Diagnostik und Therapie früher und fortgeschrittener Mammakarzinome

Guidelines Breast
Version 2023.1D

FORSCHEN
LEHREN
HEILEN

Brustkrebs Nachsorge

Guidelines Breast
Version 2023.1D

Brustkrebs Nachsorge

- **Versionen 2002–2022:**
  Bauerfeind / Bischoff / Blohmer / Böhme / Costa / Diel / Friedrich / Gerber / Gluz / Hanf / Heinrich / Huober / Janni / Kaufmann / Kolberg-Liedtke / Kümmel / Lüftner / Lux / Maass / Möbus / Müller-Schimpfle/ Mundhenke / Oberhoff / Rody / Scharl / Solbach/ Solomayer / Stickeler / Thomssen / Wöckel
- **Version 2023:**
  Friedrich / Kümmel

Aktualisierung der Therapieempfehlungen nach Durchsicht der ASCO, NCCN und ACS Guidelines*, sowie der S3 Leitlinie

Durchgeführte „Medline“ und „PubMed“-Suche nach „Surveillance Breast Cancer“ und „Follow up primary breast cancer“ (2019/01-2023/01)

*Runowicz CD et al. , American Cancer Society/American Society of Clinical Oncology Breast Cancer Survivorship Care Guideline, JCO 34 :611-635,

NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Breast Cancer, Version 4.2022 — June 21, 2022; NCCN.org

Brustkrebs Nachsorge
Ziele

	Oxford LoE	Oxford GR	AGO
Früherkennung von heilbaren Rezidiven			
▪ Intramammäre Rezidive	1a	B	++
▪ Lokoregionäre Rezidive*	1a	B	++
Früherkennung kontralateraler Karzinome	1a	B	++
Früherkennung von Metastasen			
▪ Früherkennung symptomatischer Metastasen	3b	C	+
▪ Früherkennung asymptomatischer Metastasen	1a	A	-

* Das lokoregionäre Rezidiv ist mit einem erhöhten Mortalitätsrisiko bei nodalpositiven, PR-negativen, jüngeren Patientinnen und einem kurzen Zeitintervall von Erstdiagnose bis Rezidiv verbunden.

1. De Bock GH, Bonnema J, van Der Hage J et al., Effectiveness of Routine Visits and Routine Tests in Detecting Isolated Locoregional Recurrences After Treatment for Early-Stage Invasive Breast Cancer: A Meta-Analysis and Systematic Review. J Clin Oncol 2004; 22 (19): 4010-4018.
2. Margenthaler JA, Allan E, Cheng L, et al. Surveillance of Patients With Breast Cancer After Curative-Intent Primary Treatment: Current Practice Patterns. Journal of Oncology Practice 2012; 8(2): 79 – 83.
3. Parmeshwar R, Margenthaler JA, Allam E, et al. Patient Surveillance After Initial Breast cancer Therapy Variation by Physician Specialty. Am J Surg 2013; 206(2): 218-222.
4. Jochelson M, Hayes DF, Ganz PA. Surveillance and Monitoring in Breast Cancer Survivors: Maximizing Benefit and Minimizing Harm. ASCO Educational Book 2013 e13 – e18.
5. Khatcheressian JL, Hurley P, Bantug E, et al. Breast Cancer Follow-up and Management After Primary Treatment: American Society of Clinical Oncology Clinical Practice Guideline Update . J Clin Oncol. 2013 March 1; 31(7):961-965.
6. Runowicz CD, Leach CR, Henry NL, et al. American Cancer Society/American Society of Clinical Oncology Breast Cancer Survivorship Care Guideline. Journal of Clinical Oncology 2016;34:611-35.
7. Cardoso F, Kyriakides S, Ohno S, et al. Early breast cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Annals of Oncology 2019;30:1194-220.
8. Lee et al. Cancer Res Treat. 2015 Oct;47(4):765-73àReduced mortality according to regular follow up Impact on

Survival of Regular Postoperative Surveillance for Patients with Early Breast Cancer
9. Moschetti I, Cinquini M, Lambertini M et al., Follow-up strategies for women treated for early breast cancer. Cochrane Database Syst Rev. 2016 May 27;(5):1CD001768.
10. NCCN Clinical Practice Guidelines in Oncology, Breast Cancer Version 3.17-10.17; https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf
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12. Lin J, Hu H, Shriver CD et al., Survival among Breast Cancer Patients: Comparison of the U.S. Military Health System with the Surveillance, Epidemiology and End Results Program. Clin Breast Cancer. 2021 Dec 1:S1526-8209(21)00348-7.
13. Viuff JH, Greiber IK, Karlsen MA et al.,Survival in Women Diagnosed With Breast Cancer During Pregnancy. Clin Breast Cancer. 2021 Dec 1:S1526-8209(21)00346-3. doi: 10.1016/j.clbc.2021.11.009.

<u>Statement: risk factors of mortality after loco-regional recurrence</u>

1. Dent R, Valentini H, Hanna W,et al.. Factors associated with breast cancer mortality after local recurrence. Curr Oncol 2014; 21 (3): e418-25.

Statement: Outcome measurements

1. Ong WL, Schouwenburg MG, van Bommel ACM et al. A Standard Set of Value-Based Patient-Centered Outcomes for Breast Cancer: The International Consortium for Health Outcomes Measurement (ICHOM) Initiative. JAMA Oncol. 2017 May 1;3(5):677-685.
2. Browall M, Forsberg C, Wengström Y. Assessing patient outcomes and cost-effectiveness of nurse-led follow-up for women with breast cancer - have relevant and sensitive evaluation measures been used? J Clin Nurs. 2017 Jul;26(13-14):1770-1786.
3. Cheng KKF, Lim YTE, Koh ZM et al. Home-based multidimensional survivorship programmes for breast cancer survivors. Cochrane Database Syst Rev. 2017 Aug 24;8:CD011152.
4. Rassaf T, Totzeck M, Backs J et al. for Committee for Clinical Cardiovascular Medicine of the German Cardiac Society. Onco-Cardiology: Consensus Paper of the German Cardiac Society, the German Society for Pediatric Cardiology and Congenital Heart Defects and the German Society for Hematology and Medical Oncology. Clin Res Cardiol. 2020 Oct;109(10):1197-1222.
5. Dent S, Fergusson D, Aseyev O et al., A Randomized Trial Comparing 3- versus 4-Monthly Cardiac Monitoring in Patients Receiving Trastuzumab-Based Chemotherapy for Early Breast Cancer. Curr Oncol. 2021 Dec 3;28(6):5073-5083.

6. Lewinter C, Nielsen TH, Edfors LR et al., A systematic review and meta-analysis of beta-blockers and renin-angiotensin system inhibitors for preventing left ventricular dysfunction due to anthracyclines or trastuzumab in patients with breast cancer. Eur Heart J. 2021 Dec 24:ehab843. doi: 10.1093/eurheartj/ehab843.

Statement: Obesity, physical activity and quality of life

1. Bicego D, Brown K. Effects of Exercise on Quality of Life in Women Living with Breast Cancer: A Systematic Review. The Breast Journal 2009; 15(1): 45-51.
2. Carson JW, Carson KM, Porter LS et al. Yoga of Awareness program for menopausal symptoms in breast cancer survivors: results from a randomized trial. Support Care Cancer 2009; 17: 1301-1309.
3. Vaskuil DW, van Nes JG, Junngeburt JM et al. Maintenance of physical activity and body weight in relation to subsequent quality of life in postmenopausal breast cancer patients. Annals of Oncology 2010; 21: 2094–2101.
4. Cramp F, Byron-Daniel J. Exercise for the management of cancer-related fatigue in adults. Cochrane Database Syst Rev. 2012 Nov 14;11:CD006145.
5. Bower JE, Garet D, Sternlieb B et al. Yoga for persistent fatigue in breast cancer survivors: A randomized controlled trial. Cancer 2012; 118(15): 3766-75.
6. Cramer H, Lange S, Klose P et al. Can yoga improve fatigue in breast cancer patients? A systematic review. Acta Oncol 2012; 51(4): 559 – 60.
7. Yang H, Brand JS, Fang F et al. Time-dependent risk of depression, anxiety, and stress-related disorders in patients with invasive and in situ breast cancer. Int J Cancer. 2017 Feb 15;140(4):841-852.
8. Nagy AC, GulAcsi-BArdos P, CserEp Z et al.Late cardiac effect of anthracycline therapy in physically active breast cancer survivors - a prospective study. Neoplasma. 2017;64(1):92-100.
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10. NCCN-Guidelines Version 2.2018. Cancer-related Fatigue.
11. Fabi A, Bhargava R, Fatigoni S, et al. Cancer-related fatigue: ESMO Clinical Practice Guidelines for diagnosis and treatment. Annals of Oncology 2020;31:713-23.
12. Curigliano G, Lenihan D, Fradley M, et al. Management of cardiac disease in cancer patients throughout oncological treatment: ESMO consensus recommendations. Annals of Oncology 2020;31:171-90.

13. Lisevick A, Cartmel B, Harrigan M, Li F, et al. Effect of the Lifestyle, Exercise, and Nutrition (LEAN) Study on Long-Term Weight Loss Maintenance in Women with Breast Cancer. Nutrients. 2021 Sep 18;13(9):3265.

Statement: Obesity and breast cancer prognosis

1. Ewertz M, Jensen MB, Gunnarsdóttir KÁ et al.. Effect of obesity on prognosis after early-stage breast cancer. J Clin Oncol 2011; 29(1): 25-31.
2. Cespedes Feliciano EM, Kroenke CH, Bradshaw PT et al..Postdiagnosis Weight Change and Survival Following a Diagnosis of Early-Stage Breast Cancer. Cancer Epidemiol Biomarkers Prev. 2017 Jan;26(1):44-50.

Statement: Lymphedema

1. Soran A, Ozmen T, McGuire KP et al..The importance of detection of subclinical lymphedema for the prevention of breast cancer-related clinical lymphedema after axillary lymph node dissection; a prospective observational study.Lymphat Res Biol 2014;12(4): 289-9.
2. Basta MN, Wu LC, Kanchwala SK et al.. Reliable prediction of postmastectomy lymphedema: the Risk Assessment Tool Evaluating Lymphedema. Am J Surg. 2017 Jun;213(6):1125-1133.
3. Ferguson CM, Swaroop MN, Horick N, et al. Impact of Ipsilateral Blood Draws, Injections, Blood Pressure Measurements, and Air Travel on the Risk of Lymphedema for Patients Treated for Breast Cancer. Journal of Clinical Oncology 2016;34:691-8.
4. McNeely ML, Dolgoy ND, Rafn BS et. al. Nighttime compression supports improved self-management of breast cancer-related lymphedema: A multicenter randomized controlled trial. Cancer. 2021 Oct 6. doi: 10.1002/cncr.33943.

Statement: Neurotoxicity:

1. Jordan B, Margulies A, Cardoso F et al. Systemic anticancer therapy-induced peripheral and central neurotoxicity: ESMO-EONS-EANO Clinical Practice guidlines for diagnosis, prevention, treatment and follow-up. Ann Oncology 2020 Oct; 31(10):1306-1319. doi 10.1016/j.annonc.2020.07.003

Statement: web axillary pain syndrome (Morbus Mondor):

1. Agostini F, Attanasi C, Bernetti A et al., Web Axillary Pain Syndrome-Literature Evidence and Novel Rehabilitative Suggestions: A Narrative Review. Int J Environ Res Public Health. 2021 Oct 2;18(19):10383.

Statement: sexual disorders and cognitive impairment:

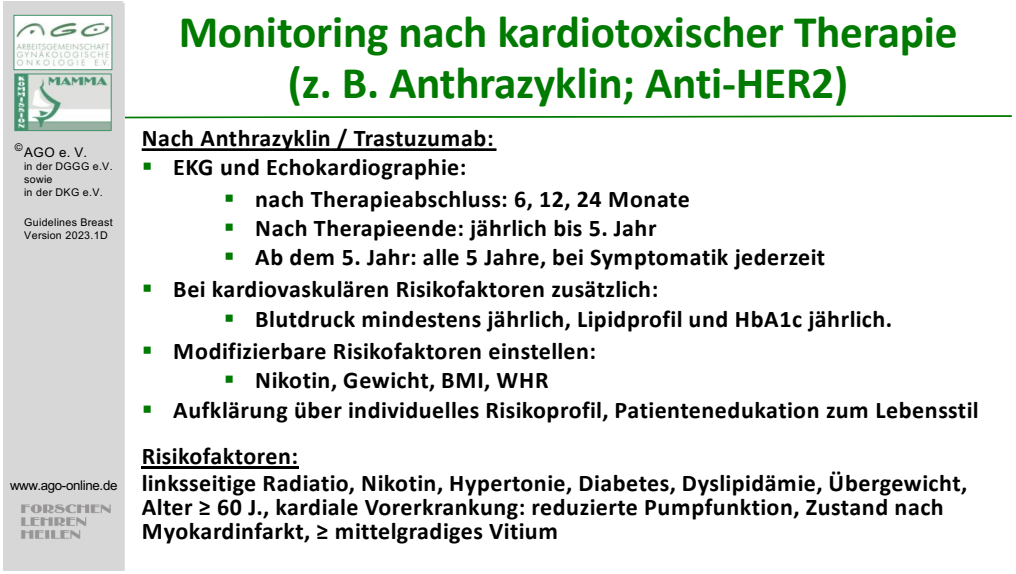
1. Runowcz CD, Leach CR, Henry L et al.. American Cancer Society/American Society of Clinical Oncology breast cancer survivorship care guideline. CA Cancer J Clin 2016; 66: 43-73.
2. Janelsins MC, Heckler CE, Peppone LJ et al.. Cognitive Complaints in Survivors of Breast Cancer After Chemotherapy Compared With Age-Matched Controls: An Analysis From a Nationwide, Multicenter, Prospective Longitudinal Study. J Clin Oncol. 2017 Feb 10;35(5):506-514.
3. Bernstein LJ, McCreath GA, Komeylian Z et al..Cognitive impairment in breast cancer survivors treated with chemotherapy depends on control group type and cognitive domains assessed: A multilevel meta-analysis. Neurosci Biobehav Rev. 2017 Dec;83:417-428.

Statement kognitive Einschränkungen

1. Small BJ, Lange M, Zhai W et al. for Thinking Living with Cancer C. O. G.-Age Studies. Impact of taxane-based chemotherapy among older women with breast cancer on cognition and quality of life: a longitudinal pooled analysis. Breast Cancer Res Treat. 2021 Nov 24. doi: 10.1007/s10549-021-06455-6.

Statement: Secondary tumors:

1. Hoekstra N, Fleury E, Merino Lara TR, et al. Long-term risks of secondary cancer for various whole and partial breast irradiation techniques. Radiother Oncol. 2018 Sep;128(3):428-433



1. Curigliano G, Lenihan D, Fradley M, et al. Management of cardiac disease in cancer patients throughout oncological treatment: ESMO consensus recommendations. Annals of Oncology 2020;31:171-90.
2. Michel L, Rassaf T, Totzeck M. Biomarkers for the detection of apparent and subclinical cancer therapy-related cardiotoxicity. J Thorac Dis 2018;10:S4282-S95.
3. Rassaf T, Totzeck M, Backs J, et al. Onco-Cardiology: Consensus Paper of the German Cardiac Society, the German Society for Pediatric Cardiology and Congenital Heart Defects and the German Society for Hematology and Medical Oncology. Clin Res Cardiol 2020;109:1197-222.
4. Dent S, Fergusson D, Aseyev O et al. ‚A Randomized Trial Comparing 3- versus 4-Monthly Cardiac Monitoring in Patients Receiving Trastuzumab-Based Chemotherapy for Early Breast Cancer. Curr Oncol. 2021 Dec 3;28(6):5073-5083.

Evaluation of current adjuvant therapy

1. Hershman DL, Kushi LH, Shao T et al. Early Discontinuation and Nonadherence to Adjuvant Hormonal Therapy in a Cohort of 8,769 Early-Stage Breast Cancer Patients. J Clin Oncol 2010; 28: 4120-4128.
2. Lueck H-J, Hadji P, Harbeck N et al. 24 Months Follow-Up Results from PACT (Patient's Anastrozole Compliance to Therapy Programme), a Non-Interventional Study Evaluating the Influence of a Standardized Information Service on Compliance in Postmenopausal Women with Early Breast Cancer. SABCS 2011 [P5-17-05].
3. Neven P, Markopoulos C, Tanner M et al. The impact of educational materials on compliance and persistence rates with adjuvant aromatase inhibitor treatment: first-year results from the compliance of aromatase inhibitors assessment in daily practice through educational approach (CARIATIDE) study. Breast. 2014 Aug;23(4):393-9.
4. Hershman DL, Kushi LH, Hillyer GC et al. Psychosocial factors related to non persistence with adjuvant endocrine therapy among women with breast cancer: the Breast Cancer Quality of Care Study (BQUAL). Breast Cancer Res Treat. 2016 May;157(1):133-43.
5. Goss PE, Ingle JN, Pritchard KI et al. Extending Aromatase-Inhibitor Adjuvant Therapy to 10 Years. N Engl J Med. 2016 Jul 21;375(3):209-19.
6. Nabieva N, Kellner S, Fehm T et al. Patient and tumor characteristics and their influence on early therapy persistence with letrozole in postmenopausal patients with early breast cancer. Ann Oncol. 2017 Oct 10.

doi: 10.1093/annonc/mdx630.
7. Laroche F, Perrot S, Medkour T et al. Quality of life and impact of pain in women treated with aromatase inhibitors for breast cancer. A multicenter cohort study. PLoS One. 2017 Nov 8;12(11):e0187165.
8. Kim, H. A., Lee, J. W., Nam, S. J., et al. Adding Ovarian Suppression to Tamoxifen for Premenopausal Breast Cancer: A Randomized Phase III Trial J Clin Oncol 2020 Feb 10;38(5):434-443

Adhärenz erhöhen durch Verhaltenstherapie/-training

1. Ream ME, Walsh EA, Jacobs JM, et al. Brief relaxation training is associated with long-term endocrine therapy adherence among women with breast cancer: post hoc analysis of a randomized controlled trial. Breast Cancer Res Treat. 2021 Nov;190(1):79-88. doi: 10.1007/s10549-021-06361-x.

Brustkrebs Nachsorge
Inhalte

	Oxford LoE	Oxford GR	AGO
▪ **Psychosoziale Aspekte der Beratung** ▪ Schwangerschaft, Kontrazeption, Sexualität, Lebensqualität, Menopausensyndrom, Angst vor Rezidiv ▪ Einbeziehung von Bezugspersonen (Partner, Familie, Freunde, Betreuer)	4	C	+
▪ **Zweitmeinung zur Primärtherapie**	2c	B	++
▪ **Allgemeine Beratung (z. B. Überprüfung der aktuellen Indikation zur genetischen Beratung (z. B. bei neu aufgetretenem Mamma-/ Ovarial-/ Pankreas-/ Prostata-Ca. in der Familie), HRT, prophylaktische Operationen, Brustrekonstruktion)**	2c	C	+

Statement: Psycho-social aspects

1. Drolet M, Maunsell E, Brisson J et al. Not Working 3 Years After Breast Cancer: Predictors in a Population-Based Study. J Clin Oncol 2005; 23(33): 8305-8312.
2. Scheier MF, Helgeson VS, Schulz R et al.. Interventions to Enhance Physical and Psychological Functioning Among Younger Women Who Are Ending Nonhormonal Adjuvant Treatment for Early-Stage Breast Cancer. J Clin Oncol 2005; 23(19): 4298-4311.
3. Fors EA, Bertheussen GF, Thune I et al.: Psychosocial interventions as part of breast cancer rehabilitation programs? Results from a systematic review. Psycho-Oncology 2011; 20: 909-918.
4. Silva C, Caramelo O, Almeida-Santos T et al.. Factors associated with ovarian function recovery after chemotherapy for breast cancer: a systematic review and meta-analysis. Hum Reprod. 2016 Dec;31(12):2737-2749.
5. Luke B, Brown MB, Missmer SA et al.. Assisted reproductive technology use and outcomes among women with a history of cancer. Hum Reprod. 2016 Jan;31(1):183-9.
6. Gudenkauf LM, Ehlers SL. Psychosocial interventions in breast cancer survivorship care. Breast. 2017 Nov 20;38:1-6.
7. Rogers LQ, Courneya KS, Anton PM et al.. Effects of a multicomponent physical activity behavior change intervention on fatigue, anxiety, and depressive symptomatology in breast cancer survivors: randomized trial. Psychooncology. 2017 Nov;26(11):1901-1906.

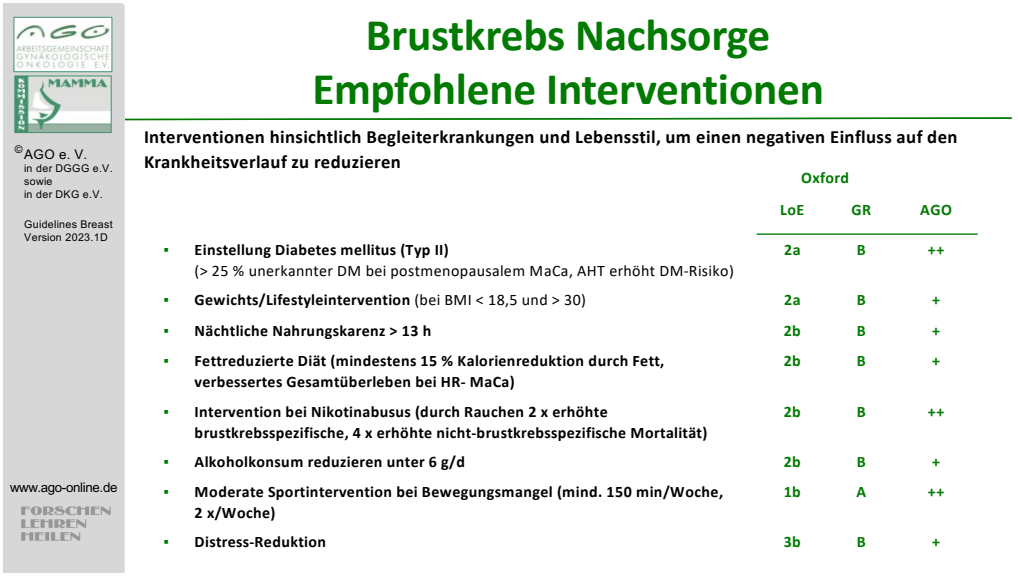
8. Y Kim, DA Kashy, RL Spillers, etal: Needs assessment of family caregivers of cancer survivors: Three cohorts comparison Psychooncology 19:573–582,2010 Crossref, Medline, Google Scholar
9. Y Kim, RL Spillers, DL Hall: Quality of life of family caregivers 5 years after a relative's cancer diagnosis: Follow-up of the national quality of life survey for caregivers Psychooncology 21:273–281,2012 Crossref, Medline, Google Scholar
10. BA Given, CW Given, PR Sherwood: Family and caregiver needs over the course of the cancer trajectory J Support Oncol 10:57–64,2012 Crossref, Medline, Google Scholar
11. Tran TXM, Jung S, Lee EG et al., Fear of Cancer Recurrence and Its Negative Impact on Health-Related Quality of Life in Long-term Breast Cancer Survivors. Cancer Res Treat. 2021 Dec 9. doi: 10.4143/crt.2021.835.

Statement: prophylactic surgery

1. Rhiem K, Engel C, Graeser M et al.. The risk of contralateral breast cancer in patients from BRCA ½ negative high risk families as compared to patients from BRCA1 or BRCA2 positive families: a retrospective cohort study. Breast Cancer Res. 2012; 14(6): R156.

Statement zur Analgesie

1. Lu YC, Chen PT, Lin MC et al., Nonsteroidal Anti-Inflammatory Drugs Reduce Second Cancer Risk in Patients With Breast Cancer: A Nationwide Population-Based Propensity Score-Matched Cohort Study in Taiwan. Front Oncol. 2021 Nov 24;11:756143. doi: 10.3389/fonc.2021.756143.



1. Onitilo AA, Donald M, Stankowski RV et al. Breast and prostate cancer survivors in a diabetic cohort: results from the Living with DiabetesStudy. Clin Med Res. 2013 Dec;11(4):210-8.
2. Anderson C, Sandler DP, Weinberg CR et al. Age- and treatment-related associations with health behavior change among breast cancer survivors. Breast. 2017 Jun;33:1-7.
3. Syrowatka A, Motulsky A, Kurteva S et al. Predictors of distress in female breast cancer survivors: a systematic review. Breast Cancer Res Treat. 2017 Sep;165(2):229-245. Review.
4. Gudenkauf LM, Ehlers SL. Psychosocial interventions in breast cancer survivorship care. Breast. 2017 Nov 20;38:1-6. Review.
5. Mehra K, Berkowitz A, Sanft T.D et al. Physical Activity, and Body Weight in Cancer Survivorship. Med Clin North Am. 2017 Nov;101(6):1151-1165. Review
6. Haykowsky MJ, Scott JM, Hudson K et al. Lifestyle Interventions to Improve Cardiorespiratory Fitness and Reduce Breast Cancer Recurrence. Am Soc Clin Oncol Educ Book. 2017;37:57-64.
7. Chlebowski RT, Aragaki AK, Anderson GL et al. Low-Fat Dietary Pattern and Breast Cancer Mortality in the Women's Health Initiative Randomized Controlled Trial. J Clin Oncol. 2017 Sep 1;35(25):2919-2926.
8. Marinac CR, Nelson SH, Breen CI et al. Prolonged Nightly Fasting and Breast Cancer Prognosis. JAMA Oncol. 2016 Aug 1;2(8):1049-55.

9. Sonnenblick A, Agbor-Tarh D, Bradbury I, et al. Impact of Diabetes, Insulin, and Metformin Use on the Outcome of Patients With Human Epidermal Growth Factor Receptor 2–Positive Primary Breast Cancer: Analysis From the ALTTO Phase III Randomized Trial. Journal of Clinical Oncology 2017;35:1421-9.

AHT erhöht Diabetes mellitus

1. Ye F, Wen J, Yang A et al., The Influence of Hormone Therapy on secondary diabetes mellitus in Breast Cancer: A Meta-analysis. Clin Breast Cancer. 2021 Jul 21:S1526-8209(21)00174-9. doi: 10.1016/j.clbc.2021.06.014.

Statement: for all statements see most recent literature see at Survivorship care guidelines of ASC and ASCO

1. Runowcz CD, Leach CR, Henry L et al. American Cancer Society/American Society of Clinical Oncology breast cancer survivorship care guideline. CA Cancer J Clin 2016; 66: 43-73.
2. Rock CL, Doyle C, Demark-Wahnefried W, et al. Nutrition and physical activity guidelines for cancer survivors. CA: a cancer journal for clinicians 2012;62:243-74.

Weight intervention.

1. Chajès V, Romieu I. Nutrition and breast cancer. Maturitas, 2014; 77 (1): 7–11.
2. Shaikh H, Bradhurst P, Ma LX et al.: Body weight management in overweight and obese breast cancer survivors. The Cochrane database of systematic reviews 2020;12:Cd012110.
3. Goodwin PJ, Segal RJ, Vallis M, et al. The LISA randomized trial of a weight loss intervention in postmenopausal breast cancer. npj Breast Cancer 2020;6:6.
4. Janni W, Rack B, Friedl T, et al. Abstract GS5-03: Lifestyle Intervention and Effect on Disease-free Survival in Early Breast Cancer Pts: Interim Analysis from the Randomized SUCCESS C Study. Cancer Research 2019;79:GS5-03-GS5-.
5. Trestini I, Sperduti I, Caldart A et al., Evidence-based tailored nutrition educational intervention improves adherence to dietary guidelines, anthropometric measures and serum metabolic biomarkers in early-stage breast cancer patients: A prospective interventional study. Breast. 2021 Dec;60:6-14. doi: 10.1016/j.breast.2021.08.008.
6. Roberts SA, Gillespie TC, Shui AM et al., Weight loss does not decrease risk of breast cancer-related arm lymphedema. Cancer. 2021 Nov 1;127(21):3939-3945. doi: 10.1002/cncr.33819.

Moderate sport intervention when physical activity was reduced

1. Chlebowski RT. Nutrition and physical activity influence on breast cancer incidence and outcome. Breast 2013; Aug;22 Suppl 2: S30-7.
2. Patsou ED, Alexias GD, Anagnostopoulos FG et al.. Effects of physical activity on depressive symptoms during breast cancer survivorship: a meta-analysis of randomised control trials. ESMO Open. 2017 Dec 11;2(5):e000271
3. Friedenreich CM, Stone CR, Cheung WY, et al. Physical Activity and Mortality in Cancer Survivors: A Systematic Review and Meta-Analysis. JNCI cancer spectrum 2020;4:pkz080.
4. Kehm RD, MacInnis RJ, John EM et al., Recreational Physical Activity and Outcomes After Breast Cancer in Women at High Familial Risk. JNCI Cancer Spectr. 2021 Dec 8;5(6):pkab090. doi: 10.1093/jncics/pkab090.

Das Essen von Nüssen erhöht OS und DFS

1. Wang C, Gu K, Wang F et al., Nut consumption in association with overall mortality and recurrence/disease-specific mortality among long-term breast cancer survivors. Int J Cancer. 2022 Feb 15;150(4):572-579.

Bariatrische Operationen

1. Lee E, Kawaguchi ES, Zhang J et al. Bariatric surgery in patients with breast and endometrial cancer in California: population-based prevalence and survival. Surg Obes Relat Dis. 2022 Jan;18(1):42-52. doi: 10.1016/j.soard.2021.09.017.

Guidelines Breast
Version 2023.1D

Nightly Fasting

Prolonged nightly fasting improves prognosis in breast cancer patients

retrospective cohort study:

2413 BC-pat. (no diabetes), nightly fasting more or less than 13 hrs

Fasting < 13 hrs: **HR 1.36, 36% increase of risk for recurrence**
HR 1.21, n.s. increase of risk for mortality

every 2-hrs-prolonged fasting was correlated with a 20% increase of sleeping duration

Marinac CR, Nelson SH, Breen CI et al. JAMA Oncol 2016: 2:1049-1055

Routine-Nachsorgeuntersuchungen bei asymptomatischen Patientinnen

Untersuchungen	Oxford LoE	Oxford GR	AGO
▪ Anamnese (spezifische Symptome)	1a	A	++
▪ Untersuchung	1a	B	++
▪ Brust-Selbst-Untersuchung	5	D	+
▪ Mammographie	1a	A	++
▪ Mammasonographie	2a	B	++
▪ Mamma-MR in der Routine*	3a	B	+/-
▪ Mamma-MR bei unklarer Mammographie /-sonographie	3b	B	+
▪ Gynäkologische Untersuchung	5	D	++
▪ DXA-Scan zu Therapiebeginn und risikoadaptiert in regelmäßigen Abständen bei Frauen mit frühzeitiger Menopause und Frauen unter AI-Therapie	5	D	+

* Bei erhöhtem Risiko erwägen (Alter unter 50 J., HR-, Beurteilbarkeit in MG+US C/D)

1. Margenthaler JA, Allan E, Cheng L, et al. Surveillance of Patients With Breast Cancer After Curative-Intent Primary Treatment: Current Practice Patterns. Journal of Oncology Practice 2012; 8(2): 79 – 83.
2. Parmeshwar R, Margenthaler JA, Allam E et al. Patient Surveillance After Initial Breast cancer Therapy Variation by Physician Specialty. Am J Surg 2013; 206(2): 218-222.
3. Jochelson M, Hayes DF, Ganz PA. Surveillance and Monitoring in Breast Cancer Survivors: Maximizing Benefit and Minimizing Harm. ASCO Educational Book 2013 e13 – e18.
4. Khatcheressian JL, Hurley P, Bantug E, et al. Breast Cancer Follow-up and Management After Primary Treatment: American Society of Clinical Oncology Clinical Practice Guideline Update . J Clin Oncol. 2013 March 1; 31(7):961-965.
5. Bychkovsky BL, Lin NU. Imaging in the evaluation and follow-up of early and advanced breast cancer: When, why, and how often? Breast. 2017 Feb;31:318-324 Review.
6. Expert Panel on Breast Imaging: Moy L, Bailey L, D'Orsi C et al. ACR Appropriateness Criteria® Stage I Breast Cancer: Initial Workup and Surveillance for Local Recurrence and Distant Metastases in Asymptomatic Women. J Am Coll Radiol. 2017 May;14(5S):S282-S292.
7. Lam DL, Houssami N, Lee JM. Imaging Surveillance After Primary Breast Cancer Treatment. AJR Am J Roentgenol. 2017 Mar;208(3):676-686. Review.

Statement: Physical examination

1. Margenthaler JA, Allan E, Cheng L, et al. Surveillance of Patients With Breast Cancer After Curative-Intent Primary Treatment: Current Practice Patterns. Journal of Oncology Practice 2012; 8(2): 79 – 83.
2. Khatcheressian JL, Hurley P, Bantug E, et al. Breast Cancer Follow-up and Management After Primary Treatment: American Society of Clinical Oncology Clinical Practice Guideline Update . J Clin Oncol. 2013 March 1; 31(7):961-965.
3. Jochelson M, Hayes DF, Ganz PA. Surveillance and Monitoring in Breast Cancer Survivors: Maximizing Benefit and Minimizing Harm. ASCO Educational Book 2013 e13 – e18.
4. Parmeshwar R, Margenthaler JA, Allam E et al.. Patient Surveillance After Initial Breast cancer Therapy Variation by Physician Specialty. Am J Surg 2013; 206(2): 218-222.

Statement: Mammography

1. De Bock GH, Bonnema J, van Der Hage J et al. Effectiveness of Routine Visits and Routine Tests in Detecting Isolated Locoregional Recurrences After Treatment for Early-Stage Invasive Breast Cancer: A Meta-Analysis and Systematic Review. J Clin Oncol 2004; 22(19): 4010-4018 .
2. Khatcheressian JL, Hurley P, Bantug E et al. Breast Cancer Follow-up and Management After Primary Treatment: American Society of Clinical Oncology Clinical Practice Guideline Update . J Clin Oncol. 2013 March 1; 31(7):961-965.

Statement: Sonography of the breast

1. Graf O, Helbich TH, Fuchsjaeger MH et al. Follow-up of palpable circumscribed noncalcified solid breast masses at mammography and US: can biopsy be averted? Radiology 2004; 233(3): 850-6.
2. Dillon MF, Hill AD, Quinn CM et al. The accuracy of ultrasound, stereotactic, and clinical core biopsies in the diagnosis of breast cancer, with an analysis of false-negative cases. Ann Surg. 2005; 242(5):701-7.
3. Karellas A, Vedantham S. Breast cancer imaging: a perspective for the next decade. Med Phys 2008; 35(11):4878-97. Review.
4. Jung Hyun-Yun., Min Jung Kim, Eun-Kyung Kim et al.. Imaging Surveillance of Patients with Breast Cancer after Primary Treatment: Current Recommendations. Korean J Radiol 2015;16(2):219-228.
5. Song SE, Cho N, Chang JM et al. Diagnostic performances of supplemental breast ultrasound screening in women with personal history of breast cancer. Acta Radiol. 2017 Jan 1:284185117725779.

Statement: MRI of the breast

1. DeMartini W, Lehman C. A review of current evidence-based clinical applications for breast magnetic resonance imaging. Top Magn Reson Imaging 2008;19(3):143-50. Review.
2. Warner E. The role of magnetic resonance imaging in screening women at high risk of breast cancer. Top Magn Reson Imaging. 2008; 19(3):163-9. Review.
3. Lehman CD, Lee JM, DeMartini WB et al. Screening MRI in Women With a Personal History of Breast Cancer. J Natl Cancer Inst. 2016 Jan 7;108(3).
4. Shah C, Ahlawat S, Khan A et al. The Role of MRI in the Follow-up of Women Undergoing Breast-conserving Therapy. Am J Clin Oncol. 2016 Jun;39(3):314-9.
5. Cho N, Han W, Han BK et al. Breast Cancer Screening With Mammography Plus Ultrasonography or Magnetic Resonance Imaging in Women 50 Years or Younger at Diagnosis and Treated With Breast Conservation Therapy. JAMA Oncol. 2017 Nov 1;3(11):1495-1502.
6. Kim EJ, Kang BJ, Kim SH et al. Diagnostic Performance of and Breast Tissue Changes at Early Breast MR Imaging Surveillance in Women after Breast Conservation Therapy.Radiology. 2017 Sep;284(3):656-666.
7. Tadros A, Arditi B, Weltz C et al.:Utility of surveillance MRI in women with a personal history of breast cancer.Clin Imaging. 2017 Nov - Dec;46:33-36.

Statement: Pelvic examination Expert Opinion

1. Cohen I, Beyth Y, Tepper R. The role of ultrasound in the detection of endometrial pathologies in asymptomatic postmenopausal breast cancer patients with tamoxifen treatment. Obstet Gynecol Surv 1998; 53(7): 429-38.
2. Giorda G, Crivellari D, Veronesi A et al. Comparison of ultrasonography, hysteroscopy, and biopsy in the diagnosis of endometrial lesions in postmenopausal tamoxifen-treated patients. Acta Obstet Gynecol Scand 2002; 81(10):975-80.
3. Robertson C1, Arcot Ragupathy SK, Boachie C et al. The clinical effectiveness and cost-effectiveness of different surveillance mammography regimens after the treatment for primary breast cancer: systemic reviews registry database analyses and economic evaluation. Health Technol Assess. 2011;15(34): 1-322.
4. Geurts SM, de Vegt F, Siesling S et al. Pattern of follow up care and early relapse detection in breast cancer patients. Breast Cancer Res Treat 2012; 136(3): 859-68.
5. Khatcheressian JL, Hurley P, Bantug E et al. Breast Cancer Follow-up and Management After Primary Treatment: American Society of Clinical Oncology Clinical Practice Guideline Update . J Clin Oncol. 2013 March 1; 31(7):961-965.

Statement: Dexa scan Expert Opinion

1. Mahon SM, Williams MT, Spies MA: Screening for second cancers and osteoporosis in long-term survivors. Cancer Pract 2000; 8(6): 282-90.
2. Runowcz CD, Leach CR, Henry L et al. American Cancer Society/American Society of Clinical Oncology breast cancer survivorship care guideline. CA Cancer J Clin 2016; 66: 43-73.
3. Shapiro CL, Van Poznak C, Lacchetti C, et al. Management of Osteoporosis in Survivors of Adult Cancers With Nonmetastatic Disease: ASCO Clinical Practice Guideline. Journal of clinical oncology : official journal of the American Society of Clinical Oncology 2019;37:2916-46.

Routine-Nachsorgeuntersuchungen bei asymptomatischen Patientinnen

	Oxford		
	LoE	GR	AGO
▪ Routinelabor (inkl. Tumormarker)	1a	A	-
▪ Labor zum Monitoring der Akut- und Spättoxizitäten der Therapien	5	D	+
▪ Lebersonographie	1a	A	-
▪ Skelettszintigraphie	1a	A	-
▪ Thorax-Röntgen	1a	A	-
▪ CT-Untersuchungen (Thorax, Abdomen und Becken)	2a	D	-
▪ Detektion isolierter / zirkulierender Tumorzellen	2a	D	-
▪ PET-CT	2b	B	-
▪ Ganzkörper-MRT	2b	B	-

1. Bychkovsky BL, Lin NU. Imaging in the evaluation and follow-up of early and advanced breast cancer: When, why, and how often? Breast. 2017 Feb;31:318-324 Review.
2. Lam DL, Houssami N, Lee JM. Imaging Surveillance After Primary Breast Cancer Treatment. AJR Am J Roentgenol. 2017 Mar;208(3):676-686. Review.
3. Expert Panel on Breast Imaging:, Moy L, Bailey L, D'Orsi C, Green ED et al. ACR Appropriateness Criteria® Stage I Breast Cancer: Initial Workup and Surveillance for Local Recurrence and Distant Metastases in Asymptomatic Women. J Am Coll Radiol. 2017 May;14(5S):S282-S292.
4. Lafranconi A, Pylkkänen L, Deandrea S et al. Intensive follow-up for women with breast cancer: review of clinical, economic and patient's preference domains through evidence to decision framework. Health Qual Life Outcomes. 2017 Oct 19;15(1):206.

<u>Statement: Magnetic resonance imaging (MRI) of the breast</u>

1. DeMartini W, Lehman C. A review of current evidence-based clinical applications for breast magnetic resonance imaging. Top Magn Reson Imaging 2008; 19(3):143-50. Review.
2. Warner E. The role of magnetic resonance imaging in screening women at high risk of breast cancer. Top Magn Reson Imaging. 2008; 19(3):163-9. Review.

3. Shah C, Ahlawat S, Khan A et al.. The Role of MRI in the Follow-up of Women Undergoing Breast-conserving Therapy. Am J Clin Oncol. 2016 Jun;39(3):314-9.

Statement: Routine biochemistry (incl. tumor markers)

1. McShane LM, Altman DG, Sauerbrei W et al. Statistics Subcommittee of the NCI-EORTC Working Group on Cancer Diagnostics. Reporting recommendations for tumor marker prognostic studies. J Clin Oncol 2005; 23(36): 9067-72.
2. Harris LN, Ismaila N, McShane LM et al. Use of Biomarkers to Guide Decisions on Adjuvant Systemic Therapy for Women With Early-stage Invasive Breast Cancer: American Society of Clinical Practice Guideline. J Clin Oncol 2016; 34(10): 1134-50.
3. Cardoso F, Kyriakides S, Ohno S, et al. Early breast cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up[†]. Annals of Oncology 2019;30:1194-220.

Statement: Ultrasound of the liver

Statement: Bone scan

Statement: Chest X-ray

Statement: CT of chest, abdomen and pelvis

1. Emens LA, Davidson NE. The follow-up of breast cancer. Semin Oncol. 2003; 30(3): 338-48. Review.
2. Moschetti I, Cinquini M, Lambertini M et al. Follow-up strategies for women treated for early breast cancer. Cochrane Database Syst Rev 2005 Jan 25;(1) Review. Update in: Cochrane Database Syst Rev 2016; (5) CD001768.
3. Dull B, Linkugel A, Margenthaler JA, Cyr AE. Overuse of Chest CT in Patients With Stage I and II Breast Cancer: An Opportunity to Increase Guidelines Compliance at an NCCN Member Institution.J Natl Compr Canc Netw. 2017 Jun;15(6):783-789.

Statement: Detection of isolated/circulating tumor cells

1. Janni W, Vogl FD, Wiedswang G et al. Persistence of disseminated tumor cells (DTC) in bone marrow (BM) during Follow-up predicts increased risk for relapse – Up-date of the pooled European data. Clin Cancer Res 2011; 17(9): 2967-76.
2. Rack B, Schindlbeck C, Jückstock J et al. Circulating tumor cells predict survival in early average-to-high risk breast cancer patients. SUCCESS Study Group. J Natl Cancer Inst. 2014 May 15;106(5).

Statement: PET / WB-MRI

1. Ide M. Cancer screening with FDG-PET. Q J Nucl Med Mol Imaging 2006; 50(1): 23-7.
2. Schöder H, Gönen M. Screening for cancer with PET and PET/CT: potential and limitations. J Nucl Med 2007; 48 Suppl 1:4S-18S. Review.
3. Lei L, Wang X, Chen Z. PET/CT Imaging for Monitoring Recurrence and Evaluating Response to Treatment in Breast Cancer. Adv Clin Exp Med. 2016 Mar-Apr;25(2):377-82.
4. Cho IH, Kong EJ. Potential Clinical Applications of ¹⁸F-Fluorodeoxyglucose Positron Emission Tomography/Magnetic Resonance Mammography in Breast Cancer. Nucl Med Mol Imaging. 2017 Sep;51(3):217-226. Review.
5. Melsaether A, Moy L. Breast PET/MR Imaging. Radiol Clin North Am. 2017 May;55(3):579-589. Review.

Background for Toxicity Management

Tamoxifen:	Cholesterol, Triglycerides, Bilirubin, ALAT, ASAT, gamma-GT, Glucose
Aromatase-Inhibitors:	Cholesterol, Triglycerides, Bilirubin, ALAT, ASAT, gamma-GT
Anthracyclines:	pro-BNP, possibly Troponin
Trastuzumab:	pro-BNP, possibly Troponin
Checkpoint-Inhibitors:	Bilirubin, ALAT, ASAT, gamma-GT, Creatinine, TSH, fT3/T4, Myoglobin

Früherkennung von potenziell heilbaren Erkrankungen

	Oxford LoE	GR	AGO
Lokoregionäre Rezidive (Thoraxwand, intramammäre Rezidive):			
▪ **Inzidenz 7–20 %** **(abhängig von der Zeit der Nachbeobachtung)**			
▪ **Brust-Selbst-Untersuchung**	5	D	+
▪ **Klin. Untersuchung, Mammographie & US**	1a	A	++
▪ **Mamma-MR bei unklarer Mammographie /-sonographie***	3a	B	+/-

* Bei erhöhtem Risiko erwägen (Alter unter 50 J., HR-, Beurteilbarkeit in MG+US C/D)

Statement incidence

1. Perry NM. Quality assurance in the diagnosis of breast disease. EUSOMA Working Party. Eur J Cancer 2001; 37: 159-172
2. Wapnir IL, Anderson SJ, Mamounas EP et al. Prognosis after ipsilateral breast tumor recurrence and locoregional recurrences in five National Surgical Adjuvant Breast and Bowel Project node-positive adjuvant breast cancer trials. J Clin Oncol 2006; 24:2028-2037

Statement breast self examination

1. Thomas DB, Gao DL, Ray RM et al. Randomized trial of breast self-examination in Shanghai: final results. J Natl Cancer Inst 2002; 94(19): 1445-57.
2. Khatcheressian JL, Wolff AC, Smith TJ. American Society of Clinical Oncology 2006 update of the breast cancer follow-up and management guidelines in the adjuvant setting. J Clin Oncol. 2006 Nov 1;24(31):5091-7.
3. Montgomery DA, Krupa K, Cooke TG. Follow-up in breast cancer: does routine clinical examination improve outcome? A systematic review of the literature. Br J Cancer 2007; 97(12): 1632-41.

Statement physical examination, mammography & US & MRI

1. Beinart G, Gonzalez-Angulo AM, Broglio K. Clinical course of 771 patients with bilateral breast cancer: characteristics associated with overall and recurrence-free survival. Clin Breast Cancer 2007; 7(11): 867-74.
2. Montgomery DA, Krupa K, Cooke TG. Follow-up in breast cancer: does routine clinical examination improve outcome? A systematic review of the literature. Br J Cancer. 2007; 97(12): 1632-41.
3. Buist DS1, Abraham LA, Barlow WE et al. Diagnosis of second breast cancer events after initial diagnosis of early stage breast cancer. Breast Cancer Surveillance Consortium. Breast Cancer Res Treat 2010; 124(3): 863-73.
4. Kim JY, Cho N, Koo HR et al. Unilateral breast cancer: screening of contralateral breast by using preoperative MR imaging reduces incidence of metachronous cancer. adiology. 2013 Apr;267(1):57-66.
5. Khatcheressian JL, Hurley P, Bantug E et al. Breast Cancer Follow-up and Management After Primary Treatment: American Society of Clinical Oncology Clinical Practice Guideline Update . J Clin Oncol. 2013 March 1; 31(7):961-965.
6. Neuman HB, Schumacher JR, Francescatti AB et al. Utility of Clinical Breast Examinations in Detecting Local-Regional Breast Events After Breast-Conservation in Women with a Personal History of High-Risk Breast Cancer. Ann Surg Oncol. 2016 Oct;23(10):3385-91.
7. Tsai WC, Wei HK, Hung CF et al. Better Overall Survival for Breast Cancer Patients by Adding Breast Ultrasound to Follow-Up Examinations for Early Detection of Locoregional Recurrence-A Survival Impact Study. Ultrasound Med Biol. 2016 Sep;42(9):2058-64.
8. Freedman RA, Keating NL, Partridge AH et al.:Surveillance Mammography in Older Patients With Breast Cancer-Can We Ever Stop?: A Review. JAMA Oncol. 2017 Mar 1;3(3):402-409.
9. Taros A, Arditi B, Weltz C et al. Utility of surveillance MRI in women with a personal history of breast cancer. Clin Imaging. 2017 Nov - Dec;46:33-36.

Früherkennung von potenziell heilbaren Erkrankungen

	Oxford LoE	GR	AGO
Kontralaterales Mammakarzinom:			
▪ Rel. Risiko: 2,5 – 5			
▪ Inzidenz: 0,5 – 1,0 %/Jahr			
▪ Brust-Selbst-Untersuchung	5	D	+
▪ Klin. Untersuchung, Mammographie & US	1a	A	++
▪ Mamma-MR*	3b	B	+/-
▪ Männliches Mammakarzinom: Vorgehen analog wie beim Karzinom der Frau bei unklarer Mammographie /-sonographie**	5	D	+

* Bei erhöhtem Risiko erwägen (Alter unter 50 J., HR-, Beurteilbarkeit in MG+US C/D)
** S. Kapitel „Brustkrebs: Spezielle Situationen / Männliches Mammakarzinom“

Statement risk and incidence

1. Hooning MJ, Aleman BM, Hauptmann M et al. Roles of radiotherapy and chemotherapy in the development of contralateral breast cancer J Clin Oncol 2008; 26(34): 5561-8.
2. Yerushalmi R, Kennecke H, Woods R et al. Does multicentric/multifocal breast cancer differ from unifocal breast cancer? An analysis of survival and contralateral breast cancer incidence. Breast Cancer Res Treat 2009; 117(2): 365-70.
3. Bertelsen L, Mellemkjær L, Christensen J et al. Age-Specific Incidence of Breast Cancer in Breast Cancer Survivors and Their First-Degree Relatives. Epidemiology 2009; 20(2): 175 – 80.
4. Chao C, Bhatia S, Xu L, et al. Incidence, Risk Factors, and Mortality Associated With Second Malignant Neoplasms Among Survivors of Adolescent and Young Adult Cancer. JAMA Network Open 2019;2:e195536-e.

Statement breast self examination

1. Thomas DB, Gao DL, Ray RM et al. Randomized trial of breast self-examination in Shanghai: final results. J Natl Cancer Inst 2002; 94(19): 1445-57.
2. Montgomery DA, Krupa K, Cooke TG et al. Follow-up in breast cancer: does routine clinical examination improve outcome? A systematic review of the literature. Br J Cancer 2007; 97(12): 1632-41.

3. Khatcheressian JL, Hurley P, Bantug E et al.: Breast Cancer Follow-up and Management After Primary Treatment: American Society of Clinical Oncology Clinical Practice Guideline Update. J Clin Oncol. 2013 March 1; 31(7):961-965.

Statement physical examination, mammography & US&MRI

1. Beinart G, Gonzalez-Angulo AM, Broglio K et al. Clinical course of 771 patients with bilateral breast cancer: characteristics associated with overall and recurrence-free survival. Clin Breast Cancer 2007; 7(11): 867-74.
2. Montgomery DA, Krupa K, Cooke TG et al. Follow-up in breast cancer: does routine clinical examination improve outcome? A systematic review of the literature. Br J Cancer. 2007; 97(12): 1632-41.
3. Khatcheressian JL, Hurley P, Bantug E, et al. Breast Cancer Follow-up and Management After Primary Treatment: American Society of Clinical Oncology Clinical Practice Guideline Update . J Clin Oncol. 2013 March 1; 31(7):961-965.
4. Kim JY1, Cho N, Koo HR et al. Unilateral breast cancer: screening of contralateral breast by using preoperative MR imaging reduces incidence of metachronous cancer.Radiology. 2013 Apr;267(1):57-66.
5. Freedman RA, Keating NL, Partridge AH et al. Surveillance Mammography in Older Patients With Breast Cancer-Can We Ever Stop?: A Review. JAMA Oncol. 2017 Mar 1;3(3):402-409.
6. Vapiwala N, Hwang WT, Kushner CJ et al. No impact of breast magnetic resonance imaging on 15-year outcomes in patients with ductal carcinoma in situ or early-stage invasive breast cancer managed with breast conservation therapy. Cancer. 2017 Apr 15;123(8):1324-1332.
7. van Bodegraven EA, van Raaij JC, Van Goethem M et al. Guidelines and recommendations for MRI in breast cancer follow-up: A review. Eur J Obstet Gynecol Reprod Biol. 2017 Nov;218:5-11.

Statement surveillance of male breast cancer

1. Ferzoco RM, Ruddy KJ. Optimal delivery of male breast cancer follow-up care: improving outcomes, Breast Cancer: Targets and Therapy 2015:7 371–379
2. Auvinen A, Curtis RE, Ron E. Risk of subsequent cancer following breast cancer in men. J Natl Cancer Inst. 2002;94(17):1330–1332.

Früherkennung von potenziell heilbaren Erkrankungen

	Oxford LoE	GR	AGO
Sonstige Zweitkarzinome:			
▪ **MDS (RR 10,9), AML (RR 2,6–5,3), Kolorektal RR 3,0; Endometrium RR 1,6; Ovar RR 1,5; Lymphome RR 7**			
▪ **Screening auf Zweitmalignome entsprechend der gültigen Leitlinien**	5	D	++
▪ **Gyn. Krebsfrüherkennungsuntersuchung**	5	D	++
▪ **Routinemäßige transvaginale Sonographie / Biopsie des Endometriums**	1b	B	-

Statement: Risk

1. Brown LM, Chen BE, Pfeiffer RM et al. Risk of second non-hematological malignancies among 376,825 breast cancer survivors. Breast Cancer Res Treat 2007; 106(3): 439-51.
2. Kirova YM, De Rycke Y, Gambotti L et al. Second malignancies after breast cancer: the impact of different treatment modalities. Br J Cancer 2008 Mar 11; 98(5): 870-4.
3. Schaapveld M, Visser O, Louwman MJ et al. Risk of new primary nonbreast cancers after breast cancer treatment: a Dutch population-based study. J Clin Oncol 2008; 26(8): 1239-46.
4. Andersson M, Jensen MB, Engholm G et al. Risk of second primary cancer among patients with early operable breast cancer registered or randomised in Danish Breast Cancer cooperative Group (DBCG) protocols of the 77, 82 and 89 programmes during 1977-2001. Acta Oncol 2008; 47(4): 755-64.
5. CG Valentini, L Fianchi, MT Voso et al. Incidence of Acute Myeloid Leukemia after Breast Cancer, Mediterr J Hematol Infect Dis. 2011; 3(1): e2011069.
6. Kaplan H1, Malmgren J, De Roos AJ. Risk of myelodysplastic syndrome and acute myeloid leukemia post radiation treatment for breast cancer: a population-based study. Breast Cancer Res Treat. 2013 Feb;137(3):863-7.
7. Kaplan HG, Malmgren JA, Atwood MK. Increased incidence of myelodysplastic syndrome and acute myeloid leukemia following breast cancer treatment with radiation alone or combined with chemotherapy: a registry cohort analysis

1990-2005. BMC Cancer. 2011 Jun 21;11:260. doi: 10.1186/1471-2407-11-260.
8. Freedman RA, Seisler DK, Foster JC et al. Risk of acute myeloid leukemia and myelodysplastic syndrome among older women receiving anthracycline-based adjuvant chemotherapy for breast cancer on Modern Cooperative Group Trials (Alliance A151511). Breast Cancer Res Treat. 2017 Jan;161(2):363-373. doi: 10.1007/s10549-016-4051-1.
9. Sung H, Hyun N, Leach CR, et al. Association of First Primary Cancer With Risk of Subsequent Primary Cancer Among Survivors of Adult-Onset Cancers in the United States. JAMA 2020;324:2521-35.

Statement: Screening for secondary malignancies according to current guidelines

1. Runowicz CD, Leach CR, Henry NL, et al. American Cancer Society/American Society of Clinical Oncology Breast Cancer Survivorship Care Guideline. Journal of Clinical Oncology 2016;34:611-35.

Statement: Pelvic examination and PAP smear

1. Gerber B, Krause A, Müller H et al. Ultrasonographic detection of asymptomatic endometrial cancer in postmenopausal patients offers no prognostic advantage over symptomatic disease discovered by uterine bleeding. Eur J Cancer 2001; 37(1): 64-71.
2. Fishman DA, Cohen L, Blank SV et al. The role of ultrasound evaluation in the detection of early-stage epithelial ovarian cancer. Am J Obstet Gynecol 2005; 192(4): 1214-21.
3. Rieck GC, Lim K, Rogers MT et al. Screening for familial ovarian cancer--management and outcome of women with moderate to high risk of developing ovarian cancer. Int J Gynecol Cancer 2006;16 Suppl 1: 86-91.
4. Chan JK, Manuel MR, Cheung MK et al. Breast cancer followed by corpus cancer: is there a higher risk for aggressive histologic subtypes? Gynecol Oncol 2006; 102(3): 508-12.

Statement: Endometrial ultrasound / biopsy

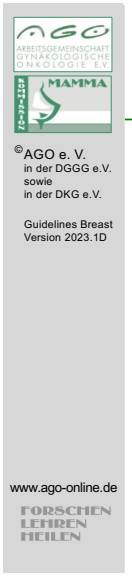
1. Gerber B, Krause A, Müller H, et al. Effects of adjuvant tamoxifen on the endometrium in postmenopausal women with breast cancer: a prospective long-term study using transvaginal ultrasound. J Clin Oncol 2000; 18(20): 3464-70
2. Barakat RR, Gilewski TA, Almadrones L et al. Effect of adjuvant tamoxifen on the endometrium in women with breast cancer: a prospective study using office endometrial biopsy. J Clin Oncol 2000;18(20): 3459-63.
3. Fung MF, Reid A, Faught W et al. Prospective longitudinal study of ultrasound screening for endometrial abnormalities in women with breast cancer receiving tamoxifen. Gynecol Oncol 2003; 91(1): 154-9.

Statement: Marrow neoplasms after adjuvant breast cancer therapy

1. Wolff AC, Blackford AL, Visvanathan K et al. Risk of marrow neoplasms after adjuvant breast cancer therapy: the national comprehensive cancer network experience. J Clin Oncol. 2015; 33(4): 340-8.

Statement: Secondary lung tumors:

1. Hoekstra N, Fleury E, Merino Lara TR et al. Long-term risks of secondary cancer for various whole and partial breast irradiation techniques. Radiother Oncol. 2018 Sep;128(3):428-433
2. Burt LM, Ying J, Poppe MM, et al. Risk of secondary malignancies after radiation therapy for breast cancer: Comprehensive results. Breast (Edinburgh, Scotland) 2017;35:122-9.



Nachsorge bei invasiven und nicht invasiven Karzinomen
Synopsis

Empfehlung für asymptomatische Patientinnen

(mod. nach ASCO-ACS Empfehlungen 2016, NCCN 2022, ESMO2019 und S3-Leitlinie 2017)

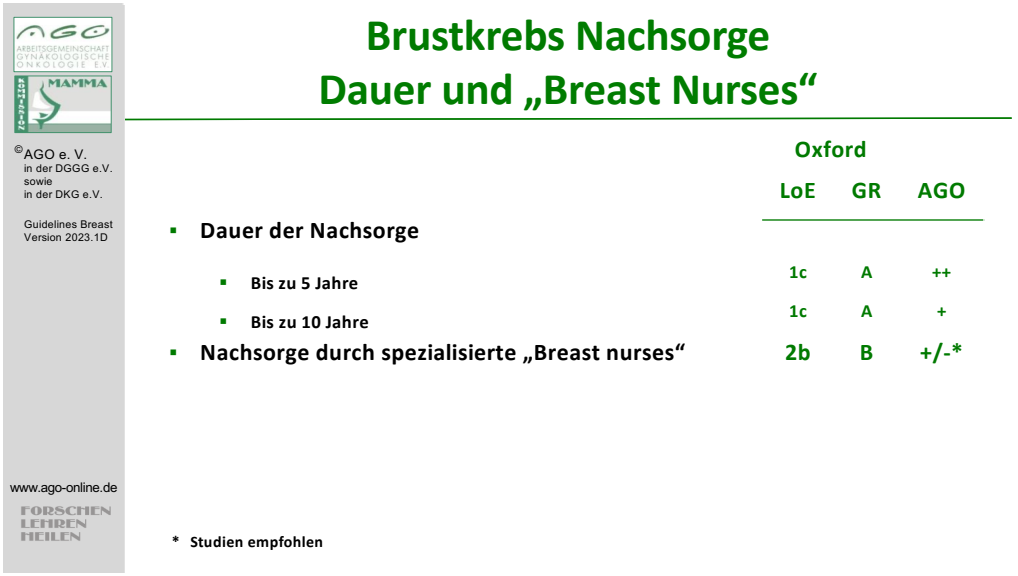
		Nachsorge / Follow-Up*		Screening / Follow up
Jahre nach Primärtherapie		1 2 3	4 5	> 5
Anamnese, klinische Untersuchung, Beratung		inv.: alle 3 Mon. in situ: alle 6 Mon.	alle 6 Mon.	alle 12 Mon.
Selbstuntersuchung		monatlich		
Bildgebende Diagnostik, Laboruntersuchungen		indiziert nur bei Symptomatik +/- Befunden +/- Verdacht auf Rezidiv/Metastasen bzw. Monitoring der Nebenwirkungen der Therapie		
Mammographie und ergänzende Sonographie	BET**	beidseits: alle 12 Monate		
	Mastektomie	kontralateral alle 12 Monate		
Echokardiografie		6, 12, 24 Monate, dann jährlich bis 5 Jahre nach Abschluss Anthrazyklin- oder Trastuzumab-haltiger Therapie (v. a. bei Risikofaktoren); danach alle 5 Jahre		

* Fortlaufende "Nachsorgeuntersuchungen" bei noch laufender adjuvanter Therapie

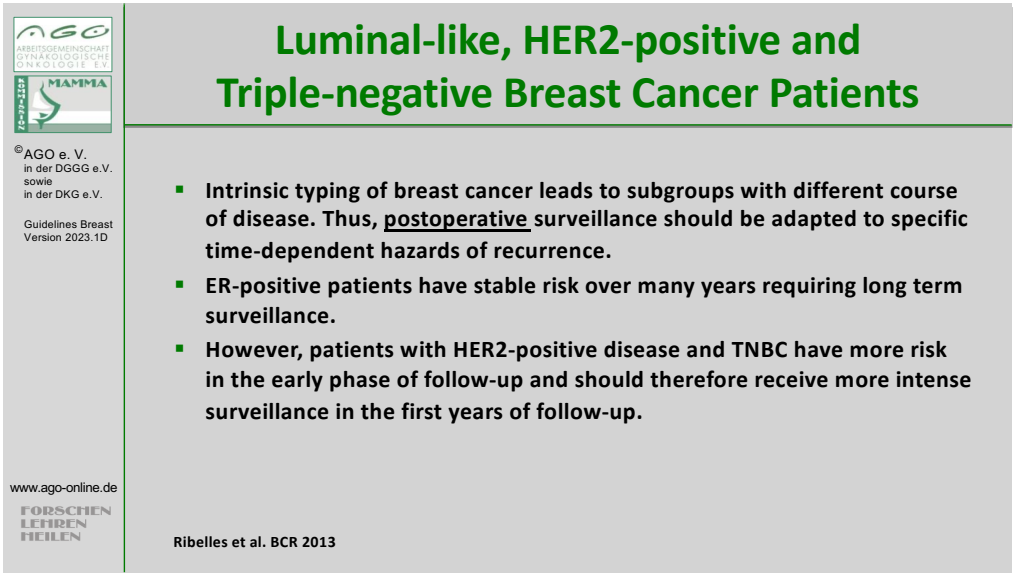
** nach BET: Erste Mammographie 1 Jahr nach initialer Mammographie, oder zumindest 6 Monate nach abgeschlossener Radiatio

1. Runowcz CD, Leach CR, Henry L et al. American Cancer Society/American Society of Clinical Oncology breast cancer survivorship care guideline. CA Cancer J Clin 2016; 66: 43-73
2. Merkow RP, Korenstein D, Yeahia R et al. Quality of Cancer Surveillance Clinical Practice Guidelines: Specificity and Consistency of Recommendations. JAMA Intern Med. 2017 May 1;177(5):701-709.
3. Muradali D, Kennedy EB, Eisen A et al. Breast screening for survivors of breast cancer: A systematic review. Prev Med. 2017 Oct;103:70-75.
4. NCCN Clinical Practice Guidelines in Oncology, Breast Cancer Version 02.2022 https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf
5. Cardoso F, Kyriakides S, Ohno S, et al. Early breast cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Annals of Oncology 2019;30:1194-220.
6. Interdisziplinäre S3-Leitlinie für die Früherkennung,Diagnostik, Therapie und Nachsorge des Mammakarzinoms. Langversion 4.0 – Dezember 2017 AWMF-Registernummer: 032-045OL;http://www.leitlinienprogramm-onkologie.de/fileadmin/user_upload/LL_Mammakarzinom_Langversion_4.0.pdf
7. Curigliano G, Lenihan D, Fradley M, et al. Management of cardiac disease in cancer patients throughout oncological treatment: ESMO consensus recommendations. Annals of Oncology 2020;31:171-90.

8. Michel L, Rassaf T, Totzeck M. Biomarkers for the detection of apparent and subclinical cancer therapy-related cardiotoxicity. J Thorac Dis 2018;10:S4282-S95.
9. Rassaf T, Totzeck M, Backs J, et al. Onco-Cardiology: Consensus Paper of the German Cardiac Society, the German Society for Pediatric Cardiology and Congenital Heart Defects and the German Society for Hematology and Medical Oncology. Clin Res Cardiol 2020;109:1197-222.
10. Dent S, Fergusson D, Aseyev O et al. ,A Randomized Trial Comparing 3- versus 4-Monthly Cardiac Monitoring in Patients Receiving Trastuzumab-Based Chemotherapy for Early Breast Cancer. Curr Oncol. 2021 Dec 3;28(6):5073-5083.



1. Sheppard C. Breast cancer follow-up: literature review and discussion. Eur J Oncol Nurs 2007;11(4):340-7.
2. van Hezewijk M, Ranke GM, van Nes JG et al. Patients' needs and preferences in routine follow-up for early breast cancer; an evaluation of the changing role of the nurse practitioner. Eur J Surg Oncol 2011; 37(9): 765-73.
3. Interdisziplinäre S3-Leitliniefür die Früherkennung, Diagnostik, Therapie und Nachsorge des Mammakarzinoms. Langversion 4.0 – Dezember 2017 AWMF-Registernummer: 032-045OL; http://www.leitlinienprogramm-onkologie.de/fileadmin/user_upload/LL_Mammakarzinom_Langversion_4.0.pdf
4. NCCN Clinical Practice Guidelines in Oncology, Breast Cancer Version 3.17-10.17; https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf



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