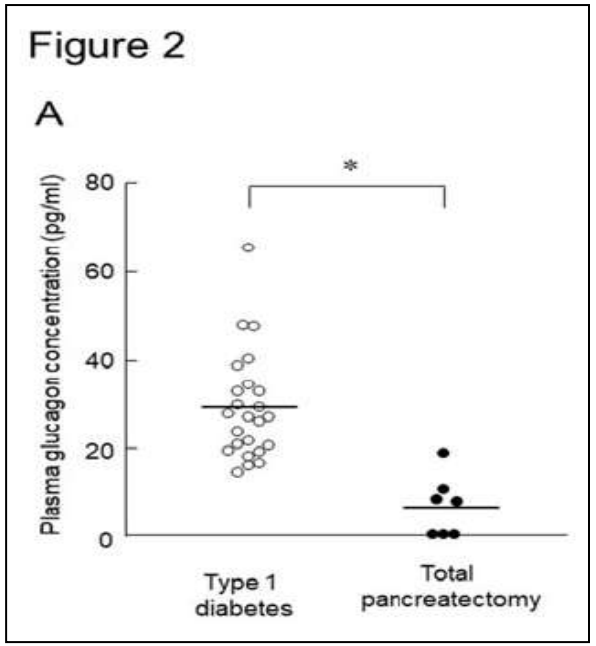


Figure 2.
A. Plasma glucagon concentration (pg/ml) in patients with total pancreatectomy (closed circle) and type 1 diabetes (open circle). Shown are all individual data points and means.The plasma glucagon concentration in the total pancreatectomy group was significantly lower than that in the type 1 diabetes group (6.3 ± 6.9 vs. 28.7 ± 12.2 pg/ml, P=0.00007)*p=0.00007 vs. type 1 diabetes
B. Correlation between the fasting plasma glucagon concentration and basal insulin dose in patients with total pancreatectomy (closed circle) and type 1 diabetes (open circle). The basal insulin requirement was positively associated with the fasting plasma glucagon concentration (R=0.38, p=0.038). However, the correlation was not statistically significant within each group (total pancreatectomy: R=0.43, NS; type 1 diabetes: R=0.02, NS).

Linee guida NICE

Some people have insulin insufficiency because of other conditions. The committee noted that these people would get the same care as people with type 1 diabetes, so they should have access to CGM in the same way.

Glucose metrics	
Average glucose *Goal < 154 mg/dL*	156 mg/dL
Glucose management indicator (GMI) *Goal < 7%*	7%
Glucose variability *Defined as percent of coefficient variation* *Goal ≤ 36%*	46%

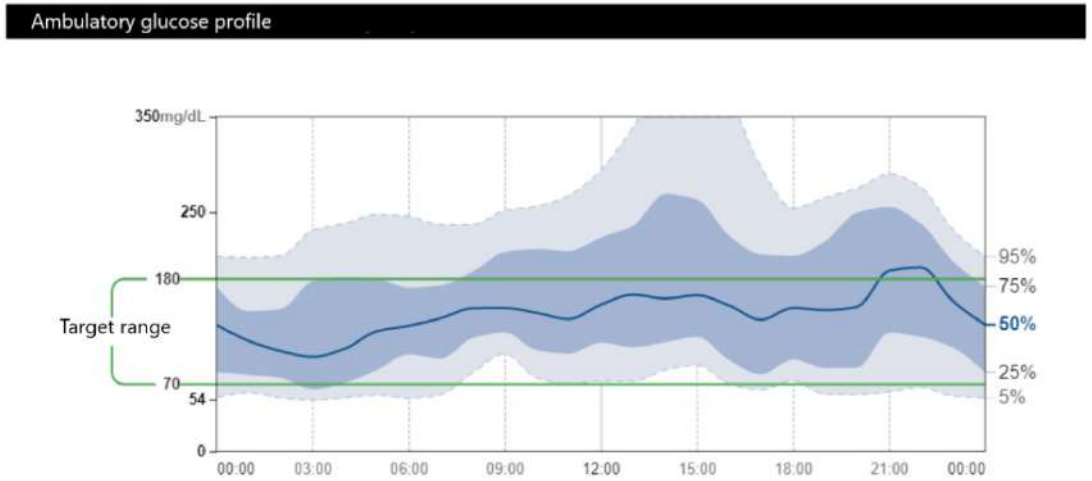


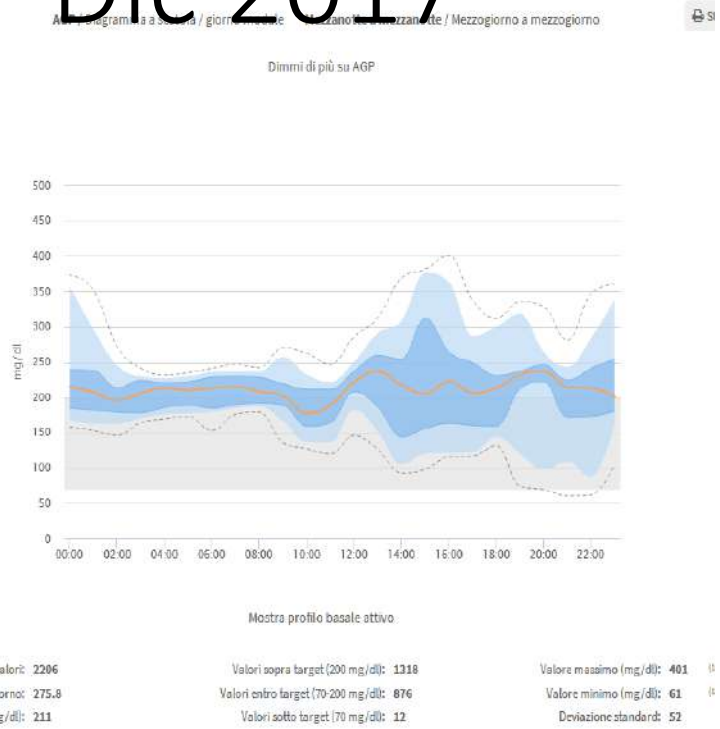
Figure 2. Ambulatory glucose profile (AGP) report of continuous glucose monitoring (CGMS) in a patient with total pancreatectomy due to an 8 × 6 × 7.5 cm pNET.

Due to the increased risk of hypoglycemia in these patients when they are on intensive insulin therapy (basal-bolus regimen), **a continuous interstitial glucose monitoring system should be considered**

Donna di 66 aa
7/2017 Pancreasectomia totale (radicalizzazione della pancreasectomia per sanguinamento dell'anastomosi pancreatico-digiunale in paziente sottoposta ad exeresi di massa addominale , emicolectomia dx ,nefrectomia dx e DCP in data 6/2017. liposarcoma retroperitoneale)

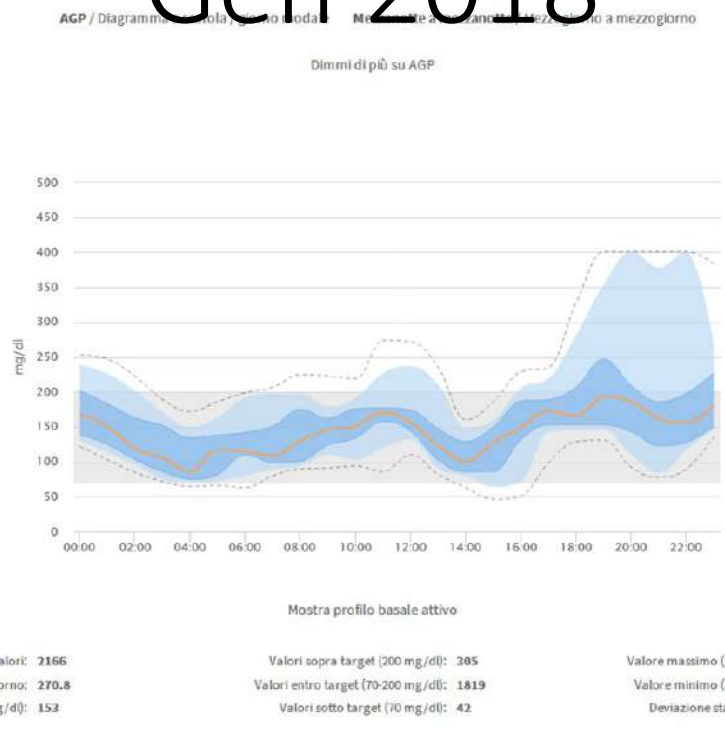
Da dic 2017 inizia CGM

Dic 2017



Numero valori:	2206	Valori sopra target (200 mg/dl):	1318	Valore massimo (mg/dl):	401
Valori/giorno:	275.8	Valori entro target (70-200 mg/dl):	876	Valore minimo (mg/dl):	61
Media periodo (mg/dl):	211	Valori sotto target (70 mg/dl):	12	Deviazione standard:	52

Gen 2018



Numero valori:	2166	Valori sopra target (200 mg/dl):	305	Valore massimo (mg/dl):	401
Valori/giorno:	270.8	Valori entro target (70-200 mg/dl):	1819	Valore minimo (mg/dl):	46
Media periodo (mg/dl):	153	Valori sotto target (70 mg/dl):	42	Deviazione standard:	60

Da 11.2018 SAP CSII+ CGM

Glucometri SM74413192 PL90404772 Pompa per insulina 130441418

Periodo: 28/02/2021 - 13/03/2021, 14 giorni

CGM Tempo CGM attivo: 88%

- 20% Molto alta
- 26% Alto
- 53% Tempo entro target
- 0% Basso
- 0% Molto basso

Intervallo impostato: **70-200 mg/dL**

Tempo entro target	53%
Media	199 mg/dL
Deviazione standard	62 mg/dL

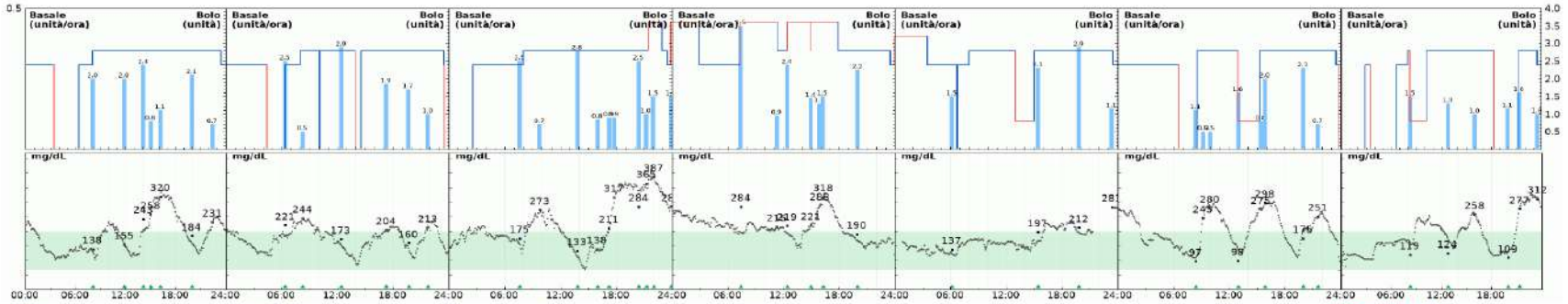
Insulina

- Bolo 60% 9.4 U
- Basale 40% 6.3 U

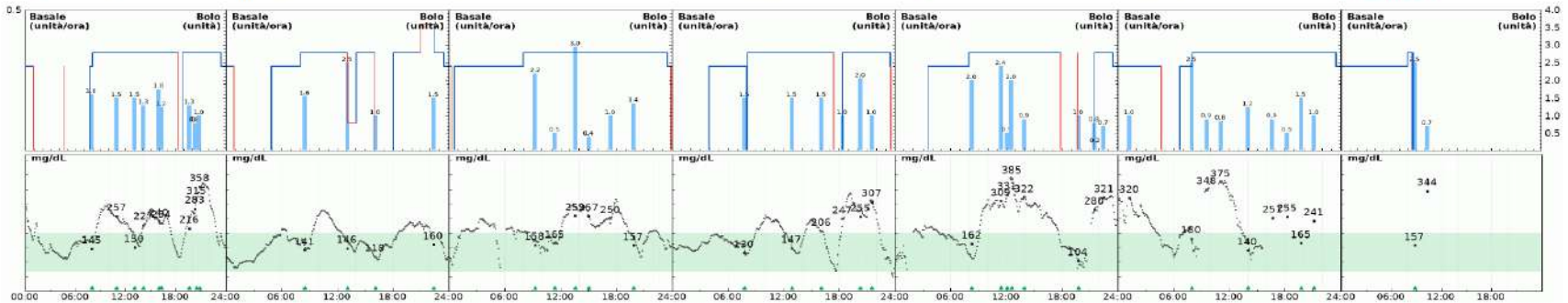
Dose Giornaliera Media	15.8 unità
Deviazione standard	5.3

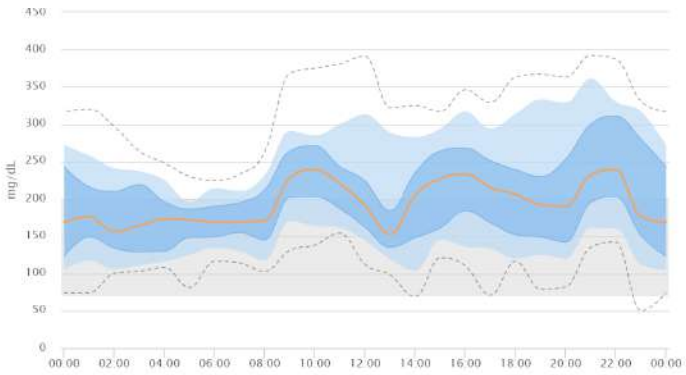
Confronto : Panoramica giorno per giorno (28/02/2021 - 13/03/2021)

Domenica 28/2 | Lunedì 1/3 | Martedì 2/3 | Mercoledì 3/3 | Giovedì 4/3 | Venerdì 5/3 | Sabato 6/3



Domenica 7/3 | Lunedì 8/3 | Martedì 9/3 | Mercoledì 10/3 | Giovedì 11/3 | Venerdì 12/3 | Sabato 13/3





Mostra profilo basale attivo

Molto basso	Basso	Tempo entro target	Alto	Molto alta	Tempo CGM attivo
< 54 mg/dL	54 - 70 mg/dL	70 - 200 mg/dL	200 - 250 mg/dL	> 250 mg/dL	
0 %	0 %	54 %	26 %	20 %	88 %

Media periodo: **199 mg/dL**
Valore massimo: **392 mg/dL** (02/03/2021 21:30)
Valore minimo: **50 mg/dL** (10/03/2021 23:45)

Deviazione standard (SD): **62 mg/dL**
Coefficiente di variazione (CV): **31 %**
Glucose management indicator (GMI): **64.8 mmol/mol - 8.1 %**

Acta Diabetologica (2021) 58:967–969
https://doi.org/10.1007/s00592-021-01715-9

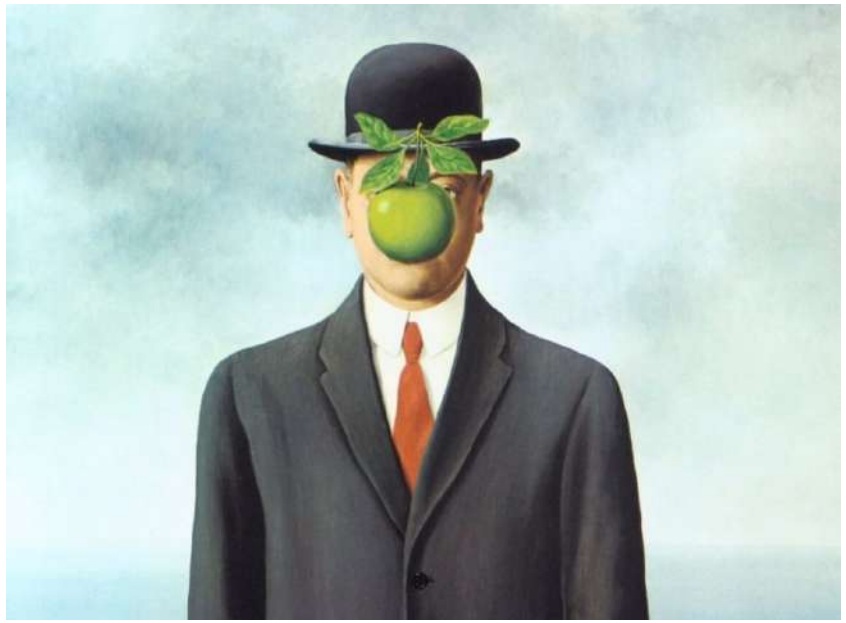
CASE REPORT

Advanced hybrid closed-loop system: first successful clinical case after total pancreatectomy

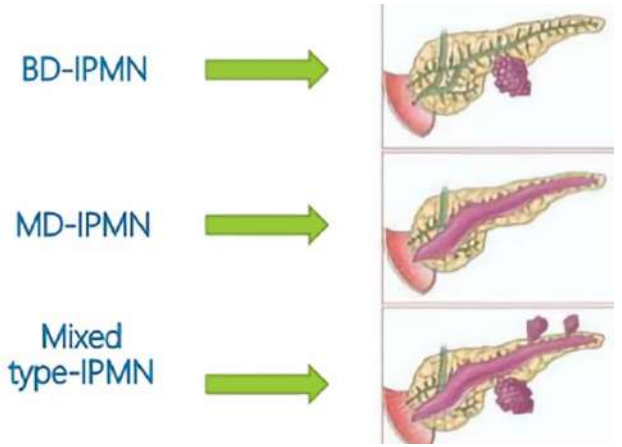
A. Rizzi[1] · L. Tartaglione[1] · M. Di Leo[1] · S. Alfieri[2] · D. Pitocco[1]

Received: 21 February 2021 / Accepted: 30 March 2021 / Published online: 16 April 2021

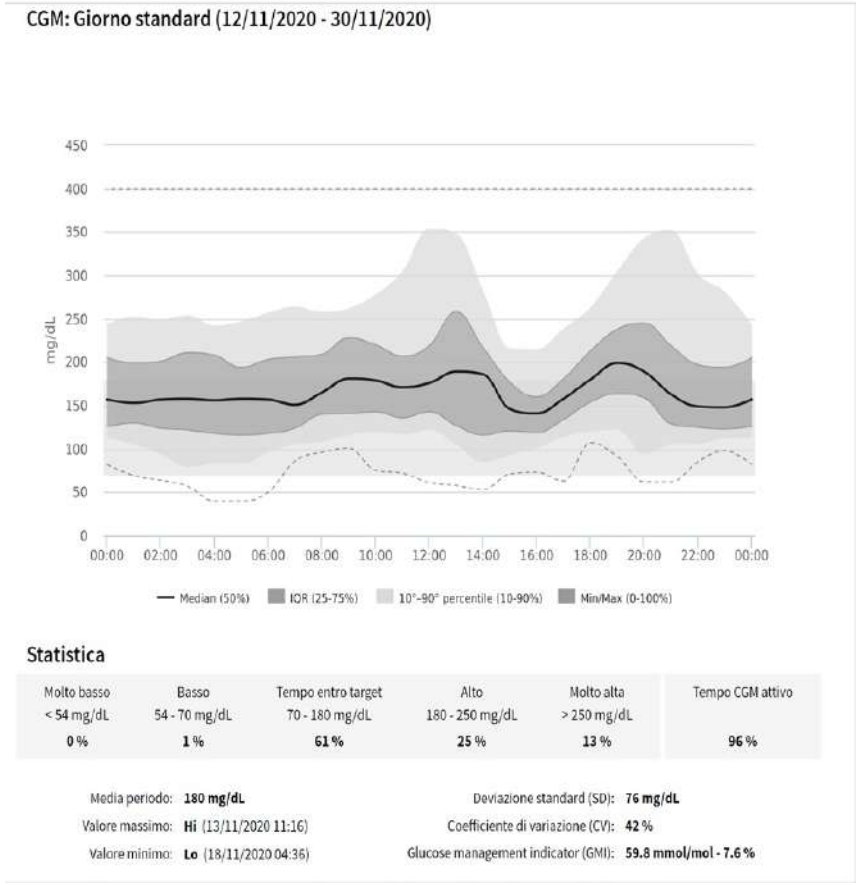
Ci siamo anche noi (sabaudamente)



Uomo 64 aa
familiarità per IPMN degenerate
10/11/2020 pancreasectomia totale spleen preserving per IPMN multifocale



In corso di ricovero inizia utilizzo di MDI+ CGM



Dal 1 dicembre 2020 Microinfusore PLGS e poi HCLS

DdN: 22 apr, 1956 Diabete: Tipo 1

13 ott, 2023 - 26 ott, 2023 (14 giorni)
Oggi: 26 ottobre 2023

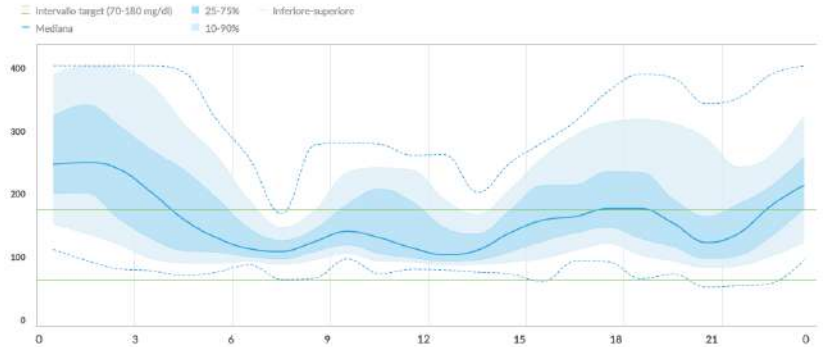
Glicemia – Tempo in target

17%	Molto alta > 250 mg/dl
22%	Alta 181-250 mg/dl
61%	Intervallo target 70-180 mg/dl
0%	Bassa 54-69 mg/dl
0%	Molto bassa < 54 mg/dl

Riepilogo

GMI	7.5% (58,9 mmol/mol)
Media	177 mg/dl
% di tempo CGM attivo	94,3% (13,2 giorni)
DS	78mg/dl
CV	44.2%
Mediana	155mg/dl
Più alta	HImg/dl
Più bassa	60mg/dl

Profilo Glicemico Ambulatoriale (AGP)



Insulina - Dispositivo
Dal microinfusore per insulina

- 42% 11,7 unità — Basale/giorno
- 58% 16,1 unità — Bolo/giorno

Insulina/giorno	27,8unità
Sostituzioni (%)	0% (0 boli)
Boli/giorno	8,8

Dettagli del sistema
Tandem t:slim X2 (13gg 7h)

Control-IQ	98% (13gg)
Attività - Sonno	35% (4gg 15h)
Attività - Esercizio	0%
Manuale	2% (7h)

LGS/PLGS

Tempo di sospensione/giorno	2h 22m
Media sospensioni/giorno	6,5

Media sospensione/ora del giorno

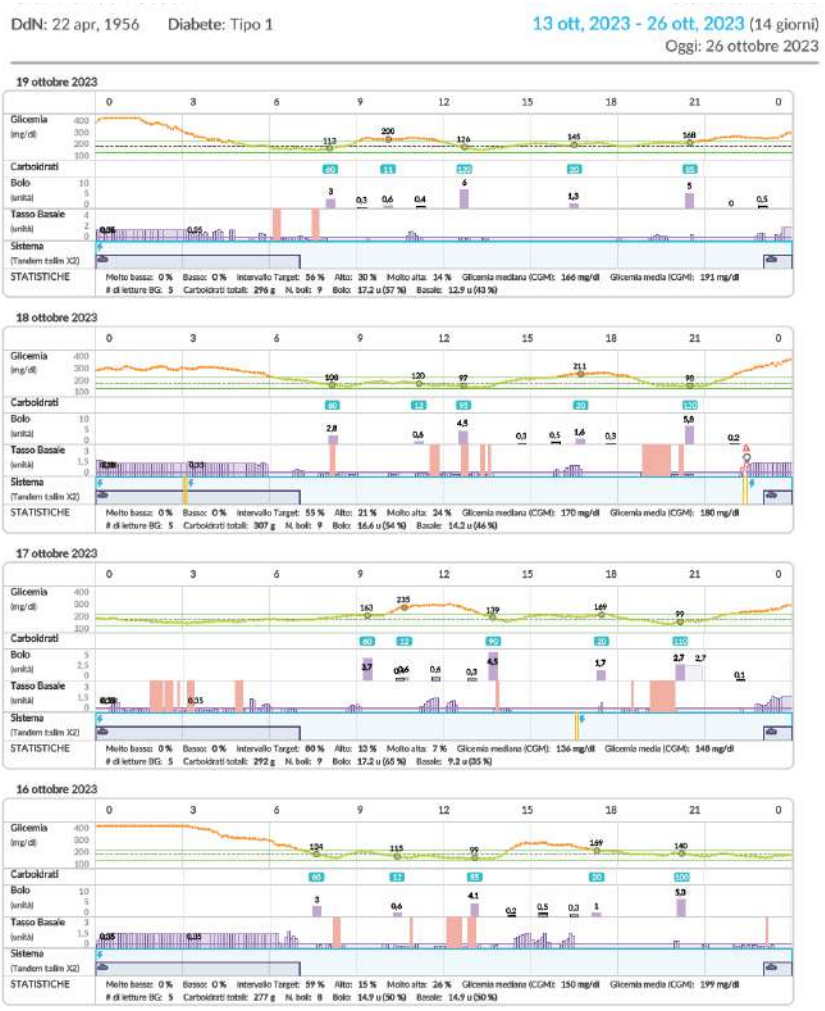
Mattino	27%
Pomeriggio	31%
Sera	19%
Notte	24%

Dieta

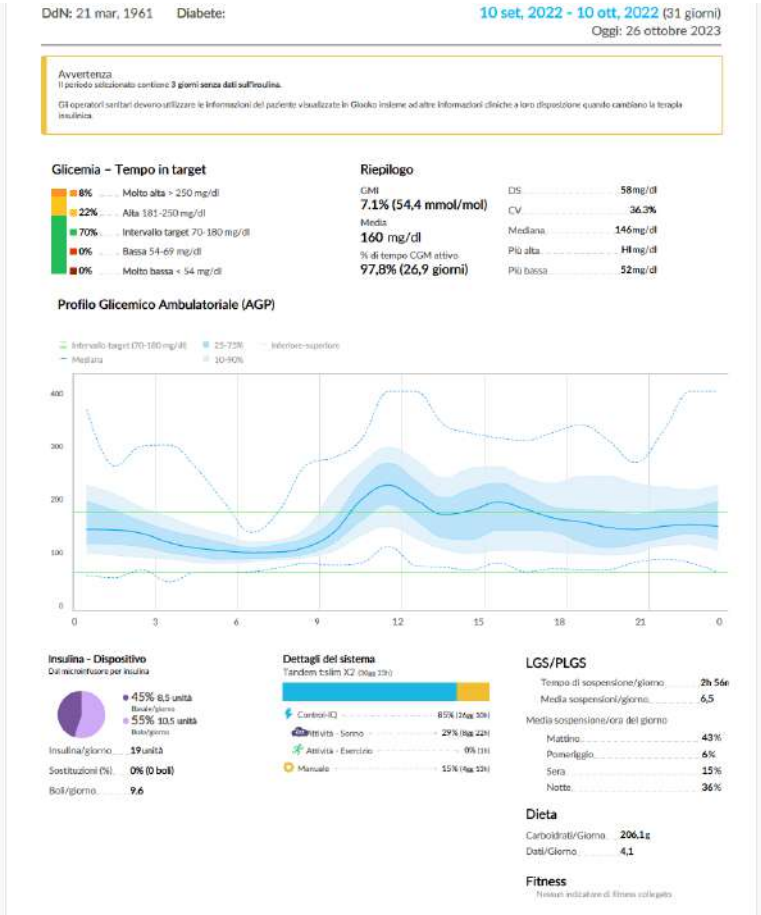
Carboidrati/Giorno	285,6g
Dati/Giorno	4,4

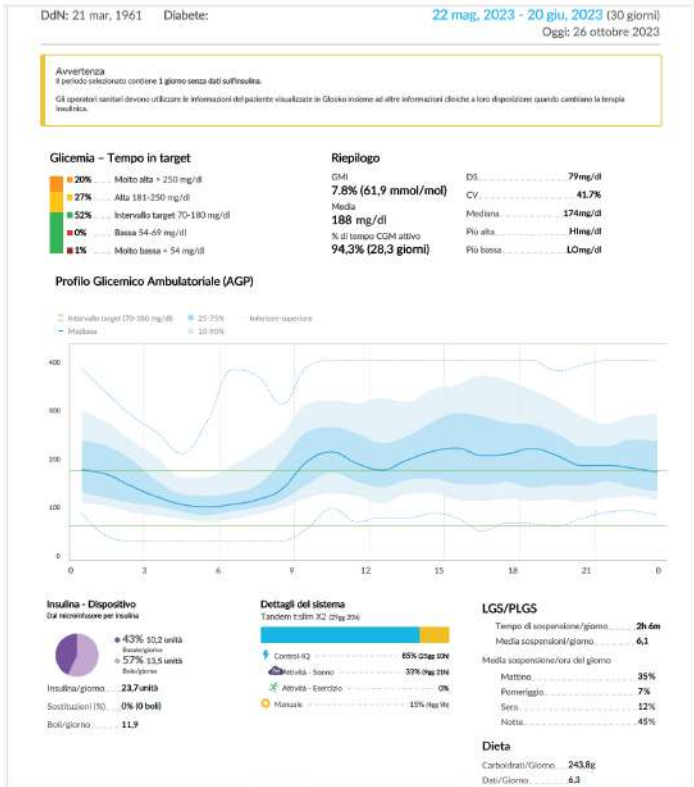
Fitness
Nessun indicatore di fitness collegato

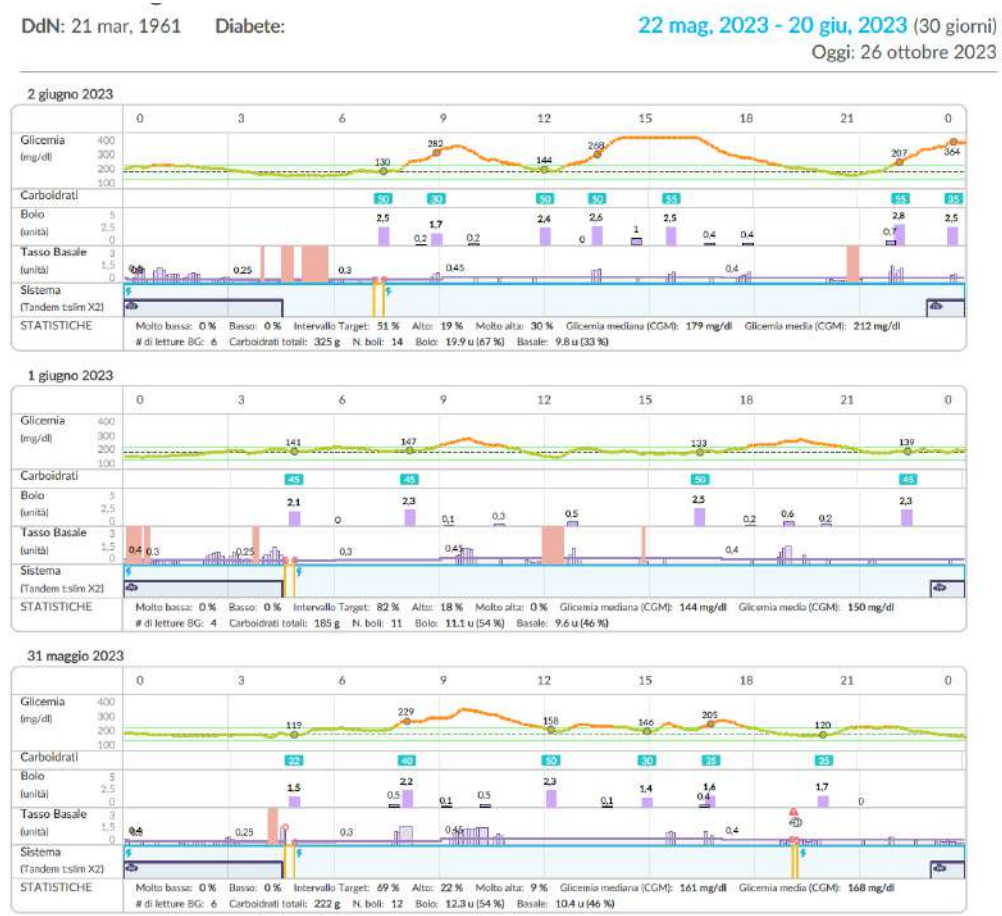
Commenti



Donna di 60 aa
DMT2 dal 2013 (non complicanze)con valori in peggioramento dal 6.2021
2.2022 pancreasectomia totale per NET
Dal 13.09.22 utilizza HCLS




DdN: 21 mar, 1961 Diabete:
22 mag, 2023 - 20 giu, 2023 (30 giorni)
Oggi: 26 ottobre 2023
Avvertenza
Il periodo selezionato contiene 1 giorno senza dati sull'insulina.
Gli operatori sanitari devono utilizzare le informazioni del paziente visualizzate in Glooko insieme ad altre informazioni cliniche a loro disposizione quando cambiano la terapia insulinica.
Glicemia – Tempo in target
20% Molto alta > 250 mg/dl
27% Alta 181-250 mg/dl
52% Intervallo target 70-180 mg/dl
0% Bassa 54-69 mg/dl
1% Molto bassa < 54 mg/dl
Riepilogo
GMI
7.8% (61,9 mmol/mol)
Media
188 mg/dl
% di tempo CGM attivo
94,3% (28,3 giorni)
DS 79mg/dl
CV 41.7%
Mediana 174mg/dl
Più alta HImg/dl
Più bassa LOmg/dl
Profilo Glicemico Ambulatoriale (AGP)
Insulina - Dispositivo
Dal microinfusore per insulina
43% 10,2 unità
57% 13,5 unità
Insulina/giorno 23,7 unità
Sostituzioni (%) 0% (0 boli)
Boli/giorno 11,9
Dettagli del sistema
Tandem t:slim X2
Controllo-IQ 65%
Attività - Sonno 33%
Attività - Esercizio 0%
Manuale 15%
LGS/PLGS
Tempo di sospensione/giorno 2h 6m
Media sospensioni/giorno 6,1
Media sospensione/ora del giorno
Mattino 35%
Pomeriggio 7%
Sera 12%
Notte 45%
Dieta
Carboidrati/Giorno 243,8g
Dati/Giorno 6,3


DdN: 21 mar, 1961 Diabete:
22 mag, 2023 - 20 giu, 2023 (30 giorni)
Oggi: 26 ottobre 2023
2 giugno 2023
Glicemia (mg/dl)
Carboidrati
Bolo (unità)
Tasso Basale (unità)
Sistema (Tandem t:slim X2)
STATISTICHE
Molto bassa: 0 % Basso: 0 % Intervallo Target: 51 % Alto: 19 % Molto alta: 30 % Glicemia mediana (CGM): 179 mg/dl Glicemia media (CGM): 212 mg/dl
di letture BG: 6 Carboidrati totali: 325 g N. boli: 14 Bolo: 19.9 u (67 %) Basale: 9.8 u (33 %)
1 giugno 2023
Molto bassa: 0 % Basso: 0 % Intervallo Target: 82 % Alto: 18 % Molto alta: 0 % Glicemia mediana (CGM): 144 mg/dl Glicemia media (CGM): 150 mg/dl
di letture BG: 4 Carboidrati totali: 185 g N. boli: 11 Bolo: 11.1 u (54 %) Basale: 9.6 u (46 %)
31 maggio 2023
Molto bassa: 0 % Basso: 0 % Intervallo Target: 69 % Alto: 22 % Molto alta: 9 % Glicemia mediana (CGM): 161 mg/dl Glicemia media (CGM): 168 mg/dl
di letture BG: 6 Carboidrati totali: 222 g N. boli: 12 Bolo: 12.3 u (54 %) Basale: 10.4 u (46 %)

Grazie,continuate le prove