


Diagnostik und Therapie früher und fortgeschrittener Mammakarzinome

Brustkrebs Nachsorge



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- **Versionen 2002–2019:**
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 Gerber / Hanf / Heinrich / Huober / Janni / Kaufmann / Kümmel / Lux
 / Maass / Möbus / Müller-Schimpfle/ Mundhenke / Oberhoff / Rody /
 Scharl / Solbach/ Solomayer / Thomssen / Wöckel

- **Version 2020:**
 Kolberg-Liedtke / Möbus

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

Durchgeführte „Medline“ Suche nach „Surveillance Breast Cancer“ und „Follow up primary breast cancer“ (2018/01-2019/01)

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



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Brustkrebs Nachsorge Ziele

Früherkennung von heilbaren Rezidiven

- Intramammäre Rezidive
- Lokoregionäre Rezidive*

Früherkennung kontralateraler Karzinome

Früherkennung von Metastasen

- Früherkennung symptomatischer Metastasen
- Früherkennung asymptomatischer Metastasen

	Oxford		
	LoE	GR	AGO
1a	B	++	
1a	B	++	
1a	B	++	
3b	C	+	
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. 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):CD001768.
7. NCCN Clinical Practice Guidelines in Oncology, Breast Cancer Version 3.17-10.17;

https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf

Statement: risk factors of mortality after loco-regional recurrence

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.

Brustkrebs Nachsorge Ziele			
	Oxford		
	LoE	GR	AGO
▪ Verbesserung der Lebensqualität	2b	B	+
▪ Verbesserung der körperlichen Leistungsfähigkeit	2a	B	+
▪ Reduktion bzw. zeitnahe Erkennung therapiebedingter Nebenwirkungen (wie z.B. Osteoporose, Herzinsuffizienz, Fatigue, Neuro-toxizität, Lymphödeme, sexuelle Beschwerden, kognitive Einschränkungen, Sterilität, Zweitmalignome) und Veranlassung notwendiger Therapien	2b	B	+
▪ Teilnahme an Interventionsprogrammen in der Nachsorge (z.B. Lifestyle, Therapieadhärenz etc.)	3b	B	+

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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.

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.
9. Baumann FT, Bieck O, Oberste M et al.. Sustainable impact of an individualized exercise program on physical activity level and fatigue syndrome on breast cancer patients in two German rehabilitation centers. *Support Care Cancer.* 2017 Apr;25(4):1047-1054.
10. NCCN-Guidelines Version 1.2017. Cancer-related Fatigue.

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.

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. Janelins 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: 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



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Inhalte und Ziele

Oxford		
LoE	GR	AGO
2b	B	++
5	D	++


- **Evaluation laufender adjuvanter Therapien**
 - inkl. Überprüfung der Adhärenz endokriner Therapien

- **Pro-aktive Verbesserung der Adhärenz anstreben durch:**
 - Patientenaufklärung über die günstigen Daten einer 5- bis 10-jährigen adj. endokrinen Therapie
 - Frühzeitige Therapie von Nebenwirkungen (z.B. Sport-intervention, NSAID, Vitamin D / Calcium-Substitution)

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.



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Inhalte und Ziele

Oxford		
LoE	GR	AGO
4	C	+
2c	B	++
2c	C	+

- **Psychosoziale Aspekte der Beratung**
 - Schwangerschaft, Kontrazeption, Sexualität, Lebensqualität, Menopausensyndrom, Angst vor Rezidiv
 - Einbeziehung von Bezugspersonen (Partner, Familie, Freunde, Betreuer)
- **Zweitmeinung zur Primärtherapie**
- **Allgemeine Beratung (z.B. Genetik, HRT, prophylaktische Operationen, Brustrekonstruktion)**


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, et al: 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

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.

<div>  <h2>Brustkrebs Nachsorge</h2> <h3>Empfohlene Interventionen</h3> </div>			
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Interventionen hinsichtlich Begleiterkrankungen und Lebensstil, um einen negativen Einfluss auf den Krankheitsverlauf zu reduzieren		Oxford	
		LoE	GR AGO
▪ Einstellung Diabetes mellitus (Typ II) (> 25% unerkannter DM bei postmenopausalem MaCa)		5	D ++
▪ Gewichtsintervention (bei BMI <18,5 und >30)		2a	B +
▪ Nächtliche Nahrungskarenz > 13h		2b	B +
▪ Fettreduzierte Diät (mindestens 15 % Kalorienreduktion durch Fett) ist mit einem verbesserten Gesamtüberleben bei HR neg. Patientinnen verbunden		2b	B +
▪ Intervention bei Nikotinabusus (durch Rauchen 2 x erhöhte brustkrebspezifische, 4 x erhöhte nicht-brustkrebspezifische Mortalität)		2b	B ++
▪ Alkoholkonsum reduzieren unter 6 g/d		2b	B +
▪ Moderate Sportintervention bei Bewegungsmangel		1b	A ++
▪ Distress-Reduktion		3b	B +

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.

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.

Weight intervention.

1. Chajès V, Romieu I. Nutrition and breast cancer. Maturitas, 2014; 77 (1): 7–11.

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



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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

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

Routine-Nachsorgeuntersuchungen bei asymptomatischen Patientinnen			
	Oxford		
	LoE	GR	AGO
Untersuchungen			
▪ 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)

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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.
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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.



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Routine-Nachsorgeuntersuchungen bei asymptomatischen Patientinnen

	Oxford		
	LoE	GR	AGO
▪ Routinelabor (inkl. Tumormarker)	1a	A	-
▪ 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.
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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.

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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.

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.
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Statement: Detection of isolated/circulating tumor cells

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Früherkennung von potenziell heilbaren Erkrankungen

Lokoregionäre Rezidive (Thoraxwand, intramammäre Rezidive):

- Inzidenz 7–20 %
(abhängig von der Zeit der Nachbeobachtung)
- Brust-Selbst-Untersuchung
- Klin. Untersuchung, Mammographie & US
- Mamma-MR*

Oxford		
LoE	GR	AGO
5	D	+
1a	A	++
3a	B	+/-

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

Statement incidence


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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.
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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.
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9. 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.

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	<table> <tr> <th rowspan="2"></th><th colspan="3">Oxford</th></tr> <tr> <th>LoE</th><th>GR</th><th>AGO</th></tr> <tr> <td colspan="4">Kontralaterales Mammakarzinom:</td></tr> <tr> <td>▪ Rel. Risiko: 2,5–5</td><td></td><td></td><td></td></tr> <tr> <td>▪ Inzidenz: 0,5–1,0 % / Jahr</td><td></td><td></td><td></td></tr> <tr> <td>▪ Brust-Selbst-Untersuchung</td><td>5</td><td>D</td><td>+</td></tr> <tr> <td>▪ Klin. Untersuchung, Mammographie & US</td><td>1a</td><td>A</td><td>++</td></tr> <tr> <td>▪ Mamma-MR*</td><td>3b</td><td>B</td><td>+/-</td></tr> <tr> <td colspan="4">Männliches Mammakarzinom: Vorgehen analog wie beim Karzinom der Frau**</td></tr> <tr> <td></td><td>5</td><td>D</td><td>+</td></tr> </table> <p>* Bei erhöhtem Risiko erwägen (Alter unter 50 J., HR-, Beurteilbarkeit in MG+US C/D)</p> <p>** S. Kapitel „Brustkrebs: Spezielle Situationen/Männliches Mammakarzinom“</p>				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**					5	D
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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.
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Statement breast self examination


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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.
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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.
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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.
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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.



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Früherkennung von potenziell heilbaren Erkrankungen

Oxford

LoE	GR	AGO
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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.
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Statement: Screening for secondary malignancies according to current guidelines

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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



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Brustkrebs Nachsorge


Synopsis

Empfehlung für asymptomatische Patientinnen
(mod. nach ASCO-ACS Empfehlungen 2016, NCCN 9.2019 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.			inv.: alle 6 Mon.		inv.: alle 12 Mon.
Selbstuntersuchung		monatlich					
Bildgebende Diagnostik, Laboruntersuchungen		indiziert nur bei Symptomatik +/- Befunden +/- Verdacht auf Rezidiv/Metastasen					
Mammo- graphie und ergänzend Sono-graphie	BET**	beidseits: alle 12 Monate					
	Mastektomie	kontralateral alle 12 Monate					

* 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 3.17-10.17;
https://www.nccn.org/professionals/physician_gls/pdf/breast.pdf
5. 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



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Brustkrebs Nachsorge


Dauer und „Breast Nurses“

Oxford		
LoE	GR	AGO
1c	A	++
1c	A	+
2b	B	+/-*

- **Dauer der Nachsorge**
 - Bis zu 5 Jahre
 - Bis zu 10 Jahre
- **Nachsorge durch spezialisierte „Breast nurses“**

* Studien empfohlen

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.
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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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Luminal-like, HER2-positive and Triple-negative Breast Cancer Patients

- **Intrinsic typing of breast cancer leads to subgroups with different course of disease. Thus, postoperative surveillance should be adapted to specific time-dependent hazards of recurrence.**
- **ER-positive patients have stable risk over many years requiring long term surveillance.**
- **However, patients with HER2-positive disease and TNBC have more risk in the early phase of follow-up and should therefore receive more intense surveillance in the first years of follow-up.**

Ribelles et al. BCR 2013

1. Voduc KD, Cheang MC, Tyldesley S et al.: Breast cancer subtypes and the risk of local and regional relapse. J Clin Oncol 2010; 28(10): 1684-91.
2. Ribelles N, Perez-Villa L, Jerez JM et al.: Pattern of recurrence of early breast cancer is different according to intrinsic subtype and proliferation index. Breast Cancer Res 2013;15(5):R98.
3. Metzger-Filho O1, Sun Z, Viale G et al.: Patterns of Recurrence and Outcome According to Breast Cancer Subtypes in Lymph Node–Negative Disease: Results From International Breast Cancer Study Group Trials VIII and IX. J Clin Oncol 2013; 31(25): 3083-3090.
4. Benveniste AP, Dryden MJ, Bedrosian I et al.: Surveillance of women with a personal history of breast cancer by tumour subtype. Clin Radiol. 2017 Mar;72(3):266.e1-266.e6.
5. Chu AJ, Chang JM, Cho NK et al.: Imaging Surveillance for Survivors of Breast Cancer: Correlation between Cancer Characteristics and Method of Detection. J Breast Cancer. 2017 Jun;20(2):192-197.