

## Додатковий матеріал

### Ультразвукова діагностика (УЗД) шлунково-кишкового тракту при функціональних розладах –консенсусна заява EFSUMB.

#### Gastrointestinal Ultrasound in Functional Disorders of the Gastrointestinal Tract - EFSUMB Consensus Statement

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#### Посилання та допоміжна література до Заяви

Drossman DA. Functional Gastrointestinal Disorders: History, Pathophysiology, Clinical Features and Rome IV". Gastroenterology 2016; 150:1262–1279.

Gilja OH, Hausken T, Ødegaard S, Berstad A. Ultrasonography and three-dimensional methods of the upper gastrointestinal tract. Eur J Gastroenterol Hepatol 2005; 17:277-82.

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#### Функціональні захворювання стравоходу

Chen MH, Kikuchi Y, Chu BC, Kishimoto R, Choji K, Miyasaka K. Demonstration of the distal end of the oesophagus by transabdominal ultrasound. Br J Radiol. 1997 Dec;70(840):1215-21. doi: 10.1259/bjr.70.840.9505839. PMID: 9505839.

Tanomkiat W, Chongchitnan P. Transabdominal sonography of gastroesophageal junctions. J Clin Ultrasound. 1999 Nov-Dec;27(9):505-12. doi: 10.1002/(sici)1097-0096(199911/12)27:93.0.co;2-8. PMID: 10525212.

Wilcox A, Jackson D, Jones J, Thomas S. Bolus Detection in the Proximal Esophagus Using PulseEcho Ultrasound: A Feasibility Study. Otolaryngol Head Neck Surg. 2020 Sep;163(3):569-571. doi: 10.1177/0194599820920835. Epub 2020 May 5. PMID: 32366167.

Zhu SY, Liu RC, Chen LH, Luo F, Yang H, Feng X, Liao XH. Sonographic demonstration of the normal thoracic esophagus. J Clin Ultrasound. 2005 Jan;33(1):29-33. doi: 10.1002/jcu.20083. PMID: 15690445.

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Kacar S, Uysal S, Kuran S, Dagli U, Ozin Y, Karabulut E, Sasmaz N. Transcutaneous cervical esophagus ultrasound in adults: relation with ambulatory 24-h pH-monitoring and esophageal manometry. World J Gastroenterol. 2007 Oct 21;13(39):5245-52. doi: 10.3748/wjg.v13.i39.5245. PMID: 17876896; PMCID: PMC4171307.

## **Розлади ковтання.**

### *Твердження 1*

УЗД ШКТ може використовуватися для дослідження розладів ковтання та в якості додаткового інструменту отримання візуального контролю через зворотній зв'язок під час реабілітації дисфагії [LoE 4; GoR: C].  
Консенсусний рівень згоди: А+ 7/11, А- 4/11 ( 1 утримався).

Перелік термінів [(ultrasound or sonography or ultrasonography) and swallowing and dysphagia] на запит в PubMed з січня 1990 р. по січень 2021 р. дав 3350 статей. Нижче наведено відповідні з них, що цікаві до теми (ті, які включені в рукопис як посилання, виділені жирним курсивом):

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2. Ardakani FE. J Contemp Dent Pract. 2006 Jul 1;7(3):67-74. Evaluation of Swallowing Patterns of the Tongue Using Real-time B-mode Sonography.

**3. Blyth KM, McCabe P, Madill C, Ballard KJ. Ultrasound in dysphagia rehabilitation: a novel approach following partial glossectomy. Disabil Rehabil 2017; 39:2215-2227.**

4. Chen YC, Hsiao MY, Wang YC, Fu CP, Wang TG. Reliability of Ultrasonography in Evaluating Hyoid Bone Movement. J Med Ultrasound. 2017 Apr-Jun;25(2):90-95. doi: 10.1016/j.jmu.2017.01.002. Epub 2017 Feb 16. PMID: 30065466; PMCID: PMC6029310.

5. Cho JG, Byeon HK, Oh KH, Baek SK, Kwon SY, Jung KY, Woo JS. Objective Assessment of Postoperative Swallowing Difficulty Through Ultrasound in Patients Undergoing Thyroidectomy. Dysphagia. 2020 Apr;35(2):253-260. doi: 10.1007/s00455-019-10020-1. Epub 2019 May 24. PMID: 31127378

6. de Wijk RA, Wulfert F, Prinz JF. Oral processing assessed by M-mode ultrasound imaging varies with food attribute. Physiol Behav. 2006 Aug 30;89(1):15-21. doi: 10.1016/j.physbeh.2006.05.021. Epub 2006 Jul 3. PMID: 16820180.

7. Grassi R, Farina R, Floriani I, Amodio F, Romano S. Assessment of fetal swallowing with gray-scale and color Doppler sonography. *AJR Am J Roentgenol.* 2005 Nov;185(5):1322-7. doi: 10.2214/AJR.04.1114.
8. Hsiao MY, Chang YC, Chen WS, Chang HY, Wang TG. Application of ultrasonography in assessing oropharyngeal dysphagia in stroke patients. *Ultrasound Med Biol* 2012; 38:1522-1528.
9. Huang YL, Hsieh SF, Chang YC, Chen HC, Wang TG. Ultrasonographic evaluation of hyoidlarynx approximation in dysphagic stroke patients. *Ultrasound Med Biol.* 2009 Jul;35(7):1103-8. doi: 10.1016/j.ultrasmedbio.2009.02.006. Epub 2009 May 7.
10. Huckabee ML, Macrae P, Lamvik K. Expanding Instrumental Options for Dysphagia Diagnosis and Research: Ultrasound and Manometry. *Folia Phoniatr Logop.* 2015;67(6):269- 84. doi: 10.1159/000444636. Epub 2016 May 3.
11. Kim JH, Kim MS. Lateral pharyngeal wall motion analysis using ultrasonography in stroke patients with dysphagia. *Ultrasound Med Biol.* 2012 Dec;38(12):2058-64. doi: 10.1016/j.ultrasmedbio.2012.07.028. Epub 2012 Oct 11.
12. Kuhl V(1), Eicke BM, Dieterich M, Urban PP. Sonographic analysis of laryngeal elevation during swallowing. *J Neurol.* 2003 Mar;250(3):333-7. doi: 10.1007/s00415-003-1007-2.
13. Kwak HJ, Kim L, Ryu BJ, Kim YH, Park SW, Cho DG, Lee CJ, Ha KW. Influence of Nasogastric Tubes on Swallowing in Stroke Patients: Measuring Hyoid Bone Movement with Ultrasonography. *Ann Rehabil Med.* 2018 Aug;42(4):551-559. doi: 10.5535/arm.2018.42.4.551. Epub 2018 Aug 31. PMID: 30180524; PMCID: PMC6129699.
- 14. Lee YS, Lee KE, Kang Y, Yi TI, Kim JS. Usefulness of Submental Ultrasonographic Evaluation for Dysphagia Patients. *Ann Rehabil Med.* 2016 Apr;40(2):197-205. doi: 10.5535/arm.2016.40.2.197. Epub 2016 Apr 25.**
15. Macrae PR(1), Doeltgen SH, Jones RD, Huckabee ML. Intra- and inter-rater reliability for analysis of hyoid displacement measured with sonography. *J Clin Ultrasound.* 2012 Feb;40(2):74-8. doi: 10.1002/jcu.20874. Epub 2011 Sep 26.
16. Manabe N, Haruma K, Nakato R, Kusunoki H, Kamada T, Hata J. New ultrasonographic screening method for oropharyngeal dysphagia: tissue Doppler imaging. *Am J Physiol Gastrointest Liver Physiol.* 2018 Jan 1;314(1): G32-G38. doi: 10.1152/ajpgi.00019.2017. Epub 2017 Sep 1. PMID: 28864498.
17. Matsuo T, Matsuyama M, Nakatani K, Mori N. Evaluation of swallowing movement using ultrasonography. *Radiol Phys Technol.* 2020 Mar;13(1):62-68. doi: 10.1007/s12194-019- 00547-1. Epub 2019 Nov 30. PMID: 31786806.
18. Miller JL, Watkin KL. Lateral pharyngeal wall motion during swallowing using real time ultrasound. *Dysphagia.* 1997 Summer;12(3):125-32. doi: 10.1007/PL00009526.
19. Miura Y, Nakagami G, Yabunaka K, Tohara H, Noguchi H, Mori T, Sanada H. A Randomized Controlled Trial to Investigate the Effectiveness of the Prevention of Aspiration Pneumonia Using Recommendations for Swallowing Care Guided by Ultrasound Examination. *Healthcare*

(Basel). 2018 Feb 12;6(1):15. doi: 10.3390/healthcare6010015. PMID: 29439537; PMCID: PMC5872222.

20. Morinière S, Hammoudi K, Marmouset F, Bakhos D, Beutter P, Patat F. Ultrasound analysis of the upper esophageal sphincter during swallowing in the healthy subject. *Eur Ann Otorhinolaryngol Head Neck Dis.* 2013 Dec;130(6):321-5. doi: 10.1016/j.anorl.2012.01.008. Epub 2013 Jul 9.

21. Nakamori M, Hosomi N, Takaki S, Oda M, Hiraoka A, Yoshikawa M, Matsushima H, Ochi K, Tsuga K, Maruyama H, Izumi Y, Matsumoto M. Tongue thickness evaluation using ultrasonography can predict swallowing function in amyotrophic lateral sclerosis patients. *Clin Neurophysiol.* 2016 Feb;127(2):1669-1674. doi: 10.1016/j.clinph.2015.07.032. Epub 2015 Aug 21.

22. Ogawa N, Mori T, Fujishima I, Wakabayashi H, Itoda M, Kunieda K, Shigematsu T, Nishioka S, Tohara H, Yamada M, Ogawa S. Ultrasonography to Measure Swallowing Muscle Mass and Quality in Older Patients With Sarcopenic Dysphagia. *J Am Med Dir Assoc.* 2018 Jun;19(6):516-522. doi: 10.1016/j.jamda.2017.11.007. Epub 2017 Dec 26. PMID: 29287693.

23. Ohkubo M, Scobbie JM. Tongue Shape Dynamics in Swallowing Using Sagittal Ultrasound. *Dysphagia.* 2019 Feb;34(1):112-118. doi: 10.1007/s00455-018-9921-8. Epub 2018 Jun 28. PMID: 29955953.

24. Peng CL, Jost-Brinkmann PG, Yoshida N, Miethke RR, Lin CT. Differential diagnosis between infantile and mature swallowing with ultrasonography. *Eur J Orthod.* 2003 Oct;25(5):451-6. doi: 10.1093/ejo/25.5.451.

25. Sonies BC, Wang C, Sapper DJ. Evaluation of normal and abnormal hyoid bone movement during swallowing by use of ultrasound duplex-Doppler imaging. *Ultrasound Med Biol.* 1996;22(9):1169-75. doi: 10.1016/s0301-5629(96)00158-5.

26. Steele C, Sasse C, Bressmann T. Tongue-pressure and hyoid movement timing in healthy liquid swallowing. *Int J Lang Commun Disord.* 2012 Jan-Feb;47(1):77-83. doi: 10.1111/j.1460-6984.2011.00082.x. Epub 2011 Oct 5. PMID: 22268903; PMCID: PMC4319712.

27. Tamburrini S(1), Solazzo A, Sagnelli A, Del Vecchio L, Reginelli A, Monsorrò M, Grassi R. Amyotrophic lateral sclerosis: sonographic evaluation of dysphagia. *Radiol Med.* 2010 Aug;115(5):784-93. doi: 10.1007/s11547-010-0523-2. Epub 2010 Feb 19.

28. Tomii Y, Matsuoka H, Torii T, Uehara T, Toyoda K, Minematsu K. A new ultrasound method for evaluating dysphagia in acute stroke patients. *Int J Stroke.* 2011 Jun;6(3):279-80. doi: 10.1111/j.1747-4949.2011.00603.x.

29. Van Den Engel-Hoek L, Lagarde M, Van Alfen N. Ultrasound of oral and masticatory muscles: Why every neuromuscular swallow team should have an ultrasound machine. *Clin Anat.* 2017 Mar;30(2):183-193. doi: 10.1002/ca.22818. Epub 2017 Jan 24.

30. Winiker K, Burnip E, Gozdzikowska K, Guiu Hernandez E, Hammond R, Macrae P, Huckabee ML. Ultrasound: Validity of a Pocket-Sized System in the Assessment of Swallowing. *Dysphagia.* 2021 Jan 2:1-9.

31. Yamaguchi K, Hara K, Nakagawa K, Yoshimi K, Ariya C, Nakane A, Furuya J, Tohara H. Ultrasonography Shows Age-related Changes and Related Factors in the Tongue and Suprahyoid Muscles. *J Am Med Dir Assoc*. 2020 Nov 15:S1525-8610(20)30888-4. doi: 10.1016/j.jamda.2020.10.012. Epub ahead of print. PMID: 33229307.

## Інші захворювання стравоходу

### Твердження 2

Ультразвук може бути додатковим діагностичним методом в оцінці функціональних порушень стравоходу і не може замінити ендоскопію, рН-метрію та манометрію високої розрізняючої здатності [LoE 4; GoR: C].  
Консенсусний рівень згоди : A+ 9/12, A- 3/12.

### Твердження 3

Специфічні морфологічні і функціональні сонографічні знахідки можуть стати приводом для діагностування хвороб стравоходу у випадках, коли ультразвук потрібний для пацієнтів зі стравохідними симптомами [LoE 5: GoR: C].  
Консенсусний рівень згоди : A+ 6/12, A- 6/12.

## Дивертикул Ценкера.

На запит для пошуку [(ultrasound or sonography) and Zenker's diverticulum] на PubMed з січня 1990 по січень 2021, отримано 220 статей. Нижче повідомляється про відповідні теми, що викликають інтерес (ті, що включені як посилання до рукопису, показані жирним курсивом):

- 1. Achille G, Castellana M, Russo S, Montepara M, Giagulli VA, Triggiani V. Zenker Diverticulum: A Potential Pitfall in Thyroid Ultrasound Evaluation: A Case Report and Systematic Review of Literature. *Endocr Metab Immune Disord Drug Targets* 2019; 19:95- 99.**
2. Alessandrini S, Samperi I, De Cristofaro F, D'Armiento E, Diacinti D, Pernazza A, Bosco D, et al. Zenker diverticulum in the right side of the neck resembling a thyroid mass at ultrasound. *J Biol Regul Homeost Agents* 2016;30:1229-1234.
3. Chen HC, Chang KM, Su WK. Incidental pharyngoesophageal diverticulum mistaken for a thyroid nodule: Report of two cases. *Diagn Cytopathol*. 2019 May;47(5):503-506. doi: 10.1002/dc.24144. Epub 2019 Jan 10. PMID: 30632292.
- 4. Cui XW, Ignee A, Baum U, Dietrich CF. Feasibility and usefulness of using swallow contrast-enhanced ultrasound to diagnose Zenker's diverticulum: preliminary results. 4 Maconi G et al. *Gastrointestinal Ultrasound in Functional ... Ultrasound Int Open* 2021; 7 | © 2021. The Author(s). *Ultrasound Med Biol* 2015; 41:975-81.**

5. Huang HJ, Chen R, Sheng JG, Cao KK, Zhao JQ. Characteristic analysis of Zenker's diverticulum incidentally detected on multimodal neck ultrasound. *J Med Ultrason* (2001). 2020 Apr;47(2):279-285. doi: 10.1007/s10396-019-00992-w. Epub 2019 Dec 17. PMID: 31848772.
6. Komatsu M, Komatsu T, Inove K. Ultrasonography of Zenker's diverticulum: special reference to differential diagnosis from thyroid nodules. *Eur J Ultrasound*. 2000 May;11(2):123-5. doi: 10.1016/s0929-8266(00)00075-6. PMID: 10781660.
7. Kwak JY, Kim EK. Sonographic findings of Zenker diverticula. *J Ultrasound Med*. 2006 May;25(5):639-42. doi: 10.7863/jum.2006.25.5.639. PMID: 16632788.
8. Li B, Zheng XY, Feng LZ. [One case of Zenker's diverticulum misdiagnosed as thyroid nodules on ultrasonography]. *Zhonghua Er Bi Yan Hou Tou Jing Wai Ke Za Zhi* 2012;47:770-771.
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10. Marcy PY, Benisvy D, Poissonnet G, Sadoul JL, Thariat J. Zenker's diverticulum: the diagnostic power of ultrasound. *Thyroid*. 2010 Nov;20(11):1317-8. doi: 10.1089/thy.2010.0140. Epub 2010 Oct 9. PMID: 20932178.
11. Navez M, Bosschaert P, Degols JC. A Symptomatic Killian-Jamieson Diverticulum Detected by Ultrasonography. *J Belg Soc Radiol*. 2015 Dec 30;99(2):74-75. doi: 10.5334/jbr-btr.877. PMID: 30039111; PMCID: PMC6032624.
12. Singaporewalla RM, Mukherjee JJ, Thamboo TP, Cheah WK. Pharyngoesophageal diverticulum resembling a thyroid nodule on ultrasound. *Head Neck* 2011;33:1800-1803.
13. Wang Y, Song Y. Sonographic characteristics of pharyngoesophageal diverticula: Report of 14 cases and review of the literature. *J Clin Ultrasound* 2016; 44:333-8.

## **Склеродермія.**

На запит для пошуку [(ultrasound or sonography or ultrasonography) and (scleroderma or (systemic sclerosis)) and esophagus] на PubMed від січня 1990 р. до січня 2021 р. було опубліковано 109 статей. Доречні теми, що представляють інтерес, наведені нижче (ті, що включені як посилання до рукопису, показані жирним курсивом):

**1. Takebayashi S, Matsui K, Ozawa Y, Nozawa T, Fujioka E. Cervical esophageal motility: evaluation with US in progressive systemic sclerosis. *Radiology* 1991; 179:389-93.**

**2. Zuber-Jerger I, Müller A, Kullmann F, Gelbmann CM, Endlicher E, Müller-Ladner U, Fleck M. Gastrointestinal manifestation of systemic sclerosis--thickening of the upper gastrointestinal wall detected by endoscopic ultrasound is a valid sign. *Rheumatology (Oxford)*. 2010 Feb;49(2):368-72.**

## **Комок (глобус).**

На запит для пошуку [(ultrasound or sonography) and ((globus pharyngeus) or globus hystericus)] на PubMed, з січня 1990 р. до січня 2021 р. видано 76 статей. Ті, що представляють інтерес, наведені нижче (ті, що включені як посилання до рукопису, показані жирним курсивом):

**1. Eskander A, Monteiro E, O'Connell D, Taylor SM; Canadian Association of Head and Neck Surgical Oncology (CAHNSO). Head and Neck Surgical Oncology Choosing Wisely Campaign: imaging for patients with hoarseness, fine needle aspiration for neck mass, and ultrasound for odynophagia. J Otolaryngol Head Neck Surg 2018; 47:2.**

**2. Järvenpää P, Ilmarinen T, Geneid A, et al. Work-up of globus: assessing the benefits of 5 Maconi G et al. Gastrointestinal Ultrasound in Functional ... Ultrasound Int Open 2021; 7 | © 2021. The Author(s). Review neck ultrasound and video fluorography. Eur Arch Otorhinolaryngol 2017; 274:931-937.**

3. Marshall JN, McGann G, Cook JA, Taub N. A prospective controlled study of high-resolution thyroid ultrasound in patients with globus pharyngeus. Clin Otolaryngol Allied Sci 1996; 21:228-31.

**4. Nam IC, Choi H, Kim ES, Mo EY, Park YH, Sun DI. Characteristics of thyroid nodules causing globus symptoms. Eur Arch Otorhinolaryngol. 2015 May;272(5):1181-8.**

5. Penovid S, Roje Ž, Brdar D, Gračan S, Bubid A, Vela J, Punda A. Globus Pharyngeus: A Symptom of Increased Thyroid or Laryngopharyngeal Reflux? Acta Clin Croat. 2018 Mar;57(1):110-115.

## **Ахалазія.**

На запит для пошуку [(ultrasound or sonography or ultrasonography) and achalasia] на PubMed, з січня 1990 р. до січня 2021 року було опубліковано 890 статей. Ті, що представляють інтерес, наведені нижче (ті, що включені як посилання до рукопису, показані жирним курсивом):

**1. Eckardt VF, Schmitt T, Kanzler G. Transabdominal ultrasonography in achalasia. Scand J Gastroenterol. 2004 Jul;39(7):634-7. doi:10.1080/00365520410005478. PMID: 15370683.**

2. Iacob D, Fufezan O, Farcau D, Hagau N, Ciuce C. Clinical and ultrasound approach to achalasia in a child. Case report. Med Ultrason 2010; 12: 66-70.

3. Sezgin O, Ulker A, Temuçin G. Sonographic findings in achalasia. J Clin Ultrasound. 2001 Jan;29(1):31- 40. doi: 10.1002/1097-0096(200101)29:13.0.co;2-i. PMID: 11180182.

4. Spence LD, Fitzgerald E. Case report: transabdominal ultrasound detection of achalasia. Clin Radiol 1996; 51: 297-298. 5. Tanomkiat W, Chongchitnan P. Transabdominal sonography of gastroesophageal junctions. J Clin Ultrasound. 1999 Nov-Dec;27(9):505-12. doi: 10.1002/(sici)1097-0096(199911/12)27:93.0.co;2-8. PMID: 10525212.

## **Гастроэзофагеальна рефлюксна хвороба ( ГЕРХ).**

На запит для пошуку (ultrasound [Title] OR sonography) [Title] AND ((gastroesophageal reflux disease) [Title]) на PubMed з січня 1990 р. до січня 2021 р. було опубліковано 1597 статей.

Ті, що представляють інтерес, наведені нижче (ті, що включені як посилання до рукопису, показані жирним курсивом):

1. Dehdashti H, Dehdashtian M, Rahim F, Payvasteh M. Sonographic measurement of abdominal esophageal length as a diagnostic tool in gastroesophageal reflux disease in infants. Saudi J Gastroenterol. 2011 Jan-Feb;17(1):53-7. doi: 10.4103/1319-3767.74483. PMID: 21196654; PMCID: PMC3099082.
2. Elbl B, Birkenfeld B, Walecka A, Szymanowicz J, Listewnik M, Gwardyś A, Urasioski T. Upper gastrointestinal tract scintigraphy and ultrasonography in diagnosis of gastroesophageal reflux in children. Pol J Radiol. 2011 Jan;76(1):63-7. PMID: 22802818; PMCID: PMC3389908.
3. Farina R, Pennisi F, La Rosa M, Puglisi C, Mazzone G, Riva G, Foti PV, Ettore GC. Contrastenhanced colour-Doppler sonography versus pH-metry in the diagnosis of gastroesophageal reflux in children. Radiol Med. 2008 Jun;113(4):591-8. English, Italian. doi: 10.1007/s11547-008-0267-4. Epub 2008 May 13. PMID: 18478190.
4. Gomes H, Menanteau B. Gastro-esophageal reflux: comparative study between sonography and pH monitoring. Pediatr Radiol. 1991;21(3):168-74. doi: 10.1007/BF02011038. PMID: 2047151.
5. Halkiewicz F, Kasner J, Karczewska K, Rusek-Zychma M. Ultrasound picture of 6 Maconi G et al. Gastrointestinal Ultrasound in Functional ... Ultrasound Int Open 2021; 7 | © 2021. The Author(s). gastroesophageal junction in children with reflux disease. Med Sci Monit. 2000 JanFeb;6(1):96-9. PMID: 11208292.
6. Hirsch W, Kedar R, Preiss U. Color doppler in the diagnosis of the gastroesophageal reflux in children: comparison with pH measurements and B-mode ultrasound. Pediatr Radiol. 1996;26(3):232-5. doi: 10.1007/BF01405307. PMID: 8599017.
7. Jang HS, Lee JS, Lim GY, Choi BG, Choi GH, Park SH. Correlation of color Doppler sonographic findings with pH measurements in gastroesophageal reflux in children. J Clin Ultrasound. 2001 May;29(4):212-7. doi: 10.1002/jcu.1022. PMID: 11323775.
8. Kacar S, Uysal S, Kuran S, Dagli U, Ozin Y, Karabulut E, Sasmaz N. Transcutaneous cervical esophagus ultrasound in adults: relation with ambulatory 24-h pH-monitoring and esophageal manometry. World J Gastroenterol 2007; 13:5245-5252.

9. Karabulut B, Bostanci I, Kacar M, Karaca G, Kosar P. Transcutaneous cervical and transabdominal ultrasonography as a diagnostic tool in gastroesophageal reflux in childhood. *ORL J Otorhinolaryngol Relat Spec.* 2010;72(6):300-4. doi: 10.1159/000319900. Epub 2010 Sep 14. PMID: 20838067.
10. Khatami A, Allameh MM, Shahnazi M, Kiumarsi A, Tajik A. A comparison between gastroesophagheal ultrasonography vs. barium swallow in determining the pattern of gastroesophageal reflux in a pediatric population. *Med Ultrason.* 2015 Mar;17(1):22-7. doi: 10.11152/mu.2013.2066.171.akh. PMID: 25745653.
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### **Кила стравохідного отвору діафрагми.**

На запит для пошуку [(ultrasound or sonography) and (hiatal or sliding) hernia] на PubMed, з січня 1990 по січень 2021, отримано 967 статей. Нижче повідомляється про відповідні теми, що викликають інтерес (ті, що включені як посилання до рукопису, показані жирним курсивом):

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## Диспепсія і інші функціональні гастродуодентальні розлади.

### Твердження 4

Ультразвук може бути використаний для вивчення скорочень шлунку і може застосовуватися для оцінки дискінезії шлунку у пацієнтів з диспепсією [LoE 3; GoR4]. Консенсусний рівень згоди : A+ 9/12, A- 2/12, I 1/12.

### Твердження 6

Ультразвук може використовуватися для оцінки спорожнення шлунку у пацієнтів з ФД, гастропарезом, і інших станів, в яких підозрюється затримка спорожнення шлунку [LoE 3, GoR 4]. Консенсусний рівень впевненості : A+ 11/12, A- 1/12.

## Скоротливість дистального відділу шлунку.

На запит для [(ultrasound OR sonography) AND ((gastric contractility) or peristalsis))] на PubMed, від 3 січня 1990 року по січень 2021 року було опубліковано 1023 статті. Ті, що представляють інтерес, наведені нижче (ті, що включені як посилання у рукописі, показані жирним курсивом):

### Спорожнення шлунку.

На запит для [(ultrasound OR sonography) AND (gastric emptying)] на PubMed, з січня 1990 по січень 2021, отримано 1606 статей. Нижче повідомляється про відповідні теми, що викликають інтерес (ті, що включено як посилання до рукопису виділені жирним курсивом):

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## Транспілоричний потік

### Твердження 7

Ультразвук з та без доплерівського методу може використовуватися для візуалізації і розрахунку транспілоричного потоку в руках експерта. [LoE 4; GoR 4]. Консенсусний рівень згоди : A+ 9/12, A- 3/12.

На запит для [(ultrasound OR sonography) AND (transpyloric flow)] на PubMed, з січня 1990 року по січень 2021, дав 19 статей. Нижче наведено відповідні з них, що цікаві для теми (ті, які включені в рукопис як посилання, виділені жирним курсивом):

1. Berstad A, Hausken T, Gilja OH, Thune N, Matre K, Odegaard S. Volume measurements of gastric antrum by 3-D ultrasonography and flow measurements through the pylorus by duplex technique. *Dig Dis Sci.* 1994 Dec;39(12 Suppl):97S-100S. doi: 10.1007/BF02300383. PMID: 7995227.

**2. Hausken T, Gilja OH, Odegaard S, Berstad A. Flow across the human pylorus soon after ingestion of food, studied with duplex sonography. Effect of glyceryl trinitrate. *Scand J Gastroenterol.* 1998 May;33(5):484-90. doi: 10.1080/00365529850172034. PMID: 9648986.**

3. Jones KL, O'Donovan D, Horowitz M, Russo A, Lei Y, Hausken T. Effects of posture on gastric emptying, transpyloric flow, and hunger after a glucose drink in healthy humans. *Dig Dis Sci.* 2006 Aug;51(8):1331-8. doi: 10.1007/s10620-005-9010-3. Epub 2006 Jul 13. PMID: 16838120.

4. Pallotta N, Cicala M, Frandina C, Corazzari E. Antro-pyloric contractile patterns and transpyloric flow after meal ingestion in humans. *Am J Gastroenterol.* 1998 Dec;93(12):2513-22. doi: 10.1111/j.1572-0241.1998.00598.x. PMID: 9860417.

5. Portincasa P, Colecchia A, Di Ciaula A, Larocca A, Muraca M, Palasciano G, Roda E, Festi D. Standards for diagnosis of gastrointestinal motility disorders. Section: ultrasonography. A position statement from the Gruppo Italiano di Studio Motilità Apparato Digerente. *Dig Liver Dis.* 2000 Mar;32(2):160-72. doi: 10.1016/s1590-8658(00)80404-1. PMID: 10975792.

6. Vingerhagen S, Hausken T, Gilja OH, Berstad A. Influence of a 5HT1 receptor agonist on gastric accommodation and initial transpyloric flow in healthy subjects. *Neurogastroenterol Motil.* 2000 Feb;12(1):95-101. doi: 10.1046/j.1365-2982.2000.00184.x. PMID: 10652116.

## Акомодація проксимального відділу шлунку та УЗ тест акомодатії до їжі

### Твердження 8

Ультразвук може бути використаним для неінвазивної оцінки акомодатції шлунку до рідкої їжі [LoE 3, GoR 4]. Консенсусний рівень згоди: A+ 8/11, A- 3/11 ( 1 утримався).

#### *Твердження 10*

Стандартизований ультразвуковий тест акомодатції до їжі може характеризувати порушення рухливості шлунку у пацієнтів з ФД [LoE 4; GoR4]. Консенсусний рівень згоди: A+ 10/11, A- 1/11 ( 1 утримався).

На запит для [(ultrasound OR sonography) AND ((gastric or stomach) accommodation)] на PubMed, з січня 1990 р. по січень 2021 р. опубліковано 108 статей. Доречні за темою, що цікаві зазначено нижче (ті, які включені як посилання в рукописі, показані жирним курсивом):

1. Ahmed AB, Matre K, Hausken T, Gregersen H, Gilja OH. Rome III subgroups of functional dyspepsia exhibit different characteristics of antral contractions measured by strain rate imaging - a pilot study. *Ultraschall Med.* 2012 Dec;33(7):E233-E240. doi: 10.1055/s-0032-1313073. Epub 2012 Dec 17. PMID: 23247728.

2. Ang D. Measurement of gastric accommodation: a reappraisal of conventional and emerging modalities. *Neurogastroenterol Motil.* 2011 Apr;23(4):287-91. doi: 10.1111/j.1365-2982.2011.01690.x. PMID: 21624107.

3. Buisman WJ, van Herwaarden-Lindeboom MY, Mauritz FA, El Ouamari M, Hausken T, Olafsdottir EJ, van der Zee DC, Gilja OH. Validation of a Novel 3-Dimensional Sonographic Method for Assessing Gastric Accommodation in Healthy Adults. *J Ultrasound Med.* 2016 Jul;35(7):1411-8. doi: 10.7863/ultra.15.04086. Epub 2016 May 20. PMID: 27208194.

4. Fan XP, Wang L, Zhu Q, Ma T, Xia CX, Zhou YJ. Sonographic evaluation of proximal gastric accommodation in patients with functional dyspepsia. *World J Gastroenterol.* 2013 Aug 7;19(29):4774-80. doi: 10.3748/wjg.v19.i29.4774. PMID: 23922476; PMCID: PMC3732851.

5. Gilja OH, Hausken T, Odegaard S, Lunding J, Berstad A. Gastric accommodation and ultrasonography. *Neurogastroenterol Motil.* 2005 Feb;17(1):155; author reply 155-6. doi: 10.1111/j.1365-2982.2005.00624.x. PMID: 15670276.

**6. Gilja OH, Hausken T, Wilhelmsen I, Berstad A. Impaired accommodation of proximal stomach to a meal in functional dyspepsia. *Dig Dis Sci.* 1996; 41:689-96.**

**7. Gilja OH, Lunding J, Hausken T, Gregersen H. Gastric accommodation assessed by ultrasonography. *World J Gastroenterol.* 2006 May 14;12(18):2825-9. doi: 10.3748/wjg.v12.i18.2825. PMID: 16718805; PMCID: PMC4087797.**

8. Hasuo H, Kusunoki H, Kanbara K, Abe T, Yunoki N, Haruma K, Fukunaga M. Tolerable pain reduces gastric fundal accommodation and gastric motility in healthy subjects: a crossover ultrasonographic study. *Biopsychosoc Med.* 2017 Feb 1;11:4. doi: 10.1186/s13030-017-0089-5. PMID: 28163776; PMCID: PMC5286732.

9. Iovino P, Santonicola A, Ciacci C. Assessment of proximal gastric accommodation in patients with functional dyspepsia. *World J Gastroenterol*. 2013 Dec 21;19(47):9137-8. doi: 10.3748/wjg.v19.i47.9137. PMID: 24379642; PMCID: PMC3870570.
10. Kato M, Nishida U, Nishida M, Hata T, Asaka R, Haneda M, Yamamoto K, Imai A, Yoshida T, Ono S, Shimizu Y, Asaka M. Pathophysiological classification of functional dyspepsia using a novel drinking-ultrasonography test. *Digestion*. 2010;82(3):162-6. doi: 10.1159/000308363. Epub 2010 Jun 25. PMID: 20588028.
11. Kugler T. The Usefulness of Water-drinking Ultrasonography Combined Test for Evaluating Patients with Functional Dyspepsia. *Korean J Gastroenterol*. 2015 Aug;66(2):92-7. doi: 10.4166/kjg.2015.66.2.92. PMID: 26289242.
12. Kusunoki H, Haruma K, Hata J, Kamada T, Ishii M, Yamashita N, Inoue K, Imamura H, Maconi G et al. Gastrointestinal Ultrasound in Functional ... *Ultrasound Int Open* 2021; 7 | © 2021. The Author(s). Review Manabe N, Shiotani A. Efficacy of mosapride citrate in proximal gastric accommodation and gastrointestinal motility in healthy volunteers: a double-blind placebo-controlled ultrasonographic study. *J Gastroenterol*. 2010 Dec;45(12):1228-34. doi: 10.1007/s00535-010-0292-7. Epub 2010 Jul 24. PMID: 20658155.
13. Kusunoki H, Haruma K, Manabe N, Imamura H, Kamada T, Shiotani A, Hata J, Sugioka H, Saito Y, Kato H, Tack J. Therapeutic efficacy of acotiamide in patients with functional dyspepsia based on enhanced postprandial gastric accommodation and emptying: randomized controlled study evaluation by real-time ultrasonography. *Neurogastroenterol Motil*. 2012 Jun;24(6):540-5, e250-1. doi: 10.1111/j.1365-2982.2012.01897.x. Epub 2012 Mar 4. PMID: 22385472.
14. Mundt MW, Hausken T, Smout AJ, Samsom M. Relationships between gastric accommodation and gastrointestinal sensations in healthy volunteers. A study using the barostat technique and two- and three-dimensional ultrasonography. *Dig Dis Sci*. 2005 Sep;50(9):1654-60. doi: 10.1007/s10620-005-2911-3. PMID: 16133965.
- 15. Steinsvik EK, Hausken T, Gilja OH. The ultrasound meal accommodation test in 509 patients with functional gastrointestinal disorders. *Scand J Gastroenterol*. 2016 Jul;51(7):788-94. doi: 10.3109/00365521.2016.1153138. Epub 2016 Mar 8. PMID: 26953788.**
- 16. Steinsvik EK, Valeur J, Hausken T, Gilja OH. Postprandial Symptoms in Patients With Functional Dyspepsia and Irritable Bowel Syndrome: Relations to Ultrasound Measurements and Psychological Factors. *J Neurogastroenterol Motil*. 2020 Jan 30;26(1):96-105. doi: 10.5056/jnm19072. PMID: 31917915; PMCID: PMC6955182.**
- 17. Storlid EL, Hausken T, Lied GA, Gilja OH, Hatlebakk JG. Gastric accommodation in healthy subjects studied by ultrasound, manometry, and impedancemetry. *Neurogastroenterol Motil*. 2018 Apr;30(4):e13249. doi: 10.1111/nmo.13249. Epub 2017 Nov 9. PMID: 29119636.**
18. Tefera S, Gilja OH, Hatlebakk JG, Berstad A. Gastric accommodation studied by ultrasonography in patients with reflux esophagitis. *Dig Dis Sci*. 2001 Mar;46(3):618-25. doi: 10.1023/a:1005619803917. PMID: 11318542.

19. Undeland KA, Hausken T, Gilja OH, Aanderud S, Berstad A. Gastric meal accommodation and symptoms in diabetes. A placebo-controlled study of glyceryl trinitrate. Eur J Gastroenterol Hepatol. 1998 Aug;10(8):677-81. PMID: 9744697.

## Об'єм шлунку і 3D ультразвук.

### Твердження 9

3D ультразвук можливо використовувати для точної оцінки внутрішньошлункових об'ємів та інтрагастального розподілу їжі [LoE 3, GoR 4]. Консенсусний рівень згоди : A+ 6/11, A- 5/12 ( 1 утримався).

На запит для [(ultrasound OR sonography) AND ((gastric or stomach) volume) AND 3D] на PubMed, з січня 1990 р. по січень 2021 р. опубліковано 126 статей. Доречні за темою, що цікавлять зазначено нижче (ті, які включені як посилання в рукописі, показані жирним курсивом):

1. Buisman WJ, Mauritz FA, Westerhuis WE, Gilja OH, van der Zee DC, van HerwaardenLindeboom MY. Evaluation of Gastric Volumes: Comparison of 3-D Ultrasound and Magnetic Resonance Imaging. Ultrasound Med Biol. 2016 Jul;42(7):1423-30. doi: 16 Maconi G et al. Gastrointestinal Ultrasound in Functional ... Ultrasound Int Open 2021; 7 | © 2021. The Author(s). 10.1016/j.ultrasmedbio.2016.01.031. Epub 2016 Apr 8. PMID: 27067418.

2. Buisman WJ, van Herwaarden-Lindeboom MY, Mauritz FA, El Ouamari M, Hausken T, Olafsdottir EJ, van der Zee DC, Gilja OH. Validation of a Novel 3-Dimensional Sonographic Method for Assessing Gastric Accommodation in Healthy Adults. J Ultrasound Med. 2016 Jul;35(7):1411-8. doi: 10.7863/ultra.15.04086. Epub 2016 May 20. PMID: 27208194.

3. Gentilcore D, Hausken T, Horowitz M, Jones KL. Measurements of gastric emptying of low- and high-nutrient liquids using 3D ultrasonography and scintigraphy in healthy subjects. Neurogastroenterol Motil. 2006 Dec;18(12):1062-8. doi: 10.1111/j.1365- 2982.2006.00830.x. PMID: 17109689.

**4. Gilja OH, Thune N, Matre K, Hausken T, Odegaard S, Berstad A. In vitro evaluation of three-dimensional ultrasonography in volume estimation of abdominal organs. Ultrasound Med Biol 1994; 20:157-65.**

**5. Gilja OH, Detmer PR, Jong JM, Leotta DF, Li XN, Beach KW, Martin R, Strandness DE Jr. Intra-gastric distribution and gastric emptying assessed by three-dimensional ultrasonography. Gastroenterology. 1997 Jul;113(1):38-49. doi: 10.1016/s0016-5085(97)70078-7. PMID: 9207260.**

6. Gilja OH, Hausken T, Berstad A, Odegaard S. Measurements of organ volume by ultrasonography. Proc Inst Mech Eng H. 1999;213(3):247-59. doi: 10.1243/0954411991534951. PMID: 10420778.

7. Kim DY, Jung HK, Lee YH, Jung SA, Moon IW, Paek JY. [The measurement of gastric emptying time with 3-D ultrasonography]. Korean J Gastroenterol. 2004 Aug;44(2):71-6. Korean. PMID: 15329517.
8. Manini ML, Burton DD, Meixner DD, Eckert DJ, Callstrom M, Schmit G, El-Youssef M, Camilleri M. Feasibility and application of 3-dimensional ultrasound for measurement of gastric volumes in healthy adults and adolescents. J Pediatr Gastroenterol Nutr. 2009 Mar;48(3):287-93. doi: 10.1097/mpg.0b013e318189694f. PMID: 19274782; PMCID: PMC2654599.
9. Mundt MW, Hausken T, Smout AJ, Samsom M. Relationships between gastric accommodation and gastrointestinal sensations in healthy volunteers. A study using the barostat technique and two- and three-dimensional ultrasonography. Dig Dis Sci. 2005 Sep;50(9):1654-60. doi: 10.1007/s10620-005-2911-3. PMID: 16133965.
10. Olafsdottir E, Gilja OH, Tefera S, Fluge G, Berstad A. Intragastric maldistribution of a liquid meal in children with recurrent abdominal pain assessed by three-dimensional ultrasonography. Scand J Gastroenterol. 2003 Aug;38(8):819-25. doi: 10.1080/00365520310003480. PMID: 12940433.
11. Scheffer RC, Gooszen HG, Wassenaar EB, Samsom M. Relationship between partial gastric volumes and dyspeptic symptoms in fundoplication patients: a 3D ultrasonographic study. Am J Gastroenterol. 2004 Oct;99(10):1902-9. doi: 10.1111/j.1572-0241.2004.40248.x. PMID: 15447748.
12. van Lelyveld N, Scheffer R, Mundt M, Samsom M. Partial gastric volumes and upper abdominal sensations in functional dyspeptic and GERD patients: a 3D ultrasonographic study. Am J Gastroenterol. 2006 Aug;101(8):1845-52. doi: 10.1111/j.1572-0241.2006.00620.x. Epub 2006 Jun 16. PMID: 16780560.

## **Функціональні порушення тонкої кишки і товстої кишки.**

### *Твердження 11*

Специфічні риси УЗД ШКТ для СПК не визначені, але використання УЗД ШКТ у пацієнтів з симптомами схожими на СПК можуть бути цінними для виокремлення цього стану від органічних захворювань [LoE 4; GoR 4].

Консенсусний рівень згоди : A+ 11/12, A- 1/12.

### **Синдром подразненого кишечника (СПК).**

На запит для [(ultrasound OR sonography) AND ((irritable bowel syndrome) or IBS)] на PubMed, від 3 січня 1990 року по січень 2021 року надано 749 статей. Повідомляються відповідні, що цікаві за темою, нижче (посилання в рукописі показано жирним курсивом):

### **Синдром надлишкового бактеріального росту у тонкій кишці.**

На запит для [(ultrasound or sonography or ultrasonography) and (small intestinal bacterial overgrowth)] на PubMed з січня 1990 року по січень 2021 року надано 60 статей. Відповідні за темою, що цікавить, описані нижче (показані ті, що включені в рукопис як посилання жирним курсивом):

## **Синдром сімейної діареї, що спричинений активацією мутації GUCY2C.**

Запит для [(ultrasound or sonography or ultrasonography) and (small intestinal bacterial overgrowth)] на PubMed, з січня 1990 року по січень 2021 року, дав 5 статей. Відповідні за темою, що цікавить, наведені нижче (ті, які включені як посилання в рукописі, показані жирним курсивом):

1. Astegiano M, Bresso F, Cammarota T, Sarno A, Robotti D, Demarchi B, Sostegni R, Macchiarella V, Pera A, Rizzetto M. Abdominal pain and bowel dysfunction: diagnostic role of intestinal ultrasound. *Eur J Gastroenterol Hepatol.* 2001 Aug;13(8):927-31. doi: 10.1097/00042737-200108000-00009. PMID: 11507357.
2. Bellini M, Tosetti C, Costa F, Biagi S, Stasi C, Del Punta A, Monicelli P, Mumolo MG, Ricchiuti A, Bruzzi P, Marchi S. The general practitioner's approach to irritable bowel syndrome: from intention to practice. *Dig Liver Dis.* 2005 Dec;37(12):934-9. doi: 10.1016/j.dld.2005.06.011. Epub 2005 Oct 21. PMID: 16243592.
3. **Crade M, Pham V. Ultrasound examination of the sigmoid colon: possible new diagnostic tool for irritable bowel syndrome. *Ultrasound Obstet Gynecol.* 2006 Feb;27(2):206-9. doi: 10.1002/uog.2620. PMID: 16404710.**
4. Devanarayana NM, Rajindrajith S, Bandara C, Shashiprabha G, Benninga MA. Ultrasonographic assessment of liquid gastric emptying and antral motility according to the subtypes of irritable bowel syndrome in children. *J Pediatr Gastroenterol Nutr* 2013; 56:443-8.
5. **Dilillo D, Zuccotti GV, Galli E, et al. Noninvasive testing in the management of children with suspected inflammatory bowel disease. *Scand J Gastroenterol* 2019; 54:586-591.**
6. Fiskerstrand T, Arshad N, Haukanes BI, Tronstad RR, Pham KDC, Johansson S, et al. Familial Diarrhea Syndrome Caused by an Activating GUCY2C Mutation. *N Engl J Med* 2012; 366: 1586-1595
7. Francis CY, Duffy JN, Whorwell PJ, Martin DF. Does routine abdominal ultrasound enhance diagnostic accuracy in irritable bowel syndrome? *Am J Gastroenterol.* 1996 18 Maconi G et al. Gastrointestinal Ultrasound in Functional ... *Ultrasound Int Open* 2021; 7 | © 2021. The Author(s). Jul;91(7):1348-50. PMID: 8677992.
8. Häuser W, Marschall U, Layer P, Grobe T. The Prevalence, Comorbidity, Management and Costs of Irritable Bowel Syndrome. *Dtsch Arztebl Int.* 2019 Jul 8;116(27-28):463- 470. doi: 10.3238/arztebl.2019.0463. PMID: 31431234; PMCID: PMC6718888.

9. Kang JY, Kang JH, Munneke G, Hayat J, Gwee KA. Can unrecognized fecal loading without infrequent bowel movements be a cause of symptoms in a subset of patients with functional bowel disorders? *Indian J Gastroenterol*. 2020 Sep 19. doi: 10.1007/s12664-020-01063-6. Epub ahead of print. PMID: 32949354.
10. Kusunoki H, Kamada T, Sato M, Haruma K, Hata J. [Ultrasonographic assessment of sigmoid colon in patients with irritable bowel syndrome]. *Nihon Rinsho*. 2006 Aug;64(8):1461-6. Japanese. PMID: 16898613.
11. Lacy B, Ayyagari R, Guerin A, Lopez A, Shi S, Luo M. Factors associated with more frequent diagnostic tests and procedures in patients with irritable bowel syndrome. *Therap Adv Gastroenterol*. 2019 Jan 1;12:1756284818818326. doi: 10.1177/1756284818818326. PMID: 30636972; PMCID: PMC6317153.
- 12. Novak KL, Jacob D, Kaplan GG, Boyce E, Ghosh S, Ma I, Lu C, Wilson S, Panaccione R. Point of Care Ultrasound Accurately Distinguishes Inflammatory from Noninflammatory Disease in Patients Presenting with Abdominal Pain and Diarrhea. *Can J Gastroenterol Hepatol*. 2016; 2016: 4023065.**
- 13. O'Connor OJ, McSweeney SE, McWilliams S, O'Neill S, Shanahan F, Quigley EM, Maher MM. Role of radiologic imaging in irritable bowel syndrome: evidence-based review. *Radiology*. 2012 Feb;262(2):485-94. doi: 10.1148/radiol.11110423. Epub 2011 Dec 9. PMID: 22156992.**
14. Okawa Y. Can irritable bowel syndrome be detected by ultrasound? *Drug Discov Ther*. 2020 Nov 4;14(5):213-217. doi: 10.5582/ddt.2020.03082. Epub 2020 Oct 29. PMID: 33116042.
15. Özçağlayan Ö, Kurtoğlu Özçağlayan Tİ, Doğru M, Mete R. Vagus nerve assessment via ultrasonography in irritable bowel syndrome. Are there any changes of dimension in the vagus nerve? *Turk J Gastroenterol*. 2020 Jul;31(7):503-507. doi: 10.5152/tjg.2020.19353. PMID: 32897223; PMCID: PMC7480199.
16. Sabaté JM, Rivière S, Jouet P, Gastaldi-Menager C, Fagot-Campagna A, Tuppin P. Healthcare use by 30,000 patients with irritable bowel syndrome (IBS) in France: a 5- year retrospective and one-year prospective national observational study. *BMC Gastroenterol* 2019; 19:111.
- 17. Soncini M, Stasi C, Usai Satta P, Milazzo G, Bianco M, Leandro G, Montalbano LM, Muscatiello N, Monica F, Galeazzi F, Bellini M; AIGO. IBS clinical management in Italy: The AIGO survey. *Dig Liver Dis*. 2019 Jun;51(6):782-789. doi: 10.1016/j.dld.2018.10.006. Epub 2018 Oct 22. PMID: 30448159.**
18. Soresi M, Mansueto P, Terranova A, D'Alcamo A, La Blasca F, Cavataio F, Iacobucci R, Carroccio A. Abdominal Ultrasound Does Not Reveal Significant Alterations in Patients With Nonceliac Wheat Sensitivity. *J Clin Gastroenterol*. 2019 Jan;53(1):e31-e36. doi: 10.1097/MCG.0000000000000969. PMID: 29206754.
19. Steinsvik EK, Valeur J, Hausken T, Gilja OH. Postprandial Symptoms in Patients With Functional Dyspepsia and Irritable Bowel Syndrome: Relations to Ultrasound Measurements and Psychological Factors. *J Neurogastroenterol Motil*. 2020 Jan 30;26(1):96-105. doi: 10.5056/jnm19072. PMID: 31917915; PMCID: PMC6955182.

20. Smereczyoski A, Starzyoska T, Kołaczyk K. *Ultrasound of selected pathologies of the small intestine. J Ultrason* 2013; 13:155-66.

21. von Volkmann HL, Nylund K, Tronstad RR, Hovdenak N, Hausken T, Fiskerstrand T, Gilja OH. *An activating gucy2c mutation causes impaired contractility and fluid stagnation in the small bowel. Scand J Gastroenterol.* 2016 Nov;51(11):1308-15.  
doi:10.1080/00365521.2016.1200139. Epub 2016 Jun 24. PMID: 27338166.

## Симптоматична неускладнена дивертикулярна хвороба товстої кишки (СНДХ)

### Твердження 12

УЗД ШКТ може виявити дивертикули сигмовидної кишки і надати дані для діагностики симптоматично неускладненої дивертикулярної хвороби товстої кишки. [LoE 3; GoE 4]. Консенсусний рівень згоди: А+ 10/12, А- 2/12.

Запит для [(ultrasound OR sonography) AND ((colonic diverticular disease) or SUDD or (colonic diverticulosis))] на PubMed, з січня 1990 року по січень 2021 року, надано 748 статей. Відповідні за темою, що цікавить, повідомляються нижче (ті, які включені як посилання в рукописі, показано в жирному курсиві):

1. Cuomo R, Barbara G, Pace F, Annese V, Bassotti G, Binda GA, Casetti et al. Italian consensus conference for colonic diverticulosis and diverticular disease. *United European Gastroenterol J* 2014; 2:413-42.

2. Dankovcik R, Vargova V, Balasicova K, Contos P, Tkacova S, Muranska S, Dudas M. Visualization of sigmoidal diverticulosis during gynecological three-dimensional ultrasound examination. *Ultrasound Obstet Gynecol.* 2013 Feb;41(2):231-2. doi: 10.1002/uog.11199. PMID: 22648742.

**3. Hollerweger A, Macheiner P, Hübner E, Brunner W, Gritzmann N. KolondivertikULOse: Sonographie und Endoskopie: ein Vergleich [Colonic diverticulosis: A comparison between sonography and endoscopy]. *Ultraschall Med.* 2002 Feb;23(1):41-6. German. doi: 10.1055/s-2002-20075. PMID: 11842371.**

4. Hollerweger A. Colonic diseases: the value of US examination. *Eur J Radiol.* 2007 Nov;64(2):239-49. doi: 10.1016/j.ejrad.2007.06.038. Epub 2007 Sep 21. PMID: 17889476.

5. Lembcke BJ, Strobel D, Dirks K, Becker D, Menzel J. Statement of the section internal medicine of the DEGUM - ultrasound obtains pole position for clinical imaging in acute

diverticulitis. *Ultraschall Med.* 2015 Apr;36(2):191-5. doi: 10.1055/s-0034-1369761. PMID: 26060863.

6. Maconi G, Carmagnola S, Guzowski T. Intestinal Ultrasonography in the Diagnosis and Management of Colonic Diverticular Disease. *J Clin Gastroenterol* 2016; 50 (Suppl 1):S20-2.

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## **Хронічний запор (закреп).**

### **Твердження 13**

**УЗД ШКТ може використовуватися для виявлення фекального заповнення при хронічних запорах, а саме при ректальному ущільненні стільця, особливо у дітей. [LoE 3, GoR 4]. Консенсусний рівень згоди A+ 10/12, A- 2/12.**

Запит для [(ultrasound OR sonography) AND (constipation or (colonic fecal load) or fecaloma)] на PubMed с січня 1990 р. по січень 2021 р. дав, що було опубліковано 2022 статті. Відповідні за темою вказані нижче (посилання, включені в рукопис, виділені жирним шрифтом і курсивом):

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