Nordic fasting recommendation – how to proceed?

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XXXIX NORDIC CONGRESS IN CLINICAL CHEMISTRY
17-20 SEPTEMBER 2024 STOCKHOLM

What is fasting?

Clinica Chimica Acta 432 (2014) 33–37

Contents lists available at ScienceDirect

Clinica Chimica Acta

journal homepage: www.elsevier.com/locate/clinchim

Standardization of collection requirements for fasting samples

For the Working Group on Preanalytical Phase (WG-PA) of the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM)

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ARTICLE INFO

Article history:
Received 27 June 2013
Received in revised form 17 October 2013
Accepted 8 November 2013
Available online 20 November 2013

Keywords:
Fasting
Guidelines
Quality improvement

ABSTRACT

Standardized protocols for patient preparation for laboratory testing are currently lacking. Moreover, a great heterogeneity exists in the definitions of "fasting" currently being used among healthcare workers and in the literature. Marked metabolic and hormonal changes occur after food ingestion, mainly due to the absorption of fluids, lipids, proteins, carbohydrates and other food constituents. This postprandial response varies markedly in response to numerous factors, such as eating behavior, food composition, fasting duration, time of the day, chronic and acute smoking, coffee and alcohol consumption. It is therefore crucial to minimize the total variability by controlling as many of these modifying factors as possible. Control of the abovementioned effects on postprandial response can only be achieved by standardizing the way patients are prepared for laboratory testing, i.e. by defining the fasting duration, as well as what is and what is not allowed (e.g., coffee, tea, smoking, water) during the period of fasting prior to sample collection. The aim of this article is to describe the range of effects of different approaches to fasting on laboratory tests, and to provide a framework for the harmonization of definitions for fasting requirements for laboratory tests.

1. Introduction

The pre-analytical phase is the major source of various factors potentially influencing the results of laboratory testing [1]. Pre-analytical errors can occur due to inappropriate test ordering, errors in patient preparation and identification, sample collection, transport and delivery to the laboratory, as well as in sample handling and storage. Most of these activities are performed outside the laboratory environment and out of the direct supervision of laboratory staff. Therefore, laboratory personnel and clinicians are quite often unaware of such variability with possible detriment to the quality of test results. If they go unrecognized, pre-analytical errors can increase healthcare costs and affect the quality of patient care by causing unnecessary delays and diagnostic errors.

To reduce the frequency of error, it is essential to standardize procedures, implement evidence-based policies and introduce continuous quality improvement. Unfortunately, pre-analytical procedures are neither fully standardized, nor harmonized worldwide.

Several standards exist for blood sample collection and handling procedures [2–4]. Nevertheless, the estimated degree of adherence to these guidelines is unacceptable [5–8]. Furthermore, several recent reports have shown a clear need for revision of the guidelines in terms of redefinition of the time needed for alcohol to dry after cleaning the venipuncture site [9], patient identification procedures [10,11], application of tourniquet [12,13] and sample mixing [14]. The Croatian Society of Medical Biochemistry and Laboratory Medicine has recently published the partially revised CLSI (Clinical and Laboratory Standards Institute) recommendations as a national standard for venous blood sampling, where several of these factors have been addressed [15]. Due to the abovementioned considerations, the pre-analytical phase is currently among the greatest challenges for laboratory professionals and for the healthcare system as a whole [16].

Although it has long been known that various 'controllable' factors such as diet, physical activity, smoking and alcohol consumption may affect laboratory test results, there is still a lack of standardization of patient preparation for laboratory testing. One of these controllable factors is the fasting of patients prior to sample collection for selected testing. However, a great heterogeneity exists in the definition of "fasting"

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http://dx.doi.org/10.1016/j.cca.2013.11.008

SCANDINAVIAN JOURNAL OF CLINICAL AND LABORATORY INVESTIGATION
2018, VOL. 78, NO. 7-8, 591–594
https://doi.org/10.1080/00365513.2018.1528508

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Taylor & Francis Group

ORIGINAL ARTICLE

Status on fasting definition for blood sampling in the Nordic countries – time for a harmonized definition

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ABSTRACT

The preanalytical phase contains a vast number of practices whose variation may influence the results of laboratory testing and should, therefore, be standardized. The Working Group on Preanalytical Phase of the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM WG-PA) has suggested a standardization of venous blood specimen collection (VBSC) requirements for fasting samples including 12h fasting time and water ad lib in the morning prior to specimen collection. The Nordic Scientific Preanalytical Working Group investigated the fasting definitions used in the Nordic countries. The Internet was assessed for stated fasting definitions of official organizations, larger laboratories, or laboratory groups. Fasting instructions for VBSC generally demanded patients to abstain from alcohol a day prior to, and to abstain from coffee, tea, smoking, and snuff intake in the morning of VBSC. Norway had a national fasting definition. Required fasting times varied from 8 to 14h. The amount of water allowed in the morning of VBSC varied from ad lib to half a glass of water. The list of analytes, where fasting was required, held 9–15 analytes except for Finland with 65 analytes. Implementation of the EFLM WG-PRE standardization of VBSC requirements for fasting samples would decrease preanalytical variability and be beneficial for medical decisions and patient data comparison. We suggest the laboratories in the Nordic countries to implement the suggested fasting requirements, which are in line with those used when fasting reference intervals were established in the Nordic reference interval project.

ARTICLE HISTORY
Received 23 April 2018
Revised 15 September 2018
Accepted 22 September 2018

KEYWORDS
Venous blood specimen collection; fasting; preanalytical

Introduction

The preanalytical phase contains a vast number of factors that can influence the results of laboratory testing [1]. These are well-known and thoroughly described, but they pose nevertheless a considerable threat to our accredited, standardized laboratories and the evidence-based reference intervals all laboratory results are supplemented with. The reason is that a large number of the activities in the preanalytical phase take place outside the laboratory environment, and clinicians are unaware of the variability in the test results preanalytical errors can cause. It is, therefore, necessary to use standardized procedures for most of these "extra-laboratory" tasks.

Because patient preparation prior to laboratory testing is one of those essential areas, the Working Group on Preanalytical Phase (WG-PA) of the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) has suggested a Standardization of collection requirements for fasting samples [2]. It is, however, not well elucidated whether the European countries actually implemented those recommendations or whether there are any stated reasons for adopting or not adopting the recommendations. A study conducted in Denmark 2005 has earlier revealed large discrepancies in terms of fasting definitions [3], but the status in the Nordic countries has not hitherto been elucidated.

The Nordic Scientific Preanalytical Working Group (WG) holds a member from each Nordic country, appointed by their national society and supported by the Nordic Society of Clinical Chemistry (Nordisk Forening for Klinisk Kemi, NFKK). As a first step towards a possible harmonized definition of fasting for blood sampling in the Nordic countries, the Nordic Scientific Preanalytical WG decided to map the present status regarding fasting definitions and also provide some pragmatic suggestions on how to reduce the preanalytical variation by suggesting a better definition of fasting in order to stimulate the implementation of more stringent fasting practices in the Nordic countries.

Materials and methods

All group members of the Nordic Scientific Preanalytical WG performed an investigation in their home country

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Supplemental data for this article can be accessed here.

What is fasting?

The Journal of the International Federation of Clinical Chemistry and Laboratory Medicine

eJIFCC

Can chewing gum be another source of preanalytical variability in fasting outpatients?

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ARTICLE INFO

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Key words:
blood specimen collection, diagnostic errors, fasting, postprandial period, reproducibility of results

ABSTRACT

Introduction

In the daily laboratory practice, there are patients coming to blood collection sites chewing sugar-free gum, considering it irrelevant to laboratory tests. The aim of this study was to evaluate whether a sugar-free chewing gum can interfere with laboratory tests.

Methods

We studied 22 healthy volunteers. After a 12-hour overnight fasting, the first blood sample was collected between 8:00 and 8:30 a.m. Then, immediately after the first venous blood collection, the subjects started chewing the gum (declared sugar-free) for 20 min. Subsequent venous blood samples were collected at 1, 2, and 4 hours after chewing the gum. Significant differences between samples were assessed by the Wilcoxon ranked-pairs test.

Results

Among all the results, statistically significant differences ($p < 0.05$) between basal and x hours after chewing

- **Should be 12 hours from 7-9 PM**

- Samples should preferably be drawn 7-9 AM
- Water intake *ad libitum*, except for the final h
- No alcohol 24 hours prior to sampling

- The following should be avoided in the morni
  - Smoking (and snuff), tea and coffee
  - Pronounced (unusual) physical activities
  - Use of (even sugar-free!) chewing gum

- Medication should be unaltered – unless specific instructions says otherwise (the requesting MD's responsibility)
- The patient should rest for 15 minutes (sitting, not supine)

What is fasting?

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The Nordic recommendation

What is fasting?

OUH
Odense Universitetshos

Blodprøver og Bioke

Korrekt faste fo
(Gælder **ikke** glukose

- Man må ikke indtage m
  prøvetagning.
- Vanligt indtag af vand

OUH
Odense Universitetshospital

Region Syddanmark

Øvrigt:

- Tyggegummi, rygning samt hård fysisk træning bør undgås om morgenen inden blodprøvetagning.
- Alkohol bør undgås 24 timer inden blodprøvetagning.
- Medicin indtages som du plejer, medmindre du har fået besked om andet af den læge, der har bestilt denne blodprøvetagning.

Version 1 / September 2023

And if the patient is not fasting?

If we don't find out

- Risk of wrong reference intervals / cut-off's
  → Erroneous diagnosis / clinical action
  → Compromised patient safety

If we *do* find out

- Cancel the sampling (for fasting analytes that is)
- Or convert to non-fasting analyses if possible

And if the patient is not fasting?

Rules of fasting

A. No intake of food or fluids (except water) for 12 h prior to blood sampling.

B. Water intake allowed until 1 h prior to blood sampling.

C. Chewing gum, smoking and hard physical exercise is avoided in the morning.

ALL criteria fulfilled, patient is properly fasting, proceed with blood sampling

If only A and B fulfilled, fasting is imperfect.
Comment in order, proceed with blood sampling.
Inform the patient on how to fast correctly.

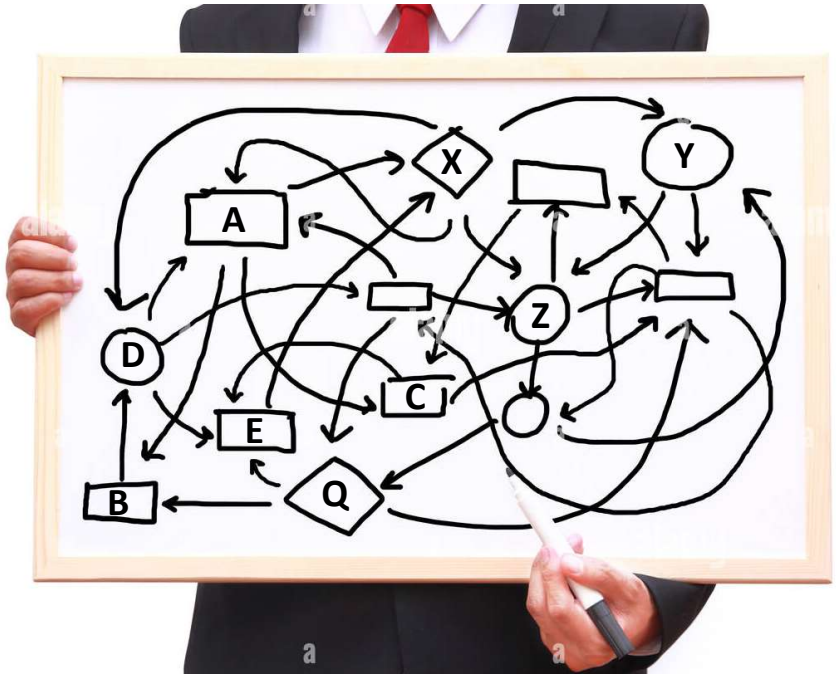
If A or B is not fulfilled, fasting is inadequate.
Comment in order "not fasting".
Cancel the blood sampling.
Inform the patient on how to fast correctly.

<u>Local experience after a year's "practice"</u>

Very good - Easy accessible
Relatable
Good with a physical card to the patients
Good with a firm definition
Still some non-believers, but its improving

What's next?

- Information – that's the hard part!
- For and by who?



What's next?

• Information to the Nordic clinical biochemistry societies	NWG
• Information to all clinical biochemistry laboratories	NS
• Information to all phlebotomists/biotechnicians	Laboratories
• Information to all GP's and hospital physicians	Laboratories
• Information to all patients having blood drawn	Laboratories AND clinicians?

HOW?

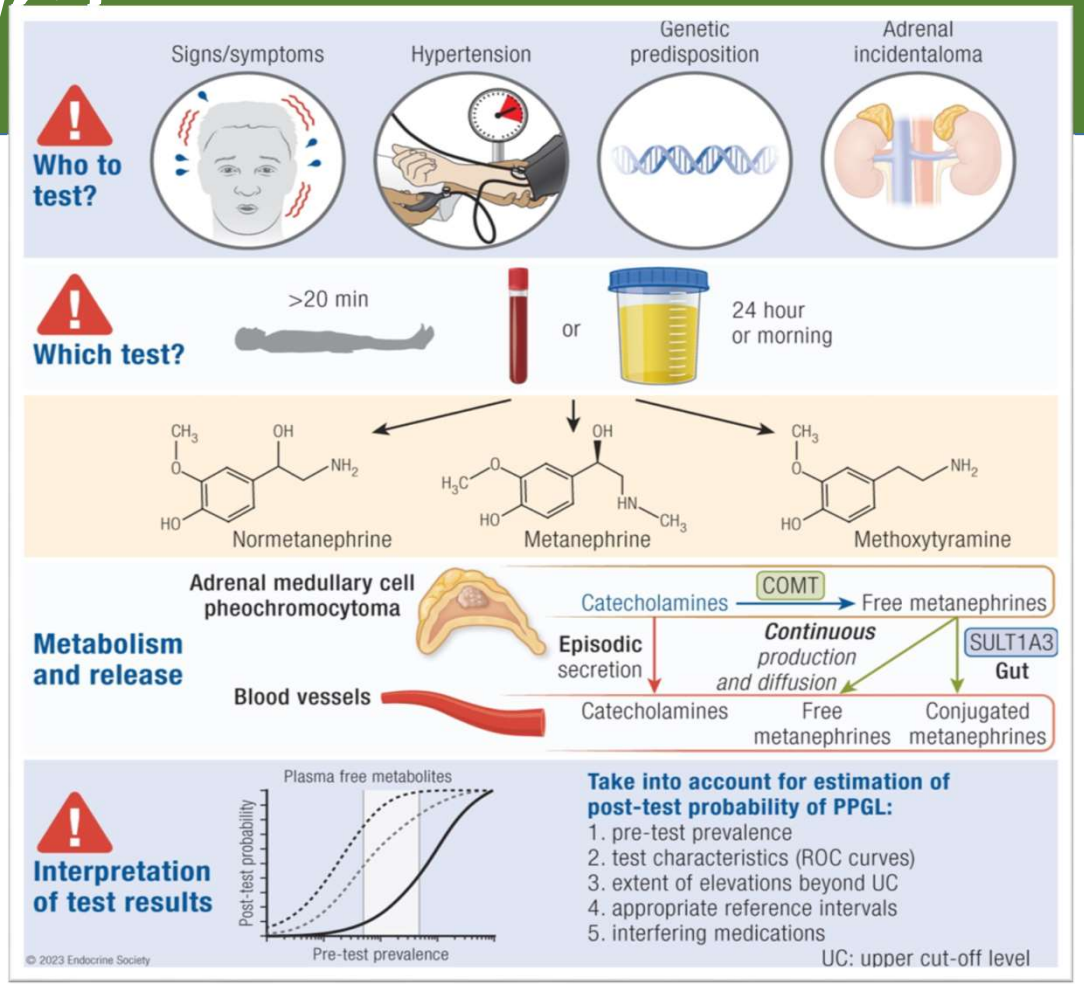
- Use the material from the Nordic WG
- Homepages
- Video / info in phlebotomy waiting rooms
- Flyers in GP's waiting rooms

What's next for the WG?

- Follow-up after a year – has it been implemented?
- Any unforeseen caveats?
- Any sub-groups that must be investigated and instructed specifically?
- Perhaps a survey of the patient-satisfaction?

What's next for the WG?

- Resting time duration?
- Samples not drawn 7-9 AM
  - other RI?
- Any other suggestions?



Eisenhofer-G et al. Endocr Rev 2023;44:862-909.

Thank you