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CADTH Reference List

Duration of Therapy for Helicobacter pylori Infection

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Summary of Abstracts

CADTH

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Key Messages

- We found 1 systematic review and 6 randomized controlled trials about the clinical effectiveness of 7-day therapy for the treatment of Helicobacter pylori infection compared to longer treatment durations.
- We found 8 evidence-based guidelines about the optimal duration of therapy for treatment of Helicobacter pylori infection.

Research Questions

1. What is the clinical effectiveness of 7-day therapy for the treatment of Helicobacter pylori infection compared to longer treatment durations?
2. What are the evidence-based guidelines regarding the optimal duration of therapy for treatment of Helicobacter pylori infection?

Methods

Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including MEDLINE, Embase, the Cochrane Database of Systematic Reviews, the International HTA Database, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were Helicobacter pylori, antibiotics and proton pump inhibitors, and 7-day therapy. CADTH-developed search filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analysis, or indirect treatment comparisons, randomized controlled trials, controlled clinical trials, and guidelines. Conference abstracts were excluded. The search was completed on January 20, 2023, and limited to English-language documents published since January 1, 2014. Internet links were provided, where available.

Selection Criteria and Summary Methods

One reviewer screened literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in Table 1. Full texts of study publications were not reviewed. The Overall Summary of Findings was based on information available in the abstracts of selected publications. Open access full-text versions of evidence-based guidelines were reviewed when available, and relevant recommendations were summarized.

Table 1: Selection Criteria

Criteria	Description
Population	Patients with Helicobacter pylori infection
Intervention	Q1: Helicobacter pylori eradication therapy (i.e., combination of antibiotics plus proton pump inhibitor [e.g., concomitant double, triple, or quadruple therapy; or sequential therapy]) for 7 days Q2: Helicobacter pylori eradication therapy Exclude: bismuth-containing therapy
Comparator	Q1: Same type of therapy with longer treatment duration (e.g., 8 to 14 days) Q2: Not applicable
Outcomes	Q1: Clinical benefits (e.g., cure or eradication of infection) and harms (e.g., antibiotic resistance, adverse events) Q2: Recommendations regarding the optimal duration of therapy for treatment of Helicobacter pylori infection
Study designs	Q1: Health technology assessments, systematic reviews, randomized controlled trials Q2: Evidence-based guidelines

Results

Fifteen relevant references were identified for this report.[1-15] One systematic review with meta-analysis[1] and 6 randomized controlled trials (RCT)[2-7] were identified about the clinical effectiveness of 7-day therapy for the treatment of Helicobacter pylori (H. pylori) infection compared to longer treatment durations. Eight evidence-based guidelines[8-15] were identified about the optimal duration of therapy for treatment of H. pylori infection. No relevant health technology assessments were identified.

Additional references of potential interest that did not meet the inclusion criteria are provided in Appendix 1.

Overall Summary of Findings

One systematic review with meta-analysis[1] and 6 RCTs[2-7] were identified about the clinical effectiveness of 7-day therapy for the treatment of H. pylori infection compared to longer treatment durations. The majority of the studies[1,3,4,6,7] compared the eradication rates of H. pylori with14-day triple therapy containing a proton pump inhibitor (PPI) to the same type of therapy administrated for 7 days. Of these, 1 systematic review[1] and 3 RCTs[4,6,7] reported that the 14-day therapy showed higher eradication rates than the 7-day therapy. However, the systematic review[1] noted that the quality of evidence was weak. One RCT[3] found that the 14-day and 7-day therapies had similar eradication outcomes and neither therapy was efficient as a first-line treatment in Korea.

Two RCTs compared H. pylori eradication rates between 10-day therapies and 7-day therapies.[2,5] Among them, 1 RCT[2] reported that 1 PPI-containing triple therapy achieved higher eradication rates when administrated for 10 days compared to 7 days. Another RCT[5] investigating a different triple regimen concluded that the 10-day and 7-day therapies achieved similar eradication outcomes.

Antibiotics investigated in the identified studies included amoxicillin,[1-7] clarithromycin,[3,6,7] levofloxacin,[2,5] moxifloxacin,[1] and tetracycline.[4] PPIs investigated in the identified studies included dexlansoprazole,[2] esomeprazole,[5] and omeprazole.[4,7] Three studies[1,3,6] did not specify PPIs in the abstracts. A detailed summary of the included systematic review and RCTs can be found in Table 2.

Table 2: Summary of Included Systematic Review and Randomized Controlled Trials

Study citation	Study design, population	Intervention and comparator	Relevant outcome(s)	Author's conclusions
Systematic review				
Marin et al. (2017)[1]	**Study design:** Systematic Review and meta-analysis **Population**: People with H. pylori infection experiencing failure of non-bismuth quadruple regimens **Number of relevant primary studies**: NR	**Intervention**: 7-day regimen of moxifloxacin, amoxicillin, and PPI as the second-line therapy **Comparator**: 14-day regimen of moxifloxacin, amoxicillin, and PPI as the second-line therapy	H. pylori eradication rates, safety	The 14-day moxifloxacin, amoxicillin, and PPI therapy showed higher eradication rates than the 7-day therapy, although the evidence was weak. The two therapies had similar safety outcomes.
Randomized controlled trials				
Elkhodary et al. (2020)[2]	**Study design**: Pilot RCT **Population**: People with H. pylori infection in Egypt **N** = 66	**Intervention**: 7-day levofloxacin (500 mg q.d.), amoxicillin (1000 mg b.i.d.), and dexlansoprazole (60 mg q.d.) therapy **Comparator**: 10-day levofloxacin (500 mg q.d.), amoxicillin (1000 mg b.i.d.), and dexlansoprazole (60 mg q.d.) therapy	H. pylori eradication rates	The 10-day levofloxacin, amoxicillin, and dexlansoprazole therapy showed higher eradication rate than the 7-day therapy.
Kim et al. (2020)[3]	**Study design**: Open-label RCT **Population**: People with H. pylori infection in Korea **N** = 369	**Intervention:** 7-day clarithromycin, amoxicillin, and PPI therapy as the first-line treatment **Comparator:** 14-day clarithromycin, amoxicillin, and PPI therapy as the first-line treatment	H. pylori eradication rates	The eradication rates of the 14-day and 7-day therapies were similar. The PPI-clarithromycin-amoxicillin therapy was not efficient as a first-line therapy either in 7 days or 14 days in Korea.

Study citation	Study design, population	Intervention and comparator	Relevant outcome(s)	Author's conclusions
Vilaichone et al. (2020)[4]	**Study design**: RCT **Population**: People with H. pylori infection in Bhutan **N** = 77	**Intervention:** 7-day tetracycline (500 mg q.i.d), amoxicillin (500 mg q.i.d), and omeprazole (20 mg b.i.d) therapy **Comparator:** 14-day tetracycline (500 mg q.i.d), amoxicillin (500 mg q.i.d), and omeprazole (20 mg b.i.d) therapy	H. pylori eradication rates	The 14-day tetracycline, amoxicillin, and omeprazole therapy showed higher eradication rates than the 7-day therapy, especially in female individuals and people aged ≥ 40 years. The 14-day therapy might be an acceptable regimen for H. pylori eradication in limited resource area such as Bhutan. Female patients and those aged ≥ 40 years should receive longer duration of treatment.
Hu et al. (2017)[5]	**Study design**: RCT **Population**: People with H. pylori infection and chronic gastritis **N** = 240	**Intervention:** 7-day levofloxacin (500 mg q.d.), amoxicillin (1000 mg b.i.d), and esomeprazole (20 mg b.i.d) therapy **Comparator:** 10-day levofloxacin (500 mg q.d.), amoxicillin (1000 mg b.i.d), and esomeprazole (20 mg b.i.d) therapy	H. pylori eradication rates	The 10-day levofloxacin, amoxicillin, and esomeprazole therapy showed similar eradication rates to the 7-day therapy.
Arama et al. (2016)[6]	**Study design**: Open-label RCT **Population**: People with H. pylori infection in Romania **N** = 78	**Intervention:** 7-day clarithromycin, amoxicillin, and PPI therapy **Comparator:** 14-clarithromycin, amoxicillin, and PPI therapy	H. pylori eradication rates, histological features, endoscopic features	The 14-day clarithromycin, amoxicillin, and PPI therapy showed higher eradication rates and better improvement in histological features than the 7-day therapy. Reduction in endoscopic aspects of gastric and duodenal lesions were observed in both regimens.
Wang et al. (2015)[7]	**Study design**: Single-centre RCT **Population**: People with H. pylori infection **N** = 298	**Intervention:** 1-week clarithromycin (500 mg b.i.d), amoxicillin (1000 mg b.i.d), and omeprazole (20 mg b.i.d) therapy **Comparator:** 2-week clarithromycin (500 mg b.i.d), amoxicillin (1000 mg b.i.d), and omeprazole (20 mg b.i.d) therapy	H. pylori eradication rates	The 2-week clarithromycin, amoxicillin, and omeprazole therapy showed higher eradication rates than the 1-week therapy.

b.i.d = twice a day; H. pylori = Helicobacter pylori; NR = not reported; PPI = proton pump inhibitor; q.d. = every day; q.i.d = 4 times a day; RCT = randomized controlled trial.

Eight evidence-based guidelines were identified.[8-15] Two guidelines[11,13] provide recommendations for children and adolescents and 2 guidelines report recommendations for adults.[14,15] For 4 guidelines, specific population is unclear.[8-10,12] The recommended durations of PPI-containing concomitant therapy,[8,10,12,13] triple therapy,[8-10,12-14] sequential therapy,[10,12,13] and high-dose dual therapy[9,12] range from 10 to 14 days in most guidelines. In addition, 1 guideline[14] recommends against administrating standard triple therapy for

7 days. However, guidelines from the Japanese Society for Pediatric Gastroenterology, Hepatology, and Nutrition (2020)[11] and the National Institute for Health and Care Excellence (2014)[15] recommend administrating triple therapy for 7 days. A detailed summary of the recommendations and their corresponding strength and evidence quality is presented in Table 3.

Table 3: Summary of Recommendations in Included Guidelines

Summary of recommendations	Quality of evidence and strength of recommendations
European Helicobacter and Microbiota Study Group (2022)[8]	
First-line therapy (p. 13) • "Statement 5: The recommended treatment duration of non-BQT (concomitant) is 14 days." (p. 15)	Strength of recommendation: 2 (weak) Quality of evidence: D (very low)
First-line therapy (p. 13) • "Statement 7: The recommended treatment duration of PPI-clarithromycin-based triple therapy is 14 days." (p. 15 to 16)	Strength of recommendation: 1 (strong) Quality of evidence: B (moderate)
Italian Society of Gastroenterology and Italian Society of Digestive Endoscopy (2022)[9]	
First-line therapy • "Statement 11: Bismuth-based quadruple therapy, concomitant therapy, or sequential therapy should be used as first-line treatment for H. pylori. A 14-day standard triple therapy may only be considered in areas with proven low clarithromycin resistance (<15%)." (p. 4)	Strength of recommendation: Strong Quality of evidence: Moderate
Salvage therapy • "Statement 13: In case of second-line treatment failure, a 14-day levofloxacin-containing triple therapy, if not used already as a second-line regimen, or a 14-day high dose dual therapy may be used as an empirical third-line regimen." (p. 5)	Strength of recommendation: Weak Quality of evidence: Low
Salvage therapy • "Statement 15: Rifabutin based 12-days triple therapy or 14-day high dose dual therapy should be used in the case of multiple eradication failures." (p. 5)	Strength of recommendation: Weak Quality of evidence: Very low
Jung HK et al. (2021)[10]	
First-line therapy • "Statement 4: Standard triple therapy (standard dose PPI, amoxicillin 1 g, and clarithromycin 500 mg twice daily) for 14 days is recommended for first-line regimen." (p. 10)	Strength of recommendation: Strong Quality of evidence: Moderate
First-line therapy • "Statement 5: Sequential therapy (standard dose PPI, amoxicillin 1 g twice daily for 5 days followed by standard dose PPI, clarithromycin 500 mg, and metronidazole 500 mg twice daily for 5 days) can be one of first line therapies for H. pylori eradication." (p. 11)	Strength of recommendation: Strong Quality of evidence: High
First-line therapy • "Statement 6: Concomitant therapy (standard dose PPI, clarithromycin 500 mg, amoxicillin 1 g, and metronidazole 500 mg twice daily for 10 days) is recommended as a first-line treatment." (p. 12)	Strength of recommendation: Strong Quality of evidence: High

Summary of recommendations	Quality of evidence and strength of recommendations
Japanese Society for Pediatric Gastroenterology, Hepatology and Nutrition (2020)[11]	
"Statement 17-2: We recommend a proton pump inhibitor-based triple regimen with amoxicillin and metronidazole (PAM regimen) for 7 days if H. pylori strains are resistant to clarithromycin." (p. 11)	Strength of recommendation: Strong Quality of evidence: D (very low)
American College of Gastroenterology (2017)[12]	
First-line therapy • "Clarithromycin triple therapy consisting of a PPI, clarithromycin, and amoxicillin or metronidazole for 14 days remains a recommended treatment in regions where H. pylori clarithromycin resistance is known to be <15% and in patients with no previous history of macrolide exposure for any reason." (p. 8)	Strength of recommendation: Conditional Quality of evidence: Low Quality of evidence for recommended duration: Moderate
First-line therapy • "Concomitant therapy consisting of a PPI, clarithromycin, amoxicillin and a nitroimidazole for 10–14 days is a recommended first-line treatment option." (p. 8)	Strength of recommendation: Strong Quality of evidence: Low Quality of evidence for recommended duration: Very low
First-line therapy • "Sequential therapy consisting of a PPI and amoxicillin for 5–7 days followed by a PPI, clarithromycin, and a nitroimidazole for 5–7 days is a suggested first-line treatment option." (p. 9)	Strength of recommendation: Conditional Quality of evidence: Low Quality of evidence for recommended duration: Very low
First-line therapy • "Hybrid therapy consisting of a PPI and amoxicillin for 7 days followed by a PPI, amoxicillin, clarithromycin and a nitroimidazole for 7 days is a suggested first-line treatment option." (p. 9)	Strength of recommendation: Conditional Quality of evidence: Low Quality of evidence for recommended duration: Very low
First-line therapy • "Levofloxacin triple therapy consisting of a PPI, levofloxacin, and amoxicillin for 10–14 days is a suggested first-line treatment option." (p. 9)	Strength of recommendation: Conditional Quality of evidence: Low Quality of evidence for recommended duration: Very low
First-line therapy • "Fluoroquinolone sequential therapy consisting of a PPI and amoxicillin for 5–7 days followed by a PPI, fluoroquinolone, and nitroimidazole for 5–7 days is a suggested first-line treatment option." (p. 9)	Strength of recommendation: Conditional Quality of evidence: Low Quality of evidence for recommended duration: Very low
Salvage therapy • "Levofloxacin triple regimen for 14 days is a recommended salvage regimen." (p. 17)	Strength of recommendation: Strong Quality of evidence: Moderate Quality of evidence for recommended duration: Low
Salvage therapy • "Concomitant therapy for 10–14 days is a suggested salvage regimen." (p. 17)	Strength of recommendation: Conditional Quality of evidence: Very low
Salvage therapy • "Rifabutin triple regimen consisting of a PPI, amoxicillin, and rifabutin for 10 days is a suggested salvage regimen." (p. 17)	Strength of recommendation: Conditional Quality of evidence: Moderate Quality of evidence for recommended duration: Very low

Summary of recommendations	Quality of evidence and strength of recommendations
Salvage therapy • "High-dose dual therapy consisting of a PPI and amoxicillin for 14 days is a suggested salvage regimen." (p. 17)	Strength of recommendation: Conditional Quality of evidence: Low Quality of evidence for recommended duration: Very low
European Society for Paediatric Gastroenterology Hepatology and Nutrition and North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (2017)[13]	
First-line therapy Recommendation 14 (p. 4 and 9): • If patients are susceptible to CLA and to MET, PPI-AMO-CLA for 14 days with standard dose or sequential therapy for 10 days is recommended. • If patients are resistant to CLA and susceptible to MET, PPI-AMO-MET for 14 days is recommended. • If patients are resistant to MET and susceptible to CLA, PPI-AMO-CLA for 14 days is recommended. • If patients are resistant to CLA and MET, PPI-AMO-MET for 14 days with high dose for amoxicillin or PPI-AMO-MET-CLA for 14 days is recommended.	Strength of recommendation: Strong Quality of evidence: Moderate to low for suggested regimens Quality of evidence for recommended duration: Low
Irish Helicobacter pylori Working Group (2017)[14]	
"Statement 8: standard triple therapy for a duration of 7 days can no longer be recommended" (p. 4).	Strength of recommendation: Strong Quality of evidence: Moderate
First-line therapy (p. 6) • "Statement 9: 14-day clarithromycin-based triple therapy with a high-dose proton pump inhibitor is recommended" (p. 4).	Strength of recommendation: Strong Quality of evidence: Moderate
Salvage therapy (p. 6) • "Statement 12: second-line therapy depends on the first-line treatment and should not be the same treatment. The options are (a) 14 days of levofloxacin-based therapy with high-dose proton pump inhibitor, (b) 14 days of clarithromycin-based triple therapy with high-dose proton pump inhibitor or (c) bismuth quadruple therapy for 14 days" (p. 5).	Strength of recommendation: Strong Quality of evidence: Moderate
National Institute for Health and Care Excellence (2014)[15]	
First-line therapy • "1.9.4 Offer people who test positive for H. pylori a 7-day, twice-daily course of treatment with: a PPI and amoxicillin and either clarithromycin or metronidazole." (p. 17 and 18)	• Strength of recommendation: Strong
First-line therapy • **"1.9.5 Offer people who are allergic to penicillin a 7-day, twice-daily course of treatment with: a PPI and clarithromycin and metronidazole." (p. 18)**	Strength of recommendation: Strong
Salvage therapy • "1.9.8 Offer people who still have symptoms after first-line eradication treatment a 7-day, twice-daily course of treatment with: a PPI and amoxicillin and either clarithromycin or metronidazole (whichever was not used first-line)." (p. 18 and 19)	Strength of recommendation: Strong

Summary of recommendations	Quality of evidence and strength of recommendations
Salvage therapy • "1.9.9 Offer people who have had previous exposure to clarithromycin and metronidazole a 7-day course of treatment with: a PPI and amoxicillin and tetracycline (or, if a tetracycline cannot be used, levofloxacin)." (p. 19)	Strength of recommendation: Strong
Salvage therapy • "1.9.10 Offer people who are allergic to penicillin (and who have not had previous exposure to a fluoroquinolone antibiotic) a 7-day, twice-daily course of treatment with: a PPI, and metronidazole and levofloxacin." (p. 19)	• Strength of recommendation: Strong

AMO = amoxicillin; BQT = proton pump inhibitor, bismuth, tetracycline, and metronidazole; CLA = clarithromycin; H. pylori = Helicobacter pylori; MET = metronidazole; PAM = proton pump inhibitor, amoxicillin, and metronidazole; PPI = proton pump inhibitor.

References

Health Technology Assessments

No literature identified.

Systematic Reviews

1. Marin AC, Nyssen OP, McNicholl AG, Gisbert JP. Efficacy and safety of quinolone-containing rescue therapies after the failure of non-bismuth quadruple treatments for Helicobacter pylori eradication: systematic review and meta-analysis. *Drugs*. 2017 May;77(7):765-776. PubMed

Randomized Controlled Trials

2. Elkhodary NM, Farrag KA, Elokaby AM, El-Hay Omran GA. Efficacy and safety of 7 days versus 10 days triple therapy based on levofloxacin-dexlansoprazole for eradication of Helicobacter pylori: a pilot randomized trial. *Indian J Pharmacol*. 2020 Sep-Oct;52(5):356-364. PubMed
3. Kim TH, Park JM, Cheung DY, Oh JH. Comparison of 7- and 14-day eradication therapy for Helicobacter pylori with first- and second-line regimen: randomized clinical trial. *J Korean Med Sci*. 2020 Feb 10;35(5):e33. PubMed
4. Vilaichone RK, Aumpan N, Ratanachu-Ek T, et al. Efficacy of omeprazole, tetracycline, and 4 times daily dosing of amoxicillin in Helicobacter pylori eradication in limited resource area in Bhutan: a prospective randomized trial (BHUTAN study). *Asian Pac J Cancer Prev*. 2020 Apr 1;21(4):1109-1114. PubMed
5. Hu YM, Luo LL, Hu XP, Xu JM, Zhang L. Levofloxacin-based triple therapy for eradicating Helicobacter pylori and effect of its Drug concentration. *West Indian Med J*. 2017;66(1):137-140.
6. Arama SS, Tiliscan C, Negoita C, et al. Efficacy of 7-day and 14-day triple therapy regimens for the eradication of Helicobacter pylori: a comparative study in a cohort of Romanian patients. *Gastroenterol Res Pract*. 2016;2016:5061640. PubMed
7. Wang J, Zhang G, Hu X, Liu Y, Bao Z, Huang Y. Two-week triple therapy has a higher Helicobacter pylori eradication rate than 1-week therapy: a single-center randomized study. *Saudi J Gastroenterol*. 2015 Nov-Dec;21(6):355-359. PubMed

Guidelines and Recommendations

8. Malfertheiner P, Megraud F, Rokkas T, et al. Management of Helicobacter pylori infection: the Maastricht VI/Florence consensus report. Gut. 2022 Aug 8;gutjnl-2022-327745. PubMed
   Refer to: WG3 Treatment, Statement 5 and 7 (page 15 to 16)
9. Romano M, Gravina AG, Eusebi LH, et al. Management of Helicobacter pylori infection: guidelines of the Italian society of gastroenterology (SIGE) and the Italian society of digestive endoscopy (SIED). *Dig Liver Dis*. 2022 Sep;54(9):1153-1161. PubMed
   Refer to: Statement 11 (page 4), Statement 13 and 15 (page 5), Table 1 (page 6)
10. Jung HK, Kang SJ, Lee YC, et al. Evidence based guidelines for the treatment of Helicobacter pylori infection in Korea 2020. *Korean J Intern Med*. 2021 Jul;36(4):807-838. P.
    Refer to: Statement 4 to 6 (page. 10 to 12); Table 4 (page 20); Figure 10 (page 20)
11. Kato S, Shimizu T, Toyoda S, et al. The updated JSPGHAN guidelines for the management of Helicobacter pylori infection in childhood. *Pediatr Int*. 2020 Dec;62(12):1315-1331. .PubMed
    Refer to: Statement 17-2 (page 11)
12. Chey WD, Leontiadis GI, Howden CW, Moss SF. ACG clinical guideline: treatment of Helicobacter pylori infection. *Am J Gastroenterol*. 2017 Feb;112(2):212-239. .PubMed
    Refer to: Recommendations of Question 3 (page 8 to 9); Table 2 (page 10); Recommendations of Question 8 (page 17); Table 4 (page 21)
13. Jones NL, Koletzko S, Goodman K, et al. Joint ESPGHAN/NASPGHAN guidelines for the management of Helicobacter pylori in children and adolescents (update 2016). *J Pediatr Gastroenterol Nutr*. 2017 Jun;64(6):991-1003. .PubMed
    Refer to: Table 2 (page 4); Recommendation 14 (page 9)
14. Smith S, Boyle B, Brennan D, et al. The Irish Helicobacter pylori Working Group consensus for the diagnosis and treatment of H. pylori infection in adult patients in Ireland. *Eur J Gastroenterol Hepatol*. 2017 May;29(5):552-559. PubMed
    Refer to: Statement 8, 9, 12 (page 4 to 5); Table 1 (page 5); Fig.1 (page 6)
15. Gastro-oesophageal reflux disease and dyspepsia in adults: investigation and management (NICE guideline CG184). London (GB): National Institute for Health and Care Excellence; 2014: https://www.nice.org.uk/guidance/cg184/resources/gastrooesophageal-reflux-disease-and-dyspepsia-in-adults-investigation-and-management-pdf-35109812699845 Accessed 2023 Jan 25.
    Refer to: Recommendation 1.9.4, 1.9.5, 1.9.8 to 1.9.10 (page 17 to 19)

Appendix 1: References of Potential Interest

Systematic Reviews

Unclear Intervention

Munoz N, Sanchez-Delgado J, Baylina M, et al. Systematic review, meta-analysis, and meta-regression: successful second-line treatment for Helicobacter pylori. *Helicobacter*. 2018 Jun;23(3):e12488. PubMed

Non-Randomized Studies

Durazzo M, Ferro A, Fagoonee S, et al. Helicobacter pylori eradication with a clarithromycin-based triple therapy in elderly patients. *Panminerva Med*. 2021 Sep;63(3):332-335. PubMed

Lee JW, Kim SJ, Choi CW, et al. Seven-day triple therapy is sufficient to eradicate infection caused by Helicobacter pylori without 23S rRNA point mutation. *Medicine (Baltimore)*. 2021 May 28;100(21):e26133. .PubMed

Guidelines and Recommendations

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Refer to: Table 1 (page 3 to 4); How do I take CLAMET-PPI? (page 9); How do I take LevoAmox-PPI? (page 11); How do I take RifAmox-PPI? (page 12); How do I take Modified Triple Regimen? (page 14)

Review of Guidelines

Cho JH & Jin SY. Current guidelines for helicobacter pylori treatment in East Asia 2022: differences among China, Japan, and South Korea. *World J Clin Cases*. 2022 Jul 6;10(19):6349-6359. .PubMed
Refer to: Table 1

Review Articles

Suzuki S, Kusano C, Horii T, Ichijima R, Ikehara H. The ideal Helicobacter pylori treatment for the present and the future. *Digestion*. 2022;103(1):62-68. PubMed