VEQ CHIMICA CLINICA 2018

Fiamma Balboni

VEQ chimica clinica 2018

Tutte le Regioni italiane

12 campioni

34 analiti per campione

Analiti da evidenziare

Chi va bene !!!!

Bilirubina totale

Bilirubina Diretta

CK – CHE - LDH

ALBUMINA

Lipasi

Rame


Chi va davvero bene

Glucosio

ESOCHINASI						
1	73.18	mg/dL	121	101.1	3.5
2	183.93	mg/dL	123	100.6	3.0
3	97.48	mg/dL	124	100.5	3.0
4	106.93	mg/dL	124	99.7	2.8
5	244.60	mg/dL	125	99.8	2.3
6	180.05	mg/dL	123	100.6	2.9
7	71.06	mg/dL	119	100.7	3.1
8	171.65	mg/dL	121	100.9	2.9
9	99.35	mg/dL	128	99.6	2.8
10	180.51	mg/dL	122	99.5	2.2
11 *		mg/dL	5	98.2	N.D
12 *		mg/dL	0		N.D
TUTTI			1230	100.3	2.9

Urea

UREASI + GLDH						
1	26.0	mg/dL	172	101.1	6.9
2	82.2	mg/dL	172	99.7	5.5
3	42.2	mg/dL	172	100.6	6.0
4	43.9	mg/dL	174	100.3	4.7
5	102.7	mg/dL	180	99.7	5.2
6	68.8	mg/dL	177	100.5	4.7
7	25.8	mg/dL	176	101.8	7.3
8	66.7	mg/dL	165	100.3	5.1
9	41.0	mg/dL	175	101.0	5.0
10	79.4	mg/dL	174	99.8	4.6
11		mg/dL	7	98.2	4.5
12 *		mg/dL	0		N.D
TUTTI			1744	100.3	5.4

Creatinina

ENZIMATICO						
1	0.617	mg/dL	38	98.3	5.3
2	3.438	mg/dL	41	103.7	2.9
3	1.482	mg/dL	40	103.1	3.5
4	0.620	mg/dL	43	99.1	6.3
5	4.692	mg/dL	45	103.8	3.4
6	0.802	mg/dL	42	98.0	4.7
7	0.582	mg/dL	43	105.7	6.0
8	0.673	mg/dL	40	101.3	5.5
9	1.414	mg/dL	40	101.7	3.2
10	3.487	mg/dL	40	101.7	3.3
11 *		mg/dL	3	100.9	N.D
12 *		mg/dL	0		N.D
TUTTI			412	101.6	4.4

Sodio

I.S.E. INDIRETTA

1	128.1	mmol/L	154	100.1	2.0
2	150.5	mmol/L	150	99.6	1.9
3	137.0	mmol/L	152	99.6	1.7
4	138.1	mmol/L	153	99.7	1.8
5	150.6	mmol/L	155	99.6	1.9
6	129.2	mmol/L	151	99.9	1.7
7	131.0	mmol/L	150	99.8	1.7
8	128.4	mmol/L	152	99.9	1.8
9	136.3	mmol/L	157	100.0	1.6
10	153.3	mmol/L	152	99.6	1.8
11		mmol/L	7	99.6	3.1
12 *		mmol/L	0		N.D
TUTTI			1533	99.8	1.9

Potassio

I.S.E. INDIRETTA

1	2.780	mmol/L	154	99.8	3.3
2	5.353	mmol/L	150	99.2	2.3
3	3.774	mmol/L	151	99.1	2.3
4	3.709	mmol/L	153	99.3	2.6
5	3.511	mmol/L	158	99.4	2.7
6	2.822	mmol/L	152	99.6	2.7
7	2.626	mmol/L	154	99.8	3.2
8	2.800	mmol/L	153	99.4	2.8
9	3.349	mmol/L	157	99.6	2.3
10	5.322	mmol/L	154	99.2	2.6
11		mmol/L	7	99.1	3.1
12 *		mmol/L	0		N.D
TUTTI			1543	99.4	2.7

Cloruro

I.S.E. INDIRETTA

1	85.7	mmol/L	126	101.3	2.7
2	111.5	mmol/L	123	100.8	2.3
3	98.0	mmol/L	124	101.2	2.1
4	98.7	mmol/L	124	100.9	2.3
5	110.0	mmol/L	125	101.0	1.9
6	87.8	mmol/L	122	101.3	1.9
7	89.5	mmol/L	121	100.9	1.8
8	86.4	mmol/L	122	101.1	1.9
9	97.4	mmol/L	129	100.8	1.6
10	116.5	mmol/L	125	100.9	2.1
11 *		mmol/L	5	101.3	N.D
12 *		mmol/L	0		N.D
TUTTI			1241	101.0	2.1

Calcio

ARSENAZO III

1	7.20	mg/dL	130	101.0	3.4
2	9.92	mg/dL	131	101.0	3.1
3	8.54	mg/dL	129	101.4	2.7
4	8.65	mg/dL	134	101.3	3.5
5	6.63	mg/dL	136	103.5	4.4
6	7.24	mg/dL	134	101.8	3.4
7	6.25	mg/dL	131	101.8	3.4
8	6.78	mg/dL	126	102.1	3.0
9	8.00	mg/dL	131	101.8	2.9
10	10.77	mg/dL	131	101.2	3.0
11 *		mg/dL	4	102.1	N.D
12 *		mg/dL	0		N.D
TUTTI			1313	101.7	3.3

Fosforo

FOSFOM.(FORMAZ.) a 340 360 nm.

1	2.446	mg/dL	138	100.3	5.5
2	4.530	mg/dL	139	100.3	5.1
3	3.381	mg/dL	134	100.7	4.5
4	3.602	mg/dL	137	100.0	4.8
5	5.304	mg/dL	141	100.0	4.3
6	2.391	mg/dL	137	99.9	5.5
7	2.324	mg/dL	136	100.2	4.7
8	2.266	mg/dL	136	99.6	5.2
9	3.451	mg/dL	141	100.1	4.5
10	4.710	mg/dL	138	99.9	4.7
11 *		mg/dL	4	98.3	N.D
12 *		mg/dL	0		N.D
TUTTI			1377	100.1	4.9

Ferro

FERENE-S

1	58.3	ug/dL	125	101.6	6.9
2	174.9	ug/dL	125	99.7	4.1
3	102.7	ug/dL	122	100.0	4.6
4	125.6	ug/dL	130	98.8	5.9
5	199.4	ug/dL	127	99.1	4.2
6	61.2	ug/dL	123	100.4	7.3
7	52.2	ug/dL	120	101.1	7.7
8	55.3	ug/dL	111	101.6	6.0
9	100.4	ug/dL	113	99.4	5.4
10	175.6	ug/dL	112	98.7	5.4
11 *		ug/dL	6	100.7	N.D
12 *		ug/dL	0		N.D
TUTTI			1208	100.0	5.8

Acido Urico

URICASI POD

1	4.063	mg/dL	187	103.4	5.4
2	7.184	mg/dL	189	101.3	5.3
3	5.568	mg/dL	187	102.0	4.5
4	5.145	mg/dL	189	101.4	4.6
5	4.493	mg/dL	197	100.6	7.4
6	3.897	mg/dL	191	102.5	4.8
7	3.663	mg/dL	189	102.7	5.0
8	3.512	mg/dL	179	102.4	4.8
9	5.347	mg/dL	188	101.5	3.9
10	7.561	mg/dL	189	100.1	5.4
11		mg/dL	8	101.5	2.8
12 *		mg/dL	0		N.D
TUTTI			1893	101.8	4.9

Proteine Totali

REAZIONE BIURETO

1	4.210	g/dL	84	100.4	4.4
2	6.834	g/dL	84	101.1	4.5
3	5.775	g/dL	81	101.4	4.4
4	5.861	g/dL	89	101.2	4.1
5	7.629	g/dL	89	100.4	3.6
6	4.440	g/dL	89	101.5	4.2
7	4.259	g/dL	90	101.4	4.4
8	4.625	g/dL	79	100.5	4.1
9	5.758	g/dL	85	100.0	3.2
10	7.532	g/dL	86	99.9	3.7
11 *		g/dL	4	102.3	N.D
12 *		g/dL	0		N.D
TUTTI			856	100.8	4.1

Colesterolo

CHOD POD

1	87.2	mg/dL	192	101.9	4.4
2	256.6	mg/dL	190	101.8	4.4
3	130.5	mg/dL	192	101.4	3.9
4	134.4	mg/dL	199	101.7	4.5
5	258.7	mg/dL	199	101.7	3.9
6	158.4	mg/dL	196	101.9	3.9
7	90.1	mg/dL	194	101.5	4.1
8	178.1	mg/dL	185	101.7	4.2
9	154.6	mg/dL	197	101.6	4.3
10	278.5	mg/dL	196	101.6	4.3
11		mg/dL	7	105.0	2.4
12 *		mg/dL	0		N.D
TUTTI			1947	102.0	4.0

Chi va male!!!!


IO QUANDO SBAGLIO NON STO SBAGLIANDO! SBAGLIO APPOSTA PER FARVI VEDERE QUAL'E' LA COSA SBAGLIATA!
DOVRESTE RINGRAZIARMI!
CAVEZ

Bilirubina totale e diretta

Bilirubina Totale

METODO	VM%	CV%
ACIDO SULFANILICO + ACC (753-588-513-**399**)	118-122-110-**112,6**	16,8-20,8-132,5-**13,8**
ACIDO SULFANILICO DIMENSION/VISTA (265-223-239-**256**)	96,5-97,8-96,4-**97,7**	5,3-5-4,9-**4,6**
AZOCOMPOSTO DRY CHEMISTRY (240-250-202-**176**)	86,6-102,3-99-**87.6**	14,7-11,6-9,7-**12,9**
BILIVERDINA (162-143-130-**137**)	106,2-106-104-**108,9**	6,3-5-4,1-**3,8**
DPD ROCHE COBAS 6000-8000 (828-799-905-**1029**)	87,1-85,7-89,8-**89,8**	3,9-3,8-4-**3,8**

Bilirubina Diretta

METODO	VM %	CV %
ACIDO SULFANILICO + SALE DIAZONIO (638-526-461-**374**)	121-123,1-120,1-**128,9**	23,6-25,7-18-**21,1**
AZOCOMPOSTO DRY CHEMISTRY (142-166-144-**100**)	100-100-100-**100**	32-28,3-22,4-**34,7**
BILIVERDINA (108-80-76-**79**)	101.9-110-106-**105,3**	8,4-7,2-10,1-**6,5**
ACIDO SULFANILICO DIMENSION/VISTA (286-227-245-**251**)	84,5-86-84-**87,4**	9,9-10,8-10,4-**11,3**
DCA (117-71-64-**87**)	103,7-103,5-100-**101.4**	15,1-10,7-8,4-**9,5**

LIPASI

DILAUR-GLIC-A.GLUT/ROCHE COBAS6-8000

1	19.50	UI/L	86	99.9	4.3
2	99.45	UI/L	83	92.0	4.1
3	34.14	UI/L	84	97.9	3.6
4	48.56	UI/L	81	93.9	3.7
5	113.25	UI/L	86	93.8	5.0
6	18.14	UI/L	88	107.0	5.9
7	21.72	UI/L	85	102.5	5.1
8	19.90	UI/L	87	108.2	5.3
9	35.83	UI/L	85	98.5	4.0
10	93.64	UI/L	84	92.5	4.6
11 *		UI/L	5	98.0	N.D
12 *		UI/L	0		N.D
TUTTI			849	98.6	4.6

DILAUR-GL-AC.GLUT ADVIA SIEMENS

1	19.50	UI/L	14	120.2	8.9
2	99.45	UI/L	14	129.1	8.8
3	34.14	UI/L	14	116.4	6.4
4	48.56	UI/L	14	117.1	8.2
5	113.25	UI/L	14	125.3	6.5
6	18.14	UI/L	14	133.3	12.7
7	21.72	UI/L	13	119.7	8.6
8	19.90	UI/L	13	136.5	11.4
9	35.83	UI/L	14	119.4	6.8
10	93.64	UI/L	14	133.5	7.3
11 *		UI/L	0		N.D
12 *		UI/L	0		N.D
TUTTI			138	125.1	8.6

DILAURILIC-GLICERO-AC.GLUT.CO

1	19.50	UI/L	27	111.8	19.9
2	99.45	UI/L	31	106.7	10.9
3	34.14	UI/L	26	113.4	21.1
4	48.56	UI/L	34	106.2	12.1
5	113.25	UI/L	33	107.1	12.9
6	18.14	UI/L	31	125.5	32.0
7	21.72	UI/L	32	111.2	17.7
8	19.90	UI/L	30	124.8	22.7
9	35.83	UI/L	28	109.6	12.3
10	93.64	UI/L	30	108.0	10.5
11 *		UI/L	3	104.9	N.D
12 *		UI/L	0		N.D
TUTTI			302	112.4	17.2

COLINESTERASI

Metodo	Sistema	N°Pool	Conc. Tutti	U.M.	N° Valori	V. Medio %	C.V.
BUTIRRILTIOC./ARCHITECT	AUTOMATICO	1	3871.2	UI/L	33	117.9	2.7
		2	7014.4	UI/L	34	118.6	2.7
		3	6145.0	UI/L	37	117.5	3.0
		4	6207.7	UI/L	37	119.0	3.8
		5	8179.3	UI/L	36	118.2	2.4
		6	3927.8	UI/L	38	116.6	2.3
		7	3939.3	UI/L	39	117.2	3.7
		8	3954.8	UI/L	37	117.5	2.0
		9	5793.1	UI/L	40	116.4	3.1
		10	5848.8	UI/L	37	116.0	2.5
		11 *		UI/L	0		N.D
		12 *		UI/L	0		N.D
		TUTTI			368	117.5	2.8
BUTIRRILTIOC.	AUTOMATICO	1	3871.2	UI/L	119	95.3	4.5
		2	7014.4	UI/L	118	95.4	5.2
		3	6145.0	UI/L	119	95.2	4.7
		4	6207.7	UI/L	125	95.1	4.9
		5	8179.3	UI/L	128	94.9	5.1
		6	3927.8	UI/L	123	95.1	6.0
		7	3939.3	UI/L	125	95.2	5.4
		8	3954.8	UI/L	121	95.0	5.8
		9	5793.1	UI/L	124	94.6	5.7
		10	5848.8	UI/L	123	95.3	5.7
		11 *		UI/L	6	96.1	N.D
		12 *		UI/L	0		N.D
		TUTTI			1225	95.1	5.3
BUTIRRILTIOC. ADVIA	AUTOMATICO	1	3871.2	UI/L	16	109.0	5.3
		2	7014.4	UI/L	15	111.1	8.5
		3	6145.0	UI/L	16	112.7	5.7
		4	6207.7	UI/L	16	116.5	7.5
		5	8179.3	UI/L	16	114.3	8.6
		6	3927.8	UI/L	16	112.8	9.1
		7	3939.3	UI/L	15	111.2	7.2
		8	3954.8	UI/L	15	111.3	9.0
		9	5793.1	UI/L	17	114.2	8.9
		10	5848.8	UI/L	17	113.0	9.2
		11 *		UI/L	0		N.D
		12 *		UI/L	0		N.D
		TUTTI			159	112.6	7.9

LDH

Riepilogo per Metodo

ANALITA: LATTATO DEIDROGENASI UI/L

Metodo	N°Pool	Conc. Tutti	U.M.	N° Valori	V. Medio %	C.V.
PIRUVATO -> LATTATO	1	164.2	UI/L	69	95.8	9.2
	2	781.8	UI/L	69	97.0	6.0
	3	434.4	UI/L	70	96.7	8.4
	4	363.6	UI/L	76	96.8	8.2
	5	408.9	UI/L	74	96.9	7.1
	6	183.4	UI/L	74	97.0	9.8
	7	162.2	UI/L	71	97.1	8.8
	8	168.5	UI/L	66	96.5	8.0
	9	308.9	UI/L	68	97.1	6.5
	10	955.5	UI/L	72	96.4	7.7
	11 *		UI/L	0		N.D
	12 *		UI/L	0		N.D
	TUTTI			709	96.7	8.0
PIRUVATO LATTATO BECKMAN (LX,CX, DX)	1	164.2	UI/L	13	124.4	4.7
	2	781.8	UI/L	12	122.3	4.2
	3	434.4	UI/L	13	121.2	5.9
	4	363.6	UI/L	13	121.2	6.4
	5	408.9	UI/L	13	120.8	5.0
	6	183.4	UI/L	13	121.5	7.6
	7	162.2	UI/L	15	119.9	5.7
	8	168.5	UI/L	14	123.8	5.6
	9	308.9	UI/L	15	111.9	22.1
	10	955.5	UI/L	16	115.2	22.3
	11 *		UI/L	0		N.D
	12 *		UI/L	0		N.D
	TUTTI			137	120.2	9.0
PIRUVATO-LATTATO BECKMAN AU	1	164.2	UI/L	21	99.9	6.7
	2	781.8	UI/L	20	101.0	17.1
	3	434.4	UI/L	19	103.5	3.9
	4	363.6	UI/L	19	102.5	3.0
	5	408.9	UI/L	20	102.6	4.8
	6	183.4	UI/L	19	101.0	5.0
	7	162.2	UI/L	17	99.6	5.8
	8	168.5	UI/L	19	98.2	4.6
	9	308.9	UI/L	19	104.0	5.9
	10	955.5	UI/L	18	106.7	6.4
	11 *		UI/L	0		N.D
	12 *		UI/L	0		N.D
	TUTTI			191	101.9	6.3

ALBUMINA

Riepilogo per Metodo

ANALITA: ALBUMINA g/dL

Metodo	N°Pool	Conc. Tutti	U.M.	N° Valori	V. Medio %	C.V.
BCG	1	3.075	g/dL	96	98.5	4.2
	2	4.585	g/dL	94	98.9	4.4
	3	3.925	g/dL	94	99.0	3.9
	4	3.968	g/dL	96	98.8	3.8
	5	5.004	g/dL	100	98.5	3.7
	6	3.209	g/dL	96	98.7	3.7
	7	3.122	g/dL	98	98.3	3.8
	8	3.204	g/dL	96	98.1	4.6
	9	3.732	g/dL	97	99.0	3.9
	10	4.907	g/dL	96	98.0	4.1
	11 *		g/dL	4	100.6	N.D
	12 *		g/dL	0		N.D
	TUTTI			963	98.6	4.0
ELETTROFORESI	1	3.075	g/dL	15	97.0	6.9
	2	4.585	g/dL	16	94.1	6.4
	3	3.925	g/dL	15	94.9	3.5
	4	3.968	g/dL	17	96.4	5.0
	5	5.004	g/dL	16	95.8	4.9
	6	3.209	g/dL	17	97.8	8.9
	7	3.122	g/dL	16	98.0	4.7
	8	3.204	g/dL	15	97.0	5.8
	9	3.732	g/dL	16	96.5	5.8
	10	4.907	g/dL	16	93.6	10.1
	11 *		g/dL	0		N.D
	12 *		g/dL	0		N.D
	TUTTI			159	96.1	6.2

Rame

Metodo	V.M.%	CV%
ASSORB. ATOMICO (126-115-118-88)	112.4-120,6-124.7-119,6	11.6-15,3-10,5-9
COLORIMETRICO (341-363-367-375)	96-92,3-91.5-92,1	15.2-15,9-13-10,5

Aspetti preanalitici che influenzano l'accuratezza della misura del glucosio

"I try to limit my sugar and carbs, so if I use this magnifying glass, it looks like I'm eating a bigger dessert."

Il diabete

Il diabete mellito è un gruppo di malattie metaboliche caratterizzate da iperglicemia cronica e disturbo del metabolismo dei carboidrati, dei lipidi e dei grassi

È dovuto alla carenza di produzione di insulina o a insulino resistenza

WHO stima che siano affetti oggi 420 milioni di persone e nel 2040 le proiezione è di 642 milioni

Classificazione

Classification of diabetes mellitus

I. Type 1 diabetes
- A. Immune-mediated
- B. Idiopathic

II. Type 2 diabetes

III. Other specific types
- A. Genetic defects of b-cell function
- B. Genetic defects in insulin action
- C. Diseases of the exocrine pancreas
- D. Endocrinopathies
- E. Drug- or chemical-induced
- F. Infections
- G. Uncommon forms of immune-mediated diabetes
- H. Other genetic syndromes sometimes associated with diabetes

IV. GDM

"The red circles are your red blood cells.
The white circles are your white blood cells.
The brown circles are donuts. We need to talk."

Diabete mellito di tipo 1, conosciuto come insulino- dipendente(IDDM) o giovanile, è normalmente causato dalla distruzione autoimmune delle cellule beta del pancreas, rendendo il pancreas incapace di sintetizzare e secernere l'insulina.

Diabete mellito di tipo 2, conosciuto come non-IDDM o dell' adulto, è causato da una combinazione di resistenza all'insulina e inadeguata produzione.

Diabete gestazionale(GDM), si sviluppa circa nel 7% delle gravidanze, generalmente regredisce dopo il parto, e costituisce rischio maggiore di sviluppo di diabete di tipo 2 in età avanzata.

Altri tipi di diabete sono rari.

Il tipo 2 è la forma più frequente, costituisce l' 85%–95% dei casi di diabete nei paesi avanzati.

Reviews/Commentaries/ADA Statements
POSITION STATEMENT

Guidelines and Recommendations for Laboratory Analysis in the Diagnosis and Management of Diabetes Mellitus

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La diagnosi di diabete

Glucosio plasma

- FPG glicemia a digiuno
- RPG glicemia random
- OGTT test di tolleranza orale

Emoglobina glicata

Fondamentale accuratezza diagnostica e preanalitica

Criteri per la diagnosi

Any one of the following is diagnostic:

HbA1c $\geq$ 6.5% (48 mmol/mol)[b]

OR

FPG $\geq$ 126 mg/dL[c]

OR

2-h Plasma glucose $\geq$ 200 mg/dL during an OGTT[d]

OR

Symptoms of hyperglycemia and casual plasma glucose $\geq$ 200 mg/dL[e]

a) In the absence of unequivocal hyperglycemia, these criteria should be confirmed by repeat testing.

b) The test should be performed in a laboratory that is NGSP certified and standardized to the DCCT assay. Point-of-care assays should not be used for diagnosis.

c) Fasting is defined as no caloric intake for at least 8 h.

d) The OGTT should be performed as described by the WHO, with a glucose load containing the equivalent of 75 g of anhydrous glucose dissolved in water.

e)“Casual” is defined as any time of day without regard to time since previous meal. The classic symptoms of hyperglycemia include polyuria, polydipsia, and unexplained weight loss.

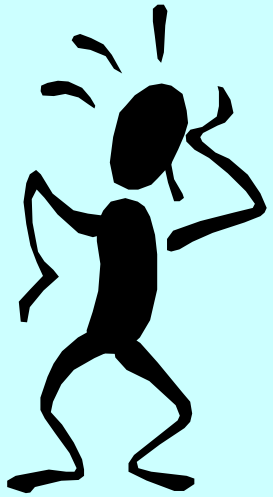
Raccomandazioni per l'ottimizzazione della fase pre-analitica per una corretta determinazione della glicemia in ambito diabetologico

Graziella Bonetti[1], Mariarosa Carta[2], Annunziata Lapolla[3], Roberto Miccoli[4], Roberto Testa[5], Andrea Mosca[6] in qualità di delegati SIBioC, Società Italiana di Patologia Clinica e Medicina di Laboratorio (SIPMeL) e Società Italiana di Diabetologia (SID) e per il Gruppo di Studio SIBioC-SIPMeL Diabete Mellito

Considerazioni analitiche:
loss of glucose from sample containers is a serious and underappreciated problem.

Decreases in glucose concentrations in whole blood ex vivo are due to glycolysis.
The rate of glycolysis—reported to average 5%–7%/h [circa 10 mg/dL] —varies with:

glucose concentration
temperature
leukocyte count
other factors



La preanalitica

Il glucosio viene rapidamente consumato dalle cellule (globuli rossi, bianchi, piastrine)

Sono stati prodotti numerosi additivi per inibire la glicolisi

NaF sodio floruro

KOx potassio ossalato

tampone citrato

Ma sono davvero utilizzati e «pratici»?

TO MINIMIZE GLYCOLYSIS, ONE SHOULD PLACE THE SAMPLE TUBE IMMEDIATELY IN AN ICE–WATER SLURRY, AND THE PLASMA SHOULD BE SEPARATED FROM THE CELLS WITHIN 30 MIN. IF THAT CANNOT BE ACHIEVED, A TUBE CONTAINING A RAPIDLY EFFECTIVE GLYCOLYSIS INHIBITOR, SUCH AS CITRATE BUFFER, SHOULD BE USED FOR COLLECTING THE SAMPLE. TUBES WITH ONLY ENOLASE INHIBITORS, SUCH AS SODIUM FLUORIDE, SHOULD NOT BE RELIED ON TO PREVENT GLYCOLYSIS

Na-Fluoride / Citrate buffer / EDTA-Na2

La miscela
acidificata, contenente tampone
citrato, NaF e
Na2EDTA, raccomandata dalla
NACB era presente in
forma liofila in provette già validate
in numerosi studi, ma ora non più
disponibili in commercio. Tale
miscela è presente in forma liquida
in altre provette che
hanno mostrato inibire in maniera
efficace e pronta la
glicolisi. Tuttavia è necessario che
le provette
vengano riempite correttamente e
che si utilizzi un
opportuno fattore di conversione
indicato dal produttore
per correggere l'effetto di diluizione.

In seguito ad una revisione sistematica della letteratura, il Working Group sulla Fase Pre-analitica di EFLM ha di recente indicato come l'impiego delle provette con miscela acidificata rappresenti un'unica opportunità ed un considerevole passo avanti verso il raggiungimento di determinazioni più accurate ed attendibili della glicemia.

Per la misura della glicemia ai fini del monitoraggio del controllo glicemico nel paziente con diabete noto si possono continuare ad utilizzare provette con litio-eparina con rapida centrifugazione e analisi o siero con acceleratore della coagulazione e gel separatore.

Ma come fare in pratica?

Ci sono altre soluzioni?

L'utilizzo di provetta dedicata per glucosio comporta delle soluzioni tecnologiche non semplici (estensioni barcode, maggiori costi, maggior sangue prelevato e da smaltire….)

Si può ipotizzare qualcosa di alternativo con le soluzioni presenti in commercio?

DE GRUYTER

Clin Chem Lab Med 2018; aop

Theresa Winter*, Anke Hannemann, Juliane Suchsland, Matthias Nauck and Astrid Petersmann

Long-term stability of glucose: glycolysis inhibitor vs. gel barrier tubes

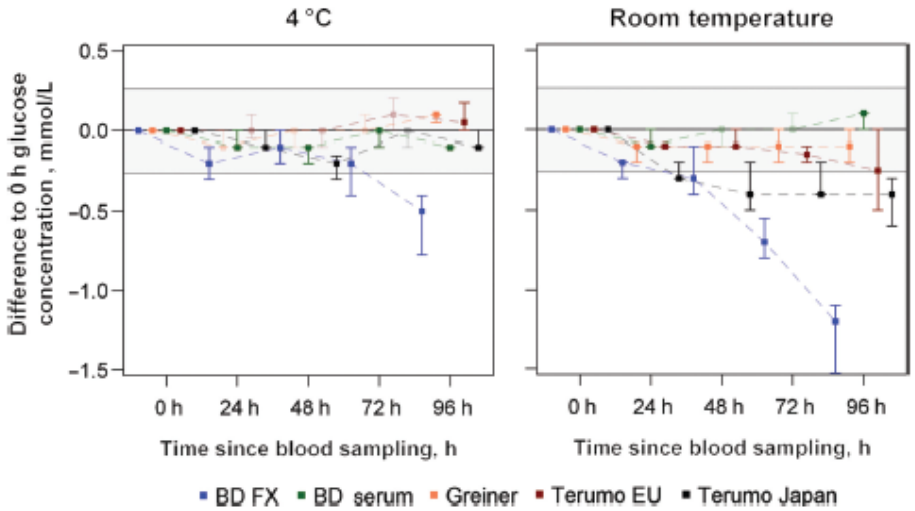


Figure 2: Transparent data points indicate non-significant and non-transparent data points indicate a significant difference to the 0 h glucose concentration as determined by Wilcoxon signed rank sum tests.
Median differences with 95% confidence intervals according to tube type and storage temperature were determined by a bootstrap analysis using 500 random samples. The grey shaded area indicates the minimum difference of 0.26 mmol/L.

Further evaluation of gel lithium heparin and serum tubes in terms of glucose stability is needed, but these tube types appear to present an acceptable solution for every day ward and laboratory use

Conclusions

We demonstrated that Greiner glucose tubes containing granulated additive represent a suitable replacement for the discontinued Terumo JP tubes. Also, BD serum tubes with gel barrier technology seem to be an adequate alternative. Both tubes provide stable glucose results for up to 96 h of storage at room temperature.

Even if obtained from the same manufacturer, not all dry citrate fluoride tubes ensure long-term glucose stability. Moreover, initial glucose concentrations in different tube types differ considerably and require further investigation.

Provette gel separatore

Glucose variation in centrifuged serum and lithium-heparin gel tubes stored for up to 96 hours at room temperature or 4°C

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Table 2

Variation of glucose concentration (median and interquartile range) in centrifuged serum or lithium-heparin tubes (n=30) stored for up to 96 hours at room temperature (RT) or at 4°C.

Sample matrix; temperature	T0	3h	6h	24h	48h	72h	96h
Serum (mmol/L); RT	5.9 (0.9)	5.9 (1.0) p=0.447	5.9 (1.0) p=0.387	5.8 (1.0) p<0.001	5.8 (1.0) p<0.001	5.8 (1.0) p<0.001	5.7 (1.0) p<0.001
- Median % bias (and IQR) vs T0	-	0.0% (2.0%)	0.0% (1.8%)	-3.0% (2.1%)	-3.0% (3.9%)	-2.8% (2.3%)	-3.4% (2.6%)
Lithium-heparin plasma (mmol/L); RT	5.7 (1.0)	5.6 (0.9) p<0.001	5.6 (0.9) p<0.001	4.5 (0.8) p<0.001	3.5 (1.2) p<0.001	2.9 (1.3) p<0.001	2.0 (1.4) p<0.001
- Median % bias (and IQR) vs T0	-	-1.3% (2.2%)	-4.1% (2.8%)	-21.9% (8.0%)	-39.3% (20.0%)	-48.3% (19.3%)	-64.1% (21.8%)
Serum (mmol/L); 4°C	5.8 (0.5)	5.8 (0.6) p=0.368	5.8 (0.7) p=0.187	5.7 (0.6) p<0.001	5.7 (0.7) p<0.001	5.7 (0.6) p<0.001	5.7 (0.7) p=0.002
- Median % bias (and IQR) vs T0	-	-0.2% (0.1%)	0.0% (2.0%)	-1.6% (1.9%)	-1.4% (2.6%)	-1.6% (2.2%)	-1.5% (2.7%)
Lithium-heparin plasma (mmol/L); 4°C	5.7 (0.6)	5.6 (0.5) p<0.001	5.6 (0.7) p<0.001	5.3 (0.6) p<0.001	5.1 (0.8) p<0.001	4.9 (0.8) p<0.001	4.7 (0.9) p<0.001
- Median % bias (and IQR) vs T0	-	-2.1% (2.6%)	-2.0% (2.1%)	-7.1% (3.2%)	-10.0% (4.8%)	-14.5% (5.2%)	-17.8% (6.8%)

IQR, interquartile range; T0, Baseline; RT, room temperature

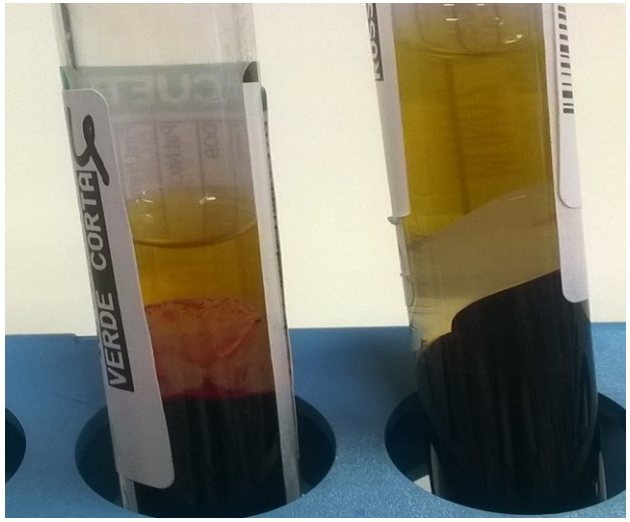
Table 1

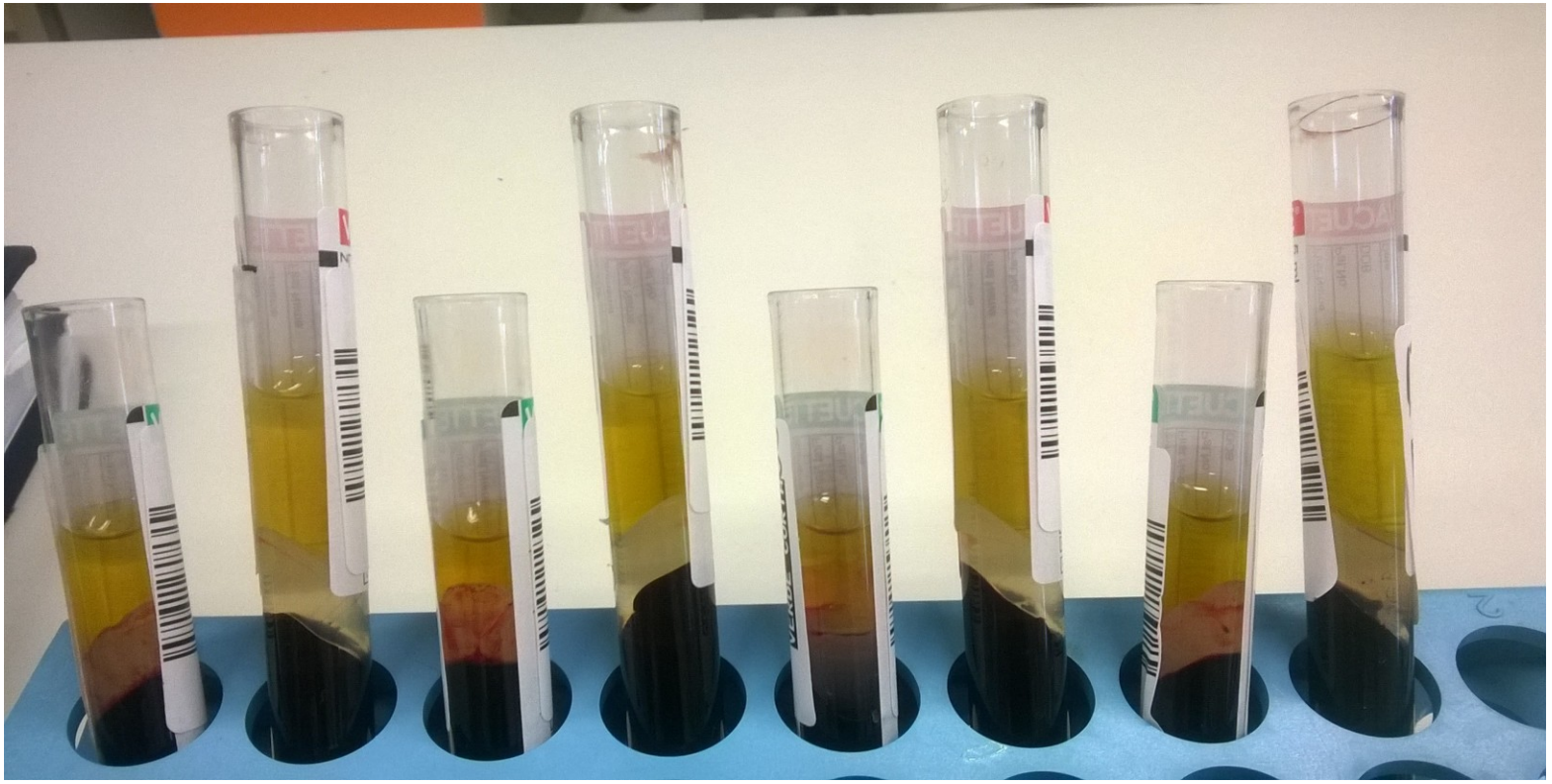
White blood cell (WBC), red blood cell (RBC) and platelet counts (median and interquartile range) in whole blood, lithium-heparin plasma and serum immediately after centrifugation.

Parameter	Samples stored at room temperature (n=30)			Samples stored at 4°C (n=30)		
	Whole blood	Serum*	Lithium-heparin plasma*	Whole blood	Serum*	Lithium-heparin plasma*
WBC ($x10^9$)	7.2 (2.7)	All <0.01	0.40 (0.30)	7.1 (1.8)	All <0.01	0.35 (0.40)
RBC ($x10^{12}$)	4.8 (0.7)	All <0.01	All <0.01	4.6 (0.5)	All <0.01	All <0.01
Platelets ($x10^9$)	224 (49)	All <0.01	27 (13)	243 (73)	All <0.01	24 (13)

* After centrifugation

WBC, White blood cells; RBC, red blood cells


VERDE CORTA



Conclusion

In conclusion, the results of our investigation seemingly attest that delayed glucose measurement in centrifuged serum tubes may be clinically viable, since the overall bias from the baseline concentration will remain clinically acceptable up to 96 hours of storage at either room temperature or 4°C. On the other hand, the marked decrease of glucose concentration observed in centrifuged lithium-heparin plasma would make its delayed measurement unadvisable, especially after 3 hours of storage. Notably, remaining cells in heparin plasma can be problematic for some laboratory tests, including glucose. Therefore, additional studies are hence warranted to confirm our findings with other brands of blood tubes.

Sono una possibile soluzione?

Pratica

Economica

Ma…

Da provare le altre «marche»

La diagnosi di diabete si fa su plasma…

Da centrifugare rapidamente

Punti prelievo con preanalitica?


GRAZIE!