
Chronic active gastritis was present in eight out of nine members of a duodenal ulcer disease family. The subjects had endoscopic evidence of duodenal ulcer (n=4) or previous (n=5) duodenal ulcer. Helicobacter pylori strains, isolated from eight out of nine members, were investigated for their similarity by PCR based RAPD fingerprinting of the bacterial chromosomal DNA using two different RAPD primers and compared with the RAPD fingerprints of the isolates of three unrelated subjects. It was shown, that the strains from the family members are related, but display subtypic variation. Cytotoxin associated gene A (caga) as shown by PCR, was only present in 6 of the 8 isolates. Analysis of 10 colonies from the primary culture plates from the biopsy specimens of each subject by PCR fingerprinting demonstrated that all subjects, except one, harboured at least 2 and up to 4 different H. pylori subtypes. Three subjects harboured a mixture of caga positive and caga negative H. pylori subtypes as shown by PCR. Four other subjects harboured a mixture of only caga positive or only caga negative subtypes. Southern blotting and hybridization using a caga probe confirmed these results. The proportion of caga negative colonies on the primary culture plates was determined by colony hybridization and varied between patients from 10 to 100%. These results indicate that genotypic comparison based upon a pure culture of one of the colonies from the primary culture plate from the biopsy specimen is questionable. The coexistence of both caga positive and negative H. pylori within the same individual, suggests little selection pressure on caga.

HELICOBACTER PYLORI (Hp) INFECTION IN ASYMMETRIC SARDINIAN SHEEPHERDS.
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It has been suggested that Hp infection could be a zoonosis on the basis of its isolation in the stomach of pigs and monkeys and on the basis of a higher prevalance of the infection, compared with the population, in categories at risk, such as veterinary surgeons, butchers and slaughter-houses workers. We undertook a study of 150 consecutive subjects and their families living in the North of Sardinia, whose work involved close contact with farm animals. All subjects were asymptomatic. A questionnaire with social and clinical data was filled in for each subject and a blood sample was taken at place of work, after informed consent was obtained. Serum Hp by ELISA (sonicated antigens, titres determined at optical density 470 nm). Ten subjects were also investigated for Cag-A systemic antibody response by immunoblotting. Upper gastrointestinal endoscopy was performed in 40 subjects. Results: Antibody to Hp was detected in 93% of the population studied, reaching 98% when shepherds alone were considered (see table). Subjects positive for IgG anti-Hp and tested by immunoblotting also showed a positive reaction for antibody to Cag-A protein. Acute or chronic gastritis was found on histological examination in all subjects submitted to endoscopy. All these subjects also showed Hp on microscopy and a positive CP test, with very rapid reaction (within 3 seconds), suggesting a strong bacterial charge in the stomach. Prevalence of infection in family members was similar to that of our control population of dyspeptic patients (73%).

A NEW TYPING METHOD FOR HELICOBACTER PYLORI: END LABELLING OF ENDOUCLEASE DIGESTED DNA FRAGMENTS. N.E.M. van Doorn 1, L. van Kempen 1, F. Namavar 2, E.P. van Rees 3, R. A. Plasterk 1, and J. de Graaf 1. Departments of Medical Microbiology 1 and Cell Biology & Immunology 2, Vrije Universiteit and The Netherlands Cancer Institute 3, Amsterdam, The Netherlands.

Variation amongst strains of Helicobacter pylori has been examined by several DNA based methods including restriction endonuclease analysis of whole chromosomal DNA (REA). Southern blot hybridization with a ribosomal DNA probe (ribotyping) and Polymerase Chain Reaction with random primers (RAPD). However these techniques have some limitations. Although the REA method gives a large number of bands, comparison of the bandpatterns is sometimes difficult due to the low resolution of the agarose gel. Furthermore the amount of bands that are compared is low (ribotyping) or differ in intensity (RAPD). We present a new typing method, which has already been applied to Actinobacillus actinomycetemcomitans, that overcomes these difficulties. Total genomic DNA of H. pylori was isolated and digested with the restriction endonuclease BglII. DNA fragments were labelled with [32P]dATP using Klenow DNA polymerase and the labelled fragments separated on a 6% polyacrylamide gel with 8M urea (sequencing gel). With this method approximately 250 bands, 100-400 bases in length, were suitable for comparison, due to the high resolution of the gel. All isolates tested had a few bands in common. In case of A. actinomycetemcomitans the endlabelling method proved to be more discriminating than REA and ribotyping. A large panel of H. pylori isolates is now under study in cluster analysis to characterize relationships among these isolates and whether there is an correlation with respect to clinical symptomatology.

DETERMINATION OF HELICOBACTER PYLORI EXPOSURE (HPE). SERUM GASTRIN (G) AND GASTRIN RELEASING PEPTIDE (GRP) IN FAMILIES WITH CHILDREN AT RISK FOR CARCINOMA (CC) OF THE STOMACH. A. Elflani 1, P. Sanious 2, L. Méndez 2, T. Spiegel 2, H. Fried 2, B. Howe 2, T. O'Dorisio 2, M. Marcon 2, S. Peilkin 2, UMDNJ-Robert Wood Johnson Medical School, Camden, New Jersey, Ohio State University, Columbus, Ohio, The Wellelsey Hospital-Toronto, Ontario, Canada.

Background: G is a tumor promoter for CC. CC and HPE are associated with elevated G in some studies but the cause of the increase is not known. In one study (Lambert) HPE was associated with colon polyps. In the present study, we report the largest series examining HPE, serum G, GRP and CC. Methods: Academic referral centers in Canada and the USA recruited 80 patients with CC as well as matched controls. G and GRP (pg/ml) were measured by RIA. HPE was assayed by serology. Values are reported as mean ± standard error of the mean. Results: 42.6% of CC patients were Hp+ compared to 40.6% of controls (NS). 54% of Canadian subjects were Hp+ compared to 31.7% of US subjects (X²=4.6, p=0.05). Histological grade and tumor stage were not affected by HPE. G and GRP values in the CC (67.5 ± 11.8, 22.9 ± 21.4) and control group (81.5 ± 15.5, 234 ± 18.5) were not significantly different. G and GRP values were also not significantly different in the HPE group (71.6 ± 11.5, 239 ± 18.8) and non-HPE (73.6 ± 11.5, 221.7 ± 24.5) subjects. Correlation coefficients of G vs GRP in the HPE group (r=0.3), the Hp+ group (r=0.1), the Hp- group (r=0.1), the HPE group with elevated G (G > 122 pg/ml,n=5, r=.03) and the total group (r=0.04) were determined. Conclusion: No apparent association exists between HPE and CC. G and GRP are not elevated in patients with CC, nor in subjects who are Hp+ compared to controls. GRP is not the cause of the elevated G observed in some Hp+ subjects. The prevalence of HPE is significantly greater in Canada than the USA.
**FREQUENCY OF cagA IN Helicobacter pylori STRAINS ISOLATED FROM BELGIAN AND MOROCCAN PATIENTS.**

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The cytoxin-associated antigen (cagA) gene is a *H. pylori* gene that encodes a 96-138 kDa protein that is associated with the vacuolating cytotoxin production. Previous data has shown an association between *H. pylori* cagA+ strains and peptic ulcer disease. The present study aimed to compare the presence of cagA in *H. pylori* strains isolated from Belgians and from Moroccans living in Belgium. Sixty-eight *H. pylori* strains, 34 from Belgians and 34 from Moroccans, were submitted to a PCR assay for the detection of cagA. Twenty-nine (85.3%) of the Belgian isolates were positive for the cagA gene, while only 12 (35.3%) of the Moroccan isolates were cagA+ (p<0.001). Similar results were found when only *H. pylori* strains from peptic ulcer patients are compared: ten out of eleven (90.9%) Belgian patients with peptic ulcers were infected with *H. pylori* cagA+ strains versus three of ten (30%) Moroccans (p=0.008). Our results emphasize that the frequency of *H. pylori* cagA+ strains can differ in different ethnic groups and that other factors than cagA are probably involved in the pathogenesis of peptic ulcer in Moroccans.

**GENOTYPIC ANALYSIS OF vacA AND cagA IN Helicobacter pylori ISOLATES FROM THE U.S., THAILAND, PERU AND CHINA.**

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vacA, the gene encoding the vacuolating cytotoxin, has a mosaic structure consisting of one of 2 main signal sequence types, s1 and s2, and one of 2 mid-region types, m1 and m2. Type s1 strains are associated with peptic ulceration and expression of *in vitro* toxin activity. Type m1 strains are associated with maximal toxin activity. In this study we compared the cagA and vacA genotypes of strains from various countries with U.S. strains. Methods. U.S. strains were isolated from 56 dyspeptic subjects, median age 58 (range 23-80), 23 of whom had past or present peptic ulceration (PU). Peruvian strains were isolated from 8 dyspeptic subjects in Lima, median age 29 (19-54), none of whom had PU. Thai strains came from 9 dyspeptic subjects in Bangkok, median age 40 (28-75), 1 with PU. Chinese strains came from asymptomatic subjects from a single village in Shandong Province. cagA and vacA genotypes of strains were determined by PCR analysis.

**THE NATURAL HISTORY OF HELICOBACTER PYLORI GASTRITIS: A 30- YEAR HISTOLGIC FOLLOW-UP STUDY.**

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The progression of chronic gastritis and *H. pylori* infection was evaluated in patients in whom a "blind" suction biopsy from the corpus mucosa had been taken in 1951 and an endoscopic re-examination was performed in 1983. Here we present only those cases who had a normal corpus mucosa (n=17) or superficial corpus gastritis (n=52) at the beginning of the study. These 69 subjects (36 men and 33 women) had in 1951 a mean age of 34 years (range 16-55). The presence of *H. pylori* infection was evaluated in Giemsa stained biopsy specimens and the degree of chronic gastritis and atrophy was evaluated in hematoxylin-eosin stained specimens from corpus mucosa (1951) or from antrum and corpus (1983). 57 (83%) of the patients were infected at the beginning of the study compared to 48 (70%) in 1983 which accounts for an annual decrease in the prevalence of *H. pylori* infection of 0.4%. Only one of the subjects who were *H. pylori* negative at the beginning became infected during the follow-up. On the other hand, 10 patients who were originally infected became *H. pylori* negative during the follow-up. In 7 of these 10 subjects (70%) both antrum and corpus mucosa became histologically normal, in 2 cases severe corpus developed and 1 case had still chronic gastritis corpus without atrophy in antrum and corpus. These results indicate that there are some cases in which *H. pylori* infection disappears (spontaneously or for other reasons) and the histology of the stomach becomes completely normal.

**Systemic inflammatory effects of Helicobacter pylori infection. P. Patel, MA Mendall. TC Northfield. Department of Medicine, St. George's Hospital Medical School. London. UK.**

**Background:** The association of *Helicobacter pylori* infection with reduced stature in children and increased risk of coronary heart disease (CHD) suggests that this infection may have effects on the body outside the stomach. We postulated that a possible mechanism linking *H. pylori* infection with these conditions could be through the systemic manifestations of gastric inflammation. Aim: to investigate the relationship between seropositivity to *H. pylori* and systemic inflammatory factors. Methods: A population based random sample of 388 white caucasian men, aged 50-69, were recruited into a cross-sectional study. Serum levels of antibodies to *H. pylori* were measured, blood levels of inflammatory factors (leucocyte, fibrinogen, C-reactive protein, platelets) determined and a questionnaire administered. C-reactive protein was treated as a dichotomous variable (<0 regarded as negative) and the data was analysed by multiple regression on Stat-view.

**Results:**

<table>
<thead>
<tr>
<th>factor</th>
<th>mean</th>
<th>mean</th>
<th>age adjusted</th>
<th>@adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>H. pylori +ve</td>
<td>H. pylori -ve</td>
<td>coefficient</td>
<td>coefficient</td>
<td></td>
</tr>
<tr>
<td>log.leucocyte</td>
<td>0.85</td>
<td>0.81</td>
<td>0.04*</td>
<td>0.05**</td>
</tr>
<tr>
<td>fibrinogen</td>
<td>2.84</td>
<td>2.61</td>
<td>0.21**</td>
<td>0.21**</td>
</tr>
<tr>
<td>platelets</td>
<td>230</td>
<td>211</td>
<td>19*</td>
<td>22*</td>
</tr>
</tbody>
</table>

* p<0.05, ** p<0.01.
57% of *H. pylori* negative subjects had raised C-reactive protein compared to 45% of *H. pylori* negative subjects (odds ratio 1.55, CI 0.87-2.57).

**Conclusion:** *H. pylori* infection is associated with increased levels of systemic markers of inflammation and may, in part, explain the association of infection with reduced stature and CHD.
HOUSEHOLD LIVING CONDITIONS AND HELICOBACTER PYLORI INFECTION IN CHILDREN UNDERGOING ELECTIVE DAY SURGERY.
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Previous studies have shown an association between Helicobacter pylori (H. pylori) infection in adults and living conditions in childhood. This study examines the relation between household living conditions and infection in children.

**Design and Methods:** Sero-prevalence study in an opportunistically recruited group of children. Anti-H. pylori IgG antibodies measured by a commercial ELISA validated for use in children. Postal questionnaire collecting socio-demographic data and data on household living conditions and domestic practices. **Subjects:** 367 children aged 3 to 14 years attending a regional referral centre for routine non-gastrointestinal day case surgery.

**Results:** Overall seroprevalence of H. pylori was 32%. Prevalence increased with age and was related to parental occupation/social class (non-manual 23.5%, manual 38.3%, p = 0.002). After adjustment for age, social class and housing tenure the following variables were positively associated with infection: number of children in the household (df = 5), household density (df = 0.7 persons per room), sharing a bedroom, sharing a bed with another child (on more than 2 nights a week), sharing a bed with a parent/adult and the Townsend deprivation score of the electoral ward of residence. On adjustment for household density only sharing a bed with a parent/adult on 1 or 2 nights in the week (odds ratio for infection 2.3 (1.22, 4.36), p<0.01) and sharing a bed with a parent/adult on more than 2 nights per week (odds ratio for infection 2.79 (1.27, 6.18), p<0.01) remained significantly associated with infection.

**Conclusion:** The importance of domestic living conditions in the acquisition of H. pylori infection is affirmed. The data also suggests that infection is transmitted within the household during close personal contact between children and infected adults.

THE PREVALENCE AND CLINICAL IMPLICATION OF METRONIDAZOLE-RESISTANT HELICOBACTER PYLORI IN TAIWAN. J.C. Yang, C.K. Yang*, J.T. Wang, T.H. Wang. Deps. of Internal Medicine and Clinical Pathology, National Taiwan University Hospital, Taipei, Taiwan, ROC.

**Backgrounds:** There is high prevalence, more than 60%, of metronidazole (MTZ)-resistant Helicobacter pylori (Hp) strains in third world countries. On the other hand, in developed countries, the resistance rate is low, about 8-35%. The aims of this study were to evaluate (1) the prevalence rate of MTZ-resistant Hp in our country; (2) the role of MTZ-resistance in the eradication of Hp.

**Methods:** The study population consisted of 410 unselective patients with epigastralgia or dyspeptic symptoms. All patients received panendoscopy with biopsy from the antrum and body for culture, histologic exam and urease test. The E-test and disk diffusion methods were adopted to evaluate the drugs susceptibility of Hp. Sixty of these patients with duodenal ulcer received alternative triple therapy (H2 blockers for 8 weeks plus amoxicillin 250mg and metronidazole 250mg four times daily for one week).

**Results:** (1) Eighty-four metronidazole-resistant strains were isolated from 308 Hp positive patients (215 male, 93 female). The difference of prevalence rate between male (22.3%) and female (38.7%) was significant. (2) The Hp eradication rate in the MTZ-susceptible group was 92% (48/50) comparing with significant lower eradication rate about 30% (3/10) in the MTZ-resistant group. (3) Four (8%) patients in the MTZ-susceptible group developed acquired MTZ-resistance after failure of eradication.

**Conclusions:** (1) The prevalence rate of MTZ-resistant Hp is about 27% in Taiwan with significant difference between the male and female. (2) MTZ-resistance represents one of the most important cause of the failure in Hp eradication.

The rate of H pylori (HP) reinfection in developing countries seems to be greater than in developed countries. To analyse this subject we studied 446 duodenal ulcer (DU) patients (pts) (257 male, 189 female, mean age 42.8 yrs., range 18 - 79 yrs.) who had HP successfully eradicated as confirmed by 14C-urea breath test (UBT) performed 83 days (median time) after therapy. 452 (96.9%) were treated successfully (association of amoxicillin 500mg tid, furazolidone 200mg tid and metronidazole 250mg tid, for five days. 269/446 (60.3%) repeated the UBT at one year (median time) after treatment. Statistics were done by chi-square test, Student’s t-test and Mann-Whitney test. Results: 74 out of 269 (27.5%) pts reininfected at one year after treatment. There were no statistical significant difference between pts who did and did not reinfection concerning age, gender, smoking, consumption of alcohol, use of NSAIDS, length of disease, previous DU surgery and familial history of DU. Reinfection rate was higher in pts from low economical class (76/223) than from those high economical class (46/243) (p < 0.01). Among the 223 pts from low economical class, 61 performed endoscopy and UBT in the first post-treatment control and 162 performed only UBT. Reinfection rate at one year control was significantly associated with the endoscopy procedure previously performed (p < 0.05). Conclusion: 1. Reinfection rate in Brazil has two different behaviors depending on the social level, i.e. similar to developed countries in the high economical class or more elevated in low class. 2. There is an indirect evidence that endoscopy might be also involved in reinfection. Support: CNPq and FAPEMIG - Brazil.

CONTRIBUTION OF SOCIOECONOMIC FACTORS TO HECHEOBACTER PLYORI ACQUISITION IN RUSSIA. H.M. Maleya, V. Paykov, O. Bivkova, D.Y. Graamal. Dept. of Medicine, VA Medical Center and Baylor College of Medicine, Houston, TX, USA, and St. Petersburg Sanitary-Hygienic Medical Institute, St. Petersburg, Russia.

Background: Studies have shown an inverse correlation between the prevalence of HP infection in adults and socioeconomic status during childhood; this has not been directly assessed in children. Russian society has essentially one socioeconomic class with 3 generations growing up under similar conditions. We asked: a) whether the HP epidemiology is stable among different birth cohorts, b) whether the pattern of HP infection in children parallels adults, and c) what are the risk factors responsible for increasing the likelihood of transmitting the infection. Methods: We examined 307 children and 213 adults attending the Polyclinic located in St. Petersburg for regular check-ups. 43 of the 307 children were from orphanages and communal apartments. Each participant answered a questionnaire. Results: HP status was determined by ELISA. The overall prevalence of HP infection was 44% in children and 88% in adults. In children, there was a significant increase of HP seroprevalence with age (p<0.001). No age effect was seen in adults (p>0.05). By age 20, 87.5% were infected and this remained stable (e.g., 87% of those 60 and older). In children, the associations between HP seropositivity and possible risk factor(s) examined included mother education, father education, family income, number of rooms in the house (including the kitchen), number of family members living in the house, crowding index, type of dwelling, and HP status of the siblings. Children from orphanages and communal apartments, and those with the highest crowding index, had the highest risk for HP acquisition (OR = 2.1, 95% CI 1.2-2.5). There was an inverse association between the mother’s education and HP seropositivity (OR=1.8, CI 95% 1.3-2.2, p = 0.06). Among the adult population, no associations were found between HP infection and any of the factors tested for the study. Conclusions: The observed change in childhood and the uniform prevalence of HP infection in adults, point to the possibility of cumulative exposure during childhood. Acquisition of HP in children forms the basis for the difference in prevalence of infection in different populations and it indicates an association between childhood overcrowding and an increased infection rate.


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Purpose: To evaluate the influence of H pylori infection in a population at high risk for peptic disease and gastric cancer. Methods: We randomly selected by age and sex 384 out of 2237 subjects (final sample of the serospiemological study San Marino-H. pylori 1.137 H. pylori+ve and 1.100 H. pylori-ve). All subjects were invited by letter and phone call to underwent gastroscopy, and the study was approved by the Ethical Committee of the San Marino Hospital. A questionnaire was administered to each subject, blood was drawn and multiple gastric biopsies from antrum and body were taken for urease test, histology and molecular biology. Serum anti-H. pylori and anti-CagA IgG were looked for by western blotting technique. Subjects were considered infected when at least two tests were positive. Results: A total of 160/222 H. pylori+ve and 44/162 H. pylori-ve subjects (as defined in the phase 1 study) accepted to participate (48% vs 27% response rate, respectively). Six subjects (3 in each group) did not tolerate endoscopy. Lesions were found in 34/103 (33.5%) H. pylori-ve (1 gastric cancer, 1 gastric carcinoid, 3 gastric polips, 2 active gastric ulcer, 2 active duodenal ulcers, 14 duodenal ulcer scars, 8 antral erosions, 3 duodenal erosions) and in 64/1 (44.6%) H. pylori+ve subjects (1 duodenal ulcer scar, 2 antral erosions, 2 duodenal erosions, 1 gastric polip) (p<0.05, Fisher exact test). Anti-CagA antibodies were present in 72/101 (71.4%) H. pylori+ve. CagA+ve had more endoscopic lesions and duodenal ulcer disease than CagA-ve and H. pylori+ve as a whole (26/46 vs 15/55, p = 0.04, and 14/46 vs 5/55, p = 0.02, respectively). Conclusions: In the adult population of San Marino there is a high prevalence of H. pylori-CagA positive strains and this condition can be considered a risk factor for gastroduodenal lesions and peptic disease.
AP-PCR AS TYPING METHOD IN CLINICAL ISOLATES OF HELICOBACTER PYLORI

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Several phenotype and genotype methods have been used in trying to differentiate H. pylori infection and to re-infection or relapse after unsuccessful treatment of H. pylori infection. The purpose of the study was to determine whether the Polimerase Chain Reaction (PCR) has been useful to differentiate H. pylori clinical isolates. Methods: 38 clinical isolates of H. pylori obtained by standard methodology were studied. biotypes taken from digestive endoscopy were cultured in Microbiology Department and microorganisms identified by catalase, urease and oxidase positive tests. 18 clinical isolates were from unrelatated patients, the other 20 were separated into 10 groups six with 2 isolates from different endoscopy of the same patient. 3 with 2 isolates from the same endoscopy but with some morphology or susceptibility differences, the last group being 2 isolates from 2 brothers. DNA was extracted from a 48H H. pylori culture in blood agar plate by the phenotypr method. Several M. LOPÉZ-BREA. Children's Hospital of University of Tartu, Tartu, Estonia; Department of Polyclinic and Family Medicine, University of Tartu, Estonia; Department of Pathology, Jorvi Hospital, Espoo, Finland

During the recent decades the tendency of fall in the prevalence of Helicobacter pylori (HP) infection has been noticed in developed countries. Aim: to evaluate whether the occurrence and eradication of gastritis in children with abdominal complaints has changed during the past 15 years in Estonia. Patients and Methods: During the years of 1980-1985 and 1990-1994 altogether 451 children with abdominal complaints were investigated by upper gastrointestinal endoscopy, together with obtaining biopsy specimens. As a rule, 2 specimens from both the antrum and corpus mucosa were stained by hematoxylin-eosin for the evaluation of gastritis according to the Sydney System and by Giemsa method for the assessment of HP colonisation. To the study group included 363 children, 177 of them were investigated during 1980-1985 and 186 during 1990-1994. 88 were excluded due to missing biopsy specimen. The ages of the children varied from 1 to 17 years (mean 11.3). The age distribution in both groups was similar, except that the proportion of up to 5-year olds was greater in the group studied in 1990-1994. Results: HP colonisation was revealed in 229 (63.1%) patients. Chronic gastritis was diagnosed in 218 (60.1%) children, in 61 (28%) of them acute infection was detected. No atrophy of gastric glands was present. There was a good correlation between gastritis and that of HP colonisation. The comparison between the prevalence of HP colonisation and of gastritis in 1980-1985 and that of 1990-1994 did not show any tendency to decrease. The prevalence of gastritis in the study population in 1980-1985 was 61.0% and in 1990-1994 59.1%. HP colonisation was diagnosed in 60.9% and in 66.1% respectively. For a more detailed analysis the occurrence of both gastritis and HP colonisation were calculated in the different birth cohorts, no statistically significant differences were found.

Conclusion: During the past 15 years there is no noticeable tendency towards decrease neither in the prevalence of HP colonisation nor of gastritis among children with abdominal complaints.

CLINICAL AND ENDOSCOPIC CHARACTERISTICS OF METRONIDAZOLE RESISTANT HELICOBACTER PYLORI

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In helicobacter pylori (HP) infection, metronidazole resistance (MR) is associated with a poor response to triple therapy. However, the clinical significance of MR is unknown, and HP sensitivity data are rarely obtained. We studied 42 patients with HP infection to determine risk factors and clinical characteristics related to MR. 67 variables were analyzed. 16 cases (38%) were MR. There were no significant differences between MR vs MS (metronidazole sensitive) patients for age, sex, race, NSAID or anti-ulcer medications, symptom duration, endoscopic indications, complications, and underlying medical conditions. In MR vs MS, the prevalence of endoscopic gastritis (81 vs 88%), histologic gastritis (88 vs 92%) and ulcers (31 vs 34%) were similar. Prior metronidazole use (NR=19%, MS=8%) and alcohol use/abuse (MR=73%, MS=57%) were not significantly different. Smoking was significantly increased in MR vs MS (60 vs 27%, p < 0.05). 56% of active smokers had MR vs 30% of those who stopped more than 5 years ago (p=ns).

CONCLUSIONS: 1. MR occurs in 38% of HP patients. 2. Smoking is a risk factor for MR. 3. This effect may be reduced upon the cessation of smoking. 4. No other clinical, endoscopic, or demographic features predict MR. 5. Determination of HP antibiotic sensitivity is recommended prior to triple therapy, particularly in smokers.

CHARACTERISTICS OF POLYPHOSPHATE (polyP) GRANULES OF HELICOBACTER PYLORI

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Recently, polyP granules have been identified and characterized in H. pylori as reservoir for stored energy and phosphorus. Furthermore, a relation between polyP and the disease process was suggested by Caselli (Gut 1993; 34: 1507). Our purpose was to get more information about polyP metabolism and relate it to the disease process.

Materials and Methods: During endoscopy, astral biopsies were obtained from 65 H. pylori-positive patients and prepared for electron microscopy. H. pylori strains were isolated to characterize polyP by histochemical and analytical methods. PolyP was analyzed by electron energy loss spectroscopy (EELS) and by electron spectroscopic imaging (ESI). Urease, phospholipase A2, alkaline and acid phosphatase as well as ATPase were detected by the localization of the specific reaction product of the enzyme with electron microscopic methods.

Results: The accumulation of polyP granules in H. pylori depends on the location of the organism in the tissue: 1) organisms within the mucus layer show no polyP granules and 2) polyP is almost exclusively found, when H. pylori adheres to damaged epithelial cells. Urease, phospholipase A2, alkaline and acid phosphatase as well as ATPase were detected by the localization of the specific reaction product of the enzyme with electron microscopic methods.

Conclusion: PolyP is involved in important metabolic pathways as demonstrated by a lot of enzymatic activities. The accumulation of polyP in organisms close to damaged cells confirms a relation to the more advanced stage of the disease process.