80th International Scientific Conference of the University of Latvia 2022

The use of shotgun metagenomic sequencing for detection of *H. pylori* pre- and post-eradication: bioinformatics feasibility assessment

Reinis Vangravs[1], *Kristaps Čivkulis*[1], *Elīna Ļeonova*[1], *Edgars Dauss*[1], *Inese Poļaka*[1], *Olga Sjomina*[1], *Mārcis Leja*[1, 2]

[1] *University of Latvia, Institute of Clinical and Preventive Medicine, Riga, Latvia*

[2] *University of Latvia, Faculty of Medicine, Riga, Latvia*

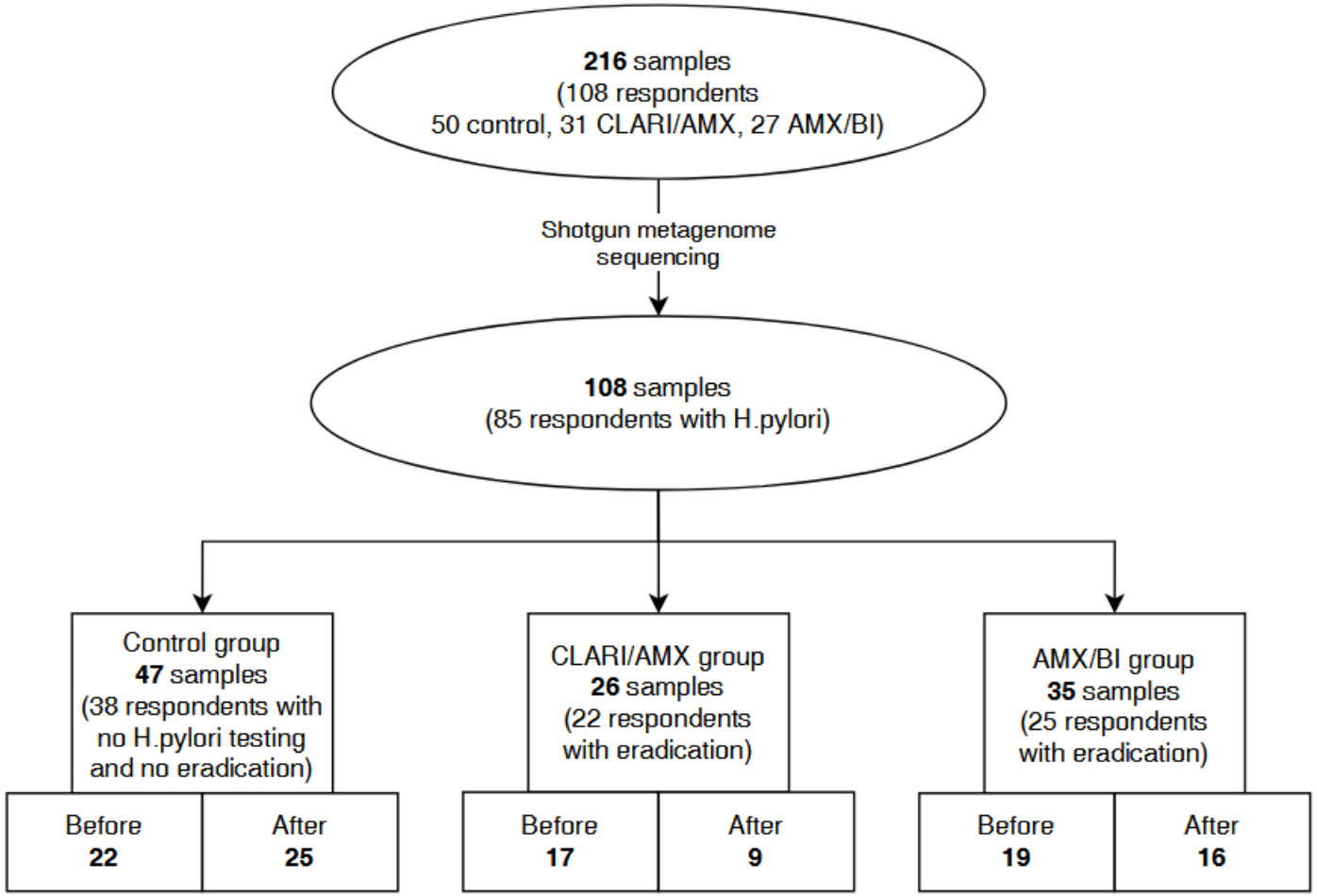
Summary

Background: Usually urea breath or stool antigen test is used for *H.pylori* detection. Shotgun metagenomic sequencing approach has not been well demonstrated.

Aim: To evaluate shotgun metagenomic sequencing and kraken2 based classification as a method for *H.pylori* identification.

Methods: Total DNA was extracted using FastDNA SPIN kit for soil, MpBio, USA. Shotgun metagenomic sequencing was performed on the DNBSEQ-G400 platform (MGI, China) using 150bp paired-end reads. At least 20 million reads were generated per sample which were quality trimmed and classified with Kraken2, using a database containing all bacterial genomes available in RefSeq (release 180 2020-12-03) and abundances were reestimated to species level with Bracken.

Results


216 samples
(108 respondents
50 control, 31 CLARI/AMX, 27 AMX/BI)
Shotgun metagenome sequencing
108 samples
(85 respondents with H.pylori)
Control group
47 samples
(38 respondents with no H.pylori testing and no eradication)
Before
22
After
25
CLARI/AMX group
26 samples
(22 respondents with eradication)
Before
17
After
9
AMX/BI group
35 samples
(25 respondents with eradication)
Before
19
After
16

Conclusions

- Kraken2 based shotgun metagenomics sequence classification method can be used to detect Helicobacter pylori species, but deeper sequencing would be required to reliably estimate their abundances.

- Different classification methods should be explored, for example, MetaPhlAn 3.0

Acknowledgement

Project is supported by ERDF (European Regional Development Fund) in Latvia, project id. No. 1.1.1.1/18/A/184 "Optimisation of H. pylori eradication therapy for population-based gastric cancer prevention".

NATIONAL DEVELOPMENT PLAN 2020

EUROPEAN UNION
European Regional Development Fund

INVESTING IN YOUR FUTURE