Literatur zum Artikel:

Frauenherzen, ein einzigartiger ischämischer Phänotyp

Warum Frauen anders krank werden

von Dr. med. Lena Marie Seegers

[1] American Heart Association, Go Red for women, in Class of Survivors https://www.goredforwomen.org/en/about-heart-disease-in-women/real-women/dina-pinelli, abgerufen am 01.11.2024

[2] Roswell RO, Kunkes J, Chen AY, Chiswell K, Iqbal S, Roe MT, Bangalore S. Impact of sex and contact-to-device time on clinical outcomes in acute ST-segment elevation myocardial infarction-findings from the National Cardiovascular Data Registry. J Am Heart Assoc. 2017

[3] GBD 2019 Diseases and Injuries Collaborators. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet 2020;396:1204–22.

[4] Vogel B, Acevedo M, Appelman Y, Bairey Merz CN, Chieffo A, Figtree GA...Mehran R. The Lancet women and cardiovascular disease Commission: reducing the global burden by 2030. Lancet. 2021 Jun 19;397(10292):2385–2438

[5] Bairey Merz CN, Andersen H, Sprague E, Burns A, Keida M, Walsh MN, Greenberger P, Campbell S, Pollin I, McCullough C, et al. Knowledge, attitudes, and beliefs regarding cardiovascular disease in women: the Women's Heart Alliance. J Am Coll Cardiol. 2017;70:123–132.

[6] Cushman M, Shay CM, Howard VJ, Jiménez MC, Lewey J, McSweeney JC, Newby LK, Poudel R, Reynolds HR, Rexrode KM, Sims M, Mosca LJ; American Heart Association. Ten-Year Differences in Women's Awareness Related to Coronary Heart Disease: Results of the 2019 American Heart Association National Survey: A Special Report From the American Heart Association. Circulation. 2021 Feb 16;143(7):e239-e248.

[7] Martinho M, Cale R, Briosa A, Pereira E, Pereira A, Grade SJ, et al. Ladies first: awareness for the risk of adverse outcomes of female patients after ST-segment elevation acute coronary syndrome. European J of Heart Fail. 2023;25(331):2.

[8] L Kuehnemund, J Koeppe, J Feld, A Wiederhold, J Illner, L Makowski, J Gerss, H Reinecke, E Freisinger, GenderVasc , Gender disparities in management and treatment in acute myocardial infarction – a German nationwide real-life analysis, European Heart Journal, Volume 41, Issue Supplement_2, November 2020, ehaa946.3192

[9] Dawson LP, Nehme E, Nehme Z, Davis E, Bloom J, Cox S, Nelson AJ, Okyere D, Anderson D, Stephenson M, Lefkovits J, Taylor AJ, Nicholls SJ, Cullen L, Kaye D, Smith K, Stub D. Sex Differences in Epidemiology, Care, and Outcomes in Patients With Acute Chest Pain. J Am Coll Cardiol. 2023 Mar 14;81(10):933–945.

[10] Perman et al. Public Perceptions on Why Women Receive Less Bystander Cardiopulmonary Resuscitation Than Men in Out-of-Hospital Cardiac Arrestv. Circ 2019.

[11] Bugiardini R, Ricci B, Cenko E, Vasiljevic Z, Kedev S, Davidovic G, Zdravkovic M, Miličić D, Dilic M, Manfrini O, Koller A, Badimon L. Delayed Care and Mortality Among Women and Men With Myocardial Infarction. J Am Heart Assoc. 2017 Aug 21;6(8):e005968.

[12] Vogel B, Acevedo M, Appelman Y, Bairey Merz CN, Chieffo A, Figtree GA, Guerrero M, Kunadian V, Lam CSP, Maas AHEM, Mihailidou AS, Olszanecka A, Poole JE, Saldarriaga C, Saw J, Zühlke L, Mehran R. The Lancet women and cardiovascular disease Commission: reducing the global burden by 2030. Lancet. 2021 Jun 19;397(10292):2385–2438.

[13] Gulati M, Levy PD, Mukherjee D, Amsterdam E, Bhatt DL, Birtcher KK, Blankstein R, Boyd J, Bullock-Palmer RP, Conejo T, Diercks DB, Gentile F, Greenwood JP, Hess EP, Hollenberg SM, Jaber WA, Jneid H, Joglar JA, Morrow DA, O'Connor RE, Ross MA, Shaw LJ. 2021 AHA/ACC/ASE/CHEST/SAEM/SCCT/SCMR Guideline for the Evaluation and Diagnosis of Chest Pain: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation. 2021 Nov 30;144(22):e368-e454.

[14] Reuter PG, Pradeau C, Huo Yung Kai S, Lhermusier T, Bourdé A, Tentillier E, Combes X, Bongard V, Ducassé JL, Charpentier S. Predicting acute coronary syndrome in males and females with chest pain who call an emergency medical communication centre. Scand J Trauma Resusc Emerg Med. 2019 Oct 17;27(1):92.

[15] Vrints C, Andreotti F, Koskinas KC, Rossello X, Adamo M, Ainslie J, Banning AP, Budaj A, Buechel RR, Chiariello GA, Chieffo A, Christodorescu RM, Deaton C, Doenst T, Jones HW, Kunadian V, Mehilli J, Milojevic M, Piek JJ, Pugliese F, Rubboli A, Semb AG, Senior R, Ten Berg JM, Van Belle E, Van Craenenbroeck EM, Vidal-Perez R, Winther S; ESC Scientific Document Group. 2024 ESC Guidelines for the management of chronic coronary syndromes. Eur Heart J. 2024 Sep 29;45(36):3415–3537.

[16] Lerner DJ, Kannel WB. Patterns of coronary heart disease morbidity and mortality in the sexes: a 26-year follow-up of the Framingham population. Am Heart J. 1986;111: 383–390.

[17] Mathur P, Ostadal B, Romeo F, Mehta JL. Gender-related differences in atherosclerosis. Cardiovasc Drugs Ther. 2015;29:319–327.

[18] El Khoudary SR, Aggarwal B, Beckie TM et al. American Heart Association Prevention Science Committee of the Council on Epidemiology and Prevention; and Council on Cardiovascular and Stroke Nursing. Menopause Transition and Cardiovascular Disease Risk: Implications for Timing of Early Prevention: A Scientific Statement From the American Heart Association. Circulation. 2020 Dec 22;142(25): e506-e532

[19] Mendelsohn ME, Karas RH. The protective effects of estrogen on the cardiovascular system. N Engl J Med. 1999;340:1801–11.

[20] Dehaini H, Fardoun M, Abou-Saleh H, El-Yazbi A, Eid AA, Eid AH. Estrogen in vascular smooth muscle cells: A friend or a foe? Vascul Pharmacol. 2018 Dec;111:15–21.

[21] Mehta LS, Beckie TM, DeVon HA, Grines CL, Krumholz HM, Johnson MN, Lindley KJ, Vaccarino V, Wang TY, Watson KE et al. American Heart Association Cardiovascular Disease in Women and Special Populations Committee of the Council on Clinical Cardiology, Council on Epidemiology and Prevention, Council on Cardiovascular and Stroke Nursing, and Council on Quality of Care and Outcomes Research. Acute Myocardial Infarction in Women: A Scientific Statement from the American Heart Association. Circulation. 2016;133:916–47.

[22] St Pierre SR, Peirlinck M, Kuhl E. Sex Matters: A Comprehensive Comparison of Female and Male Hearts. Front Physiol. 2022 Mar 22;13:831179. doi: 10.3389/fphys.2022.831179.

[23] Nakajima A, Libby P, Mitomo S, Yuki H, Araki M, Seegers LM et al. Biomarkers associated with coronary high-risk plaques. J Thromb Thrombolysis. 2022; 54:647–659

[24] Araki M, Sugiyama T, Nakajima A, Yonetsu T, Seegers LM, Dey D et al. Level of Vascular Inflammation Is Higher in Acute Coronary Syndromes Compared with Chronic Coronary Disease. Circ Cardiovasc Imaging. 2022. e014191.

[25] Nakajima A, Sugiyama T, Araki M, Seegers LM, Dey D, McNulty I et al. Plaque Rupture, Compared With Plaque Erosion, Is Associated With a Higher Level of Pancoronary Inflammation. JACC Cardiovasc Imaging. 2022;15:828–839.

[26] Smith LR, Salifu MO, McFarlane IM. Non-obstructive coronary artery disease in women: current evidence and future directions. Int J Clin Res Trials.2020;5:152.

[27] Reynolds HR, Shaw LJ, Min JK, Spertus JA, Chaitman BR, Berman DS, Picard MH et al. Association of Sex with Severity of Coronary Artery Disease, Ischemia, and Symptom Burden in Patients with Moderate or Severe Ischemia: Secondary Analysis of the ISCHEMIA Randomized Clinical Trial. JAMA Cardiol. 2020;5:773–786.

[28] Khuddus MA, Pepine CJ, Handberg EM, Bairey Merz CN, Sopko G, Bavry AA, Denardo SJ, McGorray SP, Smith KM, Sharaf BL et al. An intravascular ultrasound analysis in women experiencing chest pain in the absence of obstructive coronary artery disease: a substudy from the National Heart, Lung and Blood Institute-Sponsored Women's Ischemia Syndrome Evaluation (WISE). J Interv Cardiol. 2010;23:511–9

[29] Jang IK, Tearney GJ, MacNeill B et al. In vivo characterization of coronary atherosclerotic plaque by use of optical coherence tomography. Circulation. 2005.111:1551–5.

[30] Araki M, Park SJ, Dauerman HL, Uemura S, Kim JS, Di Mario C et al. Optical coherence tomography in coronary atherosclerosis assessment and intervention. Nat Rev Cardiol. 2022;19:684–703.

[31] Nakajima A, Sugiyama T, Araki M, Seegers LM, Dey D, McNulty I, Lee H, Yonetsu T, Yasui Y, Teng Y, Nagamine T, Nakamura S, Achenbach S, Kakuta T, Jang IK. Plaque Rupture, Compared With Plaque Erosion, Is Associated With a Higher Level of Pancoronary Inflammation. JACC Cardiovasc Imaging. 2022 May;15(5):828–839.

[32] Seegers LM, Araki M, Nakajima A, Yonetsu T, Minami Y, Ako J, Soeda T, Kurihara O, Higuma T, Kimura S, Adriaenssens T, Nef HM, Lee H, McNulty I, Sugiyama T, Kakuta T, Jang IK. Sex Differences in Culprit Plaque Characteristics Among Different Age Groups in Patients With Acute Coronary Syndromes. Circ Cardiovasc Interv. 2022 Jun;15(6): e011612.

[33] Seegers LM, DeFaria Yeh D, Yonetsu T, Sugiyama T, Minami Y, Soeda T, Araki M, Nakajima A, Yuki H, Kinoshita D, Suzuki K, Niida T, Lee H, McNulty I, Nakamura S, Kakuta T, Fuster V, Jang IK. Sex Differences in Coronary Atherosclerotic Phenotype and Healing Pattern on Optical Coherence Tomography Imaging. Circ Cardiovasc Imaging. 2023 Aug;16 (8):e015227.

[34] Vrints C, Andreotti F, Koskinas KC, Rossello X, Adamo M, Ainslie J, Banning AP, Budaj A, Buechel RR, Chiariello GA, Chieffo A, Christodorescu RM, Deaton C, Doenst T, Jones HW, Kunadian V, Mehilli J, Milojevic M, Piek JJ, Pugliese F, Rubboli A, Semb AG, Senior R, Ten Berg JM, Van Belle E, Van Craenenbroeck EM, Vidal-Perez R, Winther S; ESC Scientific Document Group. 2024 ESC Guidelines for the management of chronic coronary syndromes. Eur Heart J. 2024 Sep 29;45(36):3415–3537

[35] Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, McQueen, M, Budaj A, Pais P, Varigos J, Lisheng L; INTERHEART Study Investigators. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Lancet. 2004;364:937–952.

[36] Huxley RR, Woodward M. Cigarette smoking as a risk factor for coronary heart disease in women compared with men: a systematic review and meta-analysis of prospective cohort studies. Lancet. 2011 Oct 8;378(9799):1297–305.

[37] Kitas GD, Gabriel SE. Cardiovascular disease in rheumatoid arthritis: state of the art and future perspectives. Ann Rheum Dis. 2011 Jan;70(1):8–14.

[38] Berteotti M, Profili F, Nreu B, Casolo G, Zuppiroli A, Mannucci E, Marcucci R, Francesconi P. LDL-cholesterol target levels achievement in high-risk patients: An (un)expected gender bias. Nutr Metab Cardiovasc Dis. 2024 Jan;34 (1):145–152.

[39] Holven KB, Roeters van Lennep J. Sex differences in lipids: A life course approach. Atherosclerosis. 2023 Nov;384:117270. doi: 10.1016/j.atherosclerosis.2023.117270.

[40] Berni TR, Morgan CL, Rees DA. Women With Polycystic Ovary Syndrome Have an Increased Risk of Major Cardiovascular Events: a Population Study. J Clin Endocrinol Metab. 2021 Aug 18;106(9):e3369-e3380.

[41] Hauge MG, Damm P, Kofoed KF, Ersbøll AS, Johansen M, Sigvardsen PE, Møller MB, Fuchs A, Kühl JT, Nordestgaard BG, Køber LV, Gustafsson F, Linde JJ. Early Coronary Atherosclerosis in Women With Previous Preeclampsia. J Am Coll Cardiol. 2022 Jun 14;79(23):2310–2321.

[42] Lewey J, Levine LD, Yang L, Triebwasser JE, Groeneveld PW. Patterns of Postpartum Ambulatory Care Follow-up Care Among Women With Hypertensive Disorders of Pregnancy. J Am Heart Assoc. 2020 Sep;9(17):e016357.

[43] Schäfer-Graf UM, Gembruch U, Kainer F, Groten T, Hummel S, Hösli I, Grieshop M, Kaltheuner M, Bührer C, Kautzky-Willer A, Laubner K, Bancher-Todesca D. Gestational Diabetes Mellitus (GDM) – Diagnosis, Treatment and Follow-Up. Guideline of the DDG and DGGG (S3 Level, AWMF Registry Number 057/008, February 2018). Geburtshilfe Frauenheilkd. 2018 Dec;78(12):1219–1231.

[44] Zhang Y, Yu S, Chen Z, Liu H, Li H, Long X, Ye F, Luo W, Dai Y, Tu S, Chen W, Kong S, He Y, Xue L, Tan N, Liang H, Zhang Z, He P, Duan C, Liu Y. Gestational diabetes and future cardiovascular diseases: associations by sex-specific genetic data. Eur Heart J. 2024 Oct 25:ehae706.

[45] Parikh NI, Gonzalez JM, Anderson CAM, Judd SE, Rexrode KM, Hlatky MA, et al. Adverse pregnancy outcomes and cardiovascular disease risk: unique opportunities for cardiovascular disease prevention in women: a scientific statement from the American Heart Association. Circulation. 2021;143(18):e902–16.

[46] Honigberg MC, Zekavat SM, Aragam K, Finneran P, Klarin D, Bhatt DL, Januzzi JL Jr, Scott NS, Natarajan P. Association of Premature Natural and Surgical Menopause With Incident Cardiovascular Disease. JAMA. 2019 Dec 24;322(24): 2411–2421.

[47] Iorga A, Cunningham CM, Moazeni S, Ruffenach G, Umar S, Eghbali M. The protective role of estrogen and estrogen receptors in cardiovascular disease and the controversial use of estrogentherapy. Biol Sex Differ. 2017;8(1):33.

[48] van Velzen DM, Paldino A, Klaver M, et al. Cardiometabolic effects of testosterone in transmen and estrogen plus cyproterone acetate in transwomen. J Clin Endocrinol Metab. 2019;104(6):1937–1947.

[49] Nota NM, Wiepjes CM et al.. Occurrence of acute cardiovascular events in transgender individuals receiving hormone therapy: results from a large cohort study. Circulation. 2019;139(11):1461–1462.

[50] Lakshmikanth T, Consiglio C, Sardh F, Forlin R, Wang J, Tan Z, Barcenilla H, Rodriguez L, Sugrue J, Noori P, Ivanchenko M, Piñero Páez L, Gonzalez L, Habimana Mugabo C, Johnsson A, Ryberg H, Hallgren Å, Pou C, Chen Y, Mikeš J, James A, Dahlqvist P, Wahlberg J, Hagelin A, Holmberg M, Degerblad M, Isaksson M, Duffy D, Kämpe O, Landegren N, Brodin P. Immune system adaptation during gender-affirming testosterone treatment. Nature.
2024 Sep;633(8028):155–164.

[51] Khandelwal A, Bakir M, Bezaire M, Costello B, Gomez JMD, Hoover V, Nazir NT, Nichols K, Reisenberg A, Rao A, Sanghani R, Tracy M, Volgman AS. Managing Ischemic Heart Disease in Women: Role of a Women's Heart Center. Curr Atheroscler Rep. 2021 Aug 4;23(10):56.

Quellen zum Artikel:

Substitution sucht Nachwuchs

Die Initiative „Junge Suchtmedizin“ will Stigmata abbauen

von Dr. med. Deborah Scholz-Hehn

Europäische Beobachtungsstelle für Drogen und Drogensucht (2021), Opioid-related deaths: health and social responses (Opioidbedingte Todesfälle: Gesundheitliche und soziale Maßnahmen):
https://www.euda.europa.eu/publications/mini-guides/opioid-related-deaths-health-and-social-responses_en

Magnan et al., 2024: Stigma Against Patients With Substance Use Disorders Among Health Care Professionals and Trainees and Stigma-Reducing Interventions: A Systematic Review. Academic Medicine 99(2):p 221–231, February 2024. |
DOI: 10.1097/ACM.0000000000005467
https://journals.lww.com/academicmedicine/fulltext/2024/02000/stigma_ against_patients_with_substance_use.28.aspx

Bundesinstitut für Arzneimittel und Medizinprodukte/Substitutionsregister:
https://www.bfarm.de/DE/Bundesopiumstelle/Substitutionsregister/_node.html

Bielenberg et al., 2021: A systematic review of stigma interventions for providers who treat patients with substance use disorders. Journal of Substance Abuse Treatment Vol.131, Dec 2021, 108486
https://www.sciencedirect.com/science/article/pii/S0740547221002129

Literatur zum Artikel:

Behandlungspflicht versus Patientenablehnung

[1] § 7 Abs. 2 S. 2 MBO-Ä; § 7 Abs. 2 S. 2 BO-Ärzte Hessen

[2] siehe Art. 3 Abs. 3 GG und §§ 19, 20 AGG

[3] § 13 Abs. 7: „Der Vertragsarzt darf die Behandlung eines Versicherten im Übrigen nur in begründeten Fällen ablehnen." Bundesmantelvertrag – Ärzte vom 01.10. 2024 (BMV-Ärzte); https://www.kbv.de/media/sp/BMV-Aerzte.pdf

[4] Halbe, Behandlungspflicht des Arztes, Deutsches Ärzteblatt 2018, Seite A 2256–2257, https://www.aerzteblatt.de/pdf.asp?id=203493

[5] hierzu instruktiv SG München, Urteil vom 23.04.2021, Az. S 28 KA116/18 = MedR 2022, 72

[6] siehe § 13 Abs. 7 Satz 1 BMV-Ärzte

[7] siehe § 17 Abs. 4 BMV-Ärzte

Literatur zum Artikel:

Umfassendere Aufklärung bei alternativen Heilmethoden

[1] OLG Dresden, Urteil vom 23.07.2024, Az.: 4 U 1610/21

[2] Eine Behandlungsmethode, die primär in der Naturheilkunde zu finden ist, und die sich auf die „Austreibung" der ungesunden Stoffe aus dem Organismus bezieht, mit dem Ziel, Gifte und Schadstoffe auf sanfte, naturheilkundliche Art aus dem Körper abzuleiten.

[3] § 630e Abs. 1 BGB: „Der Behandelnde ist verpflichtet, den Patienten über sämtliche für die Einwilligung wesentlichen Umstände aufzuklären. Dazu gehören insbesondere Art, Umfang, Durchführung, zu erwartende Folgen und Risiken der Maßnahme sowie ihre Notwendigkeit, Dringlichkeit, Eignung und Erfolgsaussichten im Hinblick auf die Diagnose oder die Therapie. Bei der Aufklärung ist auch auf Alternativen zur Maßnahme hinzuweisen, wenn mehrere medizinisch gleichermaßen indizierte und übliche Methoden zu wesentlich unterschiedlichen Belastungen, Risiken oder Heilungschancen führen können."

[4] Siehe BGHZ 113, 297, 310

[5] Hierzu ausführlich: Vogler, Haftung des Arztes bei der Anwendung neuartiger und und umstrittener Heilmethoden, MedR 2008, 697, 701, 702

[6] So schon BGH, Urteil vom 22.05.2007, Az. VI ZR 35/06 – juris,Rz. 97 m.w.N.

[7] Ebenso OLG München, Urteil vom 25.03.2021, Az. 1 U 1831/18 – juris, Rz. 68 m.w.N.

Literatur zum Artikel:

Long-Covid/Post-Covid-Syndrom: Aktueller Stand der Forschung und klinisches Management

von Dr. med. Sinem Koc-Günel, Prof. Dr. med. Maria Vehreschild

[1] Augustin, M., Schommers, P., Stecher, M., Dewald, F., Gieselmann, L., Gruell, H., Horn, C., Vanshylla, K., Cristanziano, V. D., Osebold, L., Roventa, M., Riaz, T., Tschernoster, N., Altmueller, J., Rose, L., Salomon, S., Priesner, V., Lüers, J. C., Albus, C., ... Lehmann, C. (2021). Post-Covid Syndrome in Non-Hospitalised Patients With COVID-19: A Longitudinal Prospective Cohort Study. The Lancet Regional Health – Europe, 6, 100122. https://doi.org/10.1016/j.lanepe.2021.100122

[2] Davis, H. E., McCorkell, L., Vogel, J. M., & Topol, E. J. (2023). Long COVID: major findings, mechanisms and recommendations. Nature Reviews Microbiology, 21(3), 133–146. https://doi.org/10.1038/ s41579–022–00846–2

[3] Huang, C. (2021) et al. 6-month outcomes in COVID-19 patients: A prospective study. The Lancet, 397(10270), 220–232, PMID: 37321233 PMCID: PMC10258565 DOI: 10.1016/S0140–6736(23)00810–3.

[4] Subramanian, A., Nirantharakumar, K., Hughes, S., Myles, P., Williams, T., Gokhale, K. M., Taverner, T., Chandan, J. S., Brown, K., Simms-Williams, N., Shah, A. D., Singh, M., Kidy, F., Okoth, K., Hotham, R., Bashir, N., Cockburn, N., Lee, S. I., Turner, G. M., ... Haroon, S. (2022). Symptoms and risk factors for long COVID in non-hospitalized adults. Nature Medicine, 28(8), 1706–1714. https://doi.org/10.1038/ s41591– 022–01909-w

[5] Peluso, M. J., Deveau, T.-M., Munter, S. E., Ryder, D., Buck, A., Beck-Engeser, G., Chan, F., Lu, S., Goldberg, S. A., Hoh, R., Tai, V., Torres, L., Iyer, N. S., Deswal, M., Ngo, L. H., Buitrago, M., Rodriguez, A., Chen, J. Y., Yee, B. C., ... Henrich, T. J. (2022). Impact of Pre-Existing Chronic Viral Infection and Reactivation on the Development of Long COVID. https://doi.org/10.1101/2022.06.21.22276660

[6] Proal, A. D., VanElzakker, M. B., Aleman, S., Bach, K., Boribong, B. P., Buggert, M., Cherry, S., Chertow, D. S., Davies, H. E., Dupont, C. L., Deeks, S. G., Eimer, W., Ely, E. W., Fasano, A., Freire, M., Geng, L. N., Griffin, D. E., Henrich, T. J., Iwasaki, A., ... Wherry, E. J. (2023). SARS-CoV-2 reservoir in post-acute sequelae of COVID-19 (PASC). Nature Immunology, 24(10), 1616–1627. https://doi.org/10.1038/s41590–023–01601–2

[7] Hashimoto, K. (2023). Detrimental effects of COVID-19 in the brain and therapeutic options for long COVID: The role of Epstein–Barr virus and the gut–brain axis. Molecular Psychiatry, 28(12), 4968–4976. https://doi.org/10.1038/s41380– 023–02161–5

[8] Zubchenko, S., Kril, I., Nadizhko, O., Matsyura, O., & Chopyak, V. (2022). Herpesvirus infections and post-COVID-19 manifestations: a pilot observational study. Rheumatology International, 42(9), 1523. https://doi.org/10.1007/S00296–022–05146–9

[9] Peluso, M. J., Deveau, T.-M., Munter, S. E., Ryder, D., Buck, A., Beck-Engeser, G., Chan, F., Lu, S., Goldberg, S. A., Hoh, R., Tai, V., Torres, L., Iyer, N. S., Deswal, M., Ngo, L. H., Buitrago, M., Rodriguez, A., Chen, J. Y., Yee, B. C., ... Henrich, T. J. (2023). Chronic viral coinfections differentially affect the likelihood of developing long COVID. Journal of Clinical Investigation, 133(3). https://doi.org/ 10.1172/JCI163669

[10] Rohrhofer, J., Graninger, M., Lettenmaier, L., Schweighardt, J., Gentile, S. A., Koidl, L., Ret, D., Stingl, M., Puchhammer-Stöckl, E., & Untersmayr, E. (2023). Association between <scp>Epstein-Barr-Virus</scp> reactivation and development of Long- <scp>COVID</scp> fatigue. Allergy, 78(1), 297–299 . https://doi.org/10.1111/all.15471

[11] Bohmwald, K., Diethelm-Varela, B., Rodríguez-Guilarte, L., Rivera, T., Riedel, C. A., González, P. A., & Kalergis, A. M. (2024). Pathophysiological, immunological, and inflammatory features of long COVID. Frontiers in Immunology, 15. https://doi.org/10.3389/fimmu.2024.1341600

[12] Acharya, D., Liu, G., & Gack, M. U. (2020). Dysregulation of type I interferon responses in COVID-19. Nature Reviews Immunology, 20(7), 397–398. https://doi.org/10.1038/ s41577–020–0346-x

[13] Patterson, B. K., Francisco, E. B., Yogendra, R., Long, E., Pise, A., Rodrigues, H., Hall, E., Herrera, M., Parikh, P., Guevara-Coto, J., Triche, T. J., Scott, P., Hekmati, S., Maglinte, D., Chang, X., Mora-Rodríguez, R. A., & Mora, J. (2022). Persistence of SARS CoV-2 S1 Protein in CD16+ Monocytes in Post-Acute Sequelae of COVID-19 (PASC) up to 15 Months Post-Infection. Frontiers in Immunlogy, 12. https://doi.org/ 10.3389/fimmu.2021.746021

[14] Gaebler, C., Wang, Z., Lorenzi, J. C. C., Muecksch, F., Finkin, S., Tokuyama, M., Cho, A., Jankovic, M., Schaefer-Babajew, D., Oliveira, T. Y., Cipolla, M., Viant, C., Barnes, C. O., Bram, Y., Breton, G., Hägglöf, T., Mendoza, P., Hurley, A., Turroja, M., … Nussenzweig, M. C. (2021). Evolution of antibody immunity to SARS-CoV-2. Nature, 591(7851), 639–644. https://doi.org/10.1038/s41586– 021–03207-w

[15] Zollner, A., Koch, R., Jukic, A., Pfister, A., Meyer, M., Rössler, A., Kimpel, J., Adolph, T. E., & Tilg, H. (2022). Postacute COVID-19 is Characterized by Gut Viral Antigen Persistence in Inflammatory Bowel Diseases. Gastroenterology, 163(2), 495–506.e8. https://doi.org/10.1053/j.gastro.2022.04.037

[16] Chen, Z., & John Wherry, E. (2020). T cell responses in patients with COVID-19. Nature Reviews Immunology, 20(9), 529–536. https://doi.org/10.1038/s41577–020–0402–6

[17] Yin, J.-X., Agbana, Y. L., Sun, Z.-S., Fei, S.-W., Zhao, H.-Q., Zhou, X.-N., Chen, J.-H., & Kassegne, K. (2023). Increased interleukin-6 is associated with long COVID-19: a systematic review and meta-analysis. Infectious Diseases of Poverty, 12(1), 43. https://doi.org/10.1186/s40249– 023–01086-z

[18] Klein, J., Wood, J., Jaycox, J. R., Dhodapkar, R. M., Lu, P., Gehlhausen, J. R., Tabachnikova, A., Greene, K., Tabacof, L., Malik, A. A., Silva Monteiro, V., Silva, J., Kamath, K., Zhang, M., Dhal, A., Ott, I. M., Valle, G., Peña-Hernández, M., Mao, T., … Iwasaki, A. (2023). Distinguishing features of long COVID identified through immune profiling. Nature, 623(7985), 139–148. https://doi.org/10.1038/ s41586–023–06651-y

[19] Peluso, M. J., Ryder, D., Flavell, R. R., Wang, Y., Levi, J., LaFranchi, B. H., Deveau, T.-M., Buck, A. M., Munter, S. E., Asare, K. A., Aslam, M., Koch, W., Szabo, G., Hoh, R., Deswal, M., Rodriguez, A. E., Buitrago, M., Tai, V., Shrestha, U., … Henrich, T. J. (2024). Tissue-based T cell activation and viral RNA persist for up to 2 years after SARS-CoV-2 infection. Science Translational Medicine, 16(754). https://doi.org/10.1126/scitranslmed.adk3295

[20] Wang, C., Yu, C., Jing, H., Wu, X., Novakovic, V. A., Xie, R., & Shi, J. (2022). Long COVID: The Nature of Thrombotic Sequelae Determines the Necessity of Early Anticoagulation. Frontiers in Cellular and Infection Microbiology, 12, 861703. https://doi.org/10.3389/FCIMB. 2022.861703/BIBTEX

[21] Tijmes, F. S., Marschner, C., Thavendiranathan, P., & Hanneman, K. (2023). Magnetic Resonance Imaging of Cardiovascular Manifestations Following <scp>COVID</scp> -19. Journal of Magnetic Resonance Imaging, 58(1), 26–43. https://doi.org/10.1002/jmri.28677

[22] Castanares-Zapatero, D., Chalon, P., Kohn, L., Dauvrin, M., Detollenaere, J., Maertens de Noordhout, C., Primus-de Jong, C., Cleemput, I., Van den Heede, K., (2022). Pathophysiology of Long COVID: A review. European Respiratory Journal, 59(1), 2101965.

[23] Ståhlberg, M., Fischer, K., Tahhan, M., Zhao, A., Fedorowski, A., Runold, M., Nygren-Bonnier, M., Björnson, M., Lund, L. H., Bruchfeld, J., Desta, L., Braunschweig, F., & Mahdi, A. (2024). Post-Acute COVID-19 Syndrome: Prevalence of Peripheral Microvascular Endothelial Dysfunction and Associations with NT-ProBNP Dynamics. The American Journal of Medicine. https://doi.org/10.1016/ j.amjmed.2024.10.012

[24] Kuchler, T., Günthner, R., Ribeiro, A., Hausinger, R., Streese, L., Wöhnl, A., Kesseler, V., Negele, J., Assali, T., Carbajo-Lozoya, J., Lech, M., Schneider, H., Adorjan, K., Stubbe, H. C., Hanssen, H., Kotilar, K., Haller, B., Heemann, U., & Schmaderer, C. (2023). Persistent endothelial dysfunction in post-COVID-19 syndrome and its associations with symptom severity and chronic inflammation. Angiogenesis, 26(4), 547–563. https://doi.org/10.1007/s10456–023–09885–6

[25] Alfaro, E., Díaz-García, E., García-Tovar, S., Galera, R., Casitas, R., Torres-Vargas, M., López-Fernández, C., Añón, J. M., García-Río, F., & Cubillos-Zapata, C. (2024). Endothelial dysfunction and persistent inflammation in severe post-COVID-19 patients: implications for gas exchange. BMC Medicine, 22(1), 242. https://doi.org/10.1186/s12916– 024–03461–5

[26] Szögi, T., Borsos, B. N., Masic, D., Radics, B., Bella, Z., Bánfi, A., Ördög, N., Zsiros, C., Kiricsi, Á., Pankotai-Bodó, G., Kovács, Á., Paróczai, D., Botkáné, A. L., Kajtár, B., Sükösd, F., Lehoczki, A., Polgár, T., Letoha, A., Pankotai, T., & Tiszlavicz, L. (2024). Novel biomarkers of mitochondrial dysfunction in Long COVID patients. GeroScience. https://doi.org/10.1007/ s11357–024–01398–4

[27] Mayer, K. P., Ismaeel, A., Kalema, A. G., Montgomery-Yates, A. A., Soper, M. K., Kern, P. A., Starck, J. D., Slone, S. A., Morris, P. E., Dupont-Versteegden, E. E., & Kosmac, K. (2024). Persistent Fatigue, Weakness, and Aberrant Muscle Mitochondria in Survivors of Critical COVID-19. Critical Care Explorations, 6(10), e1164. https://doi.org/10.1097/CCE .0000000000001164

[28] Haunhorst, S., Dudziak, D., Scheibenbogen, C., Seifert, M., Sotzny, F., Finke, C., Behrends, U., Aden, K., Schreiber, S., Brockmann, D., Burggraf, P., Bloch, W., Ellert, C., Ramoji, A., Popp, J., Reuken, P., Walter, M., Stallmach, A., & Puta, C. (2024). Towards an understanding of physical activity-induced post-exertional malaise: Insights into microvascular alterations and immunometabolic interactions in post-COVID condition and myalgic encephalomyelitis/chronic fatigue syndrome. Infection. https://doi.org/10.1007/s15010– 024–02386–8

[29] Gay, L., Desquiret-Dumas, V., Nagot, N., Rapenne, C., Van de Perre, P., Reynier, P., & Molès, J. (2024). Long-term persistence of mitochondrial dysfunctions after viral infections and antiviral therapies: A review of mechanisms involved. Journal of Medical Virology, 96(9). https://doi.org/10.1002/jmv.29886

[30] Zhang, F., Lau, R. I., Liu, Q., Su, Q., Chan, F. K. L., & Ng, S. C. (2023). Gut microbiota in COVID-19: key microbial changes, potential mechanisms and clinical applications. Nature Reviews Gastroenterology & Hepatology, 20(5), 323–337. https://doi.org/10.1038/s41575– 022–00698–4

[31] Liu, Q., Su, Q., Zhang, F., Tun, H. M., Mak, J. W. Y., Lui, G. C.-Y., Ng, S. S. S., Ching, J. Y. L., Li, A., Lu, W., Liu, C., Cheung, C. P., Hui, D. S. C., Chan, P. K. S., Chan, F. K. L., & Ng, S. C. (2022). Multi-kingdom gut microbiota analyses define COVID-19 severity and post-acute COVID-19 syndrome. Nature Communications, 13(1), 6806. https://doi.org/ 10.1038/s41467–022–34535–8

[32] Hamrefors, V., Kahn, F., Holmqvist, M., Carlson, K., Varjus, R., Gudjonsson, A., Fedorowski, A., & Ohlsson, B. (2024). Gut microbiota composition is altered in postural orthostatic tachycardia syndrome and post-acute COVID-19 syndrome. Scientific Reports, 14(1), 3389. https://doi.org/10.1038/s41598–024–53784–9

[33] Ancona, G., Alagna, L., Alteri, C., Palomba, E., Tonizzo, A., Pastena, A., Muscatello, A., Gori, A., & Bandera, A. (2023). Gut and airway microbiota dysbiosis and their role in COVID-19 and long-COVID. Frontiers in Immunology, 14. https://doi.org/10.3389/fimmu.2023.1080043

[34] Moreno-Corona, N. C., López-Ortega, O., Pérez-Martínez, C. A., Martínez-Castillo, M., De Jesús-González, L. A., León-Reyes, G., & León-Juárez, M. (2023). Dynamics of the Microbiota and Its Relationship with Post-COVID-19 Syndrome. International Journal of Molecular Sciences, 24(19), 14822. https://doi.org/ 10.3390/ijms241914822

[35] Fedorowski, A., & Sutton, R. (2023). Autonomic dysfunction and postural orthostatic tachycardia syndrome in post-acute COVID-19 syndrome. Nature Reviews Cardiology, 20(5), 281–282. https://doi.org/10.1038/ s41569–023–00842-w

[36] Iadecola, C., Anrather, J., & Kamel, H. (2020). Effects of COVID-19 on the Nervous System. Cell, 183(1), 16–27.e1. https://doi.org/ 10.1016/j.cell.2020.08.028

[37] Dani, M., Dirksen, A., Taraborrelli, P., Torocastro, M., Panagopoulos, D., Sutton, R., & Lim, P. B. (2021). Autonomic dysfunction in 'long COVID': rationale, physiology and management strategies. Clinical Medicine, 21(1), e63–e67. https://doi.org/ 10.7861/clinmed.2020–0896

[38] Tsilingiris, D., Karampela, I., Christodoulatos, G. S., Papavasileiou, G., Petropoulou, D., & Magkos, F. (2023). Laboratory Findings and Biomarkers in Long COVID: What Do We Know So Far? Insights Into Epidemiology, Pathogenesis, Therapeutic Perspectives and Challenges. International Journal of Molecular Sciences, 24(13), 10458. https://doi.org/10.3390/ijms241310458

[39] Bonilla, H., Tian, L., Marconi, V. C., Shafer, R., McComsey, G. A., Miglis, M., Yang, P., Bonilla, A., Eggert, L., & Geng, L. N. (2023). Low-dose naltrexone use for the management of post-acute sequelae of COVID-19. International Immunopharmacology, 124, 110966. https://doi.org/ 10.1016/j.intimp.2023.110966

[40] Patel, K., Allen, S., Haque, M. N., Angelescu, I., Baumeister, D., & Tracy, D. K. (2016). Bupropion: a systematic review and meta-analysis of effectiveness as an antidepressant. Therapeutic Advances in Psychopharmacology, 6(2), 99–144. https://doi.org/10.1177/2045125316629071

[41] Salvucci, F., Codella, R., Coppola, A., Zacchei, I., Grassi, G., Anti, M. L., Nitisoara, N., Luzi, L., & Gazzaruso, C. (2023). Antihistamines improve cardiovascular manifestations and other symptoms of long-COVID attributed to mast cell activation. Frontiers in Cardiovascular Medicine, 10. https://doi.org/10.3389/fcvm. 2023.1202696

[42] Schieffer, E., & Schieffer, B. (2022). The rationale for the treatment of long-Covid symptoms – A cardiologist's view. Frontiers in Cardiovascular Medicine, 9 https://doi.org/10.3389/fcvm.2022.992686

[43] Crosby, L. D., Kalanidhi, S., Bonilla, A., Subramanian, A., Ballon, J. S., & Bonilla, H. (2021). Off label use of Aripiprazole shows promise as a treatment for Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS): a retrospective study of 101 patients treated with a low dose of Aripiprazole. Journal of Translational Medicine, 19(1), 50. https://doi.org/10.1186/s12967– 021–02721–9

[44] Joseph, P., Pari, R., Miller, S., Warren, A., Stovall, M. C., Squires, J., Chang, C.-J., Xiao, W., Waxman, A. B., & Systrom, D. M. (2022). Neurovascular Dysregulation and Acute Exercise Intolerance in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome. CHEST, 162(5), 1116–1126. https://doi.org/10.1016/j.chest. 2022.04.146

[45] Geng, L. N., Bonilla, H., Hedlin, H., Jacobson, K. B., Tian, L., Jagannathan, P., Yang, P. C., Subramanian, A. K., Liang, J. W., Shen, S., Deng, Y., Shaw, B. J., Botzheim, B., Desai, M., Pathak, D., Jazayeri, Y., Thai, D., O'Donnell, A., Mohaptra, S., ...

Singh, U. (2024). Nirmatrelvir-Ritonavir and Symptoms in Adults With Postacute Sequelae of SARS-CoV-2 Infection. JAMA Internal Medicine, 184(9), 1024. https://doi.org/10.1001/jamainternmed.2024.2007

[46] Vehreschild, M. J. G. T., Atanasov, P., Yurko, K., Oancea, C., Popov, G., Smesnoi, V., Placinta, G., Kohlhof, H., Vitt, D., Peelen, E., Mihajlović, J., & Muehler, A. R. (2022). Safety and Efficacy of Vidofludimus Calcium in Patients Hospitalized with COVID-19: A Double-Blind, Randomized, Placebo-Controlled, Phase 2 Trial. Infectious Diseases and Therapy, 11(6), 2159–2176 . https://doi.org/10.1007/s40121– 022–00690–0

[47] Joshi, D., Gyanpuri, V., Pathak, A., Chaurasia, R. N., Mishra, V. N., Kumar, A., Singh, V. K., & Dhiman, N. R. (2022). Neuropathic Pain Associated with COVID-19: a Systematic Review of Case Reports. Current Pain and Headache Reports, 26(8), 595–603. https://doi.org/10.1007/ s11916–022–01065–3

[48] Yang, J., Li, H., Zhao, H., Xie, Y., Li, J., & Wang, M. (2024). Effectiveness of telerehabilitation in patients with post-COVID-19: a systematic review and meta-analysis of randomised controlled trials. BMJ Open, 14(7), e074325. https://doi.org/10.1136/bmjopen-2023–074325

[49] Weigl, M., Beeck, S., Kraft, E., Stubbe, H. C., Adorjan, K., Ruzicka, M., & Lemhöfer, C. (2024). Multidisciplinary rehabilitation with a focus on physiotherapy in patients with Post Covid19 condition: an observational pilot study. European Archives of Psychiatry and Clinical Neuroscience, 274(8), 2003–2014. https://doi.org/10.1007/s00406–023–01747-y

[50] Pouliopoulou, D. V., Macdermid, J. C., Saunders, E., Peters, S., Brunton, L., Miller, E., Quinn, K. L., Pereira, T. V., & Bobos, P. (2023). Rehabilitation Interventions for Physical Capacity and Quality of Life in Adults With Post–COVID-19 Condition. JAMA Network Open, 6(9), e2333838. https://doi.org/10.1001/jamanetworkopen.2023.33838

Literatur zum Artikel:

100 Jahre Dialyse am Uniklinikum Gießen

von PD Dr. med. Faeq Husain-Syed

[1] Jager KJ, Kovesdy C, Langham R, Rosenberg M, Jha V, Zoccali C. A single number for advocacy and communication-worldwide more than 850 million individuals have kidney diseases. In: Kidney Int 2019; 96: 1048–1050.

[2] Bello AK, Okpechi IG, Osman MA, Cho Y, Htay H, Jha V, Wainstein M, Johnson DW. Epidemiology of haemodialysis outcomes. In: Nat Rev Nephrol 2022; 18: 378–395.

[3] IQTIG [Institut für Qualitätssicherung und Transparenz im Gesundheitswesen] (2019a): Jahresbericht 2018 zur Qualität in der Dialyse. Anlage 2 zum Beschluss. In: G-BA [Gemeinsamer Bundesausschuss]: Beschluss des Gemeinsamen Bundesausschusses über die Veröffentlichung des Jahresberichts 2018 zur Qualität in der Dialyse. [Stand:] 10.07.2019. Berlin: G-BA. URL: https://www.g-ba.de/downloads/39–261–3977/2019–09–19_QSD-RL_IQTIG-Jahresbericht-2018-Datenanalysten.pdf (abgerufen am: 31.11.2024).

[4] Vincent JL, Lefrant JY, Kotfis K, Nanchal R, Martin-Loeches I, Wittebole X, Sakka SG, Pickkers P, Moreno R, Sakr Y, Icon, investigators S, investigators S. Comparison of European ICU patients in 2012 (ICON) versus 2002 (SOAP). In: Intensive Care Med 2018; 44: 337–344.

[5] Christopher L. Blagg. From Miracle to Mainstream: Creating the World's First Dialysis Organization (Northwest Kidney Centers, 2017).

[6] Haas G. Über Versuche der Blutanswaschung am Lebenden mit Hilfe der Dialyse. In: Archiv f. experiment. Pathol. u. Pharmakol 1926; 116, 158–172. https://doi-org.ezproxy.uni-giessen.de/10.1007/BF01863649.

[7] Haas G. Über Versuche der Blutauswaschung am Lebenden mit Hilfe der Dialyse. In: Archiv f. experiment. Pathol. u. Pharmakol 1927; 120, 371–386. https://doi-org.ezproxy.uni-giessen.de/10.1007/BF01862656.

[8] Deutsche Digitale Bibliothek. Blutwäsche an einem Hund. https://www.deutsche-digitale-bibliothek.de/item/DOCDMTK547CNILFXVTUDO4RIU7CCS7N4?isThumbnailFiltered=true&query=Blutwäsche+an+einem+hund&rows=20&offset=0&viewType=list&hitNumber=1 (abgerufen am: 30.11.2024).

[9] Enke U. 90 Jahre „Blutwaschung am Lebenden". In: Spiegel der Forschung 2005; 22: 18–25. https://jlupub.ub.uni-giessen.de/server/api/core/bitstreams/c9ff2e4b-fc2f-48de-b804-eefd4e9eff4a/content (abgerufen am: 30.11.2024).

[10] Haas G. Versuche der Blutauswaschung am Lebenden mit Hilfe der Dialyse. In: Klin Wochenschr 1925; 4, 13–14. https://doi.org/10.1007/BF01745400.

[11] Sander U. Die Travenol-Tankniere. In: Dialyse aktuell 2022; 26: 153. https://doi.org/10.1055/a-1736–5930.

[12] Birk H-W. Peritonealdialyse. In: Hess. Ärzteblatt 2023; 7/8 , 432–37.

[13] Biesen WV, Vanholder RC, Veys N, Dhondt A, Lameire NH. An evaluation of an integrative care approach for end-stage renal disease patients. J Am Soc Nephrol 2000; 11: 116–125.

[14] Bundesverband Niere e. V. http://www.bundesverband-niere.de/ueber-uns/gremienarbeit (abgerufen am: 02.12.2024).

[15] Medical Netcare GmbH. Jahresberichte zur Qualitätssicherung in der Dialyse. https://m-nc.de/qs-dialyse-jahresberichte (abgerufen am: 02.12.2024).

[16] McCullough KP, Morgenstern H, Rayner HC, Port FK, Jadoul MY, Akizawa T, Pisoni RL, Herman WH, Robinson BM, Investigators DC, (2024) Explaining International Trends in Mortality on Hemodialysis Through Changes in Hemodialysis Practices in the Dialysis Outcomes and Practice Patterns Study (DOPPS). Am J Kidney Dis 2024; 9:S0272–6386(24)00907–7.

[17] Chesnaye NC, Ortiz A, Zoccali C, Stel VS, Jager KJ. The impact of population ageing on the burden of chronic kidney disease. In: Nat Rev Nephrol 2024; 20: 569–585.

[18] ISN-Global Kidney Health Atlas 2023. https://www.theisn.org/wp-content/uploads/media/ISN%20Atlas_2023%20Digital_REV_2023_10_03.pdf (abgerufen am: 1.12.2024).

[19]; Foreman KJ, Marquez N, Dolgert A, Fukutaki K, Fullman N, McGaughey M, Pletcher MA, Smith AE, Tang K, Yuan CW, Brown JC, Friedman J, He J, Heuton KR, Holmberg M, Patel DJ, Reidy P, Carter A, Cercy K, Chapin A, Douwes-Schultz D, Frank T, Goettsch F, Liu PY, Nandakumar V, Reitsma MB,

Reuter V, Sadat N, Sorensen RJD, Srinivasan V, Updike RL, York H, Lopez AD, Lozano R, Lim SS, Mokdad AH, Vollset SE, Murray CJL. Forecasting life expectancy, years of life lost, and all-cause and cause-specific mortality for 250 causes of death: reference and alternative scenarios for 2016–40 for 195 countries and territories. In: Lancet 2018; 392: 2052–2090.

[20] Deutsche Gesellschaft für Allgemeinmedizin und Familienmedizin (DEGAM) und Deutsche Gesellschaft für Nephrologie (DGfN). S3-Leitlinie zur Versorgung von Patient*innen mit chronischer, nicht-nierenersatztherapiepflichtiger Nierenkrankheit in der Hausarztpraxis. Juni 2024. https://register.awmf.org/de/leitlinien/detail/053–048 (abgerufen am: 01.12.2024).

[21] Visseren FLJ, Mach F, Smulders YM, Carballo D, Koskinas KC, Back M, Benetos A, Biffi A, Boavida JM, Capodanno D, Cosyns B, Crawford C, Davos CH, Desormais I, Di Angelantonio E, Franco OH, Halvorsen S, Hobbs FDR, Hollander M, Jankowska EA, Michal M, Sacco S, Sattar N, Tokgozoglu L, Tonstad S, Tsioufis KP, van Dis I, van Gelder IC, Wanner C, Williams B; ESC National Cardiac Societies; ESC Scientific Document Group. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice. In: Eur Heart J 2021; 42: 3227–3337.

[22] Merker L, Ebert T, Guthoff M, Isermann B. Nephropathy in Diabetes. In: Exp Clin Endocrinol Diabetes 2023; 131: 61–65.

[23] Wanner C, Busch M. [New guideline on diabetes management in chronic kidney disease]. In: Inn Med (Heidelb) 2023; 64: 219–224.

[24] Hahn KM, Strutz F. The Early Diagnosis and Treatment of Chronic Renal Insufficiency. In: Deutsches Arzteblatt Int 2024; 121: 428–435.

[25] Husain-Syed F, Gröne HJ, Assmus B, Bauer P, Gall H, Seeger W, Ghofrani A, Ronco C, Birk HW. Congestive nephropathy: a neglected entity? Proposal for diagnostic criteria and future perspectives. ESC Heart Fail 2021; 8: 183–203.