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Helicobacter pylori status and associated gastroscopic diagnoses in a tertiary hospital endoscopy population in Rwanda

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Background: The study was undertaken to document the prevalence of *Helicobacter pylori* and endoscopic diagnoses in Rwandans presenting for gastroscopy.

Methods: We studied an endoscopic database containing 961 consecutive gastroscopy patients at the University Teaching Hospital, Butare, over 12 months. Patient characteristics, endoscopic diagnoses and *H. pylori* status (by modified rapid urease testing) were analysed.

Results and conclusion: The overall *H. pylori* positivity rate was 75% (n=825), similar to that found elsewhere in sub-Saharan Africa. Common endoscopic diagnoses included duodenal ulceration (20%), duodenitis (9%), benign gastric outlet obstruction (6%) and malignancy (5%). Duodenal ulceration was strongly associated with *H. pylori* infection (OR 6.2 [3.1–12.6]; p<0.001).

Keywords: Gastroscopy, *Helicobacter pylori*, Rwanda

Introduction

Helicobacter pylori is a ubiquitous human bacterial pathogen affecting about half of the world's population,[1] with consequences including peptic ulcer disease and its complications, as well as the risk of gastric metaplasia and progression to gastric carcinoma. Africa has not been spared, with reported prevalence rates varying between 55 and 92%.[2]

However, little data has been collected on *H. pylori* in Rwanda and the wider Great Lakes region, with the only prior study published 27 years ago showing 75% *H. pylori* prevalence.[3] Thus, this study was undertaken at the main endoscopy centre for southern Rwanda to document the prevalence of *H. pylori* and the frequency of major diagnoses at endoscopy, and to examine their association.

Materials and methods

The study was a retrospective, descriptive case series derived from a routinely collected hospital endoscopy database. The study population were patients presenting for gastroscopy at the University Teaching Hospital in Butare, Rwanda over a 12-month period (April 2011 to 2012). They were a highly select population given that the Rwandan endoscopy rate is estimated at 0.025%, about 30 times lower than the UK benchmark of 0.75%.[4]

Patient characteristics, indication for gastroscopy and (self-reported) prior treatment with proton pump inhibitors or triple therapy had been recorded in this database, along with endoscopic diagnoses and *H. pylori* status. Endoscopic findings of gastritis were excluded from our study. Incomplete database entries were reconstructed from endoscopy reports.

H. pylori testing was performed using the modified rapid urease (MRU) test, where the endoscopist felt it was necessary for patient care. Two fresh gastric biopsies (one from the antrum and one from the corpus) were routinely taken for immediate *H. pylori* testing in the endoscopy suite. The MRU test materials were made up fresh each week. The method used for the MRU test (as described by Katelaris et al.[5]) was shown to perform well in resource poor settings, with a sensitivity of 97% and specificity of 95%. Positive and negative controls were established prior to the clinical introduction of testing, using histology as the reference standard.

Ethical approval for the study was obtained from the University Teaching Hospital of Butare Research Ethics Committee. Patient identifiers (name, record number) were excluded on extraction of the data from the database. As the study was retrospective and observational, and involved a routinely collected hospital

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database, individual informed consent was not sought, in accordance with the Helsinki Declaration.

The data were entered in SPSS Version 17.0 (Chicago, IL, USA) and then double checked against the original source. All calculations were performed on a per-patient basis, with only the initial endoscopy for a patient analysed. All p values for differences between study groups were calculated using the χ^2 test and were two-tailed, with significance level of $p<0.05$.

Results and Discussion

In total, 1012 gastroscopies were present in the database for the study period. One endoscopy was excluded from analysis because of incomplete data, and 50 were repeat procedures, leaving 961 endoscopies available for analysis, of which 825 had MRU testing performed. Patients were of African ethnicity (99.2%; 954/961) and generally young (median age 34), with a slight female preponderance (54.4%; 523/961). Few patients (10%; 97/961), who had received 'triple therapy' (H. *pylori* eradication therapy usually consisting of amoxicillin, metronidazole and omeprazole in Rwanda) prior to their gastroscopy, were on current anti-secretory therapy at the time of gastroscopy (7.8%; 75/961) or had undergone prior gastroscopy (5.2%; 50/961). The main indication for gastroscopy was dyspepsia (84% of cases; 812/961).

In total, 39.8% of patients (383/961) had a major endoscopic diagnosis (ulceration, stricture, malignancy, see Supplementary Figure 1), with the most common diagnosis being duodenal ulcer disease (20.1%; 194/961). Of note, the frequency of gastric outlet obstruction was high (10%; 97/961) and the rate of malignancy was also significant (4.5%; 44/961). The prevalence of duodenal ulceration encountered was also comparable to those seen in Kenya (21%) and pooled African data (26%).[6,7] The ratio of duodenal ulceration to gastric ulceration of 5:1 was at the low end of the range of ratios previously reported in Africa.[8] The prevalence of benign gastric outlet obstruction was much higher than that reported elsewhere; an Ethiopian study reported a prevalence of <1%.[9]

In the subset of endoscopy patients who underwent *H. pylori* testing (n=825), the overall prevalence of *H. pylori* in our study was 75.3% (622/825), and is similar to that reported 25 years ago in Rwanda by Rouvroy et al.[3] As shown in Table 1, duodenal ulceration was associated with a significantly higher prevalence of *H. pylori* positivity than other findings at gastroscopy among patients never treated for *H. pylori* (OR 6.2 [3.1–12.6]; p<0.001). The lower rates of *H. pylori* infection in patients with advanced gastric malignancy are a known phenomenon[10] thought to relate to the natural history of *H. pylori* infection and the onset of the metaplasia-cancer sequence.[11]

Among patients reporting prior triple therapy, more than half remained *H. pylori* positive (57.7%; 52/90). This may reflect the poor efficacy of available triple therapy in eradicating *H. pylori* infection in Rwanda, or high rates of reinfection. A further study with rigorous *H. pylori* resistance testing and calculation of reinfection rates is therefore needed.

Our study had a number of limitations, mostly related to the study design. All of our data were retrospectively obtained from a database, thus any errors in the database will be reflected in our results. Our calculations of the rates of *H. pylori* positivity are based upon MRU testing and were not confirmed with histology or non-invasive testing methods. As we sampled a referral population in a tertiary centre, it is likely to be subject to referral bias. In an effort to determine the size of this bias, we reanalysed our endoscopic data when stratified by referral origin. Patients referred from outside the district had significantly higher rates of gastric outlet obstruction and cancer, but not gastric or duodenal ulceration, when compared with those from within the district, suggesting a more marked referral bias for patients with malignant and obstructive diagnoses.

Conclusion

The current study provides evidence that *H. pylori* is associated with gastrointestinal pathology in the Great Lakes region of Africa. A high prevalence of duodenal ulcer disease was seen, with a strong link between duodenal ulceration and *H. pylori* infection. The high prevalence of malignancy and benign gastric outlet obstruction, and poor success in eradicating *H. pylori* following triple therapy, point to major deficiencies in current management of the bacterial pathogen.

Supplementary data

Supplementary data are available at Transactions Online (http://trstmh.oxfordjournals.org/).

Table 1. *Helicobacter pylori* positivity by major diagnosis among patients never treated for *H. pylori*

Diagnosis	*H. pylori* positive	
No major diagnosis	71%	(303/426)
Duodenal ulceration	94%	(139/148)
Duodenitis	91%	(61/67)
Benign GOO	86%	(36/42)
Gastric ulceration	85%	(22/26)
Gastric carcinoma	50%	(7/14)

GOO: gastric outlet obstruction.

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Authors' contributions: TDW conceived the study and designed the protocol; TDW, FN and MK carried out the patient examinations; TDW performed the MRU tests; TDW collated, entered and checked the data; TDW performed the statistical analysis; TDW and PK drafted the manuscript. All authors read and approved the final manuscript. TDW and PK are the guarantors of the paper.

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