

Current situation and risk factors for *Helicobacter pylori* eradication failure in Northwest China: A real-world evidence study

Supplementary file

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Supplementary Table 1. Demographic and clinical characteristics of patients with *H pylori* infection

Characteristics	Cases (n)	Percentage
Overall cases	823	
Gender		
Male	389	47.3%
Female	434	52.7%
Age, range (yr)		
< 30	65	7.9%
30-40	172	20.9%
41-50	166	20.2%
51-60	244	29.7%
> 60	176	21.4%
BMI (m2/kg)		
< 18.5	35	4.3%
18.5-25	579	70.4%
25-30	187	22.7%
> 30	22	2.7%
Daily smoking	176	21.4%
Alcohol intake [§]	148	18.0%
Level of education		
Primary or below	136	16.5%
Junior	200	24.3%
Senior	244	29.7%
Higher	243	29.5%
Personal income		
<2000	200	24.3%
2000-5000	437	53.1%
5000-10000	161	19.6%
>10000	25	3.0%
Marital status		
Yes	754	91.6%
No	69	8.4%
Province		
Shaanxi	409	49.7%
Shanxi	401	48.7%
Others *	13	1.6%
Residence		
Urban areas	459	55.8%
Non-urban areas	364	44.2%
Diagnostic method		
Urea breath tests	801	97.3%
Others	22	2.7%
Eradication attempts		

Primary	761	92.5%
Rescue	62	7.5%
Family history of gastric cancer	34	4.1%
Comorbidity		
Biliary tract disease [†]	67	8.1%
Hypertension	88	10.7%
Coronary heart disease	25	3.0%
Diabetes	12	1.5%
Concurrent medication (daily or on demand)		
NSAIDS	45	5.5%
Aspirin	44	5.4%
Metformin	15	1.8%
Statin	49	6.0%
Vitamin	25	3.0%
Dietary Habit		
High salt diet (>3 times/wk)	129	15.7%
Processed food (>3 times/wk)	98	11.9%
Spicy food (>3 times/wk)	199	24.2%
Fresh vegetables (≥500 g/d)	270	32.8%
Fruit (≥300 g/d)	293	35.6%
Tea (≥2 times/wk)	268	32.6%
Coffee (≥2 times/wk)	94	11.4%
Milk (≥2 times/wk)	342	41.6%
Received gastroscopy	273	33.2%
Endoscopic and pathological findings		
Chronic gastritis	38	13.9% [‡]
Intestinal metaplasia	19	7.0% [‡]
Intraepithelial neoplasia	5	1.8% [‡]

Note: §, Alcohol intake was defined as the subject who reported consuming alcohol during the past month; *, Other provinces included Gansu Province (7 cases), Inner Mongolia (one case), the Xinjiang Uygur Autonomous Region (one case), Sichuan Province (one case), Jiangsu Province (one case), Hubei Province (one case), and Henan Province (one case); †, Biliary tract diseases included cholecystitis, gallstones, and gallbladder polyps; ‡, The percentage was compared to cases who had received gastroscopy. BMI: Body mass index; H. pylori: Helicobacter pylori; NSAIDS: nonsteroidal anti-inflammatory drugs.

Supplementary Table 2. Eradication rates with bismuth quadruple regimens for *H pylori* infection and multivariate analyses for risk factors of eradication failure

Risk factors	Eradication rate (%)		Univariate analysis		Multivariate analysis	
			χ^2	P_1	AOR (95% CI)	P_2
Gender						
Male	91.8%	357/389	0.043	0.836		
Female	92.2%	400/434				
Age, range (yr)						
< 30	92.3%	60/65	2.966	0.563		
30-40	91.9%	158/172				
41-50	90.4%	150/166				
51-60	94.3%	230/244				
> 60	90.3%	159/176				
BMI (m2/kg)						
18.5-25	90.5%	524/579	N/A	0.049	Reference	-
< 18.5	94.3%	33/35			0.22 (0.04, 1.15)	0.073
> 25	95.7%	200/209			0.38 (0.17, 0.82)	0.015
Daily smoking						
Yes	90.9%	160/176	0.348	0.555		
No	92.3%	597/647				
Alcohol intake						
Yes	91.9%	136/148	0.002	0.965		
No	92.0%	621/675				
Level of education						
Primary or below	89.0%	121/136	3.650	0.302		
Junior	90.5%	181/200				
Senior	93.4%	228/244				
Higher	93.4%	227/243				
Personal income						
<2000	91.5%	183/200	N/A	0.522		
2000-5000	92.9%	406/437				
5000-10000	89.4%	144/161				
>10000	96.0%	24/25				
Marital status						
Yes	91.8%	692/754	0.504	0.478		
No	94.2%	65/69				
Province						
Shaanxi	89.0%	364/409	9.808	0.002	Reference	-
Outside ^a	94.9%	393/414			0.35 (0.15, 0.80)	0.012
Residence						
Urban	94.6%	434/459	9.313	0.002	Reference	-
Non-urban areas	88.7%	323/364			1.22 (0.64, 2.30)	0.548
Processed food (>3 times/wk)						

Yes	96.9%	95/98	3.708	0.054		
No	91.3%	662/725				
Eradication attempts						
Primary	93.3%	710/761	21.468 *	<0.001	Reference	-
Rescue	75.8%	47/62			4.12 (1.86, 9.13)	<0.001
Adverse events						
Without	93.3%	715/766	25.192 *	<0.001	Reference	-
With	73.7%	42/57			6.13 (2.75, 13.69)	<0.001
PPI [†]						
Esomeprazole	96.7%	146/151	N/A	<0.001	Reference	-
Omeprazole	91.9%	136/148			2.33 (0.7, 7.81)	0.169
Rabeprazole	92.3%	215/233			1.36 (0.43, 4.35)	0.601
Pantoprazole	82.3%	130/158			2.72 (0.82, 9)	0.101
Lansoprazole	98.4%	125/127			0.86 (0.15, 4.97)	0.870
Ilaprazole	83.3%	5/6			0.96 (0.05, 18.61)	0.976
Antibiotic regimen [‡]						
Amoxicillin plus clarithromycin	94.6%	454/480	N/A	<0.001	Reference	-
Amoxicillin plus metronidazole	98.2%	54/55			1.00 (0.12, 8.46)	0.997
Amoxicillin plus levofloxacin	92.4%	121/131			1.81 (0.74, 4.41)	0.195
Amoxicillin plus furazolidone	84.6%	77/91			2.83 (1.23, 6.50)	0.014
Levofloxacin plus furazolidone	70.7%	29/41			12.63(3.59,44.42)	<0.001
Other regimens [§]	88.0%	22/25			2.00 (0.45, 8.92)	0.362

Note: P values were obtained from the comparisons of the proportion between groups using χ^2 statistic. N/A: Fisher's exact test ($T < 1$); *, Continuity correction ($1 \leq T \leq 5$); †, PPI: Proton pump inhibitor, the following PPI dosages were prescribed: esomeprazole, 20 mg bid; rabeprazole, 20 mg bid; omeprazole, 20 mg bid; lansoprazole, 30 mg bid; pantoprazole, 40 mg bid; ilaprazole, 5 mg bid; ‡, The following antibiotic dosages were prescribed: amoxicillin, 1000 mg bid; clarithromycin, 500 mg bid; levofloxacin, 500 mg qd or 200 mg bid; furazolidone, 100 mg bid; metronidazole, 400 mg tid, or 400 mg qid; §, Other regimens included clarithromycin plus metronidazole (1/1); clarithromycin plus levofloxacin (3/4); clarithromycin plus furazolidone (4/5); amoxicillin plus tetracycline (1/1); levofloxacin plus tetracycline (2/2); tetracycline plus furazolidone (11/12). AOR: Adjusted odds ratio; BMI: Body mass index; CI: Confidence interval; PPI: Proton pump inhibitor.

Supplementary Table 3. Main adverse events for different quadruple regimens during medication

Adverse events		Success	Failure	χ^2	<i>P</i>
Frequency of symptoms					
Upper abdominal pain	8	6	2		
Heartburn or acid	8	8	0		
regurgitation					
Nausea or vomiting	4	1	3		
Abdominal distension	14	9	5		
Belching	11	8	3		
Increased flatus frequency	8	6	2		
Increased stool frequency	4	4	0		
Decreased stool frequency	6	4	2		
Loose stool	5	4	1		
Dry stool	10	7	3		
Defecate immediately if	1	1	0		
necessary					
Tenesmus	5	3	2		
Bitter taste in mouth	3	3	0		
Total	87	64	23		
Cases	57	42	15	25.192 *	<0.001

Note: P values were obtained from the comparisons of the incidence of adverse events between groups using χ^2 statistic. *, Continuity correction ($1 \leq T \leq 5$);

Supplementary Table 4. Univariate and multivariate analyses for risk factors of main adverse events during medication with various bismuth quadruple regimens for *H pylori* infection

Risk factors	Adverse events ^a (%)		Univariate analysis		Multivariate analysis	
			χ^2	P_1	OR (95% CI)	P_2
Gender						
Male	8.74%	34/389	3.768	0.052		
Female	5.30%	23/434				
Age, range (yr)						
< 30	3/65	4.62%	N/A	0.665		
30-40	9/172	5.23%				
41-50	12/166	7.23%				
51-60	17/244	6.97%				
> 60	16/176	9.09%				
BMI (m2/kg)						
< 18.5	8.57%	3/35	N/A	0.020	Reference	-
18.5-25	5.35%	31/579			1.56 (0.44, 5.54)	0.489
> 25	11.00%	23/209			2.20 (1.22, 3.95)	0.008
Daily smoking						
Yes	7.95%	14/176	0.367	0.544		
No	6.65%	43/647				
Alcohol intake						
Yes	10.14%	15/148	2.883	0.090		
No	6.22%	42/675				
Level of education						
Primary or below	7.35%	10/136	2.374	0.499		
Junior	8.50%	17/200				
Senior	7.38%	18/244				
Higher	4.94%	12/243				
Personal income						
<2000	6.00%	12/200	N/A	0.887		
2000-5000	7.32%	32/437				
5000-10000	6.83%	11/161				
>10000	8.00%	2/25				
Marital status						
Yes	7.16%	54/754	0.401 *	0.526		
No	4.35%	3/69				
Province						
Shaanxi	8.56%	35/409	3.358	0.067		
Outside ^a	5.31%	22/414				
Residence						
Urban	6.54%	30/459	0.245	0.621		
Non-urban areas	7.42%	27/364				
Processed food (>3 times/wk)						

Yes	7.14%	7/98	0.008	0.928		
No	6.90%	50/725				
Eradication attempts						
Primary	6.18%	47/761	7.334 *	0.007	Reference	-
Rescue	16.13%	10/62			2.48 (1.13, 5.45)	0.024
PPI [†]						
Esomeprazole	2.0%	3/151	N/A	0.001	Reference	-
Omeprazole	6.8%	10/148			4.16(1.11,15.59)	0.034
Rabeprazole	11.2%	26/233			6.24(1.84,21.12)	0.003
Pantoprazole	3.8%	6/158			2.19(0.53, 9.02)	0.276
Lansoprazole	7.1%	9/127			3.99(1.04,15.25)	0.043
Ilaprazole	50.0%	3/6			42.98(5.82,317.42)	<0.001
Antibiotic regimen						
‡	6.7%	32/480	N/A	0.131		
Amoxicillin plus clarithromycin	1.8%	1/55				
Amoxicillin plus metronidazole	12.2%	16/131				
Amoxicillin plus levofloxacin	6.6%	6/91				
Amoxicillin plus furazolidone	2.4%	1/41				
Levofloxacin plus furazolidone	4.0%	1/25				
Other regimens [§]						

N/A, Note: P values were obtained from the comparisons of the incidence rates between groups using χ^2 statistic. N/A: Fisher's exact test ($T < 1$); *, Continuity correction ($1 \leq T \leq 5$); †, PPI: Proton pump inhibitor, the following PPI dosages were prescribed: esomeprazole, 20 mg bid; rabeprazole, 20 mg bid; omeprazole, 20 mg bid; lansoprazole, 30 mg bid; pantoprazole, 40 mg bid; ilaprazole, 5 mg bid; ‡, The following antibiotic dosages were prescribed: amoxicillin, 1000 mg bid; clarithromycin, 500 mg bid; levofloxacin, 500 mg qd or 200 mg bid; furazolidone, 100 mg bid; metronidazole, 400 mg tid, or 400 mg qid; §, Other regimens included clarithromycin plus metronidazole (0/1); clarithromycin plus levofloxacin (0/4); clarithromycin plus furazolidone (0/5); amoxicillin plus tetracycline (0/1); levofloxacin plus tetracycline (0/2); tetracycline plus furazolidone (1/12). BMI: Body mass index; CI: Confidence interval; H. pylori: Helicobacter pylori; PPI: Proton pump inhibitor.