

# Literatura ACTA MEDICINAE 11–13/2024 Hematoonkologie | Hematologie | Onkologie

- 3 Profylaktická opatření a aktivní přístup ke komplikacím – klíčový faktor pro úspěšnost moderní imunoterapie**  
MUDr. Jana Mihályová Klinika hematoonkologie, FN Ostrava a LF OU, Ostrava  
doc. MUDr. Jakub Radocha, Ph.D. IV. interní hematologická klinika, Fakultní nemocnice a Lékařská fakulta UK v Hradci Králové  
prof. MUDr. Roman Hájek, CSc. Klinika hematoonkologie, FN Ostrava a LF OU, Ostrava
- 3 Cílená léčba akutních leukemii – zásadní pokrok s dokladovatelnými výstupy**  
MUDr. Barbora Dluhošová Klinika hematoonkologie, FN a LF OU, Ostrava  
MUDr. Zdeněk Koříštek, Ph.D. Klinika hematoonkologie, FN Ostrava; Klinika hematoonkologie a LF OU, Ostrava  
doc. MUDr. Mgr. Cyril Šálek, Ph.D. Ústav hematologie a krevní transfuze, Praha
- 4 Příklady genové terapie v hematologii: hemofilie a CAR-T lymfocyty**  
prof. MUDr. Petr Dulíček, Ph.D. IV. interní hematologická klinika, FN a LF UK v Hradci Králové  
MUDr. Jan Vydra, Ph.D. Ústav hematologie a krevní transfuze, Praha
- 4 Kdy bychom v hematologii měli či mohli zasahovat dříve? Příklad doutnajícího myelomu s vysokým rizikem**  
MUDr. Viera Sandecká, Ph.D. Interní hematologická a onkologická klinika, FN a LF MU, Brno,  
MUDr. Hana Plonková | prof. MUDr. Roman Hájek, CSc., Klinika hematoonkologie, FNO a LF OU, Ostrava
- 5 Minimální/měřitelná reziduální nemoc u krevních nádorových onemocnění v roce 2024**  
doc. MUDr. Tomáš Jelínek, Ph.D. Klinika hematoonkologie, FN Ostrava a LF OU, Ostrava  
doc. MUDr. Mgr. Cyril Šálek, Ph.D. Ústav hematologie a krevní transfuze, Praha  
doc. Mgr. Kateřina Machová Poláková, Ph.D. Ústav hematologie a krevní transfuze, Praha; Ústav patologické fyziologie, 1. LF UK, Praha  
MUDr. Martin Špaček, Ph.D. Centrální hematologické laboratoře ÚLBLD a I. interní klinika – klinika hematologie, 1. LF UK a VFN, Praha  
prof. MUDr. Vít Procházka, Ph.D. Hemato-onkologická klinika LF UP a FN Olomouc  
MUDr. Zdeněk Koříštek, Ph.D. Klinika hematoonkologie, FN Ostrava  
prof. MUDr. Roman Hájek, CSc. Klinika hematoonkologie, FN Ostrava a LF OU, Ostrava
- 6 Aktuální přehled hematoonkologických registrů v České republice**  
prof. MUDr. Vladimír Maisnar, Ph.D., MBA IV. interní hematologická klinika, FN Hradec Králové a LF UK, Hradec Králové  
prof. MUDr. Marek Trněný, CSc. I. interní klinika – klinika hematologie, 1. LF UK a VFN, Praha  
prof. MUDr. Michael Doubek, Ph.D. Interní hematologická a onkologická klinika FN Brno a LF MU, Brno  
prof. MUDr. Pavel Žák, Ph.D. IV. interní hematologická klinika, FN Hradec Králové, Katedra interních oborů, LF UK, Hradec Králové  
MUDr. Heidi Móćiková, Ph.D. Hematologická klinika, FN Královské Vinohrady a 3. LF UK, Praha  
doc. MUDr. Daniela Žáčková, Ph.D. Interní hematologická a onkologická klinika, FN Brno a LF MU, Brno  
doc. MUDr. Anna Jonášová, Ph.D. I. interní klinika – klinika hematologie, 1. LF UK a VFN, Praha  
doc. MUDr. Mgr. Cyril Šálek, Ph.D. Ústav hematologie a krevní transfuze, Praha  
prof. MUDr. Roman Hájek, CSc. Klinika hematoonkologie, FNO a LF OU, Ostrava
- 6 Vyléčitelnost krevních nádorů v roce 2024: kam jsme se posunuli za deset let?**  
**Část 1: Akutní leukemie a chronická myeloidní leukemie**  
prof. MUDr. Pavel Žák, Ph.D. IV. interní hematologická klinika, FN Hradec Králové; Katedra interních oborů, LF UK Hradec Králové, UK Praha  
doc. MUDr. Mgr. Cyril Šálek, Ph.D. Ústav hematologie a krevní transfuze, Praha  
doc. MUDr. Daniela Žáčková, Ph.D. Interní hematologická a onkologická klinika, Fakultní nemocnice Brno a Masarykova univerzita, Brno  
MUDr. Zdeněk Koříštek, Ph.D. Klinika hematoonkologie, FN Ostrava, Lékařská fakulta, Ostravská univerzita, Ostrava
- 7 Vyléčitelnost krevních nádorů v roce 2024: kam jsme se posunuli za deset let?**  
**Část 2: Lymfoproliferativní onemocnění**  
prof. MUDr. Roman Hájek, CSc., Klinika hematoonkologie, FN Olomouc a LF OU, Ostrava  
MUDr. Martin Šimkovič, Ph.D. IV. interní hematologická klinika, FN Hradec Králové; LF v Hradci Králové, UK Praha  
doc. MUDr. David Belada, Ph.D. IV. interní hematologická klinika, FN Hradec Králové; LF v Hradci Králové, UK Praha
- 8 Nádor a trombóza: stále dominují LMWH**  
prof. MUDr. Petr Dulíček, Ph.D. IV. interní hematologická klinika, FN a LF UK v Hradci Králové

- 8 Nové možnosti kombinované léčby paroxysmální noční hemoglobinurie**  
MUDr. Libor Červinek, Ph.D. Interní hematologická a onkologická klinika, LF MU a FN Brno
- 8 Dostarlimab v léčbě endometriálního karcinomu**  
prof. MUDr. Jindřich Fínek, Ph.D., MHA Onkologická a radioterapeutická klinika FN a LF UK, Plzeň
- 8 Adjuvantní léčba melanomu u stadií IIB a IIC**  
doc. MUDr. Radek Lakomý, Ph.D. | doc. MUDr. Alexandr Poprach, Ph.D. Klinika komplexní onkologické péče, Masarykův onkologický ústav; Klinika komplexní onkologické péče, Lékařská fakulta Masarykovy univerzity, Brno
- 9 Adjuvantní léčba světlobuněčného nádoru ledvin**  
doc. MUDr. Alexandr Poprach, Ph.D., doc. MUDr. Radek Lakomý, Ph.D. Klinika komplexní onkologické péče, Masarykův onkologický ústav a LF MU Brno
- 9 Lenvatinib a pembrolizumab v první linii léčby pokročilého renálního karcinomu – naše klinické zkušenosti**  
doc. MUDr. Hana Študentová, Ph.D. | MUDr. Anežka Zemánková | Mgr. Kateřina Holá, Ph.D. | MUDr. Martina Spisarová, Ph.D.  
Onkologická klinika, FN a LF Univerzity Palackého, Olomouc
- 9 Triple negativní karcinom prsu (TNBC) – pokroky v diagnostice a léčbě**  
prof. MUDr. Petra Tesařová, CSc. Ústav radiační onkologie FNB a 1. LF UK a Onkologická klinika VFN a 1. LF UK, Praha
- 10 Postavení imunoterapie v rámci systémové léčby nádorů horní části gastrointestinálního traktu**  
MUDr. Jiří Tomášek, Ph.D. Masarykův onkologický ústav, Brno
- 10 Karcinom plic na ASCO 2024**  
MUDr. Leona Koubková Pneumologická klinika 2. LF UK a FN v Motole, Praha
- 10 Současné trendy a pokroky v onkofertilitě**  
MUDr. Kateřina Veselá, Ph.D. REPROMEDA, s. r. o., Brno  
MUDr. Lenka Mekiňová | prof. MUDr. Martin Huser, Ph.D., MBA Gynekologicko-porodnická klinika FN Brno a LF MU, Brno
- 10 Italský Milán hostil 46. kongres ESPEN 2024 – odborníky zaujal i Nutrison s parenterálním podáním – reportáz**
- 10 Dědičná predispozice pro vznik karcinomu prostaty**  
MUDr. Tereza Piskáčková GHC Genetics

# Profylaktická opatření a aktivní přístup ke komplikacím – klíčový faktor pro úspěšnost moderní imunoterapie

MUDr. Jana Mihályová Klinika hematoonkologie, FN Ostrava a LF OU, Ostrava

doc. MUDr. Jakub Radocha, Ph.D. IV. interní hematologická klinika, Fakultní nemocnice a Lékařská fakulta UK v Hradci Králové

prof. MUDr. Roman Hájek, CSc. Klinika hematoonkologie, FN Ostrava a LF OU, Ostrava

- 1 Dreier, T. – Lorenczewski, G. – Brandl, Ch., et al.: Extremely potent, rapid and costimulation-independent cytotoxic T-cell response against lymphoma cells catalyzed by a single-chain bispecific antibody. *Int J Cancer*, 2002, 100, s. 690–697.
- 2 Cartellieri, M. – Bachmann, M. – Feldmann, A., et al.: Chimeric antigen receptor-engineered T cells for immunotherapy of cancer. *J Biomed Biotechnol*, 2010, 2010, 956304, doi: 10.1155/2010/956304.
- 3 Schuster, S. J. – Bishop, M. R. – Tam, C. S., et al.: Tisagenlecleucel in adult relapsed or refractory diffuse large B-cell lymphoma. *N Engl J Med*, 2019, 380, s. 45–56.
- 4 Kamdar, M. – Solomon, S. R. – Arnason, J., et al.: Lisocabtagene maraleucel versus standard of care with salvage chemotherapy followed by autologous stem cell transplantation as second-line treatment in patients with relapsed or refractory large B-cell lymphoma (TRANSFORM): results from an interim analysis of an open-label, randomised, phase 3 trial. *Lancet*, 2022, 399, s. 2294–2308.
- 5 Locke, F. L. – Miklos, D. B. – Jacobson, C. A., et al.: Axicabtagene ciloleucel as second-line therapy for large B-cell lymphoma. *N Engl J Med*, 2022, 386, s. 640–654.
- 6 Shah, B. D. – Ghobadi, A. – Oluwole, O. O., et al.: KTE-X19 for relapsed or refractory adult B-cell acute lymphoblastic leukaemia: phase 2 results of the single-arm, open-label, multicentre ZUMA-3 study. *Lancet*, 2021, 398, s. 491–502.
- 7 Wang, M. – Munoz, J. – Goy, A., et al.: KTE-X19 CAR-T-cell therapy in relapsed or refractory mantle-cell lymphoma. *N Engl J Med*, 2020, 382, s. 1331–1342.
- 8 Berdeja, J. G. – Madduri, D. – Usmani, S. Z., et al.: Ciltacabtagene autoleucel, a B-cell maturation antigen-directed chimeric antigen receptor T-cell therapy in patients with relapsed or refractory multiple myeloma (CARTITUDE-1): a phase 1b/2 open-label study. *Lancet*, 2021, 398, s. 314–324.
- 9 Munshi, N. C. – Anderson, L. D. – Shah, N., et al.: Idecabtagene vicleucel in relapsed and refractory multiple myeloma. *N Engl J Med*, 2021, 384, s. 705–716.
- 10 Budde, L. E. – Sehn, L. H. – Matasar, M., et al.: Safety and efficacy of mosunetuzumab, a bispecific antibody, in patients with relapsed or refractory follicular lymphoma: a single-arm, multicentre, phase 2 study. *Lancet Oncol*, 2022, 23, s. 1055–1065.
- 11 Dickinson, M. J. – Carlo-Stella, C. – Morschhauser, F., et al.: Glotofamab for relapsed or refractory diffuse large B-cell lymphoma. *N Engl J Med*, 2022, 387, s. 2220–2231.
- 12 Thieblemont, C. – Phillips, T. – Ghesquieres, H., et al.: Epcoritamab, a novel, subcutaneous CD3xCD20 bispecific T-cell-engaging antibody, in relapsed or refractory large B-cell lymphoma: dose expansion in a phase I/II trial. *J Clin Oncol*, 2023, 41, doi: https://doi.org/10.1200/JCO.22.0172.
- 13 Chari, A. – Minnema, M. C. – Berdeja, J. G., et al.: Talquetamab, a T-cell-redirection GPRC5D bispecific antibody for multiple myeloma. *N Engl J Med*, 2022, 387, s. 2232–2244.
- 14 Lesokhin, A. M. – Tomasson, M. H. – Arnulf, B., et al.: Elranatamab in relapsed or refractory multiple myeloma: phase 2 MagnetisMM-3 trial results. *Nat Med*, 2023, 29, s. 2259–2267.
- 15 Moreau, P. – Garfall, A. L. – van de Donk, N. W. C. J., et al.: Teclistamab in relapsed or refractory multiple myeloma. *N Engl J Med*, 2022, 387, s. 495–505.
- 16 Hayden, P. J. – Roddie, C. – Bader, P., et al.: Management of adults and children receiving CAR-T-cell therapy: 2021 best practice recommendations of the European Society for Blood and Marrow Transplantation (EBMT) and the Joint Accreditation Committee of ISCT and EBMT (JACIE) and the European Haematology Association (EHA). *Ann Oncol*, 2022, 33, s. 259–275.
- 17 Lee, D. W. – Santomasso, B. D. – Locke, F. L., et al.: ASTCT consensus grading for cytokine release syndrome and neurologic toxicity associated with immune effector cells. *Biol Blood Marrow Transplant*, 2019, 25, s. 625–638.
- 18 Rejeski, K. – Perez, A. – Sesques, P., et al.: CAR-HEMATOTOX: a model for CAR-T-cell-related hematologic toxicity in relapsed/refractory large B-cell lymphoma. *Blood*, 2021, 138, s. 2499–2513.
- 19 Rejeski, K. – Subklewe, M. – Aljurif, M., et al.: Immune effector cell-associated hematotoxicity: EHA/EBMT consensus grading and best practice recommendations. *Blood*, 2023, 142, s. 865–877.
- 20 Cohen, A. D. – Parekh, S. – Santomasso, B. D., et al.: Incidence and management of CAR-T neurotoxicity in patients with multiple myeloma treated with ciltacabtagene autoleucel in CARTITUDE studies. *Blood Cancer J*, 2022, 12, 32.
- 21 Kathari, Y. K. – Ahmad, H. – Kallen, M. E., et al.: Immune-mediated facial nerve paralysis in a myeloma patient post B-cell maturation antigen-targeted chimeric antigen receptor T cells. *Haematologica*, 2024, 109, s. 682–688.
- 22 Van Oekelen, O. – Aleman, A. – Upadhyaya, B., et al.: Neurocognitive and hypokinetic movement disorder with features of parkinsonism after BCMA-targeting CAR-T cell therapy. *Nat Med*, 2021, 27, s. 2099–2103.
- 23 Hines, M. R. – Knight, T. E. – McNerney, K. O., et al.: Immune effector cell-associated hemophagocytic lymphohistiocytosis-like syndrome. *Transplant Cell Ther*, 2023, 29, s. 438.e1–438.e16.
- 24 Narkhede, M. – Di Stasi, A. – Bal, S., et al.: Interim analysis of investigator-initiated phase 2 trial of siltuximab in treatment of cytokine release syndrome and immune effector cell associated neurotoxicity related to CAR T-cell therapy. *Transplant Cell Ther*, 2023, 29, s. S133–S134.
- 25 Nath, K. – Devlin, S. M. – Sauter, C. S., et al.: A phase II trial of prophylactic anakinra to prevent neurotoxicity in patients receiving anti-CD19 CAR-T-cell therapy for relapsed or refractory lymphoma: final results from cohort 2. *Blood*, 2023, 142, suppl. 1, s. 357.
- 26 Park, J. H. – Nath, K. – Devlin, S. M., et al.: CD19 CAR-T-cell therapy and prophylactic anakinra in relapsed or refractory lymphoma: phase 2 trial interim results. *Nat Med*, 2023, 29, s. 1710–1717.
- 27 Mailankody, S. – Devlin, S. M. – Landa, J., et al.: GPRC5D-targeted CAR-T cells for myeloma. *N Engl J Med*, 2022, 387, s. 1196–1206.
- 28 Drayson, M. T. – Bowcock, S. – Planche, T., et al.: Levofloxacin prophylaxis in patients with newly diagnosed myeloma (TEAMM): a multicentre, double-blind, placebo-controlled, randomised, phase 3 trial. *Lancet Oncol*, 2019, 20, s. 1760–1772.
- 29 Smith, M. – Dai, A. – Ghilardi, G., et al.: Gut microbiome correlates of response and toxicity following anti-CD19 CAR-T-cell therapy. *Nature Med*, 2022, 28, s. 713–723.
- 30 Mohan, M. – Chakraborty, R. – Bal, S., et al.: Recommendations on prevention of infections during chimeric antigen receptor T-cell and bispecific antibody therapy in multiple myeloma. *Br J Haematol*, 2023, 203, s. 736–746.
- 31 Mazahreh, F. – Mazahreh, L. – Schinke, C., et al.: Risk of infections associated with the use of bispecific antibodies in multiple myeloma: a pooled analysis. *Blood Adv*, 2023, 7, s. 3069–3074.
- 32 Raju, N. S. – Anaisie, E. – Kumar, S. K., et al.: Consensus guidelines and recommendations for infection prevention in multiple myeloma: a report from the International Myeloma Working Group. *Lancet Haematol*, 2022, 9, s. 143–161.
- 33 Van Oekelen, O. – Van Kesteren, M. – Aleman, A., et al.: 3530 Timing of vaccination impacts serological response to COVID-19 myeloma patients after BCMA-targeted CAR-T. Dostupné z: <https://ash.confex.com/ash/2023/webprogram/Paper184409.html>, vyhledáno 22. 8. 2024.
- 34 Ludwig, H. – Kumar, S.: Prevention of infections including vaccination strategies in multiple myeloma. *Am J Hematol*, 2023, 98, suppl. 2, s. S46–S62.
- 35 Meir, J. – Abid, M. A. – Abid, M. B.: State of the CAR-T: risk of infections with chimeric antigen receptor T-cell therapy and determinants of SARS-CoV-2 vaccine responses. *Transplant Cell Ther*, 2021, 27, s. 973–987.

# Cílená léčba akutních leukemí – zásadní pokrok s dokladovatelnými výstupy

MUDr. Barbora Dluhošová Klinika hematoonkologie, FN a LF OU, Ostrava

MUDr. Zdeněk Koříštek, Ph.D. Klinika hematoonkologie, FN Ostrava; Klinika hematoonkologie a LF OU, Ostrava

doc. MUDr. Mgr. Cyril Šálek, Ph.D. Ústav hematologie a krevní transfuze, Praha

- 1 Zatloukalová, S. – Azeem, K. – Čerňan, M., et al.: Epidemiology, risk factors and possibilities for the prevention of acute leukaemia. *Epidemiol Mikrobiol Immunol*, 2021, 70, s. 208–220.
- 2 Peiper, S. C. – Ashmun, R. A. – Look, A. T.: Molecular cloning, expression, and chromosomal localization of a human gene encoding the CD33 myeloid differentiation antigen. *Proc Natl Acad Sci U S A*, 1988, 72, s. 314–321.
- 3 Lambert, J. – Pautas, C. – Terré, C., et al.: Gemtuzumab ozogamicin for de novo acute myeloid leukemia: final efficacy and safety updates from the open-label, phase III ALFA-0701 trial. *Haematologica*, 2019, 104, s. 113–119.
- 4 Negrete, C. – Colita, A. – Mitu, I., et al.: A review of FLT3 kinase inhibitors in AML. *J Clin Med*, 2023, 12, s. 6429.
- 5 Lachowicz, C. A. – DiNardo, C. D. – Loghavi, S.: Molecularly targeted therapy in acute myeloid leukemia: current treatment landscape and mechanisms of response and resistance. *Cancer*, 2023, 15, s. 1617.
- 6 De Botton, S. – Montesinos, P. – Vives Polo, S., et al.: Updated efficacy and safety data from the AGILE study in patients with newly diagnosed acute myeloid leukemia treated with ivosidenib + azacitidine compared to placebo + azacitidine. *J Clin Oncol*, 2023, 41, suppl. 16, s. 7012.
- 7 DiNardo, C. D. – Jonas, B. A. – Pullarkat, V., et al.: Azacitidine and venetoclax in previously untreated acute myeloid leukemia. *N Engl J Med*, 2020, 383, s. 617–629.
- 8 Fuqua, J.: 1487 Effectiveness of Intensive Chemotherapy with 7+3 Versus Vidaza and Venetoclax in Acute Myeloid Leukemia with Sequential Stem Cell Transplant: Results from Real-World Cohorts. Dostupné z: <https://ash.confex.com/ash/2023/webprogram/Paper187949.html>, vyhledáno 26. 8. 2024.
- 9 Yilmaz, M. – Kantarjian, H. – Short, N. J., et al.: Hypomethylating agent and venetoclax with FLT3 inhibitor „triplet“ therapy in older/unfit patients with FLT3 mutated AML. *Blood Cancer J*, 2022, 12, s. 77.
- 10 Suo, X. – Zheng, F. – Wang, D., et al.: Venetoclax combined with daunorubicin and cytarabine (2+6) as induction treatment in adults with newly diagnosed acute myeloid leukemia: a phase 2, multicenter, single-arm trial. *Exp Hematol Oncol*, 2023, 12, s. 45.
- 11 Sanz, M. A. – Montesinos, P. – Rayón, C., et al.: PETHEMA and HOVON Groups: Risk-adapted treatment of acute promyelocytic leukemia based on all-trans retinoic acid and anthracycline with addition of cytarabine in consolidation therapy for high-risk patients: further improvements in treatment outcome. *Blood*, 2010, 115, s. 5137–5146.
- 12 Sanz, M. A. – Montesinos, P. – Kim, H. T., et al.: IC-APL and PETHEMA and HOVON Groups: All-trans retinoic acid with daunorubicin or idarubicin for risk-adapted treatment of acute promyelocytic leukemia: a matched-pair analysis of the PETHEMA LPA-2005 and IC-APL studies. *Ann Hematol*, 2015, 94, s. 1347–1356.
- 13 Lo Coco, F. – Avvisati, G. – Vignetti, M., et al.: Retinoic acid and arsenic trioxide for acute promyelocytic leukemia. *N Engl J Med*, 2013, 369, s. 111–121.
- 14 Platzbecker, U. – Avvisati, G. – Cicconi, L., et al.: Improved outcomes with retinoic acid and arsenic trioxide compared with retinoic acid and chemotherapy in non-high-risk acute promyelocytic leukemia: final results of the randomized Italian-German APL0406 trial. *J Clin Oncol*, 2017, 35, s. 605–612.
- 15 Burnett, A. K. – Russell, N. H. – Hills, R. K., et al.: UK National Cancer Research Institute Acute Myeloid Leukaemia Working Group: Arsenic trioxide and all-trans retinoic acid treatment for acute promyelocytic leukemia in all risk groups (AML17): results of a randomised, controlled, phase 3 trial. *Lancet Oncol*, 2015, 16, s. 1295–1305.
- 16 Schwarz, J. – Koříštek, Z. – Starý, J., et al.: Léčba akutní promyelocytární leukemie v Česku: výsledky a analýza prognostických faktorů. *Vnitř Lék*, 2008, 54, s. 773–770.
- 17 Jabbour, E. – DerSarkissian, M. – Duh, M. S., et al.: Efficacy of ponatinib versus earlier generation tyrosine kinase inhibitors for front-line treatment of newly diagnosed Philadelphia-positive acute lymphoblastic leukemia. *Clin Lymphoma Myeloma Leuk*, 2018, 18, s. 257–265.
- 18 Tran, T. H. – Tasian, S. K.: How I treat Philadelphia chromosome-like acute lymphoblastic leukemia in children, adolescents, and young adults. *Blood*, 2024, doi: 10.1182/blood.2023023153.
- 19 Kantarjian, H. – Stein, A. – Gokbuget, N., et al.: Blinatumomab versus chemotherapy for advanced acute lymphoblastic leukemia. *N Engl J Med*, 2017, 376, s. 836–847.
- 20 Litzow, M. – Sun, Z. – Mattison, R., et al.: Blinatumomab for MRD-negative acute lymphoblastic leukemia in adults. *N Engl J Med*, 2024, 391, s. 320–333.
- 21 Foà, R. – Bassan, R. – Vitale, A., et al.: Dasatinib-blinatumomab for

- Ph-positive acute lymphoblastic leukemia in adults. *N Engl J Med*, 2020, 383, s. 1613–1623.
- 22 **Jabbour, E. – Short, N. – Jain, N., et al.:** Ponatinib and blinatumomab for Philadelphia chromosome-positive acute lymphoblastic leukemia: a US, single-centre, single-arm, phase 2 trial. *Lancet Haematol*, 2023, 10, s. e24–e34.
- 23 **Kantarjian, H. M. – DeAngelo, D. J. – Stelljes, M., et al.:** Inotuzumab ozogamicin versus standard of care in relapsed or refractory acute lymphoblastic leukemia: Final report and long-term survival follow-up from the randomized, phase 3 INO-VATE study. *Cancer*, 2019, 125, s. 2474–2487.
- 24 **Stelljes, M. – Raffel, S. – Alakel, N., et al.:** Inotuzumab ozogamicin as induction therapy for patients older than 55 years with Philadelphia chromosome-negative B-precursor ALL. *J Clin Oncol*, 2024, 42, s. 273–282.
- 25 **Laetsch, T. W. – Maude, S.L. – Rives, S., et al.:** Three-year update of tisagenlecleucel in pediatric and young adult patients with relapsed/refractory acute lymphoblastic leukemia in the ELIANA trial. *J Clin Oncol*, 2023, 41, s. 1664–1669.
- 26 **Shah, B. D. – Ghobadi, A. – Oluwole, O. O., et al.:** KTE-X19 for relapsed or refractory adult B-cell acute lymphoblastic leukaemia: phase 2 results of the single-arm, open-label, multicentre ZUMA-3 study. *Lancet*, 2021, 398, s. 491–502.

## Příklady genové terapie v hematologii: hemofilie a CAR-T lymfocyty

**prof. MUDr. Petr Dulíček, Ph.D.** IV. interní hematologická klinika, FN a LF UK v Hradci Králové

**MUDr. Jan Vydra, Ph.D.** Ústav hematologie a krevní transfuze, Praha

### Literatura pro 1. část (hemofilie)

- Roth, D. A. – Tawa, Jr. N. E. – O'Brien, J. M., et al.: Nonviral transfer of the gene encoding coagulation factor VIII in patients with severe hemophilia A. *N Engl J Med*, 2001, 344, s. 1735–1742.
- Manno, C. S. – Chew, A. J. – Hutchison, S., et al.: AAV-mediated factor IX gene transfer to skeletal muscle in patients with severe hemophilia B. *Blood*, 2003, 101, s. 2963–2972.
- Powell, J. S. – Ragni, M. V. – White, G. C. 2<sup>nd</sup>, et al.: Phase 1 trial of FVII gene transfer for severe hemophilia A using a retroviral construct administered by peripheral intravenous infusion. *Blood*, 2003, 102, s. 2038–2045.
- Manno, C. S. – Pierce, G. F. – Arruda, V. R., et al.: Successful transduction of liver in hemophilia by AAV-Factor IX and limitations imposed by the host immune response. *Nat Med*, 2006, 12, s. 342–347.
- Nathwani, A. C. – Tuddenham, E. G. – Rangarajan, S., et al.: Adeno-virus-associated virus vector-mediated gene transfer in hemophilia B. *N Engl J Med*, 2011, 365, s. 2357–2365.
- Gao, G. P. – Alvira, M. R. – Wang, L., et al.: Novel adeno-associated viruses from rhesus monkeys as vectors for human gene therapy. *Proc Natl Acad Sci U S A* 2002 Sep 3;99(18):11854–11859.
- Haas, J. – Park, E. C. – Seed, B.: Codon usage limitation in the expression of HIV-1 envelope glycoprotein. *Curr Biol*, 1996, 6, s. 315–324.
- High, K. A.: Gene therapy for haemophilia: a long and winding road. *J Thromb Haemost*, 2011, 9, suppl. 1, s. 2–11.
- Chou, S.-Ch. – Hsu, Y. Ch. – Lin, S.-W.: Gene therapy for hemophilia, a clinical viewpoint. *J Formos Med Assoc*, 2023, 122, s. 1101–1110.
- Mahlangu, J. – Kaczmarek, R. – von Drygalski, A., et al.: Two-year outcomes of valoctocogene roxaparvovec therapy for hemophilia A. *N Engl J Med*, 2023, 388, s. 694–705.
- Pipe, S. W. – Leebeek, F. W. G. – Recht, M., et al.: Gene therapy with etranacogene dezaparvovec for hemophilia B. *N Engl J Med*, 2023, 388, s. 706–718.
- Chowdary, P. – Shapiro, S. – Makris, M., et al.: Phase 1-2 trial of AAVS3 gene therapy in patients with hemophilia B. *N Engl J Med*, 2022, 387, s. 237–247.

- Visweshwar, N. – Harrington, T. J. – Leavitt, A. D., et al.: Updated results of the Alta study, a phase 1/2 study of giroctocogene fitiparvovec (PF-0705480/SB-525) gene therapy in adults with severe hemophilia A. 63<sup>rd</sup> ASH; 5. 11. 2021; Atlanta, USA. *Blood*, 2021, 138, suppl. 1, s. 564. Dostupné z: <https://www.sciencedirect.com/science/article/pii/S0006497121025568>, vyhledáno 20. 8. 2024.
- Pipe, S. W. – Sheehan, J. P. – Coppens, M., et al.: First-in-human dose-finding study of AAVhu37 vector-based gene therapy: BAY 2599023 has stable and sustained expression of FVIII over 2 years. 63<sup>rd</sup> ASH; 5. 11. 2021; Atlanta, USA. *Blood*, 2021, 138, suppl. 1, s. 3971. Dostupné z: <https://www.sciencedirect.com/science/article/pii/S0006497121058869>, vyhledáno 20. 8. 2024.
- Konkle, B. A. – Walsh, Ch. E. – Escobar, M. A., et al.: BAX 335 hemophilia B gene therapy clinical trial results: potential impact of CpG sequences on gene expression. *Blood*, 2021, 137, s. 763–774.
- George, L. A. – Monahan, P. E., et al.: Multiyear factor VIII expression after AAV gene transfer for hemophilia A. *N Engl J Med*, 2021, 385, s. 1961–1973.
- George, L. A. – Sullivan, S., et al.: Efficacy and safety in 15 hemophilia B patients treated with the AAV gene therapy vector fidanacogene elaparvovec and followed for at least 1 year. DOI:10.1182/blood-2019-124091.
- Jeune, V. L. – Joergensen, J. A. – Hajjar, R. J., et al.: Pre-existing anti-adeno-associated virus antibodies as a challenge in AAV gene therapy. *Hum Gene Ther Methods*, 2013, 24, s. 59–67.
- Pipe, S. W. – Recht, M. – Key, N. S. – Leebeek, F. W. G.: First data from the phase 3 HOPE-B gene therapy trial: efficacy and safety of etranacogene dezaparvovec (AAV5-Padua hFVIX variant; AMT-061) in adults with severe or moderate-severe hemophilia B treated irrespective of pre-existing anti-capsid neutralizing antibodies. *Blood*, 2020, 136, suppl. 2, LBA-6-LBA-6, DOI:10.1182/blood-2020-143560.
- Simoni, P. – Tormene, D. – Tognin, G., et al.: X-linked thrombophilia with a mutant factor IX (factor IX Padua). *N Engl J Med*, 2009, 361, s. 1671–1675.
- Thornburg, C. D.: Etranacogene dezaparvovec for

- hemophilia B gene therapy. *Ther Adv Respir Dis*, 24. 11. 2021, doi: 10.1177/2630040211058896.

- George, L. A. – Monahan, P. E. – Eyster, M. E., et al.: Multiyear factor VIII expression after AAV gene transfer for hemophilia A. *N Engl J Med*, 2021, 385, s. 1961–1973.

- Jacobson, C. A. – Munoz, J. – Sun, F., et al.: Real-world outcomes with chimeric antigen receptor T cell therapies in large B cell lymphoma: a systematic review and meta-analysis. *Transplantation and Cellular Therapy*, 2024, 30, s. 77.el–77.e15.

### Literatura pro 2. část (CAR-T lymfocyty)

- Bassan, D. – Weinberger, L. – Yi, Y., et al.: HER2 and HLA-A\*02 dual CAR-T cells utilize LOH in a NOT logic gate to address on-target off-tumor toxicity. *J Immunother Cancer*, 2023, 11, e007426.
- Halliwel, E. – Vitali, A. – Muller, H., et al.: Targeting of low ALK antigen density neuroblastoma using AND logic-gated engineered CAR-T cells. *Cyotherapy*, 2023, 25, s. 46–58.
- Boucher, J. C. – Shrestha, B. – Vishwasrao, P., et al.: Bispecific CD33/CD123 targeted chimeric antigen receptor T cells for the treatment of acute myeloid leukemia. *Mol Ther Oncolytics*, 2023, 31, 100751.
- Tousley, A. M. – Rotiroti, M. C. – Labanieh, L., et al.: Co-opting signalling molecules enables logic-gated control of CART cells. *Nature*, 2023, 615, s. 507–516.
- Yin, Y. – Zhang, P. – He, L., et al.: Parallel CD19/CD20 CAR-activated T-cells are more effective for refractory B-cell lymphoma in vitro and in vivo. *Evid Based Complement Alternat Med*, 2022, 2022, 1227308.
- Lonéz, C. – Breman, E.: Allogeneic CAR-T therapy technologies: Has the promise been met? *Cells*, 2024, 13, s. 146.
- Blud, D. – Rubio-Reyes, P. – Perret, R., et al.: Tuning CAR-T-cell therapies for efficacy and reduced toxicity. *Semin Hematol*, 2024, S0037-1963(24)00082-9, doi: 10.1053/j.seminhematol.2024.07.003.
- Lu, L. – Xie, M. – Yang, B., et al.: Enhancing the safety of CAR-T cell therapy: Synthetic genetics switch for spatio temporal control. *Sci Adv*, 2024, 10, eadj6251.

## Kdy bychom v hematologii měli či mohli zasahovat dříve? Příklad doutnajícího myelomu s vysokým rizikem

**MUDr. Viera Sandecká, Ph.D.** Interní hematologická a onkologická klinika, FN a LF MU, Brno,

**MUDr. Hana Plonková | prof. MUDr. Roman Hájek, CSc., Klinika hematoonkologie, FNO a LF OU, Ostrava**

- Landgren, O. – Kyle, R. A. – Pfeiffer, R. M., et al.: Monoclonal gammopathy of undetermined significance (MGUS) consistently precedes multiple myeloma: a prospective study. *Blood*, 2009, 113, s. 5412–5417.
- Weiss, B. M. – Abadie, J. – Verma, P., et al.: A monoclonal gammopathy precedes multiple myeloma in most patients. *Blood*, 2009, 113, s. 5418–5422.
- Kyle, R. A. – Larson, D. R. – Therneau, T. M., et al.: Long-term follow-up of monoclonal gammopathy of undetermined significance. *N Engl J Med*, 2018, 378, s. 241–249.
- Mateos, M. V. – Kumar, S. – Dimopoulos, M. A., et al.: International Myeloma Working Group risk stratification model for smoldering multiple myeloma (SMM). *Blood Cancer J*, 2020, 10, s. 102.
- Mateos, M. V. – Hernandez, M. T. – Giraldo, P., et al.: Lenalidomide plus dexamethasone versus observation in patients with high-risk smoldering multiple myeloma (QuiRedex): long-term follow-up of a randomised, controlled, phase 3 trial. *Lancet Oncol*, 2016, 17, s. 1127–1136.
- Rajkumar, S. V. – Dimopoulos, M. A. – Palumbo, A., et al.: International Myeloma Working Group updated criteria for the diagnosis of multiple myeloma. *Lancet Oncol*, 2014, 15, s. e538–e548.
- Merz, M. – Hielscher, T. – Wagner, B., et al.: Predictive value of longitudinal whole-body magnetic resonance imaging in patients with smoldering multiple myeloma. *Leukemia*, 2014, 28, s. 1902–1908.
- Zamagni, E. – Nanni, C. – Gay, F., et al.: 18F-FDG PET/CT focal, but not osteolytic, lesions predict the progression of smoldering myeloma to active disease. *Leukemia*, 2016, 30, s. 417–422.
- Mateos, M. V. – Hernández, M. T. – Giraldo, P., et al.: Lenalidomide plus dexamethasone for high-risk smoldering multiple myeloma. *N Engl J Med*, 2013, 369, s. 438–447.
- Landgren, O. – Kyle, R. A. – Rajkumar, S. V.: From myeloma precursor disease to multiple myeloma: new diagnostic concepts and opportunities for early intervention. *Clin Cancer Res*, 2011, 17, s. 1243–1252.
- Lakshman, A. – Rajkumar, S. V. – Buadi, F. K., et al.: Risk stratification of smoldering multiple myeloma incorporating revised IMWG diagnostic criteria. *Blood Cancer J*, 2018, 8, s. 59.
- Pérez-Persona, E. – Vidriales, M. B. – Mateo, G., et al.: New criteria to identify risk of progression in monoclonal gammopathy of uncertain significance and smoldering multiple myeloma based on multiparameter flow cytometry analysis of bone marrow plasma cells. *Blood*, 2007, 110, s. 2586–2592.
- Hájek, R. – Sandecká, V. – Špička, I., et al.: Identification of patients with smoldering multiple myeloma at ultra-high risk of progression using serum parameters: the Czech Myeloma Group model. *Br J Haematol*, 2020, 190, s. 189–197.
- Lakshman, A. – Paul, S. – Rajkumar, S. V., et al.: Prognostic significance of interphase FISH in monoclonal gammopathy of undetermined significance. *Leukemia*, 2018, 32, s. 1811–1815.
- Ravi, P. – Kumar, S. – Larsen, J. T., et al.: Evolving changes in disease biomarkers and risk of early progression in smoldering multiple myeloma. *Blood Cancer J*, 2016, 6, s. e454.
- Fernandez de Larrea, C. – Isola, I. – Pereira, A., et al.: Evolving M-protein pattern in patients with smoldering multiple myeloma: impact on early progression. *Leukemia*, 2018, 32, s. 1427–1434.
- Rajkumar, S. V. – Kumar, S. – Lonial, S., et al.: Smoldering multiple myeloma current treatment algorithms. *Blood Cancer J*, 2022, 12, s. 129.
- Sandecká, V. – Popkova, T. – Stork, M., et al.: Clinical characteristics and outcomes in risk-stratified patients with smoldering multiple myeloma: data from the Czech Republic Registry of Monoclonal Gammopathies. *Blood Cancer J*, 2023, 13, s. 153.
- Lonial, S. – Dhodapkar, M. V. – Rajkumar, S. V.: Smoldering myeloma and the art of war. *J Clin Oncol*, 2020, 38, s. 2363–2365.
- Mateos, M. V. – Rodriguez Otero, P. – Koh, Y., et al.: Isatuximab in combination with lenalidomide and dexamethasone in patients with high-risk smoldering multiple myeloma: updated safety run-in results from the randomized phase 3 Ithaca Study. *Blood*, 2022, 140, suppl. 1, s. 7317–7319.
- Mateos, M. V. – Hernández, M. T. – Salvador, C., et al.: Lenalidomide-dexamethasone versus observation in high risk smoldering myeloma after 12 years of median follow-up time: A randomized, open-label study. *Eur J Cancer*, 2022, 174, s. 243–250.
- Riccardi, A. – Mora, O. – Tinelli, C., et al.: Long-term survival of stage I multiple myeloma given chemotherapy just after diagnosis or at progression of the disease: a multicentre randomized study. *Cooperative Group of Study and Treatment of Multiple Myeloma. Br J Cancer*, 2000, 82, s. 1254–1260.
- Chakraborty, R. – Al Hadidi, S. – Cliff, E. R., et al.: Is aggressive treatment of smoldering myeloma the path to curing myeloma? *Blood Adv*, 2023, 7, s. 3932–3935.
- Mateos, M. V. – Martínez-López, J. – Rodriguez Otero, P., et al.: Curative strategy for high-risk smoldering myeloma: carfilzomib,

- lenalidomide, and dexamethasone (KRd) followed by transplant, KRd consolidation, and Rd maintenance. *J Clin Oncol*, 2024, doi: 10.1200/JCO.23.02771.
- 25 Hájek, R. – Maisnar, V. – Minařík, J., et al.: Diagnostika a léčba mnohočetného myelomu 2023. Doporučení České myelomové skupiny, Slovenské myelomové skupiny a Myelomové sekce České hematologické společnosti pro diagnostiku a léčbu mnohočetného myelomu. Suppl 2. Dostupný z: [https://www.hematology.cz/wp-content/uploads/2023/05/14-Mnohocetny\\_myelom-verze-01-2023.pdf](https://www.hematology.cz/wp-content/uploads/2023/05/14-Mnohocetny_myelom-verze-01-2023.pdf), vyhledáno 26. 8. 2024.
- 26 Medina-Herrera, A. – Vazquez, I. – Cuenca, I., et al.: The genomic profiling of high-risk smoldering myeloma patients treated with an intensive strategy unveils potential markers of resistance and progression. *Blood Cancer J*, 2024, 14, s. 74.
- 27 Vaxman, I. – Gertz, M.: How I approach smoldering multiple myeloma. *Blood*, 2022, 140, s. 828–838.

## Minimální/měřitelná reziduální nemoc u krevních nádorových onemocnění v roce 2024

doc. MUDr. Tomáš Jelínek, Ph.D. Klinika hematoonkologie, FN Ostrava a LF OU, Ostrava

doc. MUDr. Mgr. Cyril Šálek, Ph.D. Ústav hematologie a krevní transfuze, Praha

doc. Mgr. Kateřina Machová Poláková, Ph.D. Ústav hematologie a krevní transfuze, Praha; Ústav patologické fyziologie, 1. LF UK, Praha

MUDr. Martin Špaček, Ph.D. Centrální hematologické laboratoře ÚBLKD a I. interní klinika – klinika hematologie, 1. LF UK a VFN, Praha

prof. MUDr. Vít Procházka, Ph.D. Hemato-onkologická klinika LF UP a FN Olomouc

MUDr. Zdeněk Koříštek, Ph.D. Klinika hematoonkologie, FN Ostrava

prof. MUDr. Roman Hájek, CSc. Klinika hematoonkologie, FN Ostrava a LF OU, Ostrava

- 1 Gökbüget, N. – Dombret, H. – Giebel, S., et al.: Minimal residual disease level predicts outcome in adults with Ph-negative B-precursor acute lymphoblastic leukemia. *Hematology*, 2019, 24, s. 337–348.
- 2 Berry, D. A. – Zhou, S. – Higley, H., et al.: Association of minimal residual disease with clinical outcome in pediatric and adult acute lymphoblastic leukemia: a meta-analysis. *JAMA Oncol*, 2017, 3, e170580.
- 3 Gökbüget, N. – Dombret, H. – Bonifacio, M., et al.: Blinatumomab for minimal residual disease in adults with B-cell precursor acute lymphoblastic leukemia. *Blood*, 2018, 131, s. 1522–1531.
- 4 Šálek, C. – Folber, F. – Frňková, E., et al.: Low levels of minimal residual disease after induction chemotherapy for BCR-ABL1-negative acute lymphoblastic leukaemia in adults are clinically relevant. *Br J Haematol*, 2022, 196, s. 706–710.
- 5 Kotrová, M. – Koopmann, J. – Trautmann, H., et al.: Prognostic value of low-level MRD in adult acute lymphoblastic leukemia detected by low- and high-throughput methods. *Blood Adv*, 2022, 6, s. 3006–3010.
- 6 Jabbour, E. – Short, N. J. – Jorgensen, J. L., et al.: Differential impact of minimal residual disease negativity according to the salvage status in patients with relapsed/refractory B-cell acute lymphoblastic leukemia. *Cancer*, 2017, 123, s. 294–302.
- 7 Zuna, J. – Horvátková, L. – Krotká, J., et al.: Minimal residual disease in BCR-ABL1-positive acute lymphoblastic leukemia: different significance in typical ALL and in CML-like disease. *Leukemia*, 2022, 36, s. 2793–2801.
- 8 Contreras Yametti, G. P. – Ostrow, T. H. – Jasinski, S., et al.: Minimal residual disease in acute lymphoblastic leukemia: current practice and future directions. *Cancers*, 2021, 13, s. 1847.
- 9 Brüggemann, M. – Schrauder, A. – Raff, T., et al.: Standardized MRD quantification in European ALL trials: proceedings of the Second International Symposium on MRD assessment in Kiel, Germany, 18–20 September 2008. *Leukemia*, 2010, 24, s. 521–535.
- 10 Heuser, M. – Freeman, S. D. – Ossenkoppole, G. J., et al.: 2021 update on MRD in acute myeloid leukemia: a consensus document from the European LeukemiaNet MRD working party. *Blood*, 2021, 138, s. 2753–2767.
- 11 Short, N. J. – Zhou, S. – Fu, C., et al.: Association of measurable residual disease with survival outcomes in patients with acute myeloid leukemia: a systematic review and metaanalysis. *JAMA Oncol*, 2020, 6, s. 1890–1899.
- 12 Sun, Y. – Zhu, G. – Zhong, H.: Minimal residual disease monitoring in acute myeloid leukemia: Focus on MFC-MRD and treatment guidance for elderly patients. *Eur J Haematol*, 2024, 112, s. 870–878.
- 13 Ravandi, F. – Cloos, J. – Buccisano, F., et al.: Measurable residual disease monitoring in patients with acute myeloid leukemia treated with lower-intensity therapy: Roadmap from an ELN-DAVID expert panel. *Am J Hematol*, 2023, 98, s. 1847–1855.
- 14 Thol, F. – Gabdoulline, R. – Liebich, A., et al.: Measurable residual disease monitoring by NGS before allogeneic hematopoietic cell transplantation in AML. *Blood*, 2018, 132, s. 1703–1713.
- 15 Cilloni, D. – Renneville, A. – Hermite, F., et al.: Real-time quantitative polymerase chain reaction detection of minimal residual disease by standardized WFI assay to enhance risk stratification in acute myeloid leukemia: a European LeukemiaNet study. *J Clin Oncol*, 2009, 27, s. 5195–5201.
- 16 Ravandi, F. – Kantarjian, H. – Faderl, S., et al.: Outcome of patients with FLT3-mutated acute myeloid leukemia in first relapse. *Leuk Res*, 2010, 34, s. 752–756.
- 17 Döhner, H. – Wei, A. H. – Appelbaum, F., et al.: Diagnosis and management of AML in adults: 2022 recommendations from an international expert panel on behalf of the ELN. *Blood*, 2022, 140, s. 1345–1377.
- 18 Abaza, Y. – Kantarjian, H. – Garcia-Manero, G., et al.: Long-term outcome of acute promyelocytic leukemia treated with all-trans-retinoic acid, arsenic trioxide, and gemtuzumab. *Blood*, 2017, 129, s. 1275–1283.
- 19 Hughes, T. – Deininger, M. – Hochhaus, A., et al.: Monitoring CML patients responding to treatment with tyrosine kinase inhibitors: review a recommendation for harmonizing current methodology for detecting BCR-ABL transcripts and kinase domain mutations and for expressing results. *Blood*, 2006, 108, s. 28–37.
- 20 Branford, S. – Cross, N. C. – Hochhaus, A., et al.: Rationale for the recommendations for harmonizing current methodology for detecting BCR-ABL transcript in patients with chronic myeloid leukemia. *Leukemia*, 2006, 20, s. 1925–1930.
- 21 Hochhaus, A. – Baccarani, M. – Silver, R. T., et al.: European LeukemiaNet 2020 recommendations for treating chronic myeloid leukemia. *Leukemia*, 2020, 34, s. 966–984.
- 22 Lauseker, M. – Hanfstein, B. – Haferlach, C., et al.: Equivalence of BCR-ABL transcript levels with complete cytogenetic remission in patients with chronic myeloid leukemia in chronic phase. *J Cancer Res Clin Oncol*, 2014, 140, s. 1965–1969.
- 23 Cross, N. C. P. – Ernst, T. – Branford, S., et al.: European LeukemiaNet laboratory recommendations for the diagnosis and management of chronic myeloid leukemia. *Leukemia*, 2023, 37, s. 2150–2167.
- 24 Branford, S. – Fletcher, L. – Cross, N. C., et al.: Desirable performance characteristics for BCR-ABL measurement on an international reporting scale to allow consistent interpretation of individual patient response and comparison of response rates between clinical trials. *Blood*, 2008, 112, s. 3330–3338.
- 25 Müller, M. C. – Cross, N. C. – Erben, P., et al.: Harmonization of molecular monitoring of CML therapy in Europe. *Leukemia*, 2009, 112, s. 1957–1963.
- 26 White, H. E. – Matejschuk, P. – Rigsby, P., et al.: Establishment of the first World Health Organization International Genetic Reference Panel for quantitation of BCR-ABL mRNA. *Blood*, 2010, 116, s. e–117.
- 27 Cross, N. C. – White, H. E. – Ernst, T., et al.: Development and evaluation of a secondary reference panel for BCR-ABL1 quantification on the International Scale. *Leukemia*, 2016, 30, s. 1844–1852.
- 28 Schafer, V. – White, H. E. – Gerrard, G., et al.: Assessment of individual molecular response in chronic myeloid leukemia patients with atypical BCR-ABL1 fusion transcripts: recommendations by the EUTOS cooperative network. *J Cancer Res Clin Oncol*, 2021, 147, s. 3081–3089.
- 29 Nicollini, F. E. – Dulucq, S. – Bourreau, L., et al.: Evaluation of residual disease and TKI duration are critical predictive factors for molecular recurrence after stopping imatinib first-line in chronic phase CML patients. *Clin Cancer Res*, 2019, 25, s. 6606–6613.
- 30 Kockerols, C. C. B. – Valk, P. J. M. – Lefin, M. D., et al.: Digital PCR for BCR-ABL1 quantification in CML: Current applications in clinical practice. *Hemisphere*, 2020, 4, s. e496.
- 31 Machova Polakova, K. – Zizkova, H. – Zuna, J., et al.: Analysis of chronic myeloid leukemia during deep molecular response by genomic PCR: a traffic light stratification model with impact on treatment-free remission. *Leukemia*, 2020, 34, s. 2113–2124.
- 32 Byrd, J. C. – Brown, J. R. – O’Brien, S., et al.: Ibrutinib versus ofatumumab in previously treated chronic lymphoid leukemia. *N Engl J Med*, 2014, 371, s. 213–223.
- 33 Furman, R. R. – Sharman, J. P. – Coutre, S. E., et al.: Idelalisib and rituximab in relapsed chronic lymphocytic leukemia. *N Engl J Med*, 2014, 370, s. 997–1007.
- 34 Al-Sawaf, O. – Zhang, C. – Tandon, M., et al.: Venetoclax plus obinutuzumab versus chlorambucil plus obinutuzumab for previously untreated chronic lymphocytic leukemia (CLL14): follow-up results from a multicentre, open-label, randomised, phase 3 trial. *Lancet Oncol*, 2020, 21, s. 1188–1200.
- 35 Kater, A. P. – Seymour, J. F., et al.: Fixed duration of venetoclax-rituximab in relapsed/refractory chronic lymphocytic leukemia eradicates minimal residual disease and prolongs survival: post-treatment follow-up of the MURANO phase III study. *J Clin Oncol*, 2019, 37, s. 269–277.
- 36 Hallek, M. – Cheson, B. D. – Catovsky, D., et al.: iwCLL guidelines for diagnosis, indications for treatment, response assessment, and supportive management of CLL. *Blood*, 2018, 131, s. 2745–2760.
- 37 Rawstron, A. C. – Fazi, C. – Agathangelidis, A., et al.: A complementary role of multiparameter flow cytometry and high-throughput sequencing for minimal residual disease detection in chronic lymphocytic leukemia: An European Research Initiative on CLL study. *Leukemia*, 2016, 30, s. 929–936.
- 38 Rawstron, A. C. – Villamor, N. – Ritgen, M., et al.: International standardized approach for flow cytometric residual disease monitoring in chronic lymphocytic leukaemia. *Leukemia*, 2007, 21, s. 956–964.
- 39 Rawstron, A. C. – Böttcher, S. – Letestu, R., et al.: Improving efficiency and sensitivity: European research initiative in CLL (ERIC) update on the international harmonised approach for flow cytometric residual disease monitoring in CLL. *Leukemia*, 2013, 27, s. 142–149.
- 40 Eichhorst, B. – Niemann, C. U. – Kater, A. P., et al.: First-line venetoclax combinations in chronic lymphocytic leukemia. *N Engl J Med*, 2023, 388, s. 1739–1754.
- 41 Coupland, S. E. – Du, M. Q. – Ferry, J. A., et al.: The fifth edition of the WHO classification of mature B-cell neoplasms: open questions for research. *J Pathol*, 2024, 262, s. 255–270.
- 42 Procházka, V. – Hanáčková, V. – Henzlová, V., et al.: Terapie zacílená proti antigenu CD19 u difúzního velkobuněčného B-lymfomu. *Transfuze Hematol Dnes*, 2024, 30, s. 13–25.
- 43 Cheson, B. D. – Fisher, R. I. – Barrington, S. F., et al.: Recommendations for initial valuation, staging, and response assessment of Hodgkin and non-Hodgkin lymphoma: the Lugano classification. *J Clin Oncol*, 2014, 32, s. 3059–3068.
- 44 López, C. – Fischer, A. – Rosenwald, A., et al.: Genetical terations in mature B- and T-cell lymphomas – a practical guide to WHO-HAEMS. *Med Genet*, 2024, 36, s. 59–73.
- 45 van der Velden, V. H. J. – Dombrink, I. – Alten, J., et al.: Analysis of measurable residual disease by Ig/TR gene rearrangements: quality assurance and updated EuroMRD guidelines. *Leukemia*, 2024, 38, s. 1315–1322.
- 46 Alcoceba, M. – Stewart, J. P. – García-Álvarez, M., et al.: Liquid biopsy for molecular characterization of diffuse large B-cell lymphoma and early assessment of minimal residual disease. *Br J Haematol*, 2024, 205, s. 109–121.
- 47 Alig, S. K. – Shahrokh Esfahani, M. – Garofalo, A., et al.: Distinct Hodgkin lymphoma subtypes defined by noninvasive genomic profiling. *Nature*, 2024, 625, s. 778–787.
- 48 Procházka, V. – Grohmann, J. – Hanackova, V., et al.: Finding a needle in haystack: digital-PCR as a sensitive tool for MRD detection in the circulating-tumor DNA samples in Hodgkin lymphoma. *Blood*, 2022, 140, suppl. 1, s. 6417–6418.
- 49 Cherng, H. J. – Herrera, A.: Circulating tumor DNA in diffuse large B-cell lymphoma: from bench to bedside? *Curr Treat Options Oncol*, 2024, 25, s. 659–678.
- 50 Dimopoulos, M. A. – Moreau, P. – Terpos, E., et al.: Multiple myeloma: EHA-ESMO Clinical Practice Guidelines for Diagnosis, Treatment and Follow-up. *Ann Oncol*, 2021, 32, s. 309–322.
- 51 Kumar, S. – Paiva, B. – Anderson, K. C., et al.: International Myeloma Working Group consensus criteria for response and minimal residual disease assessment in multiple myeloma. *Lancet Oncol*, 2019, 17, s. e328–e346.
- 52 Munshi, N. C. – Avet-Loiseau, H. – Anderson, K. C., et al.: A large meta-analysis establishes the role of MRD negativity in long-term survival outcomes in patients with multiple myeloma. *Blood Adv*, 2020, 4, s. 5988–5999.
- 53 Costa, L. J. – Chhabra, S. – Medvedova, E., et al.: Minimal residual disease response-adapted therapy in newly diagnosed multiple myeloma (MASTER): final report of the multicentre, single-arm, phase 2

- trial. *Lancet Haematol*, 2023, 10, s. e890–e901.
- 54 Flores-Montero, J. – Sanjoa-Flores, L. – Paiva, B., et al.: Next Generation Flow for highly sensitive and standardized detection of minimal residual disease in multiple myeloma. *Leukemia*, 2017, 31, s. 2094–2103.
- 55 Paiva, B. – Manrique, I. – Rytlewski, J., et al.: Time-dependent prognostic value of serological and measurable residual disease assessments after idecabtagene vicleucel. *Blood Cancer Discovery*, 2023, 4, s. 365–373, doi: 10.1158/2643-3230.BCD-23-0044.
- 56 Kubicki, T. – Dytfield, D. – Barnidge, D. R., et al.: Mass spectrometry-based assessment of M protein in peripheral blood during maintenance therapy in multiple myeloma. *Blood*, 2024, 144, s. 955–963.

## Aktuální přehled hematoonkologických registrů v České republice

prof. MUDr. Vladimír Maisnar, Ph.D., MBA IV. interní hematologická klinika, FN Hradec Králové a LF UK, Hradec Králové

prof. MUDr. Marek Trněný, CSc. I. interní klinika – klinika hematologie, 1. LF UK a VFN, Praha

prof. MUDr. Michael Doubek, Ph.D. Interní hematologická a onkologická klinika FN Brno a LF MU, Brno

prof. MUDr. Pavel Žák, Ph.D. IV. interní hematologická klinika, FN Hradec Králové, Katedra interních oborů, LF UK, Hradec Králové

MUDr. Heidi Móćiková, Ph.D. Hematologická klinika, FN Královské Vinohrady a 3. LF UK, Praha

doc. MUDr. Daniela Žáčková, Ph.D. Interní hematologická a onkologická klinika, FN Brno a LF MU, Brno

doc. MUDr. Anna Jonášová, Ph.D. I. interní klinika – klinika hematologie, 1. LF UK a VFN, Praha

doc. MUDr. Mgr. Cyril Šálek, Ph.D. Ústav hematologie a krevní transfuze, Praha

prof. MUDr. Roman Hájek, CSc. Klinika hematoonkologie, FNO a LF OU, Ostrava

- 1 Alaggio, R. – Amador, C. – Agnagostopoulos, I., et al.: Correction: The 5th of the World Health Organization Classification of haematolymphoid tumors: Lymphoid neoplasms. *Leukemia*, 2022, 36, s. 1720–1748.
- 2 Cheson, B. D. – Fisher, R. I. – Barrington, S. F., et al.: Recommendations for initial evaluation, staging, and response assessment of Hodgkin and non-Hodgkin lymphoma: the Lugano classification. *J Clin Oncol*, 2014, 32, s. 3059–3068.
- 3 Vodička, P. – Benešová, K. – Janíková, A., et al.: Polatuzumab vedotin plus bendamustine and rituximab in patients with relapsed/refractory diffuse large B-cell lymphoma in the real world. *Eur J Haematol*, 2022, 109, s. 162–165.
- 4 Janíková, A. – Michálka, J. – Bortlíček, Z., et al.: The interval between progression and therapy initiation is the key prognostic parameter in relapsing diffuse large B cell lymphoma: analysis from the Czech Lymphoma Study Group database (NIHIL). *Ann Hematol*, 2020, 99, s. 1583–1594.
- 5 Procházka, V. – Papajík, T. – Janíková, A., et al.: Frontline intensive chemotherapy improves outcome in young, high-risk patients with follicular lymphoma: pair-matched analysis from the Czech Lymphoma Study Group Database. *Leuk Lymphoma*, 2017, 58, s. 601–613.
- 6 Belada, D. – Procházka, V. – Janíková, A., et al.: The influence of maintenance therapy of rituximab on the survival of elderly patients with follicular lymphoma. A retrospective analysis from the database of the Czech Lymphoma Study Group. *Leuk Res*, 2018, 73, s. 29–38.
- 7 Obr, A. – Procházka, V. – Papajík, T., et al.: Maintenance rituximab in newly diagnosed mantle cell lymphoma patients: a real world analysis from the Czech lymphoma study group registry. *Leuk Lymphoma*, 2019, 60, s. 748–755.
- 8 Sandekčí, V. – Hájek, R. – Pour, L., et al.: A first Czech analysis of 1887 cases with monoclonal gammopathy of undetermined significance. *Eur J Haematol*, 2017, 99, s. 80–90.
- 9 Radocha, J. – Hájek, R. – Brožová, L., et al.: Simplified novel prognostic score for real-life older adults with multiple myeloma—registry-based analysis. *Ann Hematol*, 2019, 98, s. 951–962.
- 10 Štok, M. – Ševčíková, S. – Minařík, J., et al.: Identification of patients at high risk of secondary extramedullary multiple myeloma development. *Br J Haematol*, 2022, 196, s. 954–962.
- 11 Jelinek, T. – Bezdeková, R. – Žihala, D., et al.: More than 2% of circulating tumor plasma cells defines plasma cell leukemia-like multiple myeloma. *J Clin Oncol*, 2021, 41, s. 1383–1392.
- 12 Pour, L. – Brožová, L. – Špicák, I., et al.: Pomalidomid is more effective in real clinical practise than in randomized trial – an observational study of the Czech Myeloma Group. *Haematologica*, 2017, 102, s. 529.
- 13 Minařík, J. – Píka, T. – Radocha, J., et al.: Survival benefit of ixazomib, lenalidomide and dexamethasone (IRD) over lenalidomide and dexamethasone (RD) in relapsed and refractory multiple myeloma patients in routine clinical practice. *BMC Cancer*, 2021, 21, s. 73.
- 14 Štok, M. – Špicák, I. – Radocha, J., et al.: Daratumumab with lenalidomide and dexamethasone in relapsed or refractory multiple myeloma patients – real world evidence analysis. *Ann Hematol*, 2023, 102, s. 1501–1511.
- 15 Hájek, R. – Jarkovský, J. – Maisnar, V., et al.: Real world outcomes of multiple myeloma: Retrospective analysis of the Czech Registry of monoclonal gammopathies. *Clin Lymphoma Myeloma Leuk*, 2018, 18, s. e219–e240.
- 16 Panovská, A. – Němcová, L. – Nevkindová, L., et al.: Real-world data on efficacy and safety of obinutuzumab plus chlorambucil, rituximab plus chlorambucil, and rituximab plus bendamustine in the frontline treatment of chronic lymphocytic leukemia: The GO-CLEAR Study by the Czech CLL Study Group. *Hematol Oncol*, 2020, 38, s. 509–516.
- 17 Špaček, M. – Smolej, L. – Šimkovič, M., et al.: Idelalisib plus rituximab versus ibrutinib in the treatment of relapsed/refractory chronic lymphocytic leukaemia: A real-world analysis from the Chronic Lymphocytic Leukemia Patients Registry (CLCLEAR). *Br J Haematol*, 2023, 202, s. 40–47.
- 18 Šimkovič, M. – Turscányi, P. – Špaček, M., et al.: COVID-19 in patients with chronic lymphocytic leukemia: a multicenter analysis by the Czech CLL Study Group. *Ann Hematol*, 2023, 102, s. 811–817.
- 19 Kósá, F. – Nečasová, T. – Špaček, M., et al.: Secondary malignancies and survival of FCR-treated patients with chronic lymphocytic leukemia in Central Europe. *Cancer Med*, 2023, 12, s. 1961–1971.
- 20 Panovská, A. – Žák, P. – Jurková, T., et al.: Real-world data on diagnostics, treatment and outcomes of patients with hairy cell leukemia: The HCL-CLCLEAR study. *Hematol Oncol*, 2024, 42, s. e3280.
- 21 Desai, S. H. – Spinner, M. A. – Evans, A. M., et al.: Overall survival of patients with cHL who progress after autologous stem cell transplant: results in the novel agent era. *Blood Adv*, 2023, 7, s. 7295–7303.
- 22 Palíčková, M. – Móćiková, H. – Vernerová, Z., et al.: BEACOPP escalated and rituximab in the treatment of Hodgkin lymphoma occurring concurrently with diffuse large B-cell non-Hodgkin lymphoma. *Leuk Lymphoma*, 2013, 54, s. 2081–2082.
- 23 Král, Z. – Michalka, J. – Móćiková, H., et al.: Treatment of relapsed/refractory Hodgkin lymphoma: real-world data from the Czech Republic and Slovakia. *J Cancer*, 2019, 10, s. 5041–5048.
- 24 Sýkorová, A. – Móćiková, H. – Lukášová, M., et al.: Outcome of elderly patients with classical Hodgkin's lymphoma. *Leuk Res*, 2020, 90, 106311.
- 25 Maco, M. – Kupcová, K. – Heřman, V., et al.: Circulating tumor DNA in Hodgkin lymphoma. *Ann Hematol*, 2022, 101, s. 2393–2403.
- 26 Hoffmann, V. S. – Baccarani, M. – Hasford, J., et al.: Treatment and outcome of 2904 CML patients from the EUTOS population-based registry. *Leukemia*, 2017, 31, s. 593–601.
- 27 Lauseker, M. – Bachl, K. – Turkina, A., et al.: Prognosis of patients with chronic myeloid leukemia presenting in advanced phase is defined mainly by blast count, but also by age, chromosomal aberrations and hemoglobin. *Am J Hematol*, 2019, 94, s. 1236–1243.
- 28 Pfirrmann, M. – Clark, R. E. – Prejzner, W., et al.: The EUTOS long-term survival (ELTS) score is superior to the Sokal score for predicting survival in chronic myeloid leukemia. *Leukemia*, 2020, 34, s. 2138–2149.
- 29 Pavlík, T. – Janoušová, E. – Mayer, J., et al.: Current survival measures reliably reflect modern sequential treatment in CML: correlation with prognostic stratifications. *Am J Hematol*, 2013, 88, s. 790–797.
- 30 Žáčková, D. – Klamořá, H. – Bělohávková, P., et al.: Dasatinib treatment long-term results among imatinib-resistant/intolerant patients with chronic phase chronic myeloid leukemia are favorable in daily clinical practice. *Leuk Lymphoma*, 2021, 62, s. 194–202.
- 31 Horňák, T. – Semerád, L. – Žáčková, D., et al.: Analysis of serum lipids, cardiovascular risk, and indication for statin use during nilotinib and imatinib therapy in de novo CML patients – results from real-life prospective study. *Leuk Lymphoma*, 2020, 61, s. 494–496.
- 32 Žáčková, D. – Klamořá, H. – Dušek, L., et al.: Imatinib as the first-line treatment of patients with chronic myeloid leukemia diagnosed in the chronic phase: Can we compare real life data to the results from clinical trials? *Am J Hematol*, 2011, 86, s. 318–321.
- 33 Guilhot, J. – Baccarani, M. – Clark, R. E., et al.: Definitions, methodological and statistical issues for phase 3 clinical trials in chronic myeloid leukemia: a proposal by the European LeukemiaNet. *Blood*, 2012, 119, s. 5963–5971.
- 34 Šálek, C. – Hrabovský, Š. – Folber, F., et al.: Léčba dospělých pacientů s akutním lymfoblastovou leukemii v České republice v letech 2007–2020. *Klin Onkol*, 2023, 36, s. 382–395.
- 35 Šálek, C. – Folber, F. – Froňková, E., et al.: Low levels of minimal residual disease after induction chemotherapy for BCR-ABL1-negative acute lymphoblastic leukaemia in adults are clinically relevant. *Br J Haematol*, 2022, 196, s. 706–710.
- 36 Hrabovský, Š. – Folber, F. – Horáček, J. M., et al.: Comparison of real-time quantitative polymerase chain reaction and eight-color flow cytometry in assessment of minimal residual disease in adult acute lymphoblastic leukemia. *Clin Lymphoma Myeloma Leuk*, 2018, 18, s. 743–748.
- 37 Efficace, F. – Cardoni, A. – Cottone, F., et al.: Tyrosine-kinase inhibitors and patient-reported outcomes in chronic myeloid leukemia: a systematic review. *Leuk Res*, 2013, 37, s. 206–213.
- 38 Basch, E. – Deal, A. M. – Kris, M. G., et al.: Symptom monitoring with patient-reported outcomes during routine cancer treatment: a randomized controlled trial. *J Clin Oncol*, 2016, 34, s. 557–565. Erratum in: *J Clin Oncol*, 2016, 34, s. 2198.
- 39 Basch, E. – Leahy, A. B. – Dueck, A. C.: Benefits of digital symptom monitoring with patient-reported outcomes during adjuvant cancer treatment. *J Clin Oncol*, 2021, 39, s. 701–703.
- 40 Di Maio, M. – Basch, E. – Denis, F., et al.: The role of patient-reported outcome measures in the continuum of cancer clinical care: ESMO Clinical Practice Guideline. *Ann Oncol*, 2022, 33, s. 878–892.

## Vyléčitelnost krevních nádorů v roce 2024: kam jsme se posunuli za deset let?

### Část 1: Akutní leukemie a chronická myeloidní leukemie

prof. MUDr. Pavel Žák, Ph.D. IV. interní hematologická klinika, FN Hradec Králové; Katedra interních oborů, LF UK Hradec Králové, UK Praha

doc. MUDr. Mgr. Cyril Šálek, Ph.D. Ústav hematologie a krevní transfuze, Praha

doc. MUDr. Daniela Žáčková, Ph.D. Interní hematologická a onkologická klinika, Fakultní nemocnice Brno a Masarykova univerzita, Brno

MUDr. Zdeněk Koříštek, Ph.D. Klinika hematoonkologie, FN Ostrava, Lékařská fakulta, Ostravská univerzita, Ostrava

- 1 Šálek, C. – Hrabovský, Š. – Folber, F., et al.: Léčba dospělých pacientů s akutní lymfoblastovou leukemii v České republice v letech 2007–2020. *Klin Onkol*, 2023, 35, s. 382–395.
- 2 Chiaretti, S. – Messina, M. – Della Starza, I., et al.: Philadelphia-like acute lymphoblastic leukemia is associated with minimal residual disease persistence and poor outcome. First report of the minimal residual disease-oriented GIMEMA LAL1913. *Haematologica*, 2021, 106, s. 1559–1568.
- 3 Stanulla, M. – Dagdan, E. – Žaliová, M., et al.: IKZF1plus defines

- a new minimal residual disease-dependent very-poor prognostic profile in pediatric B-cell precursor acute lymphoblastic leukemia. *J Clin Oncol*, 2018, 36, s. 1240–1249.
- 4 Boissel, N. – Baruchel, A.: Acute lymphoblastic leukemia in adolescent and young adults: Treat as adults or as children? *Blood*, 2018, 132, s. 351–361.
  - 5 Stock, W. – Luger, S. M. – Advani, A. S., et al.: A pediatric regimen for older adolescents and young adults with acute lymphoblastic leukemia: results of CALGB 140403. *Blood*, 2019, 133, s. 1548–1559.
  - 6 Bassan, R.: Using minimal residual disease to improve treatment response definitions and hematopoietic cell transplantation strategy in acute leukemia. *J Clin Oncol*, 2016, 34, s. 300–302.
  - 7 Chalandron, Y. – Thomas, X. – Hayette, S., et al.: Randomized study of reduced-intensity chemotherapy combined with imatinib in adults with Ph+ positive acute lymphoblastic leukemia. *Blood*, 2015, 125, s. 3711–3719.
  - 8 Foà, R. – Chiaretti, S.: Philadelphia chromosome-positive acute lymphoblastic leukemia. *N Engl J Med*, 2022, 386, s. 2399–2411.
  - 9 Chevalier, P. – Leguay, T. – Delord, M. – Sálek, C., et al.: Instuzumab ozogamicin and low-intensity chemotherapy in older patients with newly diagnosed CD22+ Philadelphia chromosome-negative B-cell precursor acute lymphoblastic leukemia. *J Clin Oncol*, 2024 (accepted for publication).
  - 10 Pullarkat, V. – Lacayo, N. – Jabbour, E., et al.: Venetoclax and navitoclax in combination with chemotherapy in patients with relapsed or refractory acute lymphoblastic leukemia and lymphoblastic lymphoma. *Cancer Discov*, 2021, 11, s. 1440–1453.
  - 11 Platzbecker, U.: From occasional date to civil union in APL. *Blood*, 2017, 129, s. 1235.
  - 12 Ravandi, F. – Estey, E. H. – Cortes, J. E., et al.: Phase II study of all-trans retinoic acid (ATRA), arsenic trioxide (ATO), with or without gemtuzumab ozogamicin (GO) for the frontline therapy of patients with acute promyelocytic leukemia (APL). *Blood*, 2010, 116, s. 1080.
  - 13 Zhang, X. – Zhang, H. – Chen, L., et al.: Arsenic trioxide and all-trans retinoic acid (ATRA) treatment for acute promyelocytic leukemia in all risk groups: study protocol for a randomized controlled trial. *Trials*, 2018, 19, s. 476–482.
  - 14 Gill, H. – Yim, R. – Chin, L., et al.: An entirely oral regimen of oral-arsenic trioxide/all-trans retinoic acid/ascorbic acid in newly-diagnosed acute promyelocytic leukaemia (APL): Updated results of an ongoing multicentre trial. *Blood*, 2023, 142, suppl. 1, s. 157.
  - 15 Dohner, H. – Wei, A. H. – Appelbaum, F. R., et al.: Diagnosis and management of AML in adults: 2022 recommendations from an international expert panel on behalf of the ELN. *Blood*, 2022, 140, s. 1345–1377.
  - 16 Hills, R. K. – Castaigne, S. – Appelbaum, F. R., et al.: Addition of gemtuzumab ozogamicin to induction chemotherapy in adult patients with acute myeloid leukaemia: A meta-analysis of individual patient data from randomised controlled trials. *Lancet Oncol*, 2014, 15, s. 986–996.
  - 17 Stone, R. M. – Mandrekar, S. J. – Sanford, B. L., et al.: Midostaurin plus chemotherapy for acute myeloid leukemia with a FLT3 mutation. *N Engl J Med*, 2017, 377, s. 454–464.
  - 18 Erba, H. P. – Montesinos, P. – Kim, H. J., et al.: Quizartinib plus chemotherapy in newly diagnosed patients with FLT3-internal tandem-duplication-positive acute myeloid leukaemia (QuANTUM-First): A randomised, double-blind, placebo-controlled, phase 3 trial. *Lancet*, 2023, 401, s. 1571–1583.
  - 19 Xuan, L. – Wang, Y. – Yang, K., et al.: Sorafenib maintenance after allogeneic haemopoietic stem-cell transplantation in patients with FLT3-ITD acute myeloid leukaemia: Long-term follow-up of an open-label, multicentre, randomised, phase 3 trial. *Lancet Haematol*, 2023, 10, s. e600–e611.
  - 20 Lancet, J. E. – Uy, G. L. – Cortes, J. E., et al.: CPX-351 (cytarabine and daunorubicin) liposome for injection versus conventional Cytarabine plus daunorubicin in older patients with newly diagnosed secondary acute myeloid leukemia. *J Clin Oncol*, 2018, 36, s. 2684–2692.
  - 21 DiNardo, C. D. – Jonas, B. A. – Pullarkat, V., et al.: Azacitidine and venetoclax previously untreated acute myeloid leukemia. *N Engl J Med*, 2020, 383, s. 617–629.
  - 22 Wei, A. H. – Dohner, H. – Cockroft, C., et al.: Oral azacitidine maintenance therapy for acute myeloid leukemia in first remission. *N Engl J Med*, 2020, 383, s. 2526–2537.
  - 23 Montesinos, P. – Recher, C. – Vives, S., et al.: Ivosidenib and azacitidine in IDH1-mutated acute myeloid leukemia. *N Engl J Med*, 2022, 386, s. 1519–1531.
  - 24 Schetelig, J. – Schaich, M. – Schafer-Eckart, K., et al.: Hematopoietic cell transplantation in patients with intermediate and high-risk AML: Results from the randomized Study Alliance Leukemia (SAL) AML 2003 trial. *Leukemia*, 2015, 29, s. 1060–1068.
  - 25 Nowell, P. C. – Hungerford, D. A.: A minute chromosome in human chronic granulocytic leukemia. *Science*, 1960, 132, s. 1497.
  - 26 Rowley, J. D.: A new consistent abnormality in chronic myelogenous leukaemia identified by quinacrine fluorescence and giemsa staining. *Nature*, 1973, 243, s. 290–293.
  - 27 Daley, G. Q. – Van Etten, R. A. – Baltimore, D.: Induction of chronic myelogenous leukemia in mice by the P210bcr/abl gene of the Philadelphia chromosome. *Science*, 1990, 247, s. 824–830.
  - 28 Druker, B. J. – Tamura, S. – Buchdunger, E., et al.: Effects of a selective inhibitor of the ABL tyrosine kinase on the growth of BCR-ABL positive cells. *Nat Med*, 1996, 2, s. 561–566.
  - 29 O'Brien, S. G. – Guilhot, F. – Larson, R. A., et al.: Imatinib compared with interferon and low-dose cytarabine for newly diagnosed chronic-phase chronic myeloid leukemia. *N Engl J Med*, 2003, 348, s. 994–1004.
  - 30 Hochhaus, A. – Burchert, A. – Sauvage, S., et al.: Nilotinib vs. nilotinib + peg-interferon alpha induction and nilotinib or peg-interferon alpha maintenance therapy for newly diagnosed chronic myeloid leukemia patients. The Tiger trial. *Hematphere*, 2023, 7, suppl. e4695659.
  - 31 Bower, H. – Björkholm, M. – Dickman, P. W., et al.: Life expectancy of patients with chronic myeloid leukemia approaches the life expectancy of the general population. *J Clin Oncol*, 2016, 34, s. 2851–2857.
  - 32 Mahon, F.-X. – Réa, D. – Guilhot, J., et al.: Discontinuation of imatinib in patients with chronic myeloid leukaemia who have maintained complete molecular remission for at least 2 years: the prospective, multicentre Stop Imatinib (STIM) trial. *Lancet Oncol*, 2010, 11, s. 1029–1035.
  - 33 Hochhaus, A. – Baccarani, M. – Silver, R. T., et al.: European LeukemiaNet 2020 recommendations for treating chronic myeloid leukemia. *Leukemia*, 2020, 34, s. 966–984.
  - 34 Mahon, F. X. – Pfirrmann, M. – Dulucq, S., et al.: European Stop Tyrosine Kinase Inhibitor Trial (EURO-SKI) in chronic myeloid leukemia: final analysis and novel prognostic factors for treatment-free remission. *J Clin Oncol*, 2024, 42, s. 1875–1880.
  - 35 Richter, J. – Söderlund, S. – Lübbing, A., et al.: Musculoskeletal pain in patients with chronic myeloid leukemia after discontinuation of imatinib: a tyrosine kinase inhibitor withdrawal syndrome? *J Clin Oncol*, 2014, 32, s. 2821–2823.
  - 36 Sharf, G. – Marin, C. – Bradley, J. A., et al.: Treatment-free remission in chronic myeloid leukemia: the patient perspective and areas of unmet needs. *Leukemia*, 2020, 34, s. 2102–2112.
  - 37 Záčková, D. – Semerád, L. – Faber, E., et al.: Why are not all eligible chronic myeloid leukemia patients willing to attempt tyrosine kinase inhibitor discontinuation? A Czech nationwide analysis related to the TKI stopping trial HALF. *Leukemia*, 2024, 38, s. 893–897.
  - 38 Kantarjian, H. M. – Hughes, T. P. – Larson, R. A., et al.: Long-term outcomes with frontline nilotinib versus imatinib in newly diagnosed chronic myeloid leukemia in chronic phase: ENESTrd 10-year analysis. *Leukemia*, 2021, 35, s. 440–453.
  - 39 Flygt, H. – Söderlund, S. – Richter, J., et al.: Treatment-free remission after a second TKI discontinuation attempt in patients with chronic myeloid leukemia re-treated with dasatinib – interim results from the DAstop2 trial. *Leukemia*, 2024, 38, s. 781–787.
  - 40 Clark, R. – Polydoros, F. – Apperley, J., et al.: De-escalation of tyrosine kinase inhibitor therapy before complete treatment discontinuation in patients with chronic myeloid leukaemia (DESTINY): a non-randomised, phase 2 trial. *Lancet Haematol*, 2019, 6, s. e375–e383.
  - 41 Záčková, D. – Faber, E. – Stejskal, L., et al.: Half: a prospective multi-centre phase II clinical trial evaluating the efficacy and safety of tyrosine kinase inhibitors' discontinuation after two-step dose reduction in patients with chronic myeloid leukemia in deep molecular remission. *Blood*, 2021, 138, s. 3606.
  - 42 Goldman, J. – Gordon, M.: Why do chronic myelogenous leukemia stem cells survive allogeneic stem cell transplantation or imatinib: does it really matter? *Leuk Lymphoma*, 2006, 47, s. 1–7.
  - 43 Panovská, A. – Žák, P. – Jurková, T., et al.: Real-world data on diagnostics, treatment and outcomes of patients with hairy cell leukemia: The HCL-CLEAR study. *Hematol Oncol*, 2024, 42, s. e3280.
  - 44 Parry-Jones, N. – Joshi, A. – Forconi, F., et al.: Claire Dearden, on behalf of BSH guidelines committee Guideline for diagnosis and management of hairy cell leukaemia (HCL) and hairy cell variant (HCL-V). *Br J Haematol*, 2020, 191, s. 730–737.
  - 45 Chihara, D., et al.: Long-term remission by cladribine followed by rituximab in patients with hairy cell leukemia: update of a phase II trial. *Br J Haematol*, 2016, 174, s. 760–766.
  - 46 Chihara, D. – Arons, E. – Stettler-Stevenson, M., et al.: Randomized phase II study of first-line cladribine with concurrent or delayed rituximab in patients with hairy cell leukemia. *J Clin Oncol*, 2020, 38, s. 1527–1538.
  - 47 Tiacci, E., et al.: Vemurafenib plus rituximab in refractory or relapsed hairy cell leukemia. *N Engl J Med*, 2021, 384, s. 1810–1823.

## Vyléčitelnost krevních nádorů v roce 2024: kam jsme se posunuli za deset let?

### Část 2: Lymfoproliferativní onemocnění

prof. MUDr. Roman Hájek, CSc., Klinika hematoonkologie, FN Olomouc a LF OU, Ostrava

MUDr. Martin Šimkovič, Ph.D. IV. interní hematologická klinika, FN Hradec Králové; LF v Hradci Králové, UK Praha

doc. MUDr. David Belada, Ph.D. IV. interní hematologická klinika, FN Hradec Králové; LF v Hradci Králové, UK Praha

- 1 Delgado, J. – Nadeu, F. – Colomer, D., et al.: Chronic lymphocytic leukaemia: from molecular pathogenesis to novel therapeutic strategies. *Haematologica*, 2020, 105, s. 2205–2217.
- 2 Fedele, P. L. – Opat, S.: Chronic lymphocytic leukemia: time to care for the survivors. *J Clin Oncol*, 2024, 42, s. 2005–2011.
- 3 Fischer, K. – Bahlo, J. – Fink, A. M., et al.: Long-term remissions after FCR chemoimmunotherapy in previously untreated patients with CLL: Updated results of the CLL8 trial. *Blood*, 2016, 127, s. 208–215.
- 4 Thompson, P. – Bazinet, A. A. – Wierda, W. G., et al.: Sustained remissions in CLL after frontline FCR treatment with very long-term follow-up. *Blood*, 2023, 142, s. 1784–1788.
- 5 Goede, V. – Fischer, K. – Busch, R., et al.: Obinutuzumab plus chlorambucil in patients with CLL and coexisting conditions. *N Engl J Med*, 2014, 370, s. 1101–1110.
- 6 Eichhorst, B. – Fink, A. M. – Bahlo, J., et al.: First-line chemoimmunotherapy with bendamustine and rituximab versus fludarabine, cyclophosphamide, and rituximab in patients with advanced chronic lymphocytic leukaemia (CLL10): an international, open-label, randomised, phase 3, non-inferiority trial. *Lancet Oncol*, 2016, 17, s. 928–942.
- 7 Smolej, L. – Brychtová, Y. – Cmunt, E., et al.: Low-dose fludarabine and cyclophosphamide combined with rituximab in the first-line treatment of elderly/comorbid patients with chronic lymphocytic leukaemia. *Leukemia*, 2023, 37, s. 220–226.
- 8 Al-Sawaf, O. – Robrecht, S. – Zhang, C., et al.: S145: venetoclax-obinutuzumab for previously untreated chronic lymphocytic leukemia: 6-year results of the randomized phase 3 CLL14 study. *Hematphere*, 2023, 7, suppl. e064430a.
- 9 Shanafelt, T. D. – Wang, X. V. – Hanson, C. A., et al.: Long-term outcomes for ibrutinib–rituximab and chemoimmunotherapy in CLL: updated results of the E1912 trial. *Blood*, 2022, 140, s. 112–120.
- 10 Brown, J. R. – Byrd, J. C. – Ghia, P., et al.: Cardiovascular adverse events in patients with chronic lymphocytic leukemia receiving acalabrutinib monotherapy: pooled analysis of 762 patients. *Haematologica*, 2022, 107, s. 1335–1346.
- 11 Burger, J. A. – Barr, P. M. – Robak, T., et al.: Long-term efficacy and safety of first-line ibrutinib treatment for patients with CLL/SLL: 5 years of follow-up from the phase 3 RESONATE-2 study. *Leukemia*, 2020, 34, s. 787–798.
- 12 Byrd, J. C. – Hillmen, P. – Ghia, P., et al.: Acalabrutinib versus ibrutinib in previously treated chronic lymphocytic leukemia: results of the first randomized phase III trial. *JCO*, 2021, 39, s. 3441–3452.
- 13 Brown, J. R. – Eichhorst, B. – Hillmen, P., et al.: Zanubrutinib or ibrutinib in relapsed or refractory chronic lymphocytic leukemia. *N Engl J Med*, 2023, 388, s. 319–332.
- 14 Blomberg, P. – Anderson, M. A. – Gong, J.-N., et al.: Acquisition of the recurrent Gly101Val mutation in BCL2 confers resistance to venetoclax in patients with progressive chronic lymphocytic leukemia. *Cancer Discov*, 2019, 9, s. 342–353.
- 15 Jiuyang, L. – Li, S. – Wang, Q., et al.: Sonotoclax Overcomes BCL2 G101V mutation-induced venetoclax resistance in preclinical models of hematologic malignancy. *Blood*, 2024, 143, s. 1825–1836.
- 16 Salles, G., et al.: Rituximab maintenance for 2 years in patients with high tumour burden follicular lymphoma responding to rituximab plus chemotherapy (PRIMA): a phase 3, randomised controlled trial. *Lancet*, 2021, 377, s. 42–51.
- 17 Coiffier, B., et al.: Long-term outcome of patients in the LNH-98.5 trial, the first randomized study comparing rituximab-CHOP to standard CHOP chemotherapy in DLBCL patients: a study by the Groupe d'Etudes des Lymphomes de l'Adulte. *Blood*, 2010, 116, s. 2040–2045.
- 18 Sehn, L. H., et al.: Polatuzumab vedotin plus bendamustine and rituximab in relapsed/refractory DLBCL: survival update and new extension cohort data. *Blood Adv*, 2022, 6, s. 533–543.
- 19 Neelap, S. S., et al.: Three-year follow-up analysis of axicabtagene ciloleucel in relapsed/refractory indolent non-Hodgkin lymphoma (ZUMA-5). *Blood*, 2024, 143, s. 496–506.
- 20 Crump, M., et al.: Outcomes in refractory diffuse large B-cell

- lymphoma: results from the international SCHOLAR-1 study. *Blood*, 2017, 130, s. 1800–1808.
- 21 Locke, F. L., et al.: Axicabtagene ciloleucel as second-line therapy for large B-cell lymphoma. *N Engl J Med*, 2022, 386, s. 640–654.
  - 22 Dickinson, M. J., et al.: Glioftimab for relapsed or refractory diffuse large B-cell lymphoma. *N Engl J Med*, 2022, 387, s. 2220–2231.
  - 23 Thieblemont, C., et al.: Epcoritamab, a novel, subcutaneous CD3x-CD20 bispecific T-cell-engaging antibody, in relapsed or refractory large B-cell lymphoma: dose expansion in a phase I/II trial. *J Clin Oncol*, 2023, 41, s. 2238–2247.
  - 24 Tilly, H., et al.: Polatuzumab vedotin in previously untreated diffuse large B-cell lymphoma. *N Engl J Med*, 2022, 386, s. 351–363.
  - 25 Budde, L. E.: Safety and efficacy of mosunetuzumab, a bispecific antibody, in patients with relapsed or refractory follicular lymphoma: a single-arm, multicentre, phase 2 study. *Lancet Oncol*, 2022, 23, s. 1055–1065.
  - 26 Neelapu, S. S., et al.: Three-year follow-up analysis of axicabtagene ciloleucel in relapsed/refractory indolent non-Hodgkin lymphoma (ZUMA-5). *Blood*, 2024, 143, s. 496–506.
  - 27 Fowler, N. H., et al.: Tisagenlecleucel in adult relapsed or refractory follicular lymphoma: the phase 2 ELARA trial. *Nat Med*, 2022, 28, s. 325–332.
  - 28 Horwitz, S., et al.: Brentuximab vedotin with chemotherapy for CD30-positive peripheral T-cell lymphoma (ECHELON-2): a global, double-blind, randomised, phase 3 trial. *Lancet*, 2019, 393, s. 229–240.
  - 29 Wang, M. L.: Targeting BTK with ibrutinib in relapsed or refractory mantle-cell lymphoma. *N Engl J Med*, 2013, 369, s. 507–516.
  - 30 Wang, M., et al.: Three-year follow-up of KTE-X19 in patients with relapsed/refractory mantle cell lymphoma, including high-risk subgroups, in the ZUMA-2 study. *J Clin Oncol*, 2023, 41, s. 555–567.
  - 31 Saif, O. – Hoppe, B. S.: Contemporary radiation therapy use in Hodgkin lymphoma. *Semin Hematol*, 2024, 50037–1963(24)00070-2.
  - 32 Hájek, R., et al.: Diagnostika a léčba monohtočného myelomu 2023. *Transfuzie a hematologie dnes*, 2023, 29, suppl 2.
  - 33 Rückert, M. – Azarias, G. – Garg, M., et al.: Evolution of treatment patterns and survival outcomes in european patients with multiple myeloma from 2012–2023. Through the HONEU Federated Data Network (ASH 2024, zaslán abstrakt).
  - 34 Barlogie, B. – Mitchell, A. – van Rhee, F., et al.: Curing myeloma at last: defining criteria and providing the evidence. *Blood*, 2014, 124, s. 3043–3051.
  - 35 Facon, T. – Dimopoulos, M. A. – Leleu, X. P., et al.: Isatuximab, bortezomib, lenalidomide, and dexamethasone for multiple myeloma. *N Engl J Med*, 3, 6, 2024, doi: 10.1056/NEJMoa2400712, online před tiskem.
  - 36 Sonneveld, P. – Dimopoulos, M. A. – Boccadoro, M., et al.: Daratumumab, bortezomib, lenalidomide, and dexamethasone for multiple myeloma. *N Engl J Med*, 2024, 390, s. 301–313.
  - 37 Facon, T. – Kumar, S. K. – Plesner, T., et al.: Daratumumab, lenalidomide, and dexamethasone versus lenalidomide and dexamethasone alone in newly diagnosed multiple myeloma (MAIA): overall survival results from a randomised, open-label, phase 3 trial. *Lancet Oncol*, 2021, 22, s. 1582–1596.
  - 38 Weisel, K. – Kumar, S. – Moreau, P., et al.: Daratumumab plus lenalidomide and dexamethasone (D-RD) versus lenalidomide and dexamethasone (RD) alone in transplant-ineligible patients with newly diagnosed multiple myeloma (NDMM): updated analysis of the phase 3 MAIA study. *Hematphere*, 2023, 7, suppl, s. 14–15.

## Nádor a trombóza: stále dominují LMWH

prof. MUDr. Petr Dulíček, Ph.D. IV. interní hematologická klinika, FN a LF UK v Hradci Králové

- 1 Nordström, M. – Lindblad, B. – Bergqvist, D., et al.: A prospective study of the incidence of deep-vein thrombosis within a defined urban population. *J Intern Med*, 1992, 232, s. 155–160.
- 2 Mulder, F. I. – Horvath-Puhó, E. – van Es, N., et al.: Venous thromboembolism in cancer patients: a population-based cohort study. *Blood*, 2021, 137, s. 1959–1969.
- 3 Ay, C. – Pabinger, I. – Cohen, A. T.: Cancer-associated venous thromboembolism: burden, mechanisms, and management. *Thromb Haemost*, 2017, 117, s. 219–230.
- 4 Timp, J. F. – Braekkan, S. K. – Versteeg, H. H., et al.: Epidemiology of cancer-associated venous thrombosis. *Blood*, 2013, 122, s. 1712–1723.
- 5 Sørensen, H. T. – Mellemkjær, L. – Olsen, J. H., et al.: Prognosis of cancers associated with venous thromboembolism. *N Engl J Med*, 2000, 343, s. 846–850.
- 6 Zer, A. – Moskowitz, M. – Hwang, D. M., et al.: ALK-rearranged non-small-cell lung cancer is associated with a high rate of venous thromboembolism. *Clin Lung Cancer*, 2017, 28, s. 156–161.
- 7 Xu, X. – Chlebowski, R. T. – Shi, J., et al.: Aromatase inhibitor and tamoxifen use and the risk of venous thromboembolism in breast cancer survivors. *Breast Cancer Res Treat*, 2019, 174, s. 785–794.
- 8 Guo, Z. – Huang, Y. – Gong, L., et al.: Association of androgen deprivation therapy with thromboembolic events in patients with prostate cancer: a systematic review and meta-analysis. *Prostate Cancer Prostatic Dis*, 2018, 21, s. 451–460.
- 9 Li, L. – Chen, J. – Wu, D. F., et al.: Incidence and risk of thromboembolism associated with bevacizumab in patients with non-small cell lung carcinoma. *J Thor Dis*, 2018, 10, s. 5010.
- 10 Moik, F. – Posch, F. – Zielinski, C., et al.: Direct oral anticoagulants compared to low-molecular-weight heparin for the treatment of cancer-associated thrombosis: updated systematic review and meta-analysis of randomized controlled trials. *Res Pract Thromb Haemost*, 2020, 4, s. 550–561.
- 11 Khorana, A. A. – Francis, C. W. – Culakova, E., et al.: Risk factors for chemotherapy-associated venous thromboembolism in a prospective observational study. *Cancer*, 2005, 104, s. 2822–2829.
- 12 Modré kniha České onkologické společnosti: Aktualizace: 30. Brno, 2024, Kapitola 38. Dostupné z: <https://www.linkos.cz/lekar-a-multidisciplinarny-tym/personalizovana-onkologie/modra-kniha-cos/aktualni-vydani-modre-knity/>, vyhledáno 9. 10. 2024.
- 13 Khorana, A. A. – Dalal, M. – Lin, J., et al.: Incidence and predictors of venous thromboembolism (VTE) among ambulatory high-risk cancer patients undergoing chemotherapy in the United States. *Cancer*, 2013, 119, s. 648–655.
- 14 Key, N. S. – Khorana, A. A. – Kuderer, N. M., et al.: Venous thromboembolism prophylaxis and treatment in patients with cancer: ASCO clinical practice guideline update. *J Clin Oncol*, 2020, 38, s. 496–520.
- 15 Kraaijpoel, N. – Carrier, M.: How I treat cancer-associated venous thromboembolism. *Blood*, 2019, 133, s. 291–298.
- 16 Musgrave, K. M. – Power, K. – Laffan, M., et al.: Practical treatment guidance for cancer-associated thrombosis – managing the challenging patient: a consensus statement. *Crit Rev Oncol Hematol*, 2022, 171, 103599.
- 17 Kirkilesis, G. I. – Kakkos, S. K. – Tsolakis, I. A.: Editor's choice – A systematic review and meta-analysis of the efficacy and safety of anticoagulation in the treatment of venous thromboembolism in patients with cancer. *Eur J Vasc Endovasc Surg*, 2019, 57, s. 685–701.
- 18 Giustozzi, M. – Agnelli, G. – Del Toro-Cervera, J., et al.: Direct oral anticoagulants for the treatment of acute venous thromboembolism associated with cancer: a systematic review and meta-analysis. *Thromb Haemost*, 2020, 120, s. 1128–1136.
- 19 Young, A. M. – Marshall, A. – Thirlwall, J., et al.: Comparison of an oral factor Xa inhibitor with low molecular weight heparin in patients with cancer with venous thromboembolism: results of a randomized trial (SELECT-D). *J Clin Oncol*, 2018, 36, s. 2017–2023.
- 20 Wang, T. F.: Drug-drug interactions: implications for anticoagulation, with focus in patients with cancer. *Thromb Res*, 2022, 213, s. S66–S71.
- 21 Lyman, G. H. – Carrier, M. – Ay, C., et al.: American Society of Hematology 2021 guidelines for management of venous thromboembolism: prevention and treatment in patients with cancer. *Blood Adv*, 2021, 5, s. 927–974.
- 22 Lee, A. Y. – Levine, M. N. – Baker, R. I., et al.: Low-molecular-weight heparin versus a coumarin for the prevention of recurrent venous thromboembolism in patients with cancer. *N Engl J Med*, 2003, 349, s. 146–153.

## Nové možnosti kombinované léčby paroxysmální noční hemoglobinurie

MUDr. Libor Červinek, Ph.D. Interní hematologická a onkologická klinika, LF MU a FN Brno

- 1 Notaro, R. – Luzzatto, L.: Breakthrough hemolysis in PNH with proximal or terminal complement inhibition. *N Engl J Med*, 2022, 387, s. 160–166.
- 2 Kulasekararaj, A. – Mellor, J. – Earl, L., et al.: PB2056: Prevalence of clinically significant extravascular hemolysis in stable C5 inhibitor-treated patients with PNH and its association with disease control, quality of life and treatment satisfaction. *Hemisphere*, 2023, 7, suppl, e352380.
- 3 Hillmen, P. – Szer, J. – Weitz, I., et al.: Pegcetacoplan versus eculizumab in paroxysmal nocturnal hemoglobinuria. *N Engl J Med*, 2021, 384, s. 1028–1037.
- 4 Ristino, A. M. – Kulasekararaj, A. G. – Lee, J. W., et al.: Danicopan: an oral complement factor D inhibitor for paroxysmal nocturnal hemoglobinuria. *Haematologica*, 2021, 106, s. 3188–3197.
- 5 Clinical Trials.gov Identifier: NCT04469465. Dostupné z: <https://clinicaltrials.gov/ct2/show/NCT04469465>, vyhledáno 27. 9. 2024.
- 6 Lee, J. W. – Griffin, M. – Kim, J. S., et al.: Addition of danicopan to ravulizumab or eculizumab in patients with paroxysmal nocturnal hemoglobinuria and clinically significant extravascular haemolysis (ALPHA): a double-blind, randomised, phase 3 trial. *Lancet Haematol*, 2023, 10, s. e955–e965.
- 7 Voydeya, INN-danicopan (europae.eu). Dostupné z: [https://ec.europa.eu/health/documents/community-register/2024/20240419162306/anx\\_162306\\_en.pdf](https://ec.europa.eu/health/documents/community-register/2024/20240419162306/anx_162306_en.pdf), vyhledáno 27. 9. 2024.

## Dostarlimab v léčbě endometriálního karcinomu

prof. MUDr. Jindřich Fínek, Ph.D. MHA Onkologická a radioterapeutická klinika FN a LF UK, Plzeň

- 1 Mirza, M. R. – Chase, D. M. – Brian M., et al.: Dostarlimab for primary advanced or recurrent endometrial cancer. *N Engl J Med*, 2023, 388, s. 2145–2158.

## Adjuvantní léčba melanomu u stadií IIB a IIC

doc. MUDr. Radek Lakomý, Ph.D. | doc. MUDr. Alexandr Poprach, Ph.D. Klinika komplexní onkologické péče, Masarykův onkologický ústav; Klinika komplexní onkologické péče, Lékařská fakulta Masarykovy univerzity, Brno

- 1 Eggermont, A. M. M. – Blank, C. U. – Mandala, M., et al.: Adjuvant pembrolizumab versus placebo in resected stage III melanoma. *N Engl J Med*, 2018, 378, s. 1789–1801.
- 2 Weber, J. – Mandala, M. – Del Vecchio, M., et al.: Adjuvant nivolumab versus ipilimumab in resected stage III or IV melanoma. *N Engl J Med*, 2017, 377, s. 1824–1835.
- 3 Poklepovic, A. S. – Luke, J. J.: Considering adjuvant therapy for stage II melanoma. *Cancer*, 2020, 126, s. 1166–1174.
- 4 Gershenwald, J. E. – Scolyer, R. A. – Hess, K. R., et al.: Melanoma staging: Evidence-based changes in the American Joint Committee on Cancer eighth edition cancer staging manual. *CA Cancer J Clin*, 2017, 67, s. 472–492.
- 5 Napolitano, S. – Brancaccio, G. – Argenziano, G., et al.: It is finally time for adjuvant therapy in melanoma. *Cancer Treat Rev*, 2018, 69, s. 101–111.
- 6 Garbe, C. – Keim, U. – Amaral, T., et al.: Prognosis of patients with primary melanoma stage I and II according to American Joint Committee on cancer version 8 validated in two independent cohorts: implications for adjuvant treatment. *J Clin Oncol*, 2022, 40, s. 3741–3749.
- 7 Lee, A. Y. – Doppelmann, N. – Panageas, K. S., et al.: Patterns and timing of initial relapse in pathologic stage II melanoma patients. *Ann*

- Surg Oncol*, 2017, 24, s. 939–946.
- 8 Long, G.V. – Luke, J.J. – Khattak, M.A., et al.: Pembrolizumab versus placebo as adjuvant therapy in resected stage IIIB or IIC melanoma (KEYNOTE-716): distant metastasis-free survival results of a multicentre, double-blind, randomised, phase 3 trial. *Lancet Oncol*, 2022, 23, s. 1378–1388.
- 9 Luke, J. J. – Rutkowski, P. – Queirolo, P., et al.: Pembrolizumab versus placebo as adjuvant therapy in completely resected stage IIIB or IIC melanoma (KEYNOTE-716): a randomised, double-blind, phase 3 trial. *Lancet*, 2022, 399, s. 1718–1729.
- 10 Luke, J. J. – Ascierto, P. A. – Khattak, M. A., et al.: Pembrolizumab versus placebo as adjuvant therapy in resected stage IIIB or IIC melanoma: final analysis of distant metastasis-free survival in the phase III KEYNOTE-716 study. *J Clin Oncol*, 7. 3. 2024, JCO2302355.
- 11 Kirkwood, J. M. – Del Vecchio, M. – Weber, J., et al.: Adjuvant nivolumab in resected stage IIIB/C melanoma: primary results from the randomized, phase 3 CheckMate 76K trial. *Nat Med*, 2023, 29, s. 2835–2843.
- 12 Varey, A. H. R. – Li, I. – El Sharouni, M. A., et al.: Predicting recurrence-free and overall survival for patients with stage II melanoma: The MIA Calculator. *J Clin Oncol*, 2024, 42, s. 1169–1180.
- 13 Lee R. – Mandala, M. – Long, G. V., et al.: Adjuvant therapy for stage II melanoma: the need for further studies. *Eur J Cancer*, 2023, 189, 112914.
- 14 Augustin, R. C. – Luke, J. J.: Rapidly evolving pre- and post-surgical systemic treatment of melanoma. *Am J Clin Dermatol*, 26. 2. 2024.
- 15 Amaral, T. M. S. – Hoffmann, M. C. – Sinnberg, T., et al.: Clinical validation of a prognostic 11-gene expression profiling score in prospectively collected FFPE tissue of patients with AJCC v8 stage II cutaneous melanoma. *Eur J Cancer*, 2020, 125, s. 38–45.
- 16 Zager, J. S. – Gastman, B. R. – Leachman, S., et al.: Performance of a prognostic 31-gene expression profile in an independent cohort of 523 cutaneous melanoma patients. *BMC Cancer*, 2018, 18, s. 130.
- 17 Grossman, D. – Kim, C. C. – Hartman, R. I., et al.: Prognostic gene expression profiling in melanoma: necessary steps to incorporate into clinical practice. *Melanoma Manag*, 2019, 6, MMT32.
- 18 Meyer, S. – Buser, L. – Haferkamp, S., et al.: Identification of high-risk patients with a seven-biomarker prognostic signature for adjuvant treatment trial recruitment in American Joint Committee on Cancer v8 stage I-IIA cutaneous melanoma. *Eur J Cancer*, 2023, 182, s. 77–86.

## Adjuvantní léčba světlobuněčného nádoru ledvin

doc. MUDr. Alexandr Poprach, Ph.D., doc. MUDr. Radek Lakomý, Ph.D. Klinika komplexní onkologické péče,

Masarykův onkologický ústav a LF MU Brno

- 1 Cosso, F. – Roviello, G. – Nesi, G., et al.: Adjuvant therapy for renal cell carcinoma: hype or hope? *Int J Mol Sci*, 2023, 24, s. 4243.
- 2 Pal, S. K. – Uzzo, R. – Karam, J. A., et al.: Adjuvant atezolizumab versus placebo for patients with renal cell carcinoma at increased risk of recurrence following resection (IMmotion010): a multicentre, randomised, double-blind, phase 3 trial. *Lancet*, 2022, 400, s. 1103–1116.
- 3 Motzer, R. J. – Russo, P. – Grünwald, V., et al.: Adjuvant nivolumab plus ipilimumab versus placebo for localised renal cell carcinoma after nephrectomy (CheckMate 914): a double-blind, randomised, phase 3 trial. *Lancet*, 2023, 401, s. 821–832.
- 4 Powles, T. – Tomczak, P. – Park, S. H., et al.: Pembrolizumab versus placebo as post-nephrectomy adjuvant therapy for clear cell renal cell carcinoma (KEYNOTE-564): 30-month follow-up analysis of a multicentre, randomised, double-blind, placebo-controlled, phase 3 trial. *Lancet Oncol*, 2022, 23, s. 1133–1144.
- 5 Choueiri, T. – Barata, P. C.: KEYNOTE-564: adjuvant pembrolizumab prolongs survival in high-risk clear cell renal cell cancer. ASCO Daily News. Dostupné z: <https://dailynews.ascopubs.org/doi/10.1200/ADN.24.201675>. vyhledáno 2. 6. 2024.
- 6 Mollica, V. – Massari, F.: Adjuvant treatment in renal cell carcinoma: a never-ending story? *Lancet*, 2024, 403, s. 433–434, DOI: [https://doi.org/10.1016/S0140-6736\(23\)01672-0](https://doi.org/10.1016/S0140-6736(23)01672-0).

## Lenvatinib a pembrolizumab v první linii léčby pokročilého renálního karcinomu – naše klinické zkušenosti

doc. MUDr. Hana Študentová, Ph.D. | MUDr. Anežka Zemáneková | Mgr. Kateřina Holá, Ph.D. | MUDr. Martina Spisarová, Ph.D.

Onkologická klinika, FN a LF Univerzity Palackého, Olomouc

- 1 Motzer, R. J. – Tannir, N. M. – McDermott, D. F., et al.: Nivolumab plus ipilimumab versus sunitinib in advanced renal-cell carcinoma. *N Engl J Med*, 2018, 378, s. 1277–1290.
- 2 Motzer, R. – Rini, B. I. – McDermott, D. F., et al.: Nivolumab plus ipilimumab versus sunitinib in first-line treatment for advanced renal cell carcinoma: extended follow-up of efficacy and safety results from a randomised, controlled, phase 3 trial. *Lancet Oncol*, 2019, 20, s. 1370–1385.
- 3 Motzer, R. – Alekseev, B. – Rha, S. Y., et al.: Lenvatinib plus pembrolizumab or everolimus for advanced renal cell carcinoma. *N Engl J Med*, 2021, 384, s. 1289–1300.
- 4 Motzer, R. J. – Porta, C. – Eto, M., et al.: Lenvatinib plus pembrolizumab versus sunitinib in first-line treatment of advanced renal cell carcinoma: final prespecified overall survival analysis of CLEAR, a phase III study. *J Clin Oncol*, 2024, 42, s. 1222–1228.
- 5 Grünwald, V. – Powles, T. – Kopyltsov, E., et al.: Survival by depth of response and efficacy by International Metastatic Renal Cell Carcinoma Database Consortium Subgroup with lenvatinib plus pembrolizumab versus sunitinib in advanced renal cell carcinoma: analysis of the phase 3 randomized CLEAR study. *Eur Urol Oncol*, 2023, 6, s. 437–446.

## Triple negativní karcinom prsu (TNBC) – pokroky v diagnostice a léčbě

prof. MUDr. Petra Tesařová, CSc. Ústav radiační onkologie FNB a 1. LF UK a Onkologická klinika VFN a 1. LF UK, Praha

- 1 Li, Y. – Zhang, H. – Merkher, Y., et al.: Recent advances in therapeutic strategies for triple-negative breast cancer. *J Hematol Oncol*, 2022, 15, s. 121.
- 2 Zagami, P. – Carey, L. A.: Triple negative breast cancer: pitfalls and progress. *NPJ Breast Cancer*, 2022, 8, s. 95.
- 3 Garrido-Castro, A. C. – Lin, N. U. – Polyzik, K.: Insights into molecular classifications of triple-negative breast cancer: improving patient selection for treatment. *Cancer Discov*, 2019, 9, s. 176–198.
- 4 Lehmann, B. D. – Bauer, J. A. – Chen, X., et al.: Identification of human triple-negative breast cancer subtypes and preclinical models for selection of targeted therapies. *J Clin Invest*, 2011, 121, s. 2750–2767.
- 5 Lehmann, B. D. – Jovanović, B. – Chen, X., et al.: Refinement of triple-negative breast cancer molecular subtypes: implications for neoadjuvant chemotherapy selection. *PLoS ONE*, 2016, 11, e0157368.
- 6 Burstein, M. D. – Tsimelzon, A. – Poage, G. M., et al.: Comprehensive genomic analysis identifies novel subtypes and targets of triple-negative breast cancer. *Clin Cancer Res*, 2015, 21, s. 1688–1698.
- 7 Corti, C. – Giugliano, F. – Nicolò, E., et al.: HER2-low breast cancer: a new subtype? *Curr Treat Options Oncol*, 2023, 24, s. 468–478.
- 8 Bianchini, G. – De Angelis, C. – Licata, L., et al.: Treatment landscape of triple-negative breast cancer – expanded options, evolving Leeds. *Nat Rev Clin Oncol*, 2022, 19, s. 91–113.
- 9 Lee, J.: Current treatment landscape for early triple-negative breast cancer (TNBC). *J Clin Med*, 2023, 12, s. 1524.
- 10 Schmid, P. – Cortes, J. – Dent, R., et al.: KEYNOTE-522 Investigators: Event-free survival with pembrolizumab in early triple-negative breast cancer. *N Engl J Med*, 2022, 386, s. 556–567.
- 11 Masuda, N. – Lee, S. J. – Ohtani, S., et al.: Adjuvant capecitabine for breast cancer after preoperative chemotherapy. *N Engl J Med*, 2017, 376, s. 2147–2159.
- 12 Chen, Y. – Li, W. X. – Wu, J. H., et al.: Does the dose of standard adjuvant chemotherapy affect the triple-negative breast cancer benefit from extended capecitabine metronomic therapy? An exploratory analysis of the SYSUCC-001 trial. *Breast Cancer*, 2024, 16, s. 223–231.
- 13 Bonadio, R. C. – Tarantino, P. – Testa, L., et al.: Management of patients with early-stage triple-negative breast cancer following pembrolizumab-based neoadjuvant therapy: What are the evidences? *Cancer Treat Rev*, 2022, 110, 102459.
- 14 O'Rourke, H. – Hart, C. – De Boer, R. H.: Current usage of pembrolizumab in triple negative breast cancer (TNBC). *Expert Rev Anticancer Ther*, 2024, 24, s. 253–261.
- 15 Geyer, C. E. Jr. – Garber, J. E. – Gelber, R. D., et al.: OlympiA Clinical Trial Steering Committee and Investigators: Overall survival in the OlympiA phase III trial of adjuvant olaparib in patients with germline pathogenic variants in BRCA1/2 and high-risk, early breast cancer. *Ann Oncol*, 2022, 33, s. 1250–1268.
- 16 Schlam, I. – Dower, J. – Lynch, F.: Addressing residual disease in HER2-positive and triple-negative breast cancer: What is next? *Curr Oncol Rep*, 2024, 26, s. 336–345.
- 17 Leon-Ferre, R. A. – Jonas, S. F. – Salgado, R., et al.: International Immuno-Oncology Biomarker Working Group: Tumor-infiltrating lymphocytes in triple-negative breast cancer. *JAMA*, 2024, 331, s. 1135–1144.
- 18 Miles, D. – Gligorov, J. – André, F., et al.: Primary results from IMpassion131, a double-blind, placebo-controlled, randomised phase III trial of first-line paclitaxel with or without atezolizumab for unresectable locally advanced/metastatic triple-negative breast cancer. *Ann Oncol*, 2021, 32, s. 994–1004.
- 19 Cortes, J. – Rugo, H. S. – Cescon, D. W., et al.: Pembrolizumab plus chemotherapy in advanced triple-negative breast cancer. *N Engl J Med*, 2022, 387, s. 217–226.
- 20 Bardia, A. – Rugo, H. S. – Tolane, S. M., et al.: Final results from the randomised phase III ASCENT clinical trial in metastatic triple-negative breast cancer and association of outcomes by human epidermal growth factor receptor 2 and trophoblast cell surface antigen 2 expression. *J Clin Oncol*, 2024, 42, s. 1738–1744.
- 21 Modig, S. – Jacot, W. – Yamashita, T., et al.: Trastuzumab deruxtecan in previously treated HER2-low advanced breast cancer. *N Engl J Med*, 2022, 387, s. 9–20.
- 22 Olaparib for metastatic breast cancer in patients with a germline BRCA mutation [Published correction appears in *N Engl J Med*, 2017, 377, s. 1700]. *N Engl J Med*, 2017, 377, s. 523–533.
- 23 Litton, J. K. – Rugo, H. S. – Ettl, J., et al.: Talazoparib in patients with advanced breast cancer and a germline BRCA mutation. *N Engl J Med*, 2018, 379, s. 753–763.
- 24 Sharma, P. – Abramson, V. G. – O'Dea, A., et al.: Clinical and biomarker results from phase I/II study of PI3K inhibitor alpelisib plus nab-paclitaxel in HER2-negative metastatic breast cancer. *Clin Cancer Res*, 2021, 27, s. 3896–3904.
- 25 Dent, R. – Oliveira, M. – Isakoff, S. J., et al.: Final results of the double-blind placebo-controlled randomized phase 2 LOTUS trial of first-line ipatasertib plus paclitaxel for inoperable locally advanced/metastatic triple-negative breast cancer. *Breast Cancer Res Treat*, 2021, 189, s. 377–386.
- 26 Dai, C. – Ellisen, L. W.: Revisiting androgen receptor signaling in breast cancer. *Oncologist*, 2023, 28, s. 383–391.
- 27 Palmieri, C. – Linden, H. – Birrell, S. N., et al.: Activity and safety of enobosarm, a novel, oral, selective androgen receptor modulator, in androgen receptor-positive, oestrogen receptor-positive, and HER2-negative advanced breast cancer (Study G200802): a randomised, open-label, multicentre, multinational, parallel design, phase 2 trial. *Lancet Oncol*, 2024, 25, s. 317–325.
- 28 Schmid, P. – Cortés, R. A. – Dent, L., et al.: LBA18 – Pembrolizumab or placebo plus chemotherapy followed by pembrolizumab or placebo for early-stage TNBC: Updated EFS results from the phase III KEYNOTE-522 study. *Ann Oncol*, 2023, 34, suppl. 2, s. S1254–S1335.
- 29 Schmid, P., et al.: Updated survival results from KEYNOTE-522, presented at SABCS 2023. Dostupné z: <https://ascopost.com/videos/2023-sabcs/peter-schmid-on-early-stage-tnbc-updated-survival-results-from-keynote-522/>, vyhledáno 13. 8. 2024.
- 30 Pusztai, L. – Denkert, C. – O'Shaughnessy, J., et al.: Event-free survival by residual cancer burden with pembrolizumab in early-stage TNBC: exploratory analysis from KEYNOTE-522. *Ann Oncol*, 2024, 35, s. 429–436.

# Postavení imunoterapie v rámci systémové léčby nádorů horní části gastrointestinálního traktu

MUDr. Jiří Tomášek, Ph.D. Masarykův onkologický ústav, Brno

- 1 Modrá kniha ČOS pro rok 2024 – aktuální vydání dostupné na [www.linkos.cz](http://www.linkos.cz).
- 2 Obermannová, R. – Alsina, M. – Cervantes, A., et al.: Oesophageal cancer: ESMO Clinical Practice Guideline for diagnosis, treatment and follow-up. *Ann Oncol*, 2022, 33, s. 1005–1020.
- 3 Lordinck, F. – Carneiro, F. – Casciu, S., et al.: Gastric cancer: ESMO Clinical Practice Guideline for diagnosis, treatment and follow-up. *Ann Oncol*, 2022, 33, s. 992–1004.
- 4 Durdík, P. – Matěj, R. – Ryška, A.: Doporučení pro testování PD-L1: metodika testování a reportování výsledků. Verze\_3 (13. 5. 2022), Společnost českých patologů ČLS JEP. Dostupné z: <https://www.patologie.info/uvod/>, vyhledáno 6. 9. 2024.

## Karcinom plic na ASCO 2024

MUDr. Leona Koubková Pneumologická klinika 2. LF UK a FN v Motole, Praha

- 1 Lu, S. – Kato, T. – Dong, X., et al.: Osimertinib after chemoradiotherapy in stage III EGFR-mutated NSCLC. *NEMJ*, 2024, DOI: 10.1056/NEJMoa2402614.
- 2 Spigel, D. R. – Cheng, Y. – Cho, B. Ch., et al.: ADRIATIC: Durvalumab (D) as consolidation treatment (tx) for patients (pts) with limited-stage small-cell lung cancer (LS-SCLC). *J Clin Oncol*, 2024, 42, suppl. 17. Dostupné z: [https://doi.org/10.1200/JCO.2024.42.17\\_suppl.LBA5](https://doi.org/10.1200/JCO.2024.42.17_suppl.LBA5), vyhledáno 15. 8. 2024.
- 3 Solomon, B. J. – Liu, G. – Felip, E., et al.: Lorlatinib versus crizotinib in patients with advanced ALK-positive non-small cell lung cancer: 5-year outcomes from the phase III CROWN study. *J Clin Oncol*, 2024, 42, suppl. 15. 8. 2024.
- 4 Mok, T. S. K. – Yao, W. – Duruisseaux, M., et al.: KRYSAL-12: Phase 3 study of adagrasib versus docetaxel in patients with previously treated advanced/metastatic non-small cell lung cancer (NSCLC) harboring a KRASG12C mutation. *J Clin Oncol*, dostupné z: [https://doi.org/10.1200/JCO.2024.42.17\\_suppl.LBA509](https://doi.org/10.1200/JCO.2024.42.17_suppl.LBA509), vyhledáno 15. 8. 2024.
- 5 Leigh, N. B. – Lim, S. M. – Cheng, Y., et al.: Subcutaneous versus intravenous amivantamab, both in combination with lazertinib, in refractory EGFR-mutated NSCLC: primary results from the phase 3 PALOMA-3 study. *J Clin Oncol*, dostupné z: <https://doi.org/10.1200/JCO.24.01001>, vyhledáno 15. 8. 2024.

## Současné trendy a pokroky v onkofertilitě

MUDr. Kateřina Veselá, Ph.D. REPROMEDA, s. r. o., Brno

MUDr. Lenka Mekičová | prof. MUDr. Martin Huser, Ph.D., MBA Gynekologicko-porodnická klinika FN Brno a LF MU, Brno

- 1 Halászová, N. – Crha, I. – Huser, M., et al.: Zachování fertility u žen s karcinomem prsu před gonadotoxickou léčbou. *Ceska Gynekol*, 2017, 82, s. 287–292.
- 2 Huser, M.: Onkofertilita – nová oblast reprodukční medicíny. Praha, Mladá fronta, 2014.
- 3 Anderson, R. A., et al.: The ESHRE Guideline Group on Female Fertility Preservation. ESHRE guideline: female fertility preservativ. *Human Reproduction Open*, 2020, 4, hoaa052.
- 4 Khattak, H. – Malhas, R., et al.: Fresh and cryopreserved ovarian tissue transplantation for preserving reproductive and endocrine function: a systematic review and individual patient data meta-analysis. *Hum Reprod Update*, 2022, 28, s. 400–416.
- 5 Practice Committee of the American Society for Reproductive Medicine: Fertility preservation in patients undergoing gonadotoxic therapy or gonadectomy: a committee opinion. *Fertil Steril*, 2019, 112, s. 1022–1033.
- 6 Dolmans, M. M. – Marotta, M. L. – Pirard, C., et al.: Ovarian tissue cryopreservation followed by controlled ovarian stimulation and pick-up of mature oocytes does not impair the number or quality of retrieved oocytes. *J Ovarian Res*, 2014, 7, s. 80.
- 7 Dittrich, R. – Lotz, L. – Mueller, A., et al.: Oncofertility: combination of ovarian stimulation with subsequent ovarian tissue extraction on the day of oocyte retrieval. *Reprod Biol Endocrinol*, 2013, 11, s. 19.
- 8 Mekičová, L. – Ješta, M. – Crha, I.: Vybrané patologické stavy ovlivňující receptivity endometria. *Ceska Gynekol*, 2022, 87, s. 416–422.
- 9 Moawad, N. S. – Santamaría, E. – Rhiton-Vlasak, A., et al.: Laparoscopic ovarian transposition before pelvic cancer treatment: ovarian function and fertility preservation. *J Minim Invasive Gynecol*, 2017, 24, s. 28–35.
- 10 Jang, B. – Rohr, A. – Vakharia, P. P. – Collins, Z., et al.: Case report: interventional radiology's potential role for in vitro fertilization post ovarian transposition and pelvic radiation. *Fertil Res Pract*, 2019, 5, s. 4.
- 11 Veselá, K. – Trávník, P. – Horák, J., et al.: Genetika v moderní reprodukční medicíně. *Gyn Por*, 2019, 3, s. 1–6.
- 12 Azim, H. A. – Kroman, N. – Paesmans, M., et al.: Prognostic impact of pregnancy after breast cancer according to estrogen receptor status: a multicenter retrospective study. *J Clin Oncol*, 2013, 31, s. 73–79.
- 13 Blumenfeld, Z.: How to preserve fertility in young women exposed to chemotherapy? The role of GnRH agonist cotreatment in addition to cryopreservation of embryo, oocytes, or ovaries. *Oncologist*, 2007, 12, s. 1044–1054.
- 14 Danis, R. B. – Pereira, N. – Elias, R. T.: Random start ovarian stimulation for oocyte or embryo cryopreservation in women desiring fertility preservation prior to gonadotoxic cancer therapy. *Curr Pharm Biotechnol*, 2017, 18, s. 609–613.
- 15 Gerstl, B. – Sullivan, E. – Ives, A., et al.: Pregnancy outcomes after a breast cancer diagnosis: a systematic review and meta-analysis. *Clin Breast Cancer*, 2018, 18, s. e79–e88.
- 16 Kasum, M. – Beketic-Oreskovic, L. – Oreskovic, S.: Subsequent pregnancy and prognosis in breast cancer survivors. *Acta Clin Croat*, 2014, 53, s. 334–341.
- 17 Kuang, Y., et al.: Double stimulations during the follicular and luteal phases of poor responders in IVF/ICSI programmes (Shanghai protocol). *Reprod Biomed Online*, 2014, 29, s. 684–691.
- 18 Lambertini, M. – Kroman, N. – Ameye, L., et al.: Long-term safety of pregnancy following breast cancer according to estrogen receptor status. *J Natl Cancer Inst*, 2018, 110, s. 426–429.
- 19 Marklund, A. – Eloranta, S. – Wikander, I., et al.: Efficacy and safety of controlled ovarian stimulation using GnRH antagonist protocols for emergency fertility preservation in young women with breast cancer – a prospective nationwide Swedish multicenter study. *Hum Reprod*, 2020, 35, s. 929–938.
- 20 Oktay, K. – Bedoschi, G.: Appraising the biological evidence for and against the utility of GnRH for preservation of fertility in patients with cancer. *J Clin Oncol*, 2016, 34, s. 2563–2565.
- 21 Rodriguez-Wallberg, K. A. – Oktay, K.: Fertility preservation and pregnancy in women with and without BRCA mutation-positive breast cancer. *Oncologist*, 2012, 17, s. 1409–1417.
- 22 Reddy, J. – Oktay, K.: Ovarian stimulation and fertility preservation with the use of aromatase inhibitors in women with breast cancer. *Fertil Steril*, 2012, 98, s. 1363–1369.
- 23 Ubaldi, F. M. – Capalbo, A. – Vaiarelli, A., et al.: Follicular versus luteal phase ovarian stimulation during the same menstrual cycle (Duo-Stim) in a reduced ovarian reserve population results in a similar euploid blastocyst formation rate: new insight in ovarian reserve exploitation. *Fertil Steril*, 2016, 105, s. 1488–1495.
- 24 Vuković, P. – Kasum, M. – Raguž, J., et al.: Fertility preservation in young women with early-stage breast cancer. *Acta Clin Croat*, 2019, 58, s. 147–156.
- 25 Zhang, X. – Niu, J. – Che, T., et al.: Fertility preservation in BRCA mutation carriers – efficacy and safety issues: a review. *Reprod Biol Endocrinol*, 2020, 18, s. 11.
- 26 Gryner, M. – Cedrin-Durnerin, I. – Raguideau, F., et al.: Comparative effectiveness of gonadotropins used for ovarian stimulation during assisted reproductive technologies (ART) in France: A real-world observational study from the French nationwide claims database (SNDS). *Best Pract Res Clin Obstet Gynaecol*, 2023, 88, 102308.
- 27 Macháčková, E. – Foretová, L. – Gaillyová, R.: Hereditární nádorová onemocnění v klinické praxi. Praha, Grada, 2022, s. 504.

## Italský Milán hostil 46. kongres ESPEN 2024 – odborníky zaujal i Nutrison s parenterálním podáním – reportáz

- 1 Petra Beran Holečková et al.: Evaluation of a 3-month intervention with high protein omega-3 enriched oral nutritional supplement on body weight, inflammation, muscle strength and patient reported outcomes in patients with cancer. *Clinical Nutrition ESPEN*, 2024, 63, s. 1301.

## Dědičná predispozice pro vznik karcinomu prostaty

MUDr. Tereza Piskáčková GHC Genetics

- 1 Plevová, P. – Hladíková, A.: Genetic counselling in male carriers of BRCA1 and BRCA2 gene mutations. *Klin Onkol*, 2012, 25, suppl. s. S67–S73.
- 2 Giri, V. N. – Beebe-Dimmer, J. L.: Familial prostate cancer. *Semin Oncol*, 2016, 43, s. 560–565.
- 3 Rusak, B. – Klužniak, W. – Wokolorczyk, D. – Stempa, K., et al.: Inherited NBN mutations and prostate cancer risk and survival. *Cancer Res Treat*, 2019, 51, s. 1180–1187.
- 4 Raymond, V. M. – Mukherjee, B. – Wang, F., et al.: Elevated risk of prostate cancer among men with Lynch syndrome. *J Clin Oncol*, 2013, 31, s. 1713–1718.
- 5 Na, R. – Zheng, S. L. – Han, M., et al.: Germline mutations in ATM and BRCA1/2 distinguish risk for lethal and indolent prostate cancer and are associated with early age at death. *Eur Urol*, 2017, 71, s. 740–747.