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Triple Therapy for Helicobacter pylori Infection in Patients Presenting to a Tertiary Care Center in Pakistan

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(IgG) and (IgM) were performed using Microwell ELISA from Diagnostic Automation INC (USA).

Patients had the following endoscopic diagnosis: duodenal ulcer: 10; gastric ulcer, 2; nonulcer dyspepsia, 34; including gastritis, 23; hiatal hernia, 2; biliary reflux, 2; nonabnormality, 7. The mean age was 51 years with 26 men and 20 women. Sera were maintained at −70 °C before being tested.

Among the 46 sera tested, 29 were positive (63.04%). The prevalence of *H. pylori* infection in the symptomatic population of La Habana is the same as reported for other developing countries. These results indicate the importance for further studies to identify factors influencing the prevalence in the Caribbean.

Clinical Trials and Novel Treatments

Abstract no.: 11.01
Third-line Rescue Therapy with Levofloxacin or Rifabutin after Two *Helicobacter pylori* Treatment Failures

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Aim. In patients with a first eradication failure, a second (rescue) therapy still fails in > 20% of the cases. Both rifabutin and levofloxacin have been suggested to be effective in these refractory cases. Our aim was to compare two rescue regimens based on these antibiotics in patients with two consecutive eradication failures.
Methods. Patients in whom a first treatment with omeprazole-clarithromycin-amoxicillin and a second trial with omeprazole-bismuth-tetracycline-metronidazole (or ranitidine bismuth citrate with these antibiotics) had failed, received 10 day treatment with either rifabutin (150 mg b.i.d.) or levofloxacin (500 mg b.i.d.), plus amoxicillin (1 g b.i.d.), and omeprazole (20 mg b.i.d.). Cure rates were evaluated by ^{13}C-urea breath test.
Results. Forty patients were included (mean age, 56 years, 36% men; 19% peptic ulcer, and 81% functional dyspepsia): 20 received rifabutin and 20 levofloxacin. All the patients returned for follow-up. Compliance in the rifabutin group was 100%. Four patients in the levofloxacin group did not correctly take the medication (in two cases as a result of adverse effects: myalgias and rash). Side effects in the rifabutin and levofloxacin groups were reported in 60% and 50% of the cases. Five patients (25%) treated with rifabutin presented leucopenia, and six patients (30%) treated with levofloxacin presented myalgias. Per-protocol cure rates were 45% (95%CI, 26–66%) in the rifabutin group, and 85% (64–95%) in the levofloxacin group ($p < .01$). Intention-to-treat cure rates were, respectively, 45% (26–66%) and 81% (57–93%) ($p < .05$).
Conclusions. After two previous *Helicobacter pylori* eradication failures, 10-day triple levofloxacin-based rescue regimen is more effective than the same regimen with rifabutin.

Abstract no.: 11.02
Levofloxacin/Azithromycin-Based Triple Therapies as First-Line Treatment for *Helicobacter pylori* Eradication

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Background. The failure of anti-*Helicobacter pylori* therapies is the result of antibiotic resistance. Levofloxacin and azithromycin are administrable in single daily dose and could increase patients compliance. The aim of the study is to compare the efficacy of a 3- and 7-day levofloxacin/azithromycin-based regimen against standard therapy.
Material and Methods. Ninenty *H. pylori*-positive patients were randomized to receive: group A (30 patients), levofloxacin, azithromycin, and esomeprazole for 3 days; group B (30 patients), levofloxacin, azithromycin, and esomeprazole for 7 days; group C (30 patients) clarythromicin, amoxicillin, and esomeprazole. *H. pylori* status was rechecked by ^{13}C-UBT 6 weeks after end of therapies.
Results. *H. pylori* eradication rate in group A was 86.7% (26/30 patients), 93.3% (28/30 patients) in group B, 70% (21/30) in group C. Eradication rate of 7-day levofloxacin/azithromycin-based triple therapy was significantly higher than that observed using standard triple therapy (93.3% versus 70%; $p < .05$). A trend, even if not statistically significant in higher eradication rate, was observed using 3-day levofloxacin/azithromycin-based triple therapy compared to standard therapy (86.7% versus 70% $p = .06$). Incidence of side effects was lower in groups A and B than in group C. Moreover, prevalence of side effects resulted higher in the group B than in group A.
Conclusions. According to the present data, a 7-day levofloxacin/azithromycin-based triple therapy may be considered a highly effective therapy for *H. pylori* eradication. Interestingly, a short course of treatment antibiotics (3-day levofloxacin/azithromycin) may be suggested to patients with high incidence of side effect instead of standard treatment.

Abstract no.: 11.03
Ranitidine Bismuth Citrate- Versus Levofloxacin-based Triple Rescue Therapy after *Helicobacter pylori* Treatment Failure

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Aim. Ranitidine bismuth citrate (RBC)-based rescue regimen has been demonstrated to be an alternative to quadruple rescue therapy after *Helicobacter pylori* eradication failure. On the other hand, levofloxacin has remarkable activity in vitro against *H. pylori*. Our aim was to compare, by a randomized trial, two different 7-day triple rescue regimens based on RBC or levofloxacin.
Methods. Patients in whom a first eradication trial with omeprazole-clarithromycin-amoxicillin had failed were randomized, in this single-centre study, to receive 7-day treatment with: (1) RBC (400 mg b.i.d.), tetracycline (500 mg q.i.d.), and metronidazole (250 mg q.i.d.), or (2) levofloxacin (500 mg b.i.d.), amoxicillin (1 g b.i.d.), and omeprazole (20 mg b.i.d.). Cure rates were evaluated by ^{13}C-urea breath test.
Results. One hundred patients were included (mean age, 47 years, 34% men; 18% peptic ulcer, and 82% functional dyspepsia); 50 received the RBC regimen, and 50 the levofloxacin one. Groups were comparable in terms of demographic variables. Two percent of the patients (one in each group) did not return for follow-up. Compliance was similar in both groups (90% took correctly all the medications). Side effects (only mild/moderate) in the two groups were also comparable (38% with the RBC regimen and 36% with the levofloxacin). Per-protocol cure rates were 69% (95% CI, 54–80%) in the RBC group and 71% (57–82%) in the levofloxacin group. Intention-to-treat cure rates were, respectively, 68% (59–79%) and 68% (59–79%) (nonstatistically significant differences).
Conclusions. Both 7-day RBC- and levofloxacin-based rescue regimens represent effective alternatives to quadruple therapy in patients with omeprazole-clarithromycin-amoxicillin failure.

Abstract no.: 11.04
An Updated Meta-Analysis of Different Duration of First-Line, Clarithromycin-Based Triple Therapy for *Helicobacter pylori* Infection

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Aim. To evaluate the efficacy of first line, clarithromycin-based triple therapy of different length for treating *Helicobacter pylori* infection by an updated meta-analysis of comparative trials.
Methods. Computer-assisted and manual bibliographical searches were performed through May 2006. Randomized controlled trials comparing different length of identical triple therapies were included. Study quality was assessed using the Jadad scale. Meta-analysis was performed combining the risk ratio (RR) of the individual studies.
Results. Twenty-four RCTs were included in the analysis: 10 trials (six high-quality trials) comparing 7 versus 10 days (1098 versus 1064 patients); 16 trials (five high-quality trials) comparing 7 versus 14 days (1416 versus 1386 patients). The majority part of the studies was performed in Europe (16), then in Asia (4), North America (3), and Africa. The meta-analysis showed superiority of prolongation the duration of therapy: 7 versus 10 days relative RR of 0.95 (95% CI = 0.91–0.99) with an NNT of 28; 7 versus 14 days relative RR of 0.91 (0.88–0.95) with a NNT of 14. This difference reached, in both cases (7 versus 10; 7 versus 14), statistical significance. A meta-analysis performed considering only high-quality studies showed similar efficacy between different length of therapy: 7 versus 10 days relative RR of 0.95 (95% CI: 0.90–1.00); 7 versus 14 days relative RR of 0.98 (0.92–1.04), lacking statistical significant difference.
Conclusion. Increasing the length of first-line, clarithromycin-based triple therapies beyond 7 days does not improve treatment efficacy when only high-quality trials are considered into meta-analyses. More high-quality studies, especially from developing countries, are needed.

Abstract no.: 11.05
Eradication of *Helicobacter pylori* Infection with Two Triple-Therapy Regimes of 7, 10, and 14 days; Four Years Experience

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Aim. The efficacy of the most frequently used triple-therapy regimes (pantoprazole 40 mg, amoxicillin 1 g, metronidazole 500 mg, or clarithromycin 500 mg b.i.d.) of 7, 10, and 14 days duration, was investigated in 596 Croatian patients with gastric (GU), duodenal ulcer (DU), and nonulcer dyspepsia (NUD), treated from January 2002 until December 2005.
Methods. One hundred seventy-two GU (M/F 100/72), 282 DU (M/F 176/106), and 138 NUD (M/F 59/79), *Helicobacter pylori*-positive patients, underwent endoscopy with histology and culture at the beginning and 4–8 weeks after the end of the treatment. They were randomly assigned to six treatments groups: PAM groups, A for 14 days (n = 58), B for 10 days (n = 118), C for 7 days (n = 122); PAC groups, D for 14 days (n = 58), E for 10 days (n = 118), F for 7 days (n = 122). Five hundred sixty patients (94%) completed the study.
Results. The results of *H. pylori* eradications are presented in Table 1.
Conclusion. In all groups (7, 10, 14 days), the triple-therapy containing clarithromycin had greater *H. pylori* eradication rate than that containing metronidazole. The eradication rate exceeding 80% in ITT and 90% in PP calculation was achieved only by 14 and 10 days of PAC and only by 14 days of PAM. No statistical differences were found among all six groups in ulcer-healing rate, and clinical improvement rate was slightly higher in patients with ulcers than in patients with nonulcer dyspepsia. (*$p < .05$ was found between A and C groups, and between D and F groups).

	Eradication rate (ITT)	Eradication rate (PP)
A	55/58 (95%)*	55/56 (98%)*
B	98/119 (83%)	98/109 (90%)
C	92/122 (75%)*	92/113 (81%)*
D	54/58 (93%)*	54/57 (95%)*
E	93/118 (79%)	93/112 (83%)
F	90/122 (74%)	90/113 (80%)*

Abstract no.: 11.06
Impact of *Helicobacter pylori* Eradication Regimen Tailored for Clarithromycin Susceptibility in Japan

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Background. Decrease in eradication rate of proton pump inhibitor (PPI)/AC therapy for *Helicobacter pylori* was recognized. It is mainly induced by increase in clarithromycin (CAM)-resistant *H. pylori*. It is reported that PPI+AMPC+MNZ (PPI/AM) therapy have high eradication rate for CAM-resistant *H. pylori*. We investigated the usefulness of the regimens tailored for CAM-susceptibility using human feces.
Method. Fifty-four *H. pylori*-positive patients were recruited. We divided two groups. In one group, patients received PPI/AC (LPZ 60 mg + AMPC 1500 mg + CAM 800 mg 1 week) regimen without investigation into CAM susceptibility before treatment (control group). In another group, patients received PPI/AC regimen for CAM susceptibility (S), or PPI/AM regimen (RPZ 20 mg + AMPC 1500 mg + MNZ 500 mg 1 week) for CAM resistance (R) with investigation into CAM susceptibility before treatment (tailored group). CAM susceptibility test was conducted using patient feces by restriction fragment-length polymorphism–nested polymerase chain reaction (Rimbara E, et al. *Curr Microbiol* 2005; 51: 1–5).
Result. Eradication rates (ITT, intention to treat) were 92.6% and 66.7% in the tailored group and control group, respectively, with this difference being significant. Moreover, eradication rates were 90.0% and 94.1% for the PPI/AC regimen for CAM-S and PPI/AM regimen for CAM-R in tailored group, respectively, with no significant difference
Conclusion. Tailored *H. pylori*-eradication therapy for CAM-susceptibility is very useful regimen in recently Japan with CAM resistance rate more than 20%.

Abstract no.: 11.07
Third-line Rescue Therapy with Levofloxacin after Two *Helicobacter pylori* Treatment Failures

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Aim. Eradication therapy with proton pump inhibitor, clarithromycin, and amoxicillin fails in a considerable number of cases. A rescue therapy still fails in more that 20% of the cases. Our aim was to evaluate the efficacy and tolerability of a third-line levofloxacin-based regimen in patients with two consecutive *Helicobacter pylori* eradication failures.
Methods. Design: Prospective multicenter study. Patients: In whom a first treatment with omeprazole-clarithromycin-amoxicillin and a second with omeprazole-bismuth-tetracycline-metronidazole (or ranitidine bismuth citrate with these antibiotics) had failed. Intervention: A third eradication regimen with levofloxacin (500 mg b.i.d.), amoxicillin (1 g b.i.d.), and omeprazole (20 mg b.i.d.) was prescribed for 10 days. Outcome: Eradication was confirmed with ^{13}C-urea breath test 4–8 weeks after therapy.
Results. One hundred patients were initially included, and nine were lost for follow-up. All patients but five took all the medications correctly. Per-protocol and intention-to-treat eradication rates were 66% (95% CI = 56–75%) and 60% (50–70%). Adverse effects were reported in 25% of the patients, mainly including metallic taste (8%), nausea (8%), myalgia/arthralgia (5%), and diarrhea (4%); none of them were severe.
Conclusion. Levofloxacin-based rescue therapy constitutes an encouraging empirical third-line strategy after multiple previous *H. pylori* eradication failures with key antibiotics such as amoxicillin, clarithromycin, metronidazole, and tetracycline.

Abstract no.: 11.08
Reinfection of *Helicobacter pylori* in Type 1 Young Diabetic Patients: A Long-Term Follow-Up Study

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Introduction. Several studies have demonstrated that *Helicobacter pylori* eradication does not affect metabolic control in type 1 diabetic patients. The prevalence of *H. pylori* infection in diabetic patients seems to be higher than in general population and adult patients with diabetes present higher re-infection rates than dyspeptic patients. Aims of our study were to evaluate a long-term *H. pylori* re-infection rate after having performed the eradicating protocol in a group of young diabetic patients.
Methods. We enrolled 75 patients affected by type 1 diabetes and 99 healthy controls in which we had evaluated *H. pylori* infection prevalence and performed an eradicating therapy in *H. pylori*-positive patients. In all recruited patients we have re-investigated *H. pylori* presence by means of ^{13}C-urea breath test and metabolic control through the evaluation of glycosylated hemoglobin A levels and daily insulin requirement.
Results. The re-infection rate was higher in patients with diabetes than in healthy controls of similar age, gender, and socioeconomic status (33.3% versus 4.5%; $p < .05$). *H. pylori* infection appeared to be related to socioeconomic factors evaluated by means of annual income. Metabolic control was not affected by *H. pylori* status.
Conclusion. No association has been found between *H. pylori* gastric infection and type 1 diabetes mellitus; young diabetic patients are at higher risk to present a re-infection if compared with healthy controls. The test-and-treat strategy does not appear useful in these patients and *H. pylori* eradication should be taken into account case by case by the physician.

Abstract no.: 11.09
Levofloxacin-based Rescue Regimens after *Helicobacter pylori* Treatment Failure: Systematic Review and Meta-Analysis

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Background. A quadruple therapy has been generally recommended as rescue regimen for *Helicobacter pylori* eradication failures.
Objective. To systematically review the efficacy and tolerance of levofloxacin-based rescue regimen and to conduct a meta-analysis of studies comparing it with the quadruple therapy for eradication failures.
Methods. Selection of studies: Levofloxacin-based rescue regimens. For the meta-analysis, randomized controlled trials comparing levofloxacin-based and quadruple regimens were selected. Search strategy: Electronic and manual bibliographic searches. Study quality: Independently assessed by two reviewers. Data synthesis: "Intention-to-treat" *H. pylori* eradication rate.
Results. Mean eradication rate with levofloxacin was 80%. Ten-day regimens were more effective than 7-day combinations (81% versus 73%; $p < .01$). The meta-analysis showed better results with levofloxacin than with the quadruple combination (81% versus 70%; OR = 1.80; 95% CI = 0.94–3.46). This difference reached statistical significance, and heterogeneity markedly decreased when a single outlier study was excluded or when only high-quality studies were considered. Incidence of adverse effects, and severe adverse effects in particular with levofloxacin was 18% and 3%, respectively. Levofloxacin had less adverse effects (19% versus 44%; OR = 0.27; 95% CI = 0.16–0.46) and less severe adverse effects (0.8% versus 8.4%; OR = 0.20; 95% CI = 0.06–0.67) than the quadruple regimen.
Conclusion. After *H. pylori* eradication failure, levofloxacin-based rescue regimen is more effective and better tolerated than the generally recommended quadruple therapy. A 10-day combination of levofloxacin-amoxicillin proton pump inhibitor constitutes an encouraging second-line alternative.

Abstract no.: 11.10
Clinical Application of He-Ne Laser for Eradication of *Helicobacter pylori*

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The irradiation of low-power laser is followed by significant reduction of the bacterial viability. Resistance of *Helicobacter pylori* to metronidazole promotes enhanced sensibility to laser irradiation. The purpose of the study was to eradicate *H. pylori* by the laser irradiation after failure of standard drug therapies and in patients with allergy to antibiotics.
Methods. Thirty patients with proven *H. pylori* infection were selected for photodynamic therapy. Fifteen of them had clinical improvement after courses of triple and/or quadruple therapies, but had not eradication of *H. pylori*. Ten patients had not completed triple therapy because of allergy to antibiotics. Methylene blue was given to patients as photosensitizer an hour before endoscopy. The quartz light conductor was put through biopsy channel of the endoscope. Gastric mucosa was irradiated by He-Ne laser ($\lambda = 633$ nm) with 25 megawatts output power during 10–15 minutes. The course consisted of three procedures every other day. Gastric biopsy samples from each patient were sent for culture and histology.
Results. The metronidazole-resistant strains were found in 16 patients (53.3%). The laser irradiation does not alter gastric epithelial cells. All patients completed photodynamic therapy and underwent control endoscopy after 4 weeks. The therapy success was confirmed in 27 patients by histology and the rapid urease test.
Conclusion. The photodynamic therapy with He-Ne laser may be used as alternative therapy for *H. pylori* eradication in patients with allergy to antibiotics and after standard treatment failures.

Abstract no.: 11.11
Novel Approach to Eradication of *Helicobacter pylori*: Carbonic Anhydrase Inhibition Interferes with Acid Acclimatization, Studies In Vitro and In Vivo

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As *Helicobacter pylori* increasingly acquire resistance to antibiotics new eradication treatments are needed. Periplasmic alpha-carbonic anhydrase plays an important role in enabling acclimatization of *H. pylori* to an acidic milieu, prompting the question of targeting this mechanism with selective eradication therapy. This study aimed to determine the ability and conditions of Diamox, a carbonic anhydrase inhibitor, to interfere with survival of *H. pylori* and the feasibility of eradication treatment. In vitro methods included exposure of the wild type and an α-carbonic anhydrase knockout *H. pylori* organism to Diamox and assessment of survival. For in vivo studies, four groups of Mongolian gerbils were infected with *H. pylori;* group I was treated IP once daily with Diamox 50 mg/kg for 7 days, group II received Diamox 50 mg/kg by gavage once daily for 5 days, and two infected groups served as controls. In vitro Diamox impaired survival of *H. pylori* at pH = 2.0–2.5 by approximately 1–2 log scale depending on experimental conditions. Gerbils treated with Diamox IP showed reduced bacterial scores in antrum, fundus, and cardia and delayed positive CLO tests for *H. pylori,* which suggest compromised acid acclimatization of the organism. Eradication rate for this treatment regimen was low 12.5% (2 out of 16 gerbils). However, gerbils treated with Diamox by oral gavage had > 90% reduction in colony-forming unit of *H. pylori* recovered from the stomachs, suggesting effective eradication for this route of drug administration. In conclusion, the acidic milieu facilitates the antimicrobial properties of a carbonic anhydrase inhibitor for *H. pylori* offering opportunity for developing new eradication regimens.

Abstract no.: 11.12
The Effect of Novel and Current *Helicobacter pylori* Eradication Regimes on Gastric Emptying

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Background. Although antibiotic therapy is the first line of therapy for *Helicobacter pylori,* there is a global need for new therapies. However, the potential effect of current and new treatments on gastric motility is unknown.
Aim. To assess the effect of infection and treatment by current and novel regimes on gastric motility in *H. pylori* infected mice.
Methods. Fasted mice (n = 15) were gavaged 0.1 mL nutrient solution (Intralipid) containing 1 μL/mL ^{13}C-octanoic acid for the assessment of gastric emptying (GE). Breath samples were collected at intervals before and after ingestion of the solution and analyzed for $^{13}CO_2$ content. Gastric half emptying times ($t^1/_2$) were calculated from the resulting $^{13}CO_2$ excretion curves. The GE breath test was performed at pre-infection, 4 weeks after *H. pylori* infection and after 14 days of treatment. Treatment groups included amoxycillin, metronidazole, hyperimmune bovine colostrum (HBC)/neoadjuvant chemotherapy (NAC), HBC/NAC + amoxycillin, HBC/NAC + metronidazole, and triple therapy (amoxycillin, metronidazole, omeprazole).
Results. *H. pylori* infection did not alter GE. However, after 14 days of treatment, all treatments except metronidazole and HBC/NAC + metronidazole significantly slowed gastric emptying. (Table 1)
Conclusions. Four-week *H. pylori* infection does not affect gastric motility in mice. However, 14-day treatment does have an impact on GE. Further studies should assess this effect in patients and determine if the effect persists after cessation of *H. pylori* eradication therapy.

Table 1.

	Gastric half emptying times ($t^1/_2$) (min) median [IQR]		
Treatments	Pre-infection	4 weeks infection	Post-treatment
Amoxycillin	26 [20, 30]	27 [22, 31]	40 [36, 51]†‡
Metronidazole	27 [22, 30]	28 [23, 33]	36 [27, 40]
HBC/NAC	33 [30, 44]	29 [26, 33]	49 [39, 67]†‡
HBC/NAC+amox	27 [25, 32]	25 [23, 31]	36 [30, 42]†‡
HBC/NAC+metro	31 [24, 37]	38 [33, 43]	33 [28, 40]
Triple Therapy	27 [23, 35]	34 [33, 43]	55 [47, 65]†‡
Not infected	27 [18, 32]	30 [25, 38]	40 [34, 47]†

†$p < .05$ compared to pre-infection, ‡$p < .05$ compared to 4 weeks infection.

Abstract no.: 11.13
The Efficacy of One-week Low-dose Triple Therapy Containing Pantoprazole (40 mg b.i.d.), Amoxicillin (750 mg b.i.d.) and Clarithromycin (250 mg b.i.d.) for *Helicobacter pylori* Eradication in Korea

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Background/Aims. The recommended regimen of *Helicobacter pylori* eradication in Japan is standard dose proton pump inhibitor (PPI) b.i.d. + amoxicillin 750 mg b.i.d. + clarithromycin 200–400 mg b.i.d. for 7 days. In Korea, the recommended regimen of *H. pylori* eradication is standard-dose PPI b.i.d. + amoxicillin 1000 mg b.i.d. + clarithromycin 500 mg b.i.d. for 7 days. We could expect patients' good compliance, decrease of drug side effects, and cost reduction by using low-dose therapy. But the efficacy of low-dose therapy is questionable in Korea. In this study, we compared the efficacy of low-dose therapy with standard-dose therapy.
Methods. Four hundred eighty patients who visited Seoul National Unversity Bundang Hospital during January 2005 to April 2006 with documented *H. pylori* infection were enrolled. Seven patients were excluded because of malignancy and drug history. One hundred eighty-two patients received low-dose triple therapy (pantoprazole 40 mg b.i.d. + amoxicillin 750 mg b.i.d. + clarithromycin 250 mg b.i.d.) and 291 patients received standard-dose triple therapy (pantoprazole 40 mg b.i.d. + amoxicillin 1000 mg b.i.d. + clarithromycin 500 mg b.i.d.). Eradication was confirmed by UBT 1 month after eradication.
Results. The two groups were similar with regard to all clinical characteristics. The *H. pylori* eradication rates was 74.2% (135/182) in low-dose triple therapy group, and was 77.3% (225/291) in standard-dose triple therapy group. There was no significant difference of *H. pylori* eradication rates between these two groups ($p = .435$). There was no serious side effect in both group.
Conclusions. The efficacy of low-dose triple therapy is similar to standard-dose triple therapy. These findings suggest that low-dose triple therapy could be another effective regimen considering cost benefit in Korea.

Abstract no.: 11.14
Comparison of Two and Four Times a Day Amoxicillin with Proton Pump Inhibitor, Clarithromycin for *Helicobacter pylori* Infection: A Randomized Study

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Background. A proton pump inhibitor (PPI)-based triple therapy with clarithromycin and amoxicillin is now a standard regimen for *Helicobacter pylori* eradication therapy. Most *H. pylori* are

susceptible to amoxicillin, an important component of many combination therapies for *H. pylori* eradication. Amoxicillin has time-dependent bactericidal activity for against *H. pylori.*

Aim. To evaluate and compare the efficacy of two and four times daily amoxicillin regimens for treatment of *H. pylori* in a randomized study.

Methods. One hundred sixty-three patients with peptic ulcer and *H. pylori* infection confirmed by endoscopy and histology were eligible to this study. *H. pylori* infection was proved by histology or rapid urease test. Patients randomly assigned to one of the two regimens: amoxicillin 1.0 g b.i.d. (group A, n = 90) or amoxicillin 500 mg q.i.d. (group B, n = 73) with clarithromycin 500 mg b.i.d. and omeprazol 20 mg b.i.d. for 2 weeks. All patients were asked to return at the end of treatment to access compliance and adverse events. The eradication rates of *H. pylori* were evaluated by repeated endoscopy or ^{13}C-urea-breath test 4 weeks after completion of treatment.

Results. One hundred fifty-four patients completed the trial (86 group A, 68 group B). The eradication rates were 91.1% in group A, 89.0% in group B ($p > .05$). Compliances were fairly good in both groups. Side effects in two groups were generally mild and nine discontinued treatment because of adverse effects.

Conclusion. Both the two and the four times daily amoxicillin regimens are equally effective and safe for *H. pylori* eradication therapies.

Abstract no.: 11.15
Food and Nutrient Intakes in Functional Dyspepsia Before and After *Helicobacter pylori* Eradication.

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Background. In spite of the fact that functional dyspepsia is a common disease, the number of studies evaluating nutritional patterns in those patients is very limited. The dietary patterns before after *Helicobacter pylori* eradication were never studied. The aim of the study was to evaluate nutritional habits in the group of patients with functional dyspepsia and to test if *H. pylori* eradication changes them.

Material and Methods. Fifty-four patients with functional dyspepsia and present *H. pylori* infection were submitted to the study. All of them underwent *H. pylori* eradication.

The 3-day diet history was used to obtain dietary assessment. A dietary questionnaire was filled two times: before eradication treatment and about 1 month (4–6 weeks) after finishing the treatment.

Results. The patients' diet does not correspond to dietary recommendations. Low energy intake, carbohydrate, fiber, vitamins (thiamine, riboflavin, vitamin B6, folic acid), minerals (calcium, potassium, iron, zinc, and copper), and high fat consumption were found. No significant dietary changes after successful *H. pylori* eradication treatment were found. The only exception was a certain drop in polyunsaturated fatty acids.

Summary. Diet of patients with functional dyspepsia is a nutritionally imbalance diet that cannot respond to many nutritional recommendations.

After successful *H. pylori* eradication, no specific dietary changes were found. *H. pylori* eradication has got no influence on dietary habits in the group of dyspeptic patients.

Abstract no.: 11.16
Helicobacter pylori First-Line Treatment and Rescue Options in Patients Allergic to Penicillin

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Aim. To assess the efficacy and tolerability of *Helicobacter pylori* first-line treatment and rescue options in patients allergic to penicillin.

Methods. Patients: Prospective single-center study including 40 consecutive treatments administered to patients allergic to penicillin. Therapy regimens: First-line (12 patients): omeprazole, clarithromycin, and metronidazole for 7 days. Second-line (17 patients): ranitidine bismuth citrate, tetracycline, and metronidazole for 7 days. Third-line (9 patients): rifabutin, clarithromycin, and omeprazole for 10 days. Fourth-line (2 patients): levofloxacin, clarithromycin, and omeprazole for 10 days. Outcome variable: a negative ^{13}C-urea breath test 8 weeks after completion of treatment.

Results. Per-protocol/intention-to-treat eradication rates were first-line regimen, 64%/58%; second-line regimen (ranitidine-bismuth-citrate), 53%/47%; third-line regimen (rifabutin), 17%/11%; fourth-line regimen (levofloxacin), 100%/100%. Compliance with treatment was generally good, except with the rifabutin-based regimen, which presented adverse effects in 89% of the patients, including four cases of myelotoxicity.

Conclusion. *H. pylori*-infected patients allergic to penicillin may be treated with a first-line treatment combining PPI, clarithromycin, and metronidazole. Rescue options may include a regimen with ranitidine bismuth citrate, tetracycline, and metronidazole. A levofloxacin-based rescue regimen (with PPI and clarithromycin) may also represent an alternative, even when two or more consecutive eradication treatments have previously failed. However, rifabutin-clarithromycin-PPI regimen is ineffective and poorly tolerated.

Abstract no.: 11.17
The Prediction of Ulcer/Erosion Relapse after *Helicobacter pylori* Eradication: a One-Year Follow-up Study

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We estimated the long-term effects of successful *Helicobacter pylori* eradication on relapse of ulcers/erosions in duodenal ulcer patients. One hundred eight adult patients (71 men, 37 women, 16–75 years) were enrolled in the study. The endoscopy, rapid urease test (RUT), histology of gastric mucosa specimens according to the updated Sydney system standards were performed for determination the *H. pylori* status and healing of mucosa defects before treatment and at 4–6 weeks and 1 year after usual triple therapy.

The *H. pylori* eradication rate was 90.7% at 4–6 weeks after triple therapy; however, complete healing of ulcer and concurrent gastroduodenal erosions was in 67.5% cases. In a 1-year

prospective study 41 (41.8%), patients were free from *H. pylori* infection, among them were 13 (31.7%) cases of relapse of ulcers/erosions, predominantly without clinical symptoms. The higher grade of atrophy of fundal mucosa before treatment, the presence of residual ulcers or erosions, higher grade of antral mucosa infiltration by mononuclear cells, and lower grade of fundal mucosa infiltration by polymorphonuclear cells at 4–6 weeks after *H. pylori* eradication were associated with the presence of ulcers or erosions in the 1-year follow-up after *H. pylori* eradication ($p < .05$, Fisher exact test for contingency tables, Mann–Whitney U-test for semiquantitative characteristics). There were marginally significant association of disease duration > 5 years with relapse of gastroduodenal mucosal defects 1 year later ($p = .095$).

Recognized predictor factors witness the high risk of silent ulcer recurrence after successful treatment of *H. pylori,* the group of high risk needed the prolonged treatment (PPI, mucoprotectors) and endoscopy controls.

Abstract no.: 11.18
Intragastric Balloon Tolerance is Independent of *Helicobacter pylori* Status in Patients with Morbid Obesity

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Endoscopic intragastric balloon consists a method for weight loss. However, most patients experience poor balloon tolerance. It has not studied if the presence of *Helicobacter pylori* infection is a factor affecting tolerability.

Thirty-three patients (median body mass index, 38.1), 23 women, 10 men, age range 20–65 years were studied. In all patients, an intragastric balloon (INAMED, USA) was inserted endoscopically and was filled up to a median volume of 550 mL. *H. pylori* status was confirmed during screening endoscopy (rapid urease test plus histology). Exclusion criteria were peptic ulcer, severe gastritis, or chronic nonsteroidal anti-inflammatory drug use. All patients were followed up daily in the first 7 days and monthly thereafter up to removal (6 months later) by a standard questionnaire. Patients were allowed to on-demand H_2-RA/PPI's and/or prokinetics. Nausea and/or vomiting and/or crampy epigastric pain were characterized as mild to moderate (nausea, vomiting < 10/day, duration < 10 days and/or pain without necessitating further management) or severe (intractable nausea and/or vomiting > 10/day, duration > 10 days and/or severe pain necessitating further management and/or premature removal of the balloon).

Fourtenn patients were *H. pylori* positive (42.4%) whereas 19 were negative (57.6%). All patients, independently to their *H. pylori* status, experienced mild to moderate symptoms with a mean duration of 2 days. Seven (21%) experienced severe symptoms requiring further management (three *H. pylori* positive, four *H. pylori* negative) and in four of them (12%) the balloon had to be removed within 1 month (three *H. pylori* negative, one *H. pylori* positive). These findings were not statistically significant, against or for, *H. pylori* status.

Therefore, *H. pylori* eradication is not justified prior to balloon insertion.

Abstract no.: 11.19
Use of Bovine Antibodies-Based Oral Immunotherapy for Eradication of *Helicobacter pylori* in a Placebo-Controlled Clinical Trial

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Antibiotics-based regimens are frequently used for treatment of *Helicobacter pylori* infections. However, predominantly resulting from antimicrobial resistance and poor patient compliance, antibiotic-based eradication fails in 15–40% of patients. Passive immunization against *H. pylori* with orally administered bovine antibodies was successful in animal studies, and may thus serve as an alternative therapy in humans. In this study, its potential is investigated in a clinical trial.

Polyclonal antibodies (sIgA) were raised in milk of dairy cows by nasal and supra-mammary lymph node immunizations during lactation. Cows were immunized with a mix of clinical *H. pylori* isolates. Specific anti-*H. pylori* sIgA milk titers were measured by enzyme-linked immunosorbent assay. The milk was processed into a whey protein concentrate (WPC). These preparations were first tested for their ability to reduce adhesion of *H. pylori* to gastric biopsies.

To study the efficacy and safety of this WPC product, a double-blind, placebo-controlled randomized clinical trial was designed. In this study, 15 patients will be treated with the WPC product and 15 with placebo during 4 weeks. At this moment, 10 patients are included in this ongoing study. Preliminary observations showed no adverse effects of medication. The efficacy is evaluated as reduction in intragastric *H. pylori* colonization density as determined by UBT, histology, and culture. All outcome measures are evaluated on days 0 and 29 after start of treatment, and on day 56, UBT and blood tests are repeated.

Data from this study will contribute to the development of new therapeutic or preventive strategies for *H. pylori* infection, without the adverse effects of antibiotic treatment.

Abstract no.: 11.20
Triple Therapy for *Helicobacter pylori* Infection in Patients Presenting to a Tertiary Care Center in Pakistan

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Aim. To determine the eradication rate of *Helicobacter pylori* infection in patients presenting to a tertiary care center.
Methodology. Patients presenting with symptoms and having an endoscopy (EGD) were enrolled from January 2005 to March 2006. ^{14}C-urea breath test (^{14}C-UBT), rapid urease test (RUT), histopathology, culture, and sensitivity were performed. Antibiotic susceptibility was determined by disk diffusion test. Triple therapy with proton pump inhibitor 20 mg b.i.d., clarithromycin 500 mg b.i.d., and amoxicillin 1 g b.i.d. was prescribed for 10 days. Eradication of *H. pylori* infection was confirmed 4 weeks after therapy by ^{14}C-UBT.

Results. Of 80 patients, 56 (68%) were male, age range 15–76 years, and mean age 45 years. The presenting symptoms were abdominal pain in 54 (67%), vomiting 16 (20%), and nausea 10 (13%). EGD showed mucosal erythema 76 (95%) and duodenal ulcer in 4 (5%). Histopathology demonstrated that *H. pylori* associated moderate gastritis in 36 (45%) and mild gastritis in 44 (55%). Antibiotic susceptibility was determined in 45 patients 27 (60%) males. The positive cultures were from the antrum in 33 (73%) and body in 12 (27%). Fourteen (31%) were resistant to clarithromycin and three (7%) to amoxicillin. All patients completed treatment. Eighteen patients did not return for repeat ^{14}C-UBT to determine eradication status. Of the remaining 62 patients, 15 (24%) patients had a positive repeat ^{14}C-UBT.
Conclusion. There was a high resistance to clarithromycin. Triple therapy for 10 days was effective in two-third of the patients to eradicate *H. pylori*.

Abstract no.: 11.21
Role of Eradication of *Helicobacter pylori* Infection in the Treatment of Functional Dyspepsia

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Aim. To ascertain the effect of eradication of *Helicobacter pylori* infection on dyspeptic symptoms in patients with functional dyspepsia (FD).
Material and Methods. The study included 140 patients with a verified FD (according to the 1999 Rome Definition). Of 75 patients with *H. pylori* infection, eradication therapy was performed in 68 patients (90% eradication success: 7-day therapy with pantoprazole, amoxicillin, claritromycin), and 65 patients tested negatively for *H. pylori*. All patients received pantoprazole for 4 weeks. Severity of dyspepsia was evaluated with the Nepean Dyspepsia Index at baseline and after 1 month of treatment. Statistical analysis was performed using analysis of variance.
Results. All three groups of patients with FD (*H. pylori* positive eradicated, *H. pylori* positive noneradicated, and *H. pylori* negative) demonstrated statistically significant decrease in dyspeptic symptoms ($p < .001$). There was no statistically significant difference in decrease in dyspeptic symptoms between the groups ($p > .05$).
Conclusion. Eradication of *H. pylori* infection in patients with FD is not associated with a statistically significant decrease in dyspeptic symptoms; patients with eradicated and noneradicated *H. pylori* infection show a similar decrease. The presence of *H. pylori* infection has no statistically significant influence on decrease in dyspeptic symptoms in patients with FD, the patients with noneradicated *H. pylori* infection and *H. pylori*-negative patients report an approximately same decrease. Statistically significant symptoms decrease in all three groups of patients is the result of PPI therapy.

Abstract no.: 11.22
The Effectiveness of Bismuth and Eupatilin Along with Proton-Pump Inhibitor-Based Triple Regimen in Eradication of *Helicobacter pylori*

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Background. Tripotassium dicitrato bismuth (Denol®) is an oral bismuth agent used in quadruple regimen, and eupatilin (Stillen®) is the extract of *Artemisia asiatica Nakai*. Eupatilin shows anti-inflammatory and cytoprotective effect. We studied about adding bismuth and eupatilin in triple regimen and its additional effect in eradication of *Helicobacter pylori*.
Methods. This is a retrospective study about the eradication of *H. pylori* in Bundang Seoul National University Hospital between March 2005 and April 2006. *H. pylori* infection was confirmed by endoscopic biopsy and CLO test. The eradication was assessed by the ^{13}C-urea breath test at 4 weeks after the end of treatment.
Results. Five hundred sixty-three patients were included and total eradication rate is 76.7%. Two hundred ninety-six patients treated with 1-week triple therapy (pantoprazole 40 mg, amoxicillin 1000 mg, clarithromycin 500 mg, two times a day). Their eradication rate was 77.4%. One hundred eighty-four patients treated with lower-dose regimen (pantoprazole 40 mg, amoxicillin 750 mg, clarithromycin 250 mg, two times a day). This is a standard regimen in Japan. Their eradication rate was 74.5%. Between the two regimens, statistical significance did not exist ($p = .536$). Forty-seven patients treated with adding bismuth in lower-dose regimen. Their eradication rate was 74.5%. Thirty-six patients treated with adding eupatilin. Their eradication rate was 86.1%. The eradication rate is higher, but there was no statistical significance ($p = .132$)
Conclusion. Considering cost benefit and medication number, lower-dose regimen (by Japanese guideline) is acceptable treatment of *H.r pylori* in Korea. Eupatilin is a promising agent in *H. pylori* eradication but more study will be needed.

Abstract no.: 11.23
Do Proton Pump Inhibitor (PPI) Therapy before *Helicobacter pylori* Eradication Influence on the Eradication Rate? A Preliminary and Clinical study

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Introduction. The main factors affecting the outcome of treatments for *Helicobacter pylori* infection were reported to be antibiotic resistance and patient compliance. The other factors were associated with age, gender, smoking, omeprazole, or H2 blocker pre-treatment. But it was not yet satisfactory reports

about influence on eradication rate of the proton pump inhibitor (PPI) therapy before *H. pylori* eradication. The aim of this study was to determine influence on eradication rate of PPI therapy.
Methods. From March 2004 to March 2006, Fifty-four patients with peptic ulcer including ulcer scar at endoscopy and positive result at the rapid urease test were enrolled. All infected patients were given PPI-based 7-day regimen (omeprazole 20 mg b.i.d. or lansoprazole 30 mg b.i.d., amoxicillin 1 g b.i.d., clarithromycin 500 mg b.i.d.). We included only patients with good drug compliance. Eradication was assessed by urease breath test at 4 weeks after therapy.
Result. Fourty-two male and 12 female (mean age, 46 ± 14.5) patients were enrolled. No pre-PPI group was 12 (22%) and pre-PPI therapy group was 42 (78%). *H. pylori* eradication rate of no pre-PPI group was 91% on ITT analysis and pre-PPI group was 89.5%. There was no statistical significance in the two groups ($p = .80$).
Conclusion. There was no significant difference in the *H. pylori* eradication rate between no pre-PPI group and pre-PPI group. We suggest that the PPI therapy before *H. pylori* eradication does not influence on the eradication rate. More lager, randomized controlled study was necessary.

Abstract no.: 11.24
A New Curcumin-Based One-Week Triple Therapy for Eradication of *Helicobacter pylori* Infection: Something to Learn from a Failure?

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Background. Curcumin is the principal element of turmeric powder extract from *Curcuma longa*. Some studies showed actions of curcumin against *Helicobacter pylori* infection. N-acetylcystein and lactoferrin with mucolytic and antibacterial activities respectively, could play important roles in *H. pylori* eradication therapy.
Aim. To determine if a 7-day nonantibiotic therapy based on curcumin, lactoferrin, N-acetylcystein, and pantoprazole is effective on: (1) *H. pylori* eradication; (2) gastric inflammation assessed by means of serum pepsinogens; (3) symptoms relief.
Materials and Methods. Twenty-five consecutive *H. pylori*-positive patients (12 men, mean age 50 ± 12 years, range 31–76) with functional dyspepsia were enrolled. Patients were administered for 7 days: curcumin 30 mg b.i.d., bovine lactoferrin 100 mg b.i.d., N-acetylcystein 600 mg b.i.d., pantoprazole 20 mg b.i.d. *H. pylori* status and upper GI symptoms were assessed and scored by means of ^{13}C-urea breath test and a Likert scale (absent, mild, moderate, and severe) at baseline (T0) and after 2 months (T1), as well as two blood tests (at T0 and T1) for serum pepsinogens (sPGI, sPGII), gastrin-17 (G-17), and anti-*Helicobacter* IgG (IgG-*H. pylori*) were performed.
Results. Three out of 25 patients (12%) were cured from *H. pylori* infection. There was a significant decrease in the overall symptoms severity (T0: 6 ± 3; T1: 3 ± 2, $p < .001$), in sPGI (T0: 80 ± 26; T1: 74 ± 26, $p = .02$), and sPGII levels (T0: 19 ± 10; T1: 12 ± 7, $p < .001$). IgG and G-17 values did not significantly decrease after 2 months.
Conclusions. This novel therapy is not effective on *H. pylori* eradication, but despite bacterium persistence seems to improve dyspeptic symptoms as well as gastric inflammation.

Abstract no.: 11.25
Brazilian Green Propolis on *Helicobacter pylori* Infection. A Pilot Clinical Study

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Background. There is an increasing search for nonantibiotic-based anti-*Helicobacter pylori* therapy. Recent in vitro studies suggest that propolis and its phenolic components are able to inhibit *H. pylori* growth. There are no clinical studies by now.
Aims. A pilot study to evaluate the effect of Brazilian green propolis on *H. pylori*-infected individuals.
Patients and Methods. After informed consent, 11 (six women, mean age 45 years) participants naive of previous anti-*H. pylori* treatment were included. Before treatment, all participants were submitted to gastroscopy, and *H. pylori* infection were confirmed by histology, urease test, and ^{13}C-urea breath test (UBT) (IRIS, Wagner Analysen-Technik, Germany). Participants with UBT showing a delta over baseline (DOB) value higher than 4‰ were considered positive for *H. pylori* infection. Twenty drops from an alcoholic preparation of Brazilian green propolis (FUNED, Brazil) were administered three times a day for 7 days. Clinical evaluation and UBT were performed at 1–3 days and at 40 days after therapy to evaluate *H. pylori* suppression or eradication, respectively.
Results. All participants took all medication and completed the study. Only two participants referred mild nausea with the medication. One out 11 participants reached partial suppression immediately after therapy and another participant eradicated *H. pylori* infection 40 days after treatment.
Conclusions. Brazilian green propolis administered at popularly used dosis showed minimal effect on suppression or eradication of *H. pylori* infection. Further studies using larger dosis and longer duration are needed to define an eventual role of Brazilian green propolis on *H. pylori* therapy.

Abstract no.: 11.26
Efficacy of Esomeprazole and Rabeprazole for *Helicobacter pylori* Eradication in Patients with Peptic Ulcer

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Background/Aims. Esomeprazole, a new proton pump inhibitor that is the S-isomer of omeprazole and produces a greater inhibition of acid secretion than omeprazole, has recently been evaluated in the treatment of *Helicobacter pylori*. However, the clinical efficacy of esomeprazole-based triple therapy for Korean patients is not well known. Thus, we assessed the efficacy of esomeprazole-based triple therapy with *H. pylori* active peptic ulcer.
Methods. Four hundred twenty-six patients (300 men, 126 women) were enrolled retrospectively to receive either regimen EAC (esomeprazole 40 mg, clarithromycin 500 mg, amoxicilin 1 g, all twice daily) or RAC (rabeprazole 20 mg, clarithromycin 500 mg, amoxicilin 1 g, all twice daily) for 1 week. *H. pylori* infection was confirmed by histology (Giemsa stain) after endoscopic biopsy. *H. pylori* eradication rate was determined by urea breath test 4–6 weeks after completion of the treatment.
Result. The overall eradication rate was 76.8% (327/426). *H. pylori* eradication rate was 78.1% (178/228) in the EAC group and 75.3% (149/198) in the RAC group.
Conclusions. Esomeprazole-based triple therapy is effective for the eradication of *H. pylori* infection and offers comparable efficacy to rabeprazole-based therapy.

Abstract no.: 11.27
Norfloxacin-Bismuth Complexation: A Novel Approach for *Helicobacter* Therapy

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Helicobacter pylori is a curved, spiral gram-negative motile organism. It infects the gastric antrum and causes gastritis. *Helicobacter pylori* infection results in an acute, then chronic, inflammation of the gastric mucosa. The inflammation regresses following antimicrobial treatment.

Helicobacter pylori is highly susceptible to bismuth, a heavy metal with antimicrobial activity linked to its effect on bacterial iron uptake. Despite these findings, bismuth monotherapy often fails to completely eradicate these bacteria. A number of studies have linked the antimicrobial activities of many heavy metals, including bismuth, against *Helicobacter*.

Fluoroquinolones possess a broad spectrum of activity. They show activity against a wide variety of aerobic gram-negative and gram-positive bacteria. The mechanism of their action involves inhibition of bacterial DNA gyrase, which is essential for DNA replication, and it has been proposed that metal complex intermediates are involved in this process.

Present work involved the synthesis of an organometallic complex of norfloxacin with bismuth. The previously mentioned complex was purified and characterized by various spectral techniques like ultraviolet (UV), infrared (IR), nuclear magnetic resonance (NMR), differential scanning calorimeter (DSC), and atomic absorption spectrototometry (AAS). Preliminary antimicrobial evaluation confirmed the activity of the synthesized complex against various gram-negative and gram-positive organisms.
In vitro anti-*H. pylori* studies were performed and the MIC values for the complex was determined. The complex was found to be active against *H. pylori* with a MIC value of less than 0.25 µg/L. Also, the activity was compared against the standard drugs (norfloxacin alone and also with the bismuth salt alone).

NSAIDs, COXIBs, ASA, and *Helicobacter pylori* Infection

Abstract no.: 12.01
Deregulation of SHP-2 Affecting Signal Transduction Switch by *Helicobacter pylori* Oncoprotein CagA

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Aims. *Helicobacter pylori* CagA is associated with gastric carcinoma. It has been shown that phosphorylated CagA binds SHP2 and affects signal transduction switch. In addition, it has been shown that gp130, IL6 cytokine coreceptor, having a bifunctional domain, leads to balanced signaling through SHP2/Erk and STAT1/3 pathways. Therefore, the aims of this study were to evaluate the effect of translocated CagA in the signal transduction switch of gp130 and the role of tyrosine phosphorylation status regarding signal talk between SHP2/Erk and STAT1/3 pathways.
Methods. We used a pair of naturally occurring *cagA* isogenic mutants 147C and 147A. CagA expression vectors with or without CagA tyrosine phosphorylation activities were used. We performed immunoprecipitation assay to assessed the interaction between CagA, SHP2, and/or gp130. We assessed activation of STAT3 or Erk pathways,effect of bax and bcl-2 expression according to *cagA* isogenic mutants.
Results. Phosphorylated CagA showed greater magnitude of SHP2 binding activity, and SHP2 was recruited to gp130.