Literatura ACTA MEDICINAE 8–9/2020 Pneumologie | Pneumoonkologie

Kardiovaskulární komplikace chronické obstrukční plicní nemoci

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1 **Quaderi, S. A. – Hurst, J. R.**: The unmet global burden of COPD. *Glob Health Epidemiol Genom*, 2018, 3, e4-e.
2 **Lozano, R. – Naghavi, M. – Foreman, K., et al.**: Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 2012, 380, s. 2095–2128.
3 **Divo, M. – Cote, C. – de Torres, J. P., et al.**: Comorbidities and risk of mortality in patients with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med*, 2012, 186, s. 155–161.
4 **Rabe, K. F. – Hurst, J. R. – Suissa, S.**: Cardiovascular disease and COPD: dangerous liaisons? *Eur Respir Rev*, 2018, 27, pii, 180057.
5 **Smith, M. C. – Wrobel, J. P.**: Epidemiology and clinical impact of major comorbidities in patients with COPD. *Int J Chron Obstruct Pulmon Dis*, 2014, 9, s. 871–888.
6 **Bhatt, S. P. – Dransfield, M. T.**: AECOPD: Acute exacerbations of chronic obstructive cardiopulmonary disease? *Am J Respir Crit Care Med*, 2013, 188, s. 1046–1048.
7 **Miller, J. – Edwards, L. D. – Agusti, A., et al.**: Comorbidity, systemic inflammation and outcomes in the ECLIPSE cohort. *Respir Med*, 2013, 107, s. 1376–1384.
8 **Donaldson, G. C. – Hurst, J. R. – Smith, C. J., et al.**: Increased risk of myocardial infarction and stroke following exacerbation of COPD. *Chest*, 2010, 137, s. 1091–1097.
9 **Speizer, F. E. – Fay, M. E. – Dockery, D. W., et al.**: Chronic obstructive pulmonary disease mortality in six U. S. cities. *Am Rev Respir Dis*, 1989, 140, s. S49–S55.
10 **Kahnert, K. – Lucke, T. – Huber, R. M., et al.**: Relationship of hyperlipidemia to comorbidities and lung function in COPD: Results of the COSYCONET cohort. *PLoS One*, 2017, 12, s. e0177501-e.
11 **Negewo, N. A. – McDonald, V. M. – Gibson, P. G.**: Comorbidity in chronic obstructive pulmonary disease. *Respir Investig*, 2015, 53, s. 249–258.
12 **Chan, M. C. – Lin, C. H. – Kou, Y. R.**: Hyperlipidemia in COPD is associated with decreased incidence of pneumonia and mortality: a nation wide health insurance data-based retrospective cohort study. *Int J Chron Obstruct Pulmon Dis*, 2016, 11, s. 1053–1059.
13 **Coxson, H. O. – Chan, I. H. – Mayo, J. R., et al.**: Early emphysema in patients with anorexia nervosa. *Am J Respir Crit Care Med*, 2004, 170, s. 748–752.
14 **Chen, H. – Li, Z. – Dong, L., et al.**: Lipid metabolism in chronic obstructive pulmonary disease. *Int J Chron Obstruct Pulmon Dis*, 2019, 14, s. 1009–1018.
15 **Kerr, J. S. – Riley, D. J. – Lanza-Jacoby, S., et al.**: Nutritional emphysema in the rat. Influence of protein depletion and impaired lung growth. *Am Rev Respir Dis*, 1985, 131, s. 644–650.
16 **Hanson, C. – Rutten, E. P. – Wouters, E. F., et al.**: Influence of diet and obesity on COPD development and outcomes. *Int J Chron Obstruct Pulmon Dis*, 2014, 9, s. 723–733.
17 **Lambert, A. A. – Putcha, N. – Drummond, M. B., et al.**: Obesity is associated with increased morbidity in moderate to severe COPD. *Chest*, 2017, 151, s. 68–77.
18 **Li, H. – Liu, Y. – Wang, L., et al.**: High apolipoprotein M serum levels correlate with chronic obstructive pulmonary disease. *Lipids Health Dis*, 2016, 15, s. 59.
19 **Zafirova-Ivanovska, B. – Stojkovikj, J. – Dokikj, D., et al.**: The Level of cholesterol in COPD patients with severe and very severe stage of the disease. *Open Access Maced J Med Sci*, 2016, 4, s. 277–282.
20 **Davis, B. B. – Zeki, A. A. – Bratt, J. M., et al.**: Simvastatin inhibits smoke-induced airway epithelial injury: implications for COPD therapy. *Eur Respir J*, 2013, 42, s. 350–361.
21 **Thomson, N. C.**: Clinical studies of statins in asthma and COPD. *Curr Mol Pharmacol*, 2017, 10, s. 60–71.
22 **Walsh, A. – Perrem, L. – Khashan, A. S., et al.**: Statins versus placebo for people with chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*, 2019, 7, Cd011959.
23 **Lu, Y. – Chang, R. – Yao, J., et al.**: Effectiveness of long-term using statins in COPD – a network meta-analysis. *Respir Res*, 2019, 20, s. 17.
24 **Lin, C.-M. – Yang, T.-M. – Yang, Y.-H., et al.**: Statin use and the risk of subsequent hospitalized exacerbations in COPD patients with frequent exacerbations. *Int J Chron Obstruct Pulmon Dis*, 2020, 15, s. 289–299.
25 **Chen, C.-Y. – Liao, K.-M.**: The impact of atrial fibrillation in patients with COPD during hospitalization. *Int J Chron Obstruct Pulmon Dis*, 2018, 13, s. 2105–2112.
26 **Christiansen, C. F. – Christensen, S. – Mehnert, F., et al.**: Glucocorticoid use and risk of atrial fibrillation or flutter: a population-based, case-control study. *Arch Intern Med*, 2009, 169, s. 1677–1683.
27 **Kinoshita, M. – Herges, R. M. – Hodge, D. O., et al.**: Role of smoking in the recurrence of atrial arrhythmias after cardioversion. *Am J Cardiol*, 2009, 104, s. 678–682.
28 **Korantzopoulos, P. – Kolettis, T. M. – Galaris, D., et al.**: The role of oxidative stress in the pathogenesis and perpetuation of atrial fibrillation. *Int J Cardiol*, 2007, 115, s. 135–143.
29 **Ogi, H. – Nakano, Y. – Niida, S., et al.**: Is structural remodeling of fibrillated atria the consequence of tissue hypoxia? *Circ J*, 2010, 74, s. 1815–1821.
30 **Salpeter, S. R. – Ormiston, T. M. – Salpeter, E. E.**: Cardiovascular effects of beta-agonists in patients with asthma and COPD: a meta-analysis. *Chest*, 2004, 125, s. 2309–2321.
31 **Buch, P. – Friberg, J. – Scharling, H., et al.**: Reduced lung function and risk of atrial fibrillation in the Copenhagen City Heart Study. *Eur Respir J*, 2003, 21, s. 1012–1016.
32 **Li, J. – Agarwal, S. K. – Alonso, A., et al.**: Airflow obstruction, lung function, and incidence of atrial fibrillation: the Atherosclerosis Risk in Communities (ARIC) study. *Circulation*, 2014, 129, s. 971–980.
33 **Goudis, C. A.**: Chronic obstructive pulmonary disease and atrial fibrillation: An unknown relationship. *J Cardiol*, 2017, 69, s. 699–705.
34 **Johnson, L. S. – Juhlin, T. – Engstrom, G., et al.**: Reduced forced expiratory volume is associated with increased incidence of atrial fibrillation: the Malmo Preventive Project. *Europace*, 2014, 16, s. 182–188.
35 **Lammers, W. J. – Kirchhof, C. – Bonke, F. I., et al.**: Vulnerability of rabbit atrium to reentry by hypoxia. Role of inhomogeneity in conduction and wavelength. *Am J Physiol Heart Circul Physiol*, 1992, 262, s. H47–H55.
36 **Stevenson, I. H. – Roberts-Thomson, K. C. – Kistler, P. M., et al.**: Atrial electrophysiology is altered by acute hypercapnia but not hypoxemia: Implications for promotion of atrial fibrillation in pulmonary disease and sleep apnea. *Heart Rhythm*, 2010, 7, s. 1263–1270.
37 **Caram, L. Md. O. – Ferrari, R. – Naves, C. R., et al.**: Association between left ventricular diastolic dysfunction and severity of chronic obstructive pulmonary disease. *Clinics* (Sao Paulo), 2013, 68, s. 772–776.
38 **Eweda, I. – Hamada, G.**: Concordance between Doppler and pulsed-wave Doppler tissue imaging in estimation of the degree of left ventricular dysfunction and correlating it to the degree of chronic obstructive pulmonary disease. *Journal of the Saudi Heart Association*, 2016, 28, s. 15–21.
39 **Agoston-Coldea, L. – Petrovai, D. – Mihalcea, I., et al.**: Right atrium volume index in patients with secondary pulmonary hypertension due to chronic obstructive pulmonary disease. *Acta Cardiol Sin*, 2015, 31, s. 325–336.
40 **Gan, W. Q. – Man, S. F. – Senthilselvan, A., et al.**: Association between chronic obstructive pulmonary disease and systemic inflammation: a systematic review and a meta-analysis. *Thorax*, 2004, 59, s. 574–580.
41 **Kirkham, P. A. – Barnes, P. J.**: Oxidative stress in COPD. *Chest*, 2013, 144, s. 266–273.
42 **Cazzola, M. – Imperatore, F. – Salzillo, A., et al.**: Cardiac effects of formoterol and salmeterol in patients suffering from COPD with preexisting cardiac arrhythmias and hypoxemia. *Chest*, 1998, 114, s. 411–415.
43 **Hohlfeld, J. M. – Furtwaengler, A. – Konen-Bergmann, M., et al.**: Cardiac safety of tiotropium in patients with COPD: a combined analysis of Holter-ECG data from four randomised clinical trials. *Int J Clin Pract*, 2015, 69, s. 72–80.
44 **Kesten, S. – Jara, M. – Wentworth, C., et al.**: Pooled clinical trial analysis of tiotropium safety. *Chest*, 2006, 130, s. 1695–1703.
45 **Tashkin, D. P. – Celli, B. – Senn, S., et al.**: A 4-year trial of tiotropium in chronic obstructive pulmonary disease. *N Engl J Med*, 2008, 359, s. 1543–1554.
46 **Wedzicha, J. A. – Dahl, R. – Buhl, R., et al.**: Pooled safety analysis of the fixed-dose combination of indacaterol and glycopyrronium (QVA149), its monocomponents, and tiotropium versus placebo in COPD patients. *Respir Med*, 2014, 108, s. 1498–1507.
47 **Huerta, C. – Lanes, S. F. – Garcia Rodriguez, L. A.**: Respiratory medications and the risk of cardiac arrhythmias. *Epidemiology*, 2005, 16, s. 360–366.
48 **Ponikowski, P. – Voors, A. A. – Anker, S. D., et al.**: 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. *Eur Heart J*, 2016, 37, s. 2129–2200.
49 **Le Jemtel, T. H. – Padeletti, M. – Jelic, S.**: Diagnostic and therapeutic challenges in patients with coexistent chronic obstructive pulmonary disease and chronic heart failure. *J Am Coll Cardiol*, 2007, 49, s. 171–180.
50 **Ni, H. – Nauman, D. J. – Hershberger, R. E.**: Managed care and outcomes of hospitalization among elderly patients with congestive heart failure. *Arch Intern Med*, 1998, 158, s. 1231–1236.
51 **Lainscak, M. – Hodoscek, L. M. – Dungen, H. D., et al.**: The burden of chronic obstructive pulmonary disease in patients hospitalized with heart failure. *Wien Klin Wochenschr*, 2009, 121, s. 309–313.
52 **Marcun, R. – Stankovic, I. – Vidakovic, R., et al.**: Prognostic implications of heart failure with preserved ejection fraction in patients with an exacerbation of chronic obstructive pulmonary disease. *Intern Emerg Med*, 2016, 11, s. 519–527.
53 **Roberts, C. M. – Stone, R. A. – Lowe, D., et al.**: Co-morbidities and 90-day outcomes in hospitalized COPD exacerbations. *Copd*, 2011, 8, s. 354–361.
54 **Axson, E. L. – Ragutheeswaran, K. – Sundaram, V., et al.**: Hospitalisation and mortality in patients with comorbid COPD and heart failure: a systematic review and meta-analysis. *Respir Res*, 2020, 21, s. 54.
55 **Chen, W. – Thomas, J. – Sadatsafavi, M., et al.**: Risk of cardiovascular comorbidity in patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis. *Lancet Respir Med*, 2015, 3, s. 631–639.
56 **Berger, J. S. – Sanborn, T. A. – Sherman, W., et al.**: Effect of chronic obstructive pulmonary disease on survival of patients with coronary heart disease having percutaneous coronary intervention. *Am J Cardiol*, 2004, 94, s. 649–651.
57 **Malo de Molina, R. – Aguado, S. – Arellano, C., et al.**: Ischemic heart disease during acute exacerbations of COPD. *Med Sci* (Basel), 2018, 6, s. 83.
58 **Sin, D. D. – Anthonisen, N. R. – Soriano, J. B., et al.**: Mortality in COPD: Role of comorbidities. *Eur Respir J*, 2006, 28, s. 1245–1257.
59 **Brekke, P. H. – Omland, T. – Smith, P., et al.**: Underdiagnosis of myocardial infarction in COPD – Cardiac Infarction Injury Score (CIIS) in patients hospitalised for COPD exacerbation. *Respir Med*, 2008, 102, s. 1243–1247.
60 **Keller, T. – Zeller, T. – Peetz, D., et al.**: Sensitive troponin I assay in early diagnosis of acute myocardial infarction. *N Engl J Med*, 2009, 361, s. 868–877.
61 **Kvisvik, B. – Mørkrid, L. – Røsjø, H., et al.**: High-sensitivity troponin T vs I in acute coronary syndrome: Prediction of significant coronary lesions and long-term prognosis. *Clinical Chemistry*, 2017, 63, s. 552–562.
62 **Waschki, B. – Alter, P. – Zeller, T., et al.**: High-sensitivity troponin I and all-cause mortality in patients with stable COPD: an analysis of the COSYCONET study. *Eur Resp J*, 2020, 55, s. 1901314.
63 **Adamson, P. D. – Anderson, J. A. – Brook, R. D., et al.**: Cardiac troponin I and cardiovascular risk in patients with chronic obstructive pulmonary disease. *Journal of the American College of Cardiology*, 2018, 72, s. 1126–1137.
64 **Neukamm, A. – Einvik, G. – Didrik Hoiseth, A., et al.**: The prognostic value of measurement of high-sensitive cardiac troponin T for mortality in a cohort of stable chronic obstructive pulmonary disease patients. *BMC Pulm Med*, 2016, 16, s. 164.

COVID-19: diagnóza, terapie a prevence

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1 Souhrn údajů o přípravku (SPC): Plaquenil 200 mg potahované tablety, SÚKL, poslední revize textu: 10. 4. 2019.
2 Alhazzani, W. – Møller, M. H. – Arabi, Y. M., et al.: Surviving Sepsis Campaign: guidelines on the management of critically ill adults with Coronavirus Disease 2019 (COVID-19). Intensive Care Med. Dostupné z: https://doi.org/10.1007/s00134-020-06022-5, vyhledáno 6. 5. 2020.
3 American Heart Association: Patients taking angiotensin converting enzyme inhibitors (ACE-i) or angiotensin receptor blocker (ARB) medications should continue therapy as prescribed [news release]. Dostupné z: https://newsroom.heart.org/news/patients-taking-ace-i-and-arbs-who-contract-covid-19-should-continue-treatment-unless-otherwise-advised-by-their-physician, vyhledáno 18. 3. 2020.
4 Bartlett, R. H. – Ogino, M. T. – Brodie, D., et al.: Initial ELSO guidance document: ECMO for COVID-19 patients with severe cardiopulmonary failure. *ASAIO Journal*, 2020, 66, s. 472–474.
5 Cao, B. – Wang, Y. – Wen, D., et al.: A trial of lopinavir-ritonavir in adults hospitalized with severe COVID-19. *N Engl J Med*, publikováno online 18. 3. 2020, DOI: 10.1056/NEJMoa2001282.
6 Colson, P. – Rolain, J. M. – Lagier, J. C., et al.: Chloroquine and hydroxychloroquine as available weapons to fight COVID-19. *Int J Antimicrob Agents*, publikováno online 4. 3. 2020, doi:10.1016/j.ijantimicag.2020.105932.
7 Delang, L., et al.: Favipiravir as a potential counter measure against neglected and amerging RNA viruses. *Antiviral Res*, 2018, 153, s. 85–94.
8 Dong, Y. – Mo, X. – Hu, Y., et al.: Epidemiology of COVID-19 Among Children in China. *Pediatrics*, publikováno online 16. 3. 2020, pii: e20200702, doi: 10.1542/peds.2020-0702.
9 European Society for Cardiology: Position statement of the ESC Council on Hypertension on ACE-Inhibitors and Angiotensin Receptor Blockers. Dostupné z: https://www.escardio.org/Councils/Council-on-Hypertension-(CHT)/News/position-statement-of-the-esc-council-on-hypertension-on-ace-inhibitors-and-ang, vyhledáno 18. 3. 2020.
10 Chen, Z. – Hu, J. – Zhang, Z., et al.: Efficacy of hydrochloroquinein patients with COVID-19: Results of a randomised trial. Dostupné z: https://www.medrxiv.org/content/10.1101/2020.03.22.20040758v2, vyhledáno 1. 4. 2020.
11 Gattinoni, L. – Chiumello, D. – Caironi, P., et al.: COVID-19 pneumonia: different respiratory treatments for different phenotypes? *Intensive Care Med*, publikováno online 14. 4. 2020, DOI 10.1007/s00134-020-06033-2.
12 Gautret, P. – Lagier, J. C. – Parola, P., et al.: Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial. *Int J Antimicrob Agents*, publikováno online 20. 3. 2020, doi: 10.1016/j.ijantimicag.2020.105949.
13 Guan, W. J. – Ni, Z. Y. – Hu, Y., et al.: Characteristics of coronavirus disease 2019 in China. *N Engl J Med*, 2020, 382, s. 1708–1720.
14 Gurwitz, D.: Angiotensin receptor blockers as tentative SARS-CoV-2 therapeutics. *Drug Dev Res*. Publikováno online 4. 3. 2020, doi:10.1002/ddr.21656.
15 Henry, B. M. – deOliveira, M. H. S. – Benoit, S., et al.: Hematologic, biochemical and immune biomarker abnormalities associated with severe illness and mortality in coronavirus disease 2019 (COVID-19): a meta-analysis. *Clin Chem Lab Med*, publikováno online 10. 4. 2020, doi.org/10.1515/cclm-2020/0369.
16 Hoffmann, M. – Kleine-Weber, H. – Schroeder, S., et al.: SARS-CoV-2 cell entry depends on ACE2 and TMPRSS2 and is blocked by a clinically proven protease inhibitor. *Cell*, publikováno online 4. 3. 2020, doi:10.1016/j.cell.2020.02.052.
17 Chen, C. – Huang, J. – Cheng, Z., et al.: Favipiravir versus Arbidol for COVID-19: a randomized clinical trial. *medRxiv*, publikováno online 27. 3. 2020, doi:10.1101/2020.03.17.20037432.
18 Chen, T. – Wu, D. – Chen, H., et al.: Clinical characteristics of 113 deceaset patients with coronavirus disease 2019: retrospective study. *BMJ*, publikováno online 26. 3. 2020, doi: 10.1136/bmj.m1091.
19 Chen, Y. – Liu, Q.– Guo, D.: Emerging coronaviruses: genome structure, replication, and pathogenesis. *J Med Virol*, 2020, 92, s. 418–423.
20 Kampf, G. – Todt, D. – Pfaender, S., et al.: Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *J Hosp Infect*, 2020, 104, s. 246–251.
21 NICE: COVID-19 rapid guideline: critical care in adults. NICE guideline. Dostupné z: www.nice.org.uk/guidance/ng159, vyhledáno 20. 3. 2020.
22 NIH Clinical Trial Shows Remdesivir Accelerates Recovery from Advanced COVID-19. NIAID, tisková zpráva. Dostupné z: https://www.niaid.nih.gov/news-events/nih-clinical-trial-shows-remdesivir-accelerates-recovery-advanced-covid-19, vyhledáno 29. 4. 2020.
23 Russell, C. D. – Millar, J. E. – Baillie, J. K.: Clinical evidence does not support corticosteroid treatment for 2019-nCoV lung injury. *Lancet*, 2020, 395, s. 473–475.
24 Sanders, J. M. – Monogue, M. L. – Jodlowski, T. Z., et al.: Pharmacologic treatment for Coronavirus disease 2019 (COVID-19) A review. *JAMA*. Dostupné z: doi:10.1001/jama2020/6019, vyhledáno 13. 4. 2020.
25 Shen, C. – Wang, Z. – Zhao, F., et al.: Treatment of 5 Critically Ill Patients With COVID-19 With Convalescent Plasma. *JAMA*, 2020, 323, s. 1582–1589.
26 Shiraki, K. – Daikoku, T.: Favipiravir, an anti-influenza drug against life-threatening RNA virus infections. *Pharmacol Ther*, publikováno online 22. 2. 2020, doi:10.1016/j.pharmthera.2020.107512.
27 Soldati, S. – Smargiassi, A. – Inchingolo E., et al.: Proposal for international standardization of the use of lung ultrasound for patients with COVID-19. A simple, quantitative, reproducible method. *J Ultrasound Med*, 2020, 9999, s. 1–7.
28 Van Doremalen, N. – Bushmaker, T. – Morris, H. D., et al.: Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *N Engl J Med*, 2020, 382, s. 1564–1567.
29 Wang, D. – Hu, B. – Hu, C., et al.: Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA*, publikováno online 7. 2. 2020, doi:10.1001/jama.2020.1585.
30 Wang, W. – Xu, Y. – Gao, R., et al.: Detection of SARS-CoV-2 in different types of clinical specimens. *JAMA*, publikováno online 11. 3. 2020, doi:10.1001/jama.2020.3786.
31 Wang, Z. – Yang, B. – Li, Q., et al.: Clinical features of 69 cases with coronavirus disease 2019 in Wuhan, China. *Clin Infect Dis*, publikováno online 16. 3. 2020, doi:10.1093/cid/ciaa272.
32 Wu, C. – Chen, X. – Cai, Y., et al.: Risk factors associated with acute respiratory distress syndrome and death in patients with coronavirus disease 2019 pneumonia in Wuhan, China. *JAMA Intern Med*, publikováno online 13. 2. 2020, doi:10.1001/jamainternmed.20200994.
33 Wu, Z. – McGoogan, J. M.: Characteristics of and important lessons from the coronavirus disease 2019 (COVID-9) outbreak in China: summary of a report of 72,314 cases from the Chinese Center for Disease Control and Prevention. *JAMA*, 2020, 323, s. 1239–1242.
34 WHO: Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected. Interim guidance. Publikováno online 13. 3. 2020. WHO reference number: WHO/2019-nCoV/Clinical/2020.4.
35 Zhou, D. – Dai, S. M. – Tong, Q.: COVID-19: a recommendation to examine the effect of hydroxychloroquine in preventing infection and progression. *J Antimicrob Chemother*, publikováno online 20. 3. 2020, doi:10.1093/jac/dkaa114.
36 Zhou, F. – Yu, T. – Du, R., et al.: Clinical course and risk factors for mortality for adult in patients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet*, 2020, 395, s. 1054–1062.

Další zdroje informací ke COVID-19:
www.koronavirus.mzcr.cz
www.infekce.cz
www.csim.cz
www.who.int/
www.nih.gov/health-information/coronavirus
www.cdc.gov/coronavirus
www.covid19-druginteractions.org

Nové názory na použití mukolytik u chronické obstrukční plicní nemoci

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1 Čáp, P. – Vondra, V., et al.: *Akutní a chronický kašel*. Mladá fronta, Praha, 2013.
2 Juřica, J.: Farmakoterapie kašle ve zkratce. *Med Praxi*, 2016, 13, s. 268–274.
3 Kos, S.: Moderní léčba a diferenciální diagnostika kašle. *Med Praxi*, 2020, 17, s. 18–22.
4 Dobler, C. C., et al.: Pharmacologic therapies in patients with exacerbation of chronic obstructive pulmonary disease. A systematic review with meta-analysis. *Ann Intern Med*, 2020, 172, s. 413–422.
5 Dal Negro, R. W., et al.: Effect of erdosteine on the rate and duration of COPD exacerbations: the RESTORE study. *Eur Respir J*, 2017, 50, s. pii: 1700711.
6 Cazzola, M. – Calzetta, L. – Page, C., et al.: Impact of erdosteine on chronic bronchitis and COPD: A meta-analysis. *Pulm Pharmacol Therapeut*, 2018, 48, s. 185–194.
7 Rogliani, P., et al.: Efficacy and safety profile of mucolytic/antioxidant agents in chronic obstructive pulmonary disease: a comparative analysis across erdosteine, carbocysteine, and N-acetylcysteine. *Respir Research*, 2019, 20, s. 104–115.
8 Kopřiva, F.: Sledování ATB léčby dětských pacientů s recidivujícími respiračními infekcemi v letech 2013–2015 a erdosteinu aneb co nám řekla „ERICA". *Vox Pediatriae*, 2017, 1.

CHOPN a deficit α_1-antitrypsinu: co říkají data z národního registru?

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1 Stoller, J. K.: American Thoracic Society/European Respiratory Society Statement. *Am J Respir Crit Care Med*, 2003, 168, s. 818–900.
2 Miravitlles, M. – Dirksen, A. – Ferrarotti, I., et al.: European Respiratory Society statement: diagnosis and treatment of pulmonary disease in α1-antitrypsin deficiency. *Eur Respir J*, 2017, 50, 1700610, doi:10.1183/13993003.00610-2017.
3 Strnad, P. – McElvaney, N. G. – Lomas, D. A.: Alpha1-antitrypsin deficiency. *N Engl J Med*, 2020, 382, s. 1443–1455.
4 Chlumský, J.: CHOPN s prokázanou deficiencí alfa-1 antitrypsinu. In: Kolek, V. (ed.): *Doporučené postupy v pneumologii*. Praha, Maxdorf, 2019, s. 46–54.
5 Green, C. E. – Parr, D. G. – Edgar, R. G., et al.: Lung density associates with survival in alpha 1 antitrypsin deficient patients. *Respir Med*, 2016, 112, s. 81–87.
6 Chapman, K. R. – Burdon, J. G. W. – Piitulainen, E., et al.: Intravenous augmentation treatment and lung density in severe α1 antitrypsin deficiency (RAPID): a randomised, double-blind, placebo-controlled trial. *Lancet*, 2015, 386, s. 360–368.
7 Greulich, T. – Altraja, A. – Barrecheguren, M., et al.: Protocol for the EARCO Registry: a pan-European observational study in patients with α1-antitrypsin deficiency. *ERJ Open Res*, 2020, 6, s. 00181–02019.

Očkování rizikových pacientů s chronickou obstrukční plicní nemocí a asthma bronchiale

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1 Global Initiative for Chronic Obstructive Lung Disease. *Global strategy for diagnosis, management, and prevention of chronic obstructive pulmonary disease*. 2019, www.goldcopd.org.
2 **Petroušová, L. – Rožnovský, L.**: Pneumokokové infekce u dospělých a jejich prevence. *Med Praxi*, 2013, 10, s. 104–107.
3 Global Initiative for Astma (GINA). GINA workshop report: Global Strategy for Astma Management and Prevention. www.ginasthma.com.
4 **Bonten, M. J. – Huijts, S. M. – Bolkenbass, M., et al.**: Polysaccharide conjugate vaccine against pneumococcal pneumonia in adults. *N Engl J Med*, 2015, 372, s. 1114–1125.
5 **Rumlarová, Š.**: Kde mohlo pomoci očkování. *Med Praxi*, 2014, 11, s. 182–183.
6 **Kolek, V.**: Infekční pneumonie. In: Kolek, V. – Kašák, V., a kol.: *Pneumologie*. Maxdorf Jessenius, 2014, s. 121–143.
7 **Kynčl, J.**: Očkování proti chřipce. *Flu Vaccination*, SZÚ, 2017.
8 SUKL. Informace SÚKL k léčbě chřipky. Dostupné z: https://www.sukl.cz/souvisejici-informace-k-lecbe-chripky-antivirotika, vyhledáno 29. 5. 2020.
9 **Bouhoeffer, J. – Bar, G. – Riffelmann, M., et al.**: The role of Bordetella infections in patients with acute exacerbation of chronic bronchitis. *Infection*, 2005, 33, s. 13–17.
10 **Smetana, J. – Chlíbek, R.**: Očkování pacientů s chronickým respiračním onemocněním. In: Chlíbek, R., et al.: *Očkování dospělých*. Mladá fronta, 2019, s. 259–265.
11 SPC Prevenar 13.

Současné možnosti léčby idiopatické plicní fibrózy – výhledy

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1 **Vašáková, M. – Šterclová, M.**: Idiopatická plicní fibróza – doporučený postup pro diagnózu, léčbu a sledování (3. aktualizace) Sekce intersticiálních plicních procesů České pneumologické a ftizeologické společnosti. Dostupné z: http://www.pneumologie.cz/stranka/59/sekce-pro-interstic ialni-plicni-procesy/, vyhledáno 12. 3. 2020.
2 **Raghu, G. – Remy-Jardin, M. – Myers, J. L., et al.**; American Thoracic Society, European Respiratory Society, Japanese Respiratory Society, Latin American Thoracic Society: Diagnosis of idiopathic pulmonary fibrosis. *An official ATS/ERS/JRS/ALAT clinical practice guideline*. 2018.
3 **Raghu, G. – Chen, S. Y. – Hou, Q., et al.**: Incidence and prevalence of idiopathic pulmonary fibrosis in US adults 18-64 years old. *Eur Respir J*, 2016, 48, s. 179–186, doi: 10.1183/13993003.01653-2015.
4 **Paul, J. – Wolters, H. R. – Collard, K. – Jones, D.**: Pathogenesis of idiopathic pulmonary fibrosis. *Annu Rev Pathol*, 2014, 9, s. 157–179.
5 **Barratt, S. L. – Creamer, A. – Hayton, C., et al.**: Review idiopathic pulmonary fibrosis (IPF): an overview. *J Clin Med*, 2018, 7, s. 201; dostupné z: https://doi.org/10.3390/jcm7080201, vyhledáno 12. 3. 2020.
6 **Raghu, G., et al.**; American Thoracic Society; European Respiratory society; Japanese Respiratory Society; Latin American Thoracic Association. An Official ATS/ERS/JRS/ALAT Clinical Practice Guideline: Treatment of Idiopathic Pulmonary Fibrosis. An Update of the 2011 Clinical Practice Guideline. *Am J Respir Crit Care Med*, 2015, 192, s. e3–e19.
7 **Somogyi, V. – Chaudhuri, N. – Torrisi, S. E., et al.**: The therapy of idiopathic pulmonary fibrosis: what is next? *European Respiratory Review*, 2019, 28, s. 190021; DOI: 10.1183/16000617.0021-2019.
8 **Kolek, V., et al.**: *Doporučené postupy v pneumologii*. 2019, Maxdorf, s. 261–272, 358–363.
9 **Šterclová, M., et al.**: *Idiopatická plicní fibróza – informace (nejen) pro pacienty a jejich příbuzné*. 2016, Maxdorf, s. 41–47.
10 **Glassberg, M. K.**: Overview of idiopathic pulmonary fibrosis, evidence-based guidelines, and recent developments in the treatment landscape. *Am J Manag Care*, 2019, 25, s. S0.
11 **Behr, J. – Kolb, M. – Song, J. W., et al.**: Nintedanib and sildenafil in patients with idiopathic pulmonary fibrosis and right heart dysfunction. A prespecified subgroup analysis of a double-blind randomized clinical trial (INSTAGE). *Am J Respir Crit Care Med*, 2019, 200, s. 1505–1512, doi: 10.1164/rccm.201903-0488OC.
12 **Jouneau, S. – Lederlin, M. – Vernhet, L., et al.**: Malnutrition in idiopathic pulmonary fibrosis: the great forgotten comorbidity! *Eur Resp J*, 2019, 53, 1900418, DOI: 10.1183/13993003.00418-2019.
13 **Gea, J. – Badenes, D. – Balcells, E.**: Nutritional status in patients with idiopathic pulmonary fibrosis. DOI: 10.15761/PCCM.1000147.
14 **Dostálová, K. – Veselý, J.**: *Zvláštnosti metabolismu a výživy u vybraných klinických stavů*. Ústav patologické fyziologie LF UP Olomouc (e-learningový kurz).
15 **Neumannová, K.**: Jak motivovat pacienty s CHOPN k dostatečné pohybové aktivitě. *Acta Medicinae*, reprint 8/2019, s. 3–5.
16 **Maya, M. – Juarez, A. – Chan, L., et al.**: Acute exacerbation of idiopathic pulmonary fibrosis – a review of current and novel pharmacotherapies. *J Thorac Dis*, 2015, 7, s. 499–519.
17 **Irani, S. – Boehler, A.**: Lung transplantation: who, when? *Breathe*, 2006, 2, s. 221–230.
18 **Lischke, R. – Šimonek, J. – Pozniak, J., et al.**: Transplantace plic. *Rozhl Chir*, 2011, 90, s. 612–620.
19 **Yanagihara, T. – Sato, S. – Upagupta, Ch. – Kolb, M.**: What have we learned from basic science studies on idiopathic pulmonary fibrosis? *Eur Resp Rev*, 2019, 28, 190029, DOI: 10.1183/16000617.0029-2019.
20 **Raghu, G.**: Idiopathic pulmonary fibrosis: lessons from clinical trials over the past 25 years. *Eur Resp J*, 2017, 50, 1701209, DOI: 10.1183/13993003.01209-2017
21 **Chakraborty, K.**: Review paper of idiopathic pulmonary fibrosis. *Int J Adv Res*, 2015, 3, s. 1565–1570.

Navigovaná bronchoskopie

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1 **Huang, K. L. – Wang, S. Y. –Lu, W. C., et al.**: Effects of low-dose computed tomography on lung cancer screening: a systematic review, meta-analysis, and trial sequential analysis. *BMC Pulm Med*, 2019, 19, s. 126.
2 **Wahidi, M. M. – Govert, J. A. – Goudar, R. K., et al.**: Evidence for the treatment of patients with pulmonary nodules: when is it lung cancer?: ACCP evidence-based clinical practice guidelines (2nd edition). *Chest*, 2007, 132, s. 94S–107S.
3 **Grogan, E. L. – Weinstein, J. J. – Deppen, S. A., et al.**: Thoracic operations for pulmonary nodules are frequently not futile in patients with benign disease. *J Thorac Oncol*, 2011, 6, s. 1720–1725.
4 **Shin, K. E. – Lee, K. S. – Yi, C. A., et al.**: Subcentimeter lung nodules stable for 2 years at LDCT: long-term follow-up using volumetry. *Respirology*, 2014, 19, s. 921–928.
5 **MacMahon, H. – Naidich, D. P. – Goo, J. M., et al.**: Guidelines for management of incidental pulmonary nodules detected on CT images: from the Fleischner society 2017. *Radiology*, 2017, 284, s. 228–243.
6 **Gould, M. K. – Donington, J. – Lynch, W. R., et al.**: Evaluation of individuals with pulmonary nodules: when is it lung cancer? Diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians evidence-based clinical practice guidelines. *Chest*, 2013, 143, s. e93S–e120S.
7 **Callister, M. E. – Baldwin, D. R. – Akram, A. R., et al.**: British Thoracic Society guidelines for the investigation and management of pulmonary nodules. *Thorax*, 2015, 70, s. ii1–ii54.
8 **Rivera, M. P. – Mehta, A. C. – Wahidi, M. M.**: Establishing the diagnosis of lung cancer: diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians evidence-based clinical practice guidelines. *Chest*, 2013, 143, s. e142S–e165S.
9 **Bo, L. – Li, C. – Pan, L., et al.**: Diagnosing a solitary pulmonary nodule using multiple bronchoscopic guided technologies: A prospective randomized study. *Lung Cancer*, 2019, 129, s. 48–54.
10 **Sainz Zuñiga, P. V. – Vakil, E. – Molina, S., et al.**: Sensitivity of radial endobronchial ultrasound-guided bronchoscopy for lung cancer in patients with peripheral pulmonary lesions: an updated meta-analysis. *Chest*, 15. 11. 2019, pii: S0012-3692(19)34213–34218.
11 **Ishiwata, T. – Gregor, A. – Inage, T., et al.**: Advances in interventional diagnostic bronchoscopy for peripheral pulmonary lesions. *Exp Rev Resp Med*, 2019, 13, s. 885–897.

Vliv aklidinium bromidu na výskyt závažných kardiovaskulárních příhod a exacerbací u vysoce rizikových pacientů s chronickou obstrukční plicní nemocí – studie ASCENT-COPD

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1 Global Initiative for Chronic Obstructive Lung Disease. Global Strategy for the Diagnosis, Management and Prevention of Chronic Obstructive Pulmonary Disease: 2019. Dostupné z: https://goldcopd.org/wp-content/uploads/2018/11/GOLD-2019v1.7-FNAL-14Nov2018-WMS.pdf, vyhledáno 7. 2. 2019.
2 **Curkendall, S. M. – DeLuise, C. – Jones, J. K., et al.**: Cardiovascular disease in patients with chronic obscructive pulmonary disease, Saskatchewan Canada: cardiovascular disease in COPD patients. *Ann Epidemiol*, 2006, 16, s. 63–70.
3 **Sin, D. D. – Anthonisen, N. R. – Soriano, J. B., et al.**: Mortality in COPD: role of comorbidities. *Eur Resp J*, 2006, 28, s. 1245–1257.
4 **Donaldson, G. C. – Hurst, J. R. – Smith, C. J., et al.**: Increased risk of myocardial infarction and stroke following exacerbation of COPD. *Chest*, 2010, 137, s. 1091–1097.
5 **Singh, S. – Loke, Y. K. – Furberg, C. D.**: Inhaled anticholinergics and risk of major adverse cardiovascular events in patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis. *JAMA*, 2008, 300, s. 1439–1450.
6 **Tashkin, D. P. – Celli, B. – Senn, S., et al.**; UPLIFT Study Investigators: A4-year trial of tiotropium in chronic obscructive pulmonary disease. *N Engl J Med*, 2008, 359, s. 1543–1554.
7 **Michele, T. M. – Pinheiro, S. – Iyasu, S.**: The safety of tiotropium – the FDA's conclusions. *N Engl J Med*, 2010, 363, s. 1097–1099.
8 **Singh, S. – Loke, Y. K. – Enright, P. L., et al.**: Mortality associated with tiotropium mist inhaler in patients with chronic obstructive pulmonary disease: systematic review and meta-analysis of randomised controlled trials. *BMJ*, 2011, 342, s. d3215.

9 **Verhamme, K. M. – Afonso, A. – Romio, S., et al.**: Use of tiotropium Respimat soft mist inhaler versus HandiHaler and mortality in patients with COPD. *Eur Respir J*, 2013, 42, s. 606–615.
10 **Dong, Y. H. – Lin, H. H. – Shau, W. Y., et al.**: Comparative safety of inhaled medications in patients with chronic obstructive pulmonary disease: systematic review and mixed treatment comparison meta-analysis of randomised controlled trials. *Thorax*, 2013, 68, s. 48–56.
11 **Celli, B. – Decramer, M. – Kesten, S., et al.**; UPLIFT Study Investigators: Mortality in the 4-year trial of tiotropium (UPLIFT) in patients with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med*, 2009, 180, s. 948–955.
12 **Tashkin, D. P. – Leimer, I. – Metzdorf, N., et al.**: Cardiac safety of tiotropium in patients with cardiac events: a retrospective analysis of the UPLIFT trial. *Respir Res*, 2015, 16, s. 65.
13 **Wedzicha, J. A. – Agusti, A. – Donaldson, G., et al.**: Effect of aclidinium bromide on exacerbations in patients with moderate-to-severe COPD: a pooled analysis of five phase III, randomized, placebo-controlled studies. *COPD*, 2016, 13, s. 669–676.
14 **Wise, R. A. – Chapman, K. R. – Scirica, B. M., et al.**: Long-term evaluation of the effects of aclidinium bromide on major adverse cardiovascular events and COPD exacerbations in patients with moderate to very severe COPD: rationale and design of the ASCENT COPD study. *Chronic Obstr Pulm Dis*, 2018, 5, s. 5–15.
15 **Hankinson, J. L. – Odencrantz, J. R. – Fedan, K. B.**: Spirometric reference values from a sample of the general US population. *Am J Respir Crit Care Med*, 1999, 159, s. 179–187.
16 **Hicks, K. A. – Hung, H. M. J. – Mahaffey, K. W., et al.**: Standardized definitions for cardiovascular and stroke endpoint events in clinical trials. 20. 8. 2014, s. 1–33. DOstupné z: https://www.cdisc.org/system/files/all/ standard/Draft%20Definitions%20for%20CDISC %20August%2020%2C%202014.pdf, vyhledáno 28. 8. 2018. .
17 US Food and Drug Administration. Guidance for Industry: Diabetes Mellitus–Evaluating Cardiovascular Risk in New Antidiabetic Therapies to Treat Type 2 Diabetes. Prosinec 2008. Dostupné z: https://www.fda.gov/downloads/Drugs/Guidances/ ucm071627.pdf, vyhledáno 5. 9. 2018.
18 **Keene, O. N. – Roger, J. H. – Hartley, B. F., et al.**: Missing data sensitivity analysis for recurrent event data using controlled imputation. *Pharm Stat*, 2014, 13, s. 258–264.
19 **Gershon, A. – Croxford, R. – Calzavara, A., et al.**: Cardiovascular safety of inhaled long-acting bronchodilators in individuals with chronic obstructive pulmonary disease. *JAMA Intern Med*, 2013, 173, s. 1175–1185.
20 **Schmiedl, S. – Fischer, R. – Ibanez, L., et al.**: Tiotropium Respimat vs HandiHaler: real-life usage and TIOSPIR trial generalizability. *Br J Clin Pharmacol*, 2016, 81, s. 379–388.
21 **Walker, S. – Fingleton, J. – Weatherall, M., et al.**: Limited generalisability of UPLIFT findings to clinical practice. *Thorax*, 2013, 68, s. 1066–1067.
22 **Chapman, K. R. – Beck, E. – Alcaide, D., et al.**: Overall and cardiovascular safety of aclidinium bromide in patients with COPD: a pooled analysis of six phase III, placebo-controlled, randomized studies. *Chronic Obstr Pulm Dis*, 2015, 3, s. 435–445.
23 **Wang, M. T. – Liou, J. T. – Lin, C. W., et al.**: Association of cardiovascular risk with inhaled long-acting bronchodilators in patients with chronic obstructive pulmonary disease: a nested case-control study. *JAMA Intern Med*, 2018, 178, s. 229–238.
24 **Selvaraj, C. L. – Gurm, H. S. – Gupta, R., et al.**: Chronic obstructive pulmonary disease as a predictor of mortality in patients undergoing percutaneous coronary intervention. *Am J Cardiol*, 2005, 96, s. 756–759.
25 **Rothnie, K. J. – Connell, O. – Müllerová, H., et al.**: Myocardial infarction and ischemic stroke after exacerbations of chronic obstructive pulmonary disease. *Ann Am Thorac Soc*, 2018, 15, s. 935–946.
26 **Halpin, D. M. – Decramer, M. – Celli, B., et al.**: Risk of nonlower respiratory serious adverse events following COPD exacerbation in the 4-year UPLIFT trial. *Lung*, 2011, 189, s. 261–268.
27 **Rothnie, K. J. – Yan, R. – Smeeth, L., et al.**: Risk of myocardial infarction (MI) and death following MI in people with chronic obstructive pulmonary disease (COPD): a systematic review and meta-analysis. *BMJ Open*, 2015, 5, s. e007824.
28 **Wise, R. A. – Chapman, K. R. – Scirica, B. M., et al.**: Effect of aclidinium bromid on major cardiovascular events and exacerbation in high-risk patients with chronic obscructive pulmonary disease; The ASCENT-COPD randomized clinical trial. *JAMA*, 2019, 321, s. 1693–1701.

Fixní trojkombinace v léčbě symptomatické chronické obstrukční plicní nemoci – je čas k rozšíření indikačních kritérií?

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1 **Piquet, J. – Chavaillon, J. M. – David, P., et al.**: High-risk patients following hospitalisation for an acute exacerbation of COPD. *Eur Respir J*, 2013, 42, s. 946–955.
2 **Hurst, J. R. – Skolnik, N. – Hansen, G. J., et al.**: Understanding the impact of chronic obstructive pulmonary disease exacerbations on patient health and quality of life. *Eur J Intern Med*, 2020, 73, s. 1–6.
3 **Singh, D. – Papi, A. – Corradi, M., et al.**: Single inhaler triple therapy versus inhaled corticosteroid plus long-acting β_2-agonist therapy for chronic obstructive pulmonary disease (trilogy): a double-blind, parallel group, randomised controlled trial. *Lancet*, 2016, 388, s. 963–973.
4 **Vestbo, J. – Papi, A. – Corradi, M., et al.**: Single inhaler extrafine triple therapy versus long-acting muscarinic antagonist therapy for chronic obstructive pulmonary disease (TRINITY): a double-blind, parallel group, randomised controlled trial. *Lancet*, 2017, 389, s. 1919–1929.
5 **Papi, A. – Vestbo, J. – Fabbri, L., et al.**: Extrafine inhaled triple therapy versus dual bronchodilator therapy in chronic obstructive pulmonary disease (tribute): a double-blind, parallel group, randomised controlled trial. *Lancet*, 2018, 391, s. 1076–1084.
6 Global Initiative for Chronic Obstructive Lung Disease: Global Strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. Dostupné z: https://goldcopd.org, vyhlednáno 28. 12. 2018.
7 **Singh, D. – Fabbri, L. M. – Corradi, M., et al.**: Extrafine triple therapy in patients with symptomatic COPD and history of one moderate exacerbation. *Eur Respir J*, 2019, 1, 53, 1900235.
8 **Anzueto, A. R. – Kostikas, K. – Mezzi, K., et al.**: Indacaterol/glycopyrronium versus salmeterol/fluticasone in the prevention of clinically important deterioration in COPD: results from the FLAME study. *Respir Res*, 2018, 19, s. 121.
9 **Kato, M. – Tomii, K. – Hashimoto, K., et al.**: The IMPACT study – single inhaler triple therapy (FF/UMEC/VI) versus FF/VI and UMEC/VI in patients with COPD: efficacy and safety in a Japanese population. *Int J Chron Obstruct Pulmon Dis*, 2019, 14, s. 2849–2861.
10 **Halpin, D. M. – Dransfield, M. T. – Han, M. K., et al.**: The effect of exacerbation history on outcomes in the IMPACT trial. *Eur Respir J*, 2020, 1, 55.
11 **Ferguson, G. T. – Rabe, K. F. – Martinez, F. J., et al.**: Triple therapy with budesonide/glycopyrrolate/formoterol fumarate with co-suspension delivery technology versus dual therapies in chronic obstructive pulmonary disease (KRONOS): a double-blind, parallel-group, multicentre, phase 3 randomised controlled trial. *Lancet Respir Med*, 2018, 6, s. 747–758.

Klíčové vlastnosti inhalačních systémů a výhody modernizovaného systému Respimat z hlediska optimalizace léčby respiračních chorob

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1 **Kašák, V. – Kašáková, E.**: *Inhalační systémy v léčbě nemocí s chronickou bronchiální obstrukcí*. Maxdorf, Praha, 2017.
2 **Sanchis, J. – Gich, I. – Pedersen, S.**; Aerosol Drug Management Improvement Team (ADMIT): Systematic review of errors in inhaler use: has patient technique improved over time?. *Chest*, 2016, 150, s. 394–406.
3 **Dhand, R. – Eicher, J. – Hänsel, M., et al.**: Improving usability and maintaining performance: human-factor and aerosol-performance studies evaluating the new reusable Respimat inhaler. *Int J Chron Obstruct Pulmon Dis*, 2019, 14, s. 509–523.

Imunoterapie v první linii léčby nemalobuněčného karcinomu plic

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1 NCCN guidelines. Non-small cell lung cancer. Dostupné z: https://www.nccn.org/professionals/physician_gls/pdf/nscl_blocks.pdf, vyhledáno 10. 3. 2020.
2 ESMO guidelines. Metastatic Non-Small-Cell Lung Cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Dostupné z: https://www.esmo.org/Guidelines/Lung-and-Chest-Tumours/Metastatic-Non-Small-Cell-Lung-Cancer, vyhledáno 10. 3. 2020.
3 Modrá kniha České onkologické společnosti. Dostupné z: https://www.linkos.cz/files/modra-kniha/18.pdf, vyhledáno 10. 3. 2020.
4 Společnost českých patologů ČLS JEP. Nová pravidla pro testování prediktivních markerů (aktualizace z 8. 6. 2018), dostupné z: http://www.patologie.info/standardy/35, vyhledáno 10. 3. 2020.
5 Společnost českých patologů ČLS JEP. Konsenzus týkající se metodického aspektu vyšetřování a reportování exprese PD-L1. Dostupné z: http://www.patologie.info/standardy/28, vyhledáno 10. 3. 2020.
6 **Brahmer, J. R. – Rodriguez-Abreu, D. – Robinson, A. G., et al.**: Health-related quality-of-life results for pembrolizumab versus chemotherapy in advanced, PD-L1-positive NSCLC (KEYNOTE-024): a multicentre, international, randomised, open-label phase 3 trial. *Lancet Oncol*, 2017, 18, s. 1600–1609.
7 **Brahmer, J. R. – Rodríguez-Abreu, D. – Robinson, A., et al.**: OA 17.06 updated analysis of KEYNOTE-024: pembrolizumab vs platinum-based chemotherapy for advanced NSCLC with PD-L1 TPS 50%. *J Thorac Oncol*, 2017, 12, s. S1793–S1794.
8 **Gandhi, L. – Rodriguez-Abreu, D. – Gadgeel, S., et al.**: Pembrolizumab plus chemotherapy in metastatic non-small-cell lung cancer. *N Engl J Med*, 2018, 378, s. 2078–2092.
9 **Gadgeel, S. M. – Garassino, M. C. – Esteban, E., et al.**: KEYNOTE-189: Updated OS and progression after the next line of therapy (PFS2) with pembrolizumab (pembro) plus chemo with pemetrexed and platinum vs placebo plus chemo for metastatic nonsquamous NSCLC. *J Clin Oncol*, 2019, 39, suppl., abstrakt 9013.
10 **Socinski, M. A. – Jotte, R. M. – Cappuzzo, F., et al.**: Atezolizumab for first-line treatment of metastatic nonsquamous NSCLC. *N Engl J Med*, 2018, 378, s. 2288–2301.
11 **Reck, M. – Mok, T. S. K. – Nishio, M., et al.**: Atezolizumab plus bevacizumab and chemotherapy in non-small-cell lung cancer (IMpower150): key subgroup analyses of patients with EGFR mutations or baseline liver metastases in a randomised, open-label phase 3 trial. *Lancet Respir Med*, 2019, 7, s. 387–401.
12 **West, H. – McCleod, M. – Hussein, M., et al.**: Atezolizumab in combination with carboplatin plus nab-paclitaxel chemotherapy compared with chemotherapy alone as first-line treatment for metastatic non-squamous non-small-cell lung cancer (IMpower130): a multicentre, randomised, open-label, phase 3 trial. *Lancet Oncol*, 2019, 20, s. 924–937.
13 **Papadimitrakopoulou, V. – Cobo, M. – Bordon, R., et al.**: IMPOWER132: PFS and safety results with 1L atezolizumab + carboplatin/cisplatin + pemetrexed in stage IV non-squamous NSCLC. IASLC 19th World Conference on Lung Cancer 2018, abstrakt OA05.07.
14 **Paz-Ares, L. G. – Luft, A. – Vicente, D., et al.**: Pembrolizumab plus chemotherapy for squamous non-small-cell lung cancer. *N Engl J Med*, 2018, 379, s. 2040–2051.
15 **Jotte, R. M. – Cappuzzo, F. – Vynnychenko, I., et al.**: IMpower131: primary PFS and safety analysis of a randomized phase III study of atezolizumab + carboplatin + paclitaxel or nab-paclitaxel vs carboplatin

+ nab-paclitaxel as 1L therapy in advanced squamous NSCLC. *J Clin Oncol*, 2018, 36, suppl. 18, LBA9000.
15 **Hellmann, M. D. – Ciuleanu, T.-E. – Pluzanski, A., et al.**: Nivolumab plus ipilimumab in lung cancer with a high tumor mutational burden. *N Engl J Med*, 2018, 378, s. 2093–2104.
17 **Ramalingam, S. S. – Hellmann, M. D. – Awad, M. M., et al.**: Abstract CT078: tumor mutational burden (TMB) as a biomarker for clinical benefit from dual immune checkpoint blockade with nivolumab (nivo) + ipilimumab (ipi) in first-line (1L) non-small cell lung cancer (NSCLC): identification of TMB cutoff from CheckMate 568. *Cancer Res*, 2018, 78, CT078.

Imunoterapie malobuněčného karcinomu plic

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1 **Horn, L. – Mansfield, A. S. – Szczęsna, A., et al.**: First-line atezolizumab plus chemotherapy in extensive-stage small-cell lung cancer. *N Engl J Med*, 2018, 379, s. 2220–2229.
2 US National Institutes of Health. Durvalumab ± tremelimumab in combination with platinum based chemotherapy in untreated extensive-stage small cell lung cancer (CASPIAN). ClinicalTrials.gov, dostupné z: https://clinicaltrials.gov/ct2/show/NCT03043872?term=NCT03043872&rank=1, vyhledáno 10. 3. 2020.
3 A study of pembrolizumab (MK-3475) in Combination with etoposide/platinum (cisplatin or carboplatin) for participants with extensive stage small cell lung cancer (MK-3475-604/KEYNOTE-604). Dostupné z: https://clinicaltrials.gov/ct2/show/NCT03066778, vyhledáno 10. 3. 2020.
4 **Tucker, N.**: Pembrolizumab plus chemotherapy phase III study shows mixed results in SCLC. *Targeted Oncology*, publikováno online 8. 2. 2020.
5 **Scott, J. A. – Bendell, J. C. – Tailor, M. H., et al.**: Phase I/II study of nivolumab with or without ipilimumab for treatment of recurrent small cell lung cancer (SCLC): CA209-032. *J Clin Oncol*, 2015, 33, suppl., abstrakt 7503.
6 **Hellmann, M. D. – Ciuleanu, T. E. – Pluzanski, A., et al.**: Nivolumab plus ipilimumab in lung cancer with a high tumor mutational burden. *N Engl J Med*, 2018, 378, s. 2093–2104.
7 **Chung, H. Ch. – Lopez-Martin, J. A. – Kao, Ch. H., et al.**: Phase 2 study of pembrolizumab in advanced small-cell lung cancer (SCLC): KEYNOTE-158. *J Clin Oncol*, 2018, 36, suppl., s. 8506–8506.
8 US National Institutes of Health. Study of durvalumab + tremelimumab, durvalumab, and placebo in stage I-III limited disease small-cell lung cancer in patients who have not progressed following concurrent chemoradiation therapy (ADRIATIC). ClinicalTrials.gov, dostupné z: https://clinicaltrials.gov/ct2/show/NCT03703297?term=NCT03703297&rank=1, vyhledáno 10. 3. 2020.

Alectinib v léčbě ALK pozitivního nemalobuněčného karcinomu plic

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1 **Morris, S. W. – Kirstein, M. N. – Valentine, M. B., et al.**: Fusion of a kinase gene, ALK, to a nucleolar protein gene, NPM, in non-Hodgkin's lymphoma. *Science*, 1995, 267, s. 316–317.
2 **Roskoski, R.**: Anaplastic lymphoma kinase (ALK): structure, oncogenic activation, and pharmacological inhibition. *Pharmacol Res*, 2013, 68, s. 68–94.
3 **Soda, M. – Choi, Y. L. – Enomoto, M., et al.**: Identification of the transforming EML4-ALK fusion gene in non-small-cell lung cancer. *Nature*, 2007, 448, s. 561–566.
4 **Sasaki, T. – Rodig, S. J. – Chirieac, L. R., et al.**: The biology and treatment of EML4-ALK non-small cell lung cancer. *Eur J Cancer*, 2010, 46, s. 1773–1780.
5 **Passaro, A. – Lazzari, C. – Karachaliou, N., et al.**: Personalized treatment in advanced ALK-positive non-small cell lung cancer: from bench to clinical practice. *Onco Targets Ther*, 2016, 9, s. 6361–6376.
6 **Shaw, A. T. – Yeap, B. Y. – Mino-Kenudson, M., et al.**: Clinical features and outcome of patients with non-small-cell lung cancer who harbor EML4-ALK. *J Clin Oncol*, 2009, 27, s. 4247–4253.
7 **Bang, Y.-J.** : The potential for crizotinib in non-small cell lung cancer: a perspective review. *Ther Adv Med Oncol*, 2011, 3, s. 279–291.
8 **Solomon, B. J. – Mok, T. – Kim, D.-W., et al.**; PROFILE 1014 Investigators: First-line crizotinib versus chemotherapy in ALK-positive lung cancer. *N Engl J Med*, 2014, 371, s. 2167–2177.
9 **Shaw, A. T. – Kim, T. M. – Crinò, L., et al.**: Ceritinib versus chemotherapy in patients with ALK-rearranged non-small-cell lung cancer previously given chemotherapy and crizotinib (ASCEND-5): a randomised, controlled, open-label, phase 3 trial. *Lancet Oncol*, 2017, 18, s. 874–886.
10 **Novello, S. – Mazières, J. – Oh, I.-J., et al.**: Alectinib versus chemotherapy in crizotinib-pretreated anaplastic lymphoma kinase (ALK)-positive non-small-cell lung cancer: results from the phase III ALUR study. *Ann Oncol*, 2018, 29, s. 1409–1416.
11 **Camidge, D. R. – Kim, H. R. – Ahn, M.-J., et al.**: Brigatinib versus crizotinib in ALK-positive non-small-cell lung cancer. *N Engl J Med*, 2018, 379, s. 2027–2039.
12 **Solomon, B. J. – Besse, B. – Bauer, T. M., et al.**: Lorlatinib in patients with ALK-positive non-small-cell lung cancer: results from a global phase 2 study. *Lancet Oncol*, 2018, 19, s. 1654–1667.
13 **Pacheco, J. M. – Gao, D. – Smith, D., et al.**: Natural history and factors associated with overall survival in stage IV ALK-rearranged non-small cell lung cancer. *J Thorac Oncol*, 2019, 14, s. 691–700.
14 **Horn, L. – Infante, J. R. – Reckamp, K. L., et al.**: Ensartinib (X-396) in ALK-positive non-small cell lung cancer: results from a first-in-human phase I/II, multicenter study. *Clin Cancer Res*, 2018, 24, s. 2771–2779.
15 **Drilon, A. – Ou, S.-H. I. – Cho, B. C., et al.**: Repotrectinib (TPX-0005) is a next-generation ROS1/TRK/ALK inhibitor that potently inhibits ROS1/TRK/ALK solvent-front mutations. *Cancer Discov*, 2018, 8, s. 1227–1236.
16 **Lin, J. J. – Riely, G. J. – Shaw, A. T.**: Targeting ALK: precision medicine takes on drug resistance. *Cancer Discov*, 2017, 7, s. 137–155.
17 **Kodama, T. – Tsukaguchi, T. – Satoh, Y., et al.**: Alectinib shows potent antitumor activity against RET-rearranged non-small cell lung cancer. *Mol Cancer Ther*, 2014, 13, s. 2910–2918.
18 **Gadgeel, S. M. – Gandhi, L. – Riely, G. J., et al.**: Safety and activity of alectinib against systemic disease and brain metastases in patients with crizotinib-resistant ALK-rearranged non-small-cell lung cancer (AF-002JG): results from the dose-finding portion of a phase 1/2 study. *Lancet Oncol*, 2014, 15, s. 1119–1128.
19 **Yang, J. C.-H. – Ou, S.-H. I. – De Petris, L., et al.**: Pooled systemic efficacy and safety data from the pivotal phase II studies (NP28673 and NP28761) of alectinib in ALK-positive non-small cell lung cancer. *J Thorac Oncol*, 2017, 12, s. 1552–1560.
20 **Hida, T. – Nokihara, H. – Kondo, M., et al.**: Alectinib versus crizotinib in patients with ALK-positive non-small-cell lung cancer (J-ALEX): An open-label, randomised phase 3 trial. *Lancet*, 2017, 390, s. 29–39.
21 **Nakagawa, K. – Hida, T. – Nokihara, H., et al.**: Final progression-free survival results from the J-ALEX study of alectinib versus crizotinib in ALK-positive non-small-cell lung cancer. *Lung Cancer*, 2020, 139, s. 195–199.
22 **Gadgeel, S. – Peters, S. – Mok, T., et al.**: Alectinib versus crizotinib in treatment-naive anaplastic lymphoma kinase-positive (ALK+) non-small-cell lung cancer: CNS efficacy results from the ALEX study. *Ann Oncol*, 2018, 29, s. 2214–2222.
23 **Peters, S. – Camidge, D. R. – Shaw, A. T., et al.**; ALEX Trial Investigators: Alectinib versus crizotinib in untreated ALK-positive non-small-cell lung cancer. *N Engl J Med*, 2017, 377, s. 829–838.
24 **Camidge, D. R. – Dziadziuszko, R. – Peters, S., et al.**: Updated efficacy and safety data and impact of the EML4-ALK fusion variant on the efficacy of alectinib in untreated ALK-positive advanced non-small cell lung cancer in the global phase III ALEX study. *J Thorac Oncol*, 2019, 14, s. 1233–1243.
25 **Mok, T. – Camidge, D. R. – Gadgeel, S. M., et al.**: Updated overall survival and final progression-free survival data for patients with treatment-naïve advanced ALK-positive non-small-cell lung cancer in the ALEX study. *Ann Oncol*, 10. 5. 2020, DOI: https://doi.org/10.1016/j.annonc.2020.04.478.
26 **Rothenstein, J. M. – Chooback, N.**: ALK inhibitors, resistance development, clinical trials. *Curr Oncol*, 2018, 25, suppl. 1, s. S59–S67.
27 **Gainor, J. F. – Dardaei, L. – Yoda, S., et al.**: Molecular mechanisms of resistance to first- and second-generation ALK inhibitors in ALK-rearranged lung cancer. *Cancer Discov*, 2016, 6, s. 1118–1133.
28 **Dagogo-Jack, I. – Shaw, A. T.**: Crizotinib resistance: implications for therapeutic strategies. *Ann Oncol*, 2016, 27, suppl. 3, s. iii42–iii50.
29 **Garrido, P. – Conde, E. – de Castro, J., et al.**: Updated guidelines for predictive biomarker testing in advanced non-small-cell lung cancer: a national consensus of the Spanish Society of Pathology and the Spanish Society of Medical Oncology. *Clin Transl Oncol*, 2020, 22, s. 989–1003.
30 **McLeer-Florin, A. – Duruisseaux, M. – Pinsolle, J., et al.**: ALK fusion variants detection by targeted RNA-next generation sequencing and clinical responses to crizotinib in ALK-positive non-small cell lung cancer. *Lung Cancer*, 2018, 116, s. 15–24.
31 **Morcos, P. N. – Yu, L. – Bogman, K., et al.**: Absorption, distribution, metabolism and excretion (ADME) of the ALK inhibitor alectinib: results from an absolute bioavailability and mass balance study in healthy subjects. *Xenobiotica*, 2017, 47, s. 217–229.
32 **Sekiguchi, N. – Nagao, S. – Takanashi, K., et al.**: Preclinical evaluation of the potential for cytochrome P450 inhibition and induction of the selective ALK inhibitor, alectinib. *Xenobiotica*, 2017, 47, s. 1042–1051.
33 **Morcos, P. N. – Cleary, Y. – Guerini, E., et al.**: Clinical drug-drug interactions through cytochrome P450 3A (CYP3A) for the selective ALK inhibitor alectinib. *Clin Pharmacol Drug Dev*, 2017, 6, s. 280–291.
34 **Karachaliou, N. – Fernandez Bruno, M. – Bracht, J. W. P., et al.**: Profile of alectinib for the treatment of ALK-positive non-small cell lung cancer (NSCLC): patient selection and perspectives. *Onco Targets Ther*, 2019, 12, s. 4567–4575.
35 **Paik, J. – Dhillon, S.**: Alectinib: a review in advanced, ALK-positive NSCLC. *Drugs*, 2018, 78, s. 1247–1257.
36 **Planchard, D. – Popat, S. – Kerr, K., et al.**; ESMO Guidelines Committee: Metastatic non-small cell lung cancer: ESMO clinical practice guidelines for diagnosis, treatment and follow-up. *Ann Oncol*, 2018, 29, suppl. 4, s. iv192–iv237.
37 National Comprehensive Cancer Network (NCCN) Clinical Practice Guidelines in Oncology. Non-Small Cell Lung Cancer. Dostupné z: https://Www.Nccn.Org/Professionals/Physician_gls/Pdf/Nscl.Pdf, vyhledáno 27. 5. 2020.
38 **Soria, J.-C. – Tan, D. S. W. – Chiari, R., et al.**: First-line ceritinib versus platinum-based chemotherapy in advanced ALK-rearranged non-small-cell lung cancer (ASCEND-4): A randomised, open-label, phase 3 study. *Lancet*, 2017, 389, s. 917–929.
39 **Park, S. – Park, T. S. – Choi, C.-M., et al.**: Survival benefit of pemetrexed in lung adenocarcinoma patients with anaplastic lymphoma kinase gene rearrangements. *Clin Lung Cancer*, 2015, 16, s. e83–e89.
40 **Galuppini, F. – Dal Pozzo, C. A. – Deckert, J., et al.**: Tumor mutation burden: from comprehensive mutational screening to the clinic. *Cancer Cell Int*, 2019, 19, s. 209.
41 **Reck, M. – Mok, T. S. K. – Nishio, M., et al.**; IMpower150 Study Group: Atezolizumab plus bevacizumab and chemotherapy in non-small-cell lung cancer (IMpower150): key subgroup analyses of patients with EGFR mutations or baseline liver metastases in a randomised, open-label phase 3 trial. *Lancet Respir Med*, 2019, 7, s. 387–401.

Crizotinib v léčbě nemalobuněčného bronchogenního karcinomu s pozitivní přestavbou genu ROS1 – kazuistika

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1 **Davies, K. D. – Doebele, R. C.**: Molecular path ways: ROS1 fusion proteins in cancer. *Clin Cancer Res*, 2013, 19, s. 4040–4045.
2 **Kohno, T. – Nakaoku, T. – Tsuta, K., et al.**: Beyond ALK-RET, ROS1 and other oncogene fusions in lung cancer. *Transl Lung Cancer Res*, 2015, 4, s. 156–164.
3 **Zinsky, R.**: Metaanalysis of ROS1-positive lung cancer cases. *Eur Resp J*, 2016, 48, suppl. 60, PA2867; DOI: 10.1183/13993003.congress-2016.PA2867.
4 Souhrn údajů o přípravku crizotinib, SÚKL, dostupné z: https://www.ema.europa.eu/en/documents/product-information/xalkori-epar-product-information_cs.pdf, vyhledáno 10. 6. 2020.
5 **Shaw, A. T. – Ou, S.-H. – Bang, Y.-J.**: Crizotinib in ROS1 – rearranged

non-small-cell lung cancer. *N Engl J Med*, 2014, 371, s. 1963–1971.
6 **Shaw, A. T. – Riely, G. J. – Bang, Y.-J.**: Crizotinib in ROS1-rearranged advanced non-small-cell lung cancer (NSCLC): updated results, including overall survival, from PROFILE 1001. *An Oncol*, 2019, 30, s. 1121–1126.
7 **Bubendorf, L. – Büttner, R. – Al-Dayel, F., et al.**: Testing for ROS1 in non-small cell lung cancer: a review with recommendations. *Virchows Arch*, 2016, 469, s. 489–503.

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1 **Pakkala, S. – Ramalingam, S. S.**: Personalized therapy for lung cancer: Striking a moving target. *JCI Insight*, 2018, 3, e120858.
2 **Uguen, A. – De Braekeleer, M.**: ROS1 fusions in cancer: a review. *Future Oncol*, 2016, 12, s. 1911–1928
3 **Matsushime, H. – Wang, L. H. – Shibuya, M.**: Human c-ros-1 gene homologous to the v-ros sequence of UR2 sarcoma virus encodes for a transmembrane receptor like molecule. *Mol Cell Biol*, 1986, 6, s. 3000–3004.
4 **Lin, J. J. – Shaw, A. T.**: Recent advances in targeting ROS1 in lung cancer. *J Thor Oncology*, 2017, 12, s. 1611–1625.
5 **Selinger, C. I. – Li, B. T. – Pavlakis, N., et al.**: Screening for ROS1 gene rearrangements in non-small-cell lung cancer susing immunohistochemistry with FISH confirmation is an effective method to identify this rare target. *Histopathology*, 2017, 70, s. 402–411.
6 **Sehgal, K. – Patell, R. – Rangachari, D., et al.**: Targeting ROS1 rearrangements in non-small cell lung cancer with crizotinib and other kinase inhibitors. *Transl Cancer Res*, 2018, 7, suppl. 7, s. S779–S786.
7 **Shaw, A. T. – Riely, G. J. – Bang, Y. J., et al.**: Crizotinib in ROS1-rearranged advanced non-small-cell lung cancer (NSCLC): updated results, including overall survival, from PROFILE 1001. *Ann Oncol*, 2019, 30, s. 1121–1126, doi:10.1093/annonc/mdz131.
8 **Bergethon, K. – Shaw, A. T. – Ou, S. H., et al.**: ROS1 rearrangements define a unique molecular class of lung cancers. *J Clin Oncol*, 2012, 30, s. 863–870.
9 **Warth, A. – Muley, T. – Dienemann, H., et al.**: ROS1 expression and translocations in non-small-cell lung cancer: clinicopathological analysis of 1478 cases. *Histopathology*, 2014, 65, s. 187–194.
10 **McDermott, U. – Iafrate, A. J. – Gray, N. S., et al.**: Genomic alterations of anaplastic lymphoma kinase may sensitizes tumors to anaplastic lymphoma kinase inhibitors. *Cancer Res*, 2008, 68, s. 3389–3395.
11 **Gainor, J. F. – Tseng, D. – Yoda, S., et al.**: Patterns of metastatic spread and mechanisms of resistance to crizotinib in ROS1-positive non-small cell lung cancer. *JCO Precis Oncol*, 2017, 2017:10.1200/PO.17.00063.
12 **Shaw, A. T. – Solomon, B. J. – Chiari, R., et al.**: Lorlatinib in advanced ROS1-positive non-small-cell lung cancer: a multicentre, open-label, single-arm, phase 1–2 trial. *Lancet Oncol*, 2019, 20, s. 1691–1701.
13 **Ou, S. – Shaw, A. – Riely, G., et al.**: OA02.03 clinical activity of lorlatinib in patients with ROS1+ advanced non-small cell lung cancer: phase 2 study cohort EXP-6. *J Thorac Oncol*, 2018, 13, s. S322–S323.
14 NCCN Guidelines Version 6.2020, Non-Small Cell Lung Cancer. Dostupné z: www.nccn.org, vyhledáno 16. 6. 2020.
15 Prediktivní vyšetření solidních nádorů. Dostupné z: www.linkos.cz, vyhledáno 17. 6. 2020.