Susceptibility of Helicobacter pylori to Metronidazole in a Brazilian Population

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The objective of this study was to determine the Minimum Inhibitory Concentrations (MICs) of our strains to metronidazole.

Forty strains of H. pylori isolated from dyspeptic Brazilian patients who were not treated with any antimicrobial therapy for H. pylori infection and were referred to endoscopy service (Andará Hospital, Rio de Janeiro) were studied. Strains were stored in plastic vials at -70°C in sterile defibrinated sheep blood before being tested.

MICs to metronidazole for H. pylori strains grown in Brucella agar (Difco) supplemented with 10% defibrinated sheep blood and 0.004% 2, 3, 5-triphenyltetrazolium chloride (TTC-Difco) (D Queiroz et al. 1987 J Clin Microbiol 25: 2378-2379) in a microaerophilic atmosphere for 72 hr, were determined by E-test (AB Biodisk, Sweden). E-test strip with antimicrobial concentrations from 0.002 to 32 mg/l were assayed. The bacterial inoculum was prepared in Brucella broth (Difco) and adjusted to McFarland standard 0.5. The plates were streaked with non-toxic swab three times, rotating the plate approximately 90 degrees each time to ensure a distribution of inoculum. The MIC was defined as the lowest concentration at which there was completely inhibited growth. The breakpoint of ≥8 mg/l was used to indicate resistance (Y Glupczynski et al. 1990 Lancet 335: 976-977).

The prevalence of metronidazole-resistant strains was 72.5% (29/40). Twenty nine strains showed MIC ≥32 mg/l whereas 11 strains showed MIC between 0.016 to 2 mg/l. In the present study, the rate of metronidazole resistance was similar to that observed in a previous Brazilian study (64.7%) (D Queiroz et al. 1993 Am J Gastroenterol 88: 322-323), where the MIC values to metronidazole were not mentioned.

On the other hand, comparing our results to the multicentre European survey on metronidazole resistance (European Study Group on Antibiotic Susceptibility of Helicobacter pylori loc. cit.) we observe much higher resistance levels in Brazil than in Europe. The resistance there varied from 7 to 49%, having the non-Caucasian groups the most elevated percentage of resistance. Considering the
MIC $\geq 32$ mg/l, we found 100% of resistant strains while the European Group detected 88.5% (108/122).

Due to its effective local (D Edwards 1986 Biochem Pharmacol 35: 53-58) and even systemic activities (S Loft et al. 1988 Clin Pharmacol Ther 43: 420-428), reaching the gastric cells, metronidazole has been considered a complement to the treatment of *H. pylori* infection (Hopkins et al. loc. cit.). The occurrence of metronidazole-resistant *H. pylori* strains has been reported to be related to the earlier use of nitroimidazoles (T Borody et al. 1988 Gastroenterol 94: A43, M Becx et al. 1990 Lancet i: 539-540). In our country these resistant strains can possibly be explained by frequent use of this drug in the treatment of gynecological, parasitic and urological infections; moreover, free distribution and reduced costs in hospitals and medical centers indicate common availability for the population.

Considering the present results in our country, it is recommendable to perform susceptibility testing of *H. pylori* strains to antimicrobial agents before initiating treatment in order to avoid failure.

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