Helicobacter pylori and antibiotic resistance

Francis Megraud

This is an introduction to the *Gut* tutorial ''*Helicobacter pylori* and antibiotic resistance'' hosted on BMJ Learning—the best available learning website for medical professionals from the BMJ Group.

H pylori is a Gram-negative flagellated spiral bacteria. Infection with *H pylori* is mainly acquired in childhood. About 15% of infected people will develop a peptic ulcer and 1% will develop gastric cancer during their lifetime. Resistance to antibiotics is important as it leads to treatment failure. The prevalence of *H pylori* resistance to clarithromycin is <5% for adults in northern Europe, but as high as 20% in southern Europe. Resistance to clarithromycin is caused by previous consumption of macrolides. Resistance is higher in children because prescriptions of these drugs, particularly for children, have increased during the past decade, mainly for respiratory tract infections. The prevalence of *H pylori* resistance to metronidazole varies from 20–40% in Europe and the USA to 50–80% in developing countries. Metronidazole is used extensively for treating parasitic diseases in tropical countries, which is probably why there is more resistance there. For patients needing a second course of eradication treatment, a regimen should be chosen that does not include antibiotics given previously. Once you successfully eradicate *H pylori*, adult reinfection rates are low at <1% a year.

To access the tutorial (Interactive Case History), click on BMJ Learning: Take this module on BMJ Learning from the content box at the top right and bottom left of the online article. For more information please go to: http://gut.bmj.com/tutorials/collection.dtl

If prompted, subscribers must sign into *Gut* with their journal username and password. All users must also complete a one-time registration on BMJ Learning and subsequently log in (with a BMJ Learning username and password) on every visit.

Gut 2007;**56**:1502.
doi: 10.1136/gut.2007.132514

Correspondence to: Dr F Megraud, Laboratoire de Bacteriologie, CHU Pellegrin, 33076 Bordeaux cedex, France; francis.megraud@chu-bordeaux.fr

REFERENCES

1 **European Helicobacter pylori Study Group**. Current European concepts in the management of Helicobacter pylori infection. The Maastricht consensus report. *Gut* 1997;**41**:8–13.
2 **Anonymous**. The report of the Digestive Health Initiative International Update on Helicobacter pylori. *Gastroenterology* 1997;**113**:S4–5.
3 **Lam SK**, Talley NJ. Report of the 1997 Asia Pacific Consensus Conference on the management of Helicobacter pylori infection. *J Gastroenterol Hepatol* 1998;**13**:1–12.
4 **Hunt RH**, Fallone CA, Thomson ABR. Canadian Helicobacter pylori Consensus Conference update: infections in adults. *Can J Gastroenterol* 1999;**13**:213–7.
5 **Coelho LG**, Leon-Barua R, Quigley EMM, *et al.* Latin-American consensus conference on Helicobacter pylori infection. *Am J Gastroenterol* 2000;**95**:2688–91.
6 **Malfertheiner P**, Mégraud F, O'Morain C, *et al.* Current concepts in the management of Helicobacter pylori infection - The Maastricht 2-2000 Consensus Report. *Aliment Pharmacol Ther* 2002;**16**:167–80.
7 **Mégraud F**, Lamouliatte H. The treatment of refractory Helicobacter pylori infection. *Aliment Pharmacol Ther* 2003;**17**:1333–43.
8 **Mégraud F**. Epidemiology and mechanism of antibiotic resistance in Helicobacter pylori. *Gastroenterology* 1998;**115**:1278–82.
9 **Mégraud F**, Hazell S, Glupczynski Y. Antibiotic susceptibility and resistance. In: Mobley HLT, Mendz GL, Hazell SL, eds. *Helicobacter pylori: physiology and genetics*. Washington, DC: ASM Press, 2001:511–30.
10 **Graham DY**. Can therapy ever be denied for Helicobacter pylori infection? *Gastroenterology* 1997;**113**:S113–7.
11 **Glupczynski Y**, Mégraud F, Lopez-Brea M, *et al.* European multicenter survey of in vitro antimicrobial resistance in Helicobacter pylori. *Eur J Clin Microbiol Infect Dis* 2000;**11**:820–3.
12 **Mégraud F**. Surveillance de la résistance de Helicobacter pylori aux antibiotiques. In: *Surveillance nationale des maladies infectieuses 1998–2000*. St Maurice, France: Institut de Veille Sanitaire, 2003:327–9.
13 **Cabrita J**, Oleastro M, Matos R, *et al.* Features and trends in Helicobacter pylori antibiotic resistance in Lisbon area, Portugal (1990–1999). *J Antimicrob Chemother* 2000;**46**:1029–31.
14 **Loivukene K**, Maaroos HI, Kolk H, *et al.* Prevalence of antibiotic resistance of Helicobacter pylori isolates in Estonia during 1995–2000 in comparison to the consumption of antibiotics used in treatment regimens. *Clin Microbiol Infect* 2002;**8**:598–603.
15 **Perez Aldana L**, Kato M, Nakagawa S, *et al.* The relationship between consumption of antimicrobial agents and the prevalence of primary Helicobacter pylori resistance. *Helicobacter* 2002;**7**:306–9.
16 **Debets-Ossenkopp YJ**, Herscheid A, Pot RGJ, *et al.* Prevalence of Helicobacter pylori resistance to metronidazole, clarithromycin, amoxicillin, tetracycline and trovafloxacin in The Netherlands. *J Antimicrob Chemother* 1999;**43**:511–5.
17 **Cars O**, Mölstad S, Melander Z. Variation in antibiotic use in the European Union. *Lancet* 2001;**357**:1851–3.
18 **Pilotto A**, Rassu M, Leandro G, *et al.* Prevalence of Helicobacter pylori resistance to antibiotics in Northeast Italy: a multicentre study. GISU. Interdisciplinary Group for the Study of Ulcer. *Dig Liver Dis* 2000;**32**:763–8.
19 **Torres J**, Camorlinga-Ponce M, Perez-Perez G, *et al.* Increasing multidrug resistance in Helicobacter pylori strains isolated from children and adults in Mexico. *J Clin Microbiol* 2001;**39**:2677–80.
20 **Kato M**, Yamaoka Y, Kim JJ, *et al.* Regional differences in metronidazole resistance and increasing clarithromycin resistance among Helicobacter pylori isolates from Japan. *Antimicrob Agents Chemother* 2000;**44**:2214–6.
21 **Mégraud F**, Lehn N, Lind T, *et al.* Antimicrobial susceptibility testing of Helicobacter pylori in a large multicentre trial: the MACH 2 study. *Antimicrob Agents Chemother* 1999;**43**:2747–52.
22 **Osato MS**, Reddy R, Reddy SG, *et al.* Pattern of primary resistance of Helicobacter pylori to metronidazole or clarithromycin in the United States. *Arch Intern Med* 2001;**161**:1217–20.
23 **Glupczynski Y**, Broutet N, Cantagrel A, *et al.* Comparison of the E test and agar dilution method for antimicrobial susceptibility testing of Helicobacter pylori. *Eur J Clin Microbiol Infect Dis* 2002;**21**:549–52.
24 **Axon AT**. Helicobacter pylori infection. *J Antimicrob Chemother*, 1993;**32**(suppl A), 61–8.
25 **Cuchi Burgos E**, Forne Bardera M, Quintana Riera S, *et al.* Evolution of the sensitivity of 235 strains of Helicobacter pylori from 1995 to 1998 and impact of antibiotic treatment *Enferm Infecc Microbiol Clin* 2002;**20**:157–60.
26 **Parsons HK**, Carter MJ, Sanders DS, *et al.* Helicobacter pylori antimicrobial resistance in the United Kingdom: the effect of age, sex and socio-economic status. *Aliment Pharmacol Ther* 2001;**15**:1473–8.
27 **Ling TKW**, Leung WK, Lee CC, *et al.* The antimicrobial susceptibility of Helicobacter pylori in Hong Kong (1997–2001). *Helicobacter* 2002;**7**:327–9.
28 **Kim JJ**, Reddy R, Lee M, *et al.* Analysis of metronidazole, clarithromycin and tetracycline resistance of Helicobacter pylori isolates from Korea. *J Antimicrob Chemother* 2001;**47**:459–61.
29 **Birac C**, Bouchard S, Camou C, *et al.* Six year follow-up of resistance to antibiotics of Helicobacter pylori in Bordeaux, France [abstract]. *Gut* 1999;**45**(suppl 3):A107.
30 **Tankovic J**, Lascols C, Sculo Q, *et al.* Single and double mutations in gyrA but not in gyrB are associated with low- and high-level fluoroquinolone resistance in Helicobacter pylori. *Antimicrob Agents Chemother* 2003;**47**:3942–4.
31 **Heep M**, Rieger U, Beck D, *et al.* Mutations in the beginning of the rpoB gene can induce resistance to rifamycins in both Helicobacter pylori and Mycobacterium tuberculosis. *Antimicrob Agents Chemother* 2000;**44**:1075–7.
32 **Heep M**, Kist M, Strobel S, *et al.* Secondary resistance among 554 isolates of Helicobacter pylori after failure of therapy. *Eur J Clin Microbiol Infect Dis* 2000;**19**:538–41.
33 **Mégraud F**. *H pylori* antibiotic resistance: prevalence, importance, and advances in testing. *Gut* 2004;**53**:1374–84.
34 **Houben MHMG**, van de Beek D, Hensen EF, *et al.* A systematic review of Helicobacter pylori eradication therapy - the impact of antimicrobial resistance on eradication rates. *Aliment Pharmacol Ther* 1999;**13**:1047–55.
35 **National Institute for Clinical Excellence**. *Management of dyspepsia in adults in primary care*, Clinical guideline 17. London: NICE, August 2004, Also available at: http://www.nice.org.uk/pdf/CG017NICEguideline.pdf (accessed 27 August 2007).