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Guidelines Breast
Version 2020.1D

FORSCHEN
LEHREN
HEILEN

Diagnostik und Therapie früher und fortgeschrittener Mammakarzinome

Früherkennung und Diagnostik



Früherkennung und Diagnostik

- **Versionen 2005–2019:**
Albert / Blohmer / Fersis / Junkermann /
Maass / Müller-Schimpfle / Scharl / Schreer
- **Version 2020**
Fallenberg / Maass

Screened data bases

Pubmed	2013 - 2019
Medline	2013 - 2019
Cochrane	2013 - 2019

Guidelines

S3 Diagnostik, Therapie und Nachsorge des Mammakarzinoms:

Wöckel A, Festl J, Stüber T et al. Interdisciplinary Screening, Diagnosis, Therapy and Follow-up of Breast Cancer. Guideline of the DGGG and the DKG (S3-Level, AWMF Registry Number 032/045OL, December 2017) - Part 1 with Recommendations for the Screening, Diagnosis and Therapy of Breast Cancer. Geburtshilfe Frauenheilkd. 2018 Oct;78(10):927-948. doi: 10.1055/a-0646-4522. Epub 2018 Oct 19.

Wöckel A, Festl J, Stüber T et al. Interdisciplinary Screening, Diagnosis, Therapy and Follow-up of Breast

Cancer. Guideline of the DGGG and the DKG (S3-Level, AWMF Registry Number 032/045OL, December 2017) - Part 2 with Recommendations for the Therapy of Primary, Recurrent and Advanced Breast Cancer. Geburtshilfe Frauenheilkd. 2018 Nov;78(11):1056-1088. doi: 10.1055/a-0646-4630. Epub 2018 Nov 26.

2015 ACS Update Breast Cancer Screening for women at average risk

IARC Handbook 2016

European Commission 2016

(<http://ecibc.jrc.ec.europa.eu/recommendations/list/3>;Update 24.11.2016, Abruf 20122016)

Screened: Metaanalyses/ Systematic reviews / RCT / Cohort studies

Früherkennung bei asymptomatischen Frauen Mammographie (normales Risiko)

Alter	Intervall (Monate)	Oxford		AGO
		LOE	GR	
< 40	na	-	-	--
40–49	12–24	1b	B	+
50–69*	24	1a	A	++
70–74	24	1a	A	++
> 75**	24	4	C	+

* Nationales Mammographie-Screening-Programm

** Abhängig von Gesundheitszustand + Lebenserwartung mehr als 10 Jahre

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17. Paap E, Verbeek ALM, Botterweck AAM et al.: Breast cancer screening halves the risk of breast cancer death: A case referent study. The Breast 2014;23:439-444
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Tomosynthese

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Radiation Dose

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Mammography density assessment

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Früherkennung bei asymptomatischen Frauen Tomosynthese

	LOE	Oxford GR	AGO
Digitale Tomosynthese (DBT+/-DM)*	2a	B	+
Ersatz der DM durch synthetische DM+DBT**	3b	B	+

Es muss immer auch der komplette Datensatz der Tomosyntheseschichten zur Beurteilung zur Verfügung stehen, die alleinige synthetische Mammographie ist nicht ausreichend

* Sign. höhere Sensitivität, heterogene Spezifität und höhere Kosten [Gerät, Befunder, Archivierung] im Vgl. zur digitalen Mammographie;)

** Evaluation für D in laufender prospektiver Studie (TOSYMA)

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Brustkrebs Mortalitätsreduktion

Metaanalysen	RR 95%CI
Independent UK Panel, 2012	
13-year metaanalysis	0.80 (0.73–0.89)
Cochrane Review, 2011	
Fixed-effect metaanalysis of 9 RCT-trials	0.81 (0.74–0.87)
As above, but excluding women <50 years	0.77 (0.69–0.86)
Canadian Task Force, 2011	
Women aged 50–69 years	0.79 (0.68–0.90)
Duffy et al, 2012	
Review of all trials and age groups	0.79 (0.73–0.86)

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Brustkrebs Mortalitätsreduktion		
Metaanalyses		RR 95%CI
Case-Control Studies		
Broeders et al	Screening Mx	0.46 (0.4 – 0.54)
	Corr. for self selection	0.52 (0.42–0.65)
	Invited for screening	0.69 (0.57–0.83)
Incidence-based Mortality Studies		
Broeders et al	Screening Mx	0.62 (0.56–0.69)
	Invited to screening	0.75 (0.69–0.81)
Randomized Clinical Trials		
Gotsche and Jorgenson	Screening Mx	0.81 (0.74–0.87)
ECIBC		
	Screening MX	
	45-49	0.88 (0.76 - 1.02)
	50-69	0.77 (0.66 - 0.90)
	70-75	0.77 (0.54 - 1.09)

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Breast cancer mortality reduction

1. Morrell S, Taylor R, Roder D, et al. Mammography service screening and breast cancer mortality in New Zealand: a National Cohort Study 1999-2011. Br J Cancer. 2017 Mar 14;116(6):828-839
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Int J Cancer. 2017 Aug 15;141(4):671-677

4. Beau AB, Lynge E, Njor SH, et al. Benefit-to-harm ratio of the Danish breast cancer screening programme Int J Cancer. 2017 Aug 1;141(3):512-518.
5. <https://healthcare-quality.jrc.ec.europa.eu/>

Brustkrebsinzidenz und Mortalität

- Annual incidence of breast cancer and mortality in the EU (GLOBOCAN 2012)

Age	Incidence/1000	Mortality/1000
40 to 44	1,2	0,1
45 to 49	1,7	0,2
50 to 69	2,7	0,5
70 to 74	3,0	0,8

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Mammographie-Screening Vor- und Nachteile

Grundgesamtheit: per 10.000 gescreeente Frauen über 10 Jahre
Breast Cancer Surveillance Consortium Registry Data

Lebensjahr	40-49	50-59	60-69	70-74
Vermiedene Brustkrebstodesfälle (CI95%)	3 (0-9)	8 (2-17)	21 (11-32)	13 (0-32)
Falsch-positive Fälle (n)	1212	932	808	696
Brustbiopsien (n)	164	159	165	175
Falsch-negative Fälle (n)	10	11	12	13

Siu AL on behalf of the USPSTF 2016, 164:279-296

Siu AL, on behalf of the U.S. Preventive Services Task Force

Screening for Breast Cancer: U.S. Preventive Services Task Force

Recommendation Statement. Ann Internal Med 2016 vol 164: 279-296

Früherkennung Sonographie /MRT

	Oxford		
	LoE	GR	AGO
▪ Screening-Mammasonographie alleine	5	D	--
▪ Autom. 3D-Sonographie	3a	C	--
▪ Mammasonographie als Ergänzung bei:			
▪ Dichtem Parenchym (inhomogen dicht-extrem dicht)	2a	B	++
▪ Erhöhtem Risiko	1b	C	++
▪ Mammographischer Läsion	2b	B	++
▪ Zur Abklärung susp. Läsionen im MRT	2b	C	++
▪ MRT bei neg. MG und extrem dichter Brust* 50-75 J	1b	B	+

* Definition von extrem dicht entspricht BIRADS-Dichtekategorie D inhomogen dicht Kategorie C nach ACR BI-RADS-Atlas 5. ed. 2013

Breast ultrasound as an adjunct to screening mammography

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ABUS/AVUS

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US-Screening

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2. Health Quality Ontario. Ultrasound as an Adjunct to Mammography for Breast Cancer Screening: A Health Technology Assessment. Ont Health Technol Assess Ser. 2016 Jul 1;16(15):1-71.
3. Ohuchi, N, Suzuki, A, Sobue, T et al. Sensitivity and specificity of mammography and adjunctive ultrasonography to screen for breast cancer in the Japan Strategic Anti-cancer Randomized Trial (J-START): a randomised controlled trial. Lancet. 2015; 387: 341–348
4. Evans A, Trimboli RM, Athanasiou A, et al.: Breast ultrasound: recommendations for information to women and referring physicians by the European Society of Breast Imaging. European of Breast Imaging (EUSOBI) , with language review by Europa Donna—The European Breast Cancer Coalition. Insights Imaging. 2018 Aug;9(4):449-461. doi: 10.1007/s13244-018-0636-z. Epub 2018 Aug 9.

Dense Breast

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4. Health Quality Ontario. Ultrasound as an Adjunct to Mammography for Breast Cancer Screening: A Health Technology Assessment.
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7. Evans A, Trimboli RM, Athanasiou A, et al.: Breast ultrasound: recommendations for information to women and referring physicians by the European Society of Breast Imaging.European of Breast Imaging (EUSOBI) , with language review by Europa Donna–The European Breast Cancer Coalition. Insights Imaging. 2018 Aug;9(4):449-461. doi: 10.1007/s13244-018-0636-z. Epub 2018 Aug 9.
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Elevated Risk

1. Berg WA, Zhang Z, Lehrer D, et al. Detection of breast cancer with addition of annual screening ultrasound or a single screening MRI to mammography in women with elevated breast cancer risk. JAMA. 2012;307(13):1394–1404.
2. Berg WA, Blume JD, Adams AM, et al. Reasons women at elevated risk of breast cancer refuse breast MRI imaging screening: ACRIN 6666. Radiology. 2010;254(1):79–87.
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5. Evans A, Trimboli RM, Athanasiou A, et al.: Breast ultrasound: recommendations for information to women and referring physicians by the European Society of Breast Imaging.European of Breast Imaging (EUSOBI) , with language review by Europa Donna–The European Breast Cancer Coalition. Insights Imaging. 2018 Aug;9(4):449-461. doi: 10.1007/s13244-018-0636-z. Epub 2018 Aug 9.

Recommendations International

1. Oeffinger KC, Fontham ETH, Etzioni R, et al. Breast Cancer Screening for women at average risk. 2015 Guideline Update from the American Cancer Society (ACR). JAMA 2015; 314:1599-1614
2. Lauby-Secretan B, Scoccianti C, Loomis D, et al; International Agency for Research on Cancer Handbook Working Group: Breast-cancer screening–viewpoint of the IARC Working Group. N Engl J Med 2015;372:2353-2358

3. IACR Handbook 2016: Website for the IARC publications: <http://publications.iarc.fr/Book-And-Report-Series/iarc-Handbooks-Of-Cancer-Prevention/Breast-Cancer-Screening-2016>
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5. Evans A, Trimboli RM, Athanasiou A et al.: Breast ultrasound: recommendations for information to women and referring physicians by the European Society of Breast Imaging.European of Breast Imaging (EUSOBI) , with language review by Europa Donna–The European Breast Cancer Coalition. Insights Imaging. 2018 Aug;9(4):449-461. doi: 10.1007/s13244-018-0636-z. Epub 2018 Aug 9.

MRI-Screening:

1. M. F. Bakker, S. V. de Lange, R. M. Pijnappel, et al (2019). "Supplemental MRI Screening for Women with Extremely Dense Breast Tissue." N Engl J Med **381**(22): 2091-2102.

Früherkennung Klinische Untersuchung

Als alleinige Untersuchung

- Selbstuntersuchung
 - Klinische Untersuchung (CBE) durch ärztliches Personal
 - CBE wegen mammo-/sonographischer Läsion
- CBE in Kombination mit Bildgebung

Oxford		
LoE	GR	AGO
1a	A	-*
3b	C	-*
5	D	++
BCP		++

* Kann Brust-Bewußtsein erhöhen

1. Bancej C, Decker K, Chiarelli A, et al. Contributions of clinical breast examination to mammography screening in the early detection of breast cancer, J Med Screen 2003; 10: 16-21
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J Nat Cancer Inst 2002; 94 (19): 14445-1457

8. Oeffinger KC, Fontham ETH, Etzioni R, et al. Breast Cancer Screening for women at average risk. 2015 Guideline Update from the American Cancer Society (ACR). JAMA 2015; 314:1599-1614
9. Lehman CD, Lee AY, Lee CI. Imaging Management of palpable breast abnormality.Review. AJR 2014;203:1142-1153

Abklärung von Symptomen

	Oxford		
	LoE	GR	AGO
■ Klinische Untersuchung	3b	B	++
■ Mammographie	1b	A	++
■ Tomosynthese	2b	B	+
■ Alleine oder zus. Kontrastmittel mammographie	3a	B	+/-
■ Sonographie	2b	B	++
■ Elastographie (Shear wave)*	2b	B	+
■ Automat. 3D-Sonographie	3b	B	+/-
■ Minimalinvasive Biopsie	1b	A	++
■ MRT**	3b	B	+

* Zusatzuntersuchung

** Wenn klinische, mammographische und sonographische Diagnostik inkl. Nadelbiopsie keine endgültige Diagnose erlauben.

Combined DM + DBT + US + MRI

1. Mariscotti G, Houssami N, Durando M, et al. Accuracy of mammography, digital breast tomosynthesis, ultrasound and MR imaging in preoperative assessment of breast cancer. Anticancer Res. 2014 Mar;34(3):1219-25.
2. Campanino PP, Ruggieri C, Regini E, et al. Accuracy of mammography, digital breast tomosynthesis, ultrasound and MR imaging in preoperative assessment of breast cancer. Anticancer Res. 2014 Mar;34(3):1219-25.

US-Axilla +FNA/CNB

1. Diepstraten SC, Sever AR, Buckens CFM, et al. Value of preoperative ultrasound guided lymphnode biopsy for preventing completion axillary lymphnode dissection in breast cancer: a systematic review and meta-analysis. Ann Surg Oncol 2014;21:51-59
2. Evans A, Rauchhaus P, Whelehan P, et al. Does shear wave ultrasound independently predict axillary lymph node metastasis in women with invasive breast cancer? Breast Cancer Res Treat. 2013 Dec 4.

[Epub ahead of print]

3. Feng Y, Huang R, He Y, et al. Efficacy of physical examination, ultrasound, and ultrasound combined with fine-needle aspiration for axilla staging of primary breast cancer. *Breast Cancer Res Treat*. 2015 Feb;149(3):761-5. doi: 10.1007/s10549-015-3280-z. Epub 2015 Feb 10.
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Biopsie

1. Chan KY, WiseberdFirtell, J, Jois HSR, et al. Localisation techniques for guided surgical excision of non-palpable breast lesions. *Cochrane Database of Systematic reviews* 2015;vol 12
2. Lourenco AP, Mainiero MB Incorporating imaging into the locoregional management of breast cancer. *Semin Radiat Oncol* 2016;26(1)
3. Mariscotti G, Houssami N, Durando M, et al. Accuracy of mammography, digital breast tomosynthesis, ultrasound and MR imaging in preoperative assessment of breast cancer. *Anticancer Res*. 2014 Mar;34(3):1219-25.

MRT

1. Mann RM, Loo CE, Wobbes T et al The impact of preoperative MRI on the re-excision rate in invasive lobular carcinoma of the breast. *Breast Cancer Res Treat* 2010; 119: 415-422
2. Houssami N, Turner R, Morrow M. Preoperative magnetic resonance imaging in breast cancer: meta-analysis of surgical outcomes. *Ann Surg*. 2013 Feb;257(2):249-55.
3. Debald M, Abramian A, Nemes L, et al. Who may benefit from preoperative MRI? A single-center analysis of 1102 consecutive patients with primary breast cancer. *Breast Cancer Res Treat* 2015;153(3):531-537

4. Arnaut A, Catley C, Booth CM, et al. Use of preoperative Magnetic Resonance Imaging for breast cancer: A Canadian population-based study. *JAMA Oncol* 2015;1(9):1238-1250
5. Fancellu A, Turner RM, Dixon JM, et al. Metaanalysis of the effect of preoperative MRI on the surgical management of ductal carcinoma in situ. *Brit J Surg* 2015;192(8):883-893
6. Houssami N, Turner R, Macaskill P, et al. An individual person data meta-analysis of preoperative magnetic resonance imaging and breast cancer recurrence. *J Clin Oncol* 2014;32(5):392-401
7. Vos EL, Voogd AC, Verhoef C, et al. Benefits of preoperative MRI in breast cancer surgery studied in a large population-based cancer registry. *Br J Surg* 2015;102(13):1649-1657
8. Lehman CD, Lee JM, DeMartini WS, et al. Screening MRI in women with a personal history of breast cancer. *J Natl Cancer Inst* 2016;108(3)
9. Wang SY, Long JB, Killelea BK, et al. Preoperative breast MRI and contralateral breast cancer occurrence among older women with breast cancer. *J Clin Oncol* 2015;Nov 30, epub ahead of print
10. Riedl CC, Luft N, Clemens B, et al. Triple-modality screening trial for familial breast cancer underlines the importance of magnetic resonance imaging and questions the role of mammography and ultrasonography regardless of patient mutation status, age and breast density. *JCO* 2015;33(10):1128-1135
11. El Sharouni M, Postma EL, Menezes GLG et al. High prevalence of MRI-detected contralateral and ipsilateral malignant findings in patients with invasive ductolobular breast cancer: Impact on surgical management. *Clin Breast Cancer*. 2016 Aug;16(4):269-75.
12. Vriens BE, de Vries B, Lobbes MB, et al. Ultrasound is at least as good as magnetic resonance imaging in predicting tumour size post-neoadjuvant chemotherapy in breast cancer. *Eur J Cancer*. 2016 Jan;52:67-76.
13. Health Quality Ontario. Magnetic Resonance Imaging as an Adjunct to Mammography for Breast Cancer Screening in Women at Less Than High Risk for Breast Cancer: A Health Technology Assessment. *Ont Health Technol Assess Ser*. 2016; Nov 1;16(20):1-30
14. Lobbes MB, Vriens IJ, van Bommel AC, et al. Breast MRI increases the number of mastectomies for ductal cancers, but decreases them for lobular cancers. *Breast Cancer Res Treat*. 2017;162:353-364.
15. Houssami N, Turner RM, Morrow M. Meta-analysis of pre-operative magnetic resonance imaging (MRI) and surgical

treatment for breast cancer. Breast Cancer Res Treat. 2017 Sep;165(2):273-283

16. Achim Wöckel, Jasmin Festl, Tanja Stüber, et al: Interdisciplinary Screening, Diagnosis, Therapy and Follow-up of Breast Cancer. Guideline of the DGGG and the DKG (S3-Level, AWMF Registry Number 032/045OL, December 2017) – Part 1 with Recommendations for the Screening, Diagnosis and Therapy of Breast Cancer. Geburtshilfe Frauenheilkd. 2018 Oct; 78(10): 927–948.

Reviews CESM:

1. Dromain, C., N. Vietti-Violi, and J.Y. Meuwly, Angiomammography: A review of current evidences. Diagn Interv Imaging, 2019.
2. Patel, B.K., M.B.I. Lobbes, and J. Lewin, Contrast Enhanced Spectral Mammography: A Review. Semin Ultrasound CT MR, 2018. **39**(1): p. 70-79.
3. Tagliafico, A.S., et al., Diagnostic performance of contrast-enhanced spectral mammography: Systematic review and meta-analysis. Breast, 2016. **28**: p. 13-9.
4. Zhu, X., et al., Diagnostic Value of Contrast-Enhanced Spectral Mammography for Screening Breast Cancer: Systematic Review and Meta-analysis. Clin Breast Cancer, 2018. **18**(5): p. e985-e995.

CESM Originalarbeiten:

1. Luczynska, E., et al., Comparison of the Mammography, Contrast-Enhanced Spectral Mammography and Ultrasonography in a Group of 116 patients. Anticancer Res, 2016. **36**(8): p. 4359-66.
2. Fallenberg, E.M., et al., Contrast-enhanced spectral mammography: Does mammography provide additional clinical benefits or can some radiation exposure be avoided? Breast Cancer Res Treat, 2014. **146**(2): p. 371-81.
3. Tennant, S.L., et al., Contrast-enhanced spectral mammography improves diagnostic accuracy in the symptomatic setting. Clin Radiol, 2016. **71**(11): p. 1148-55.
4. Fallenberg, E.M., et al., Contrast-enhanced spectral mammography vs. mammography and MRI - clinical performance in a multi-reader evaluation. Eur Radiol, 2017. **27**(7): p. 2752-2764.

5. Jochelson, M.S., et al., Comparison of screening CEDM and MRI for women at increased risk for breast cancer: A pilot study. *Eur J Radiol*, 2017. **97**: p. 37-43.
6. Kim, E.Y., et al., Diagnostic Value of Contrast-Enhanced Digital Mammography versus Contrast-Enhanced Magnetic Resonance Imaging for the Preoperative Evaluation of Breast Cancer. *Journal of breast cancer*, 2018. **21**(4): p. 453-462.
7. Patel, B.K., et al., Value Added of Preoperative Contrast-Enhanced Digital Mammography in Patients With Invasive Lobular Carcinoma of the Breast. *Clin Breast Cancer*, 2018. **18**(6): p. e1339-e1345.

Prätherapeutische Mamma- und Axilladiagnostik

- Klinische Untersuchung
- Mammographie
 - + Tomosynthese
 - + Kontrastmittelmammographie
- Sonographie (Mamma und Axilla)
- MRT*
- Minimalinvasive Biopsie Mamma** (CNB, VAB)
 - Axilla CNB, wenn auffälliger LK-Befund
- Mamma-CT

Oxford		
LoE	GR	AGO
5	D	++
2b	B	++
2a	B	+
3a	B	+/-
2b	B	++
1b	B	+
1b	A	++
2b	B	++
5	D	-

* Die Möglichkeit der MRT-gestützten Biopsie ist Voraussetzung für die MRT-Untersuchung. MRT erwägen bei hohem familiären Risiko, eingeschränkter Beurteilbarkeit in MG & US (Beurteilbarkeit C/D), invasiv lobulärem Karzinom. Keine Reduktion der Nachresektionsrate.

** Histologische Sicherung von Zusatzbefunden im Fall therapeutischer Relevanz.

Combined DM + DBT + US + MRI

1. Mariscotti G, Houssami N, Durando M, et al. Accuracy of mammography, digital breast tomosynthesis, ultrasound and MR imaging in preoperative assessment of breast cancer. Anticancer Res. 2014 Mar;34(3):1219-25.
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in a multi-reader evaluation. Eur Radiol, 2017. **27**(7): p. 2752-2764.

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MRT: Präoperatives Staging

- 9 ausgewählte Studien
(2 randomisiert; 7 Kohortenstudien)
- 3112 Patientinnen mit Mammakarzinom
- MRT versus kein-MRT:
 - Initiale Mastektomie 16,4% versus 8,1%
[OR, 2,22 (P < 0,001); adjusted OR, 3,06 (P < 0,001)]
 - Nachresektion nach initialer BET 11,6% versus 11,4%
[OR, 1,02 (P = 0,87); adjustiert OR, 0,95 (P = 0,71)]
 - Gesamt Mastektomie 25,5% versus 18,2%
[OR, 1,54 (P < 0,001); adjustierte OR, 1,51 (P < 0,001)]

N Houssami et al. Ann Surg 2013; 257

1. Houssami N, Turner R, Morrow M. Preoperative magnetic resonance imaging in breast cancer: meta-analysis of surgical outcomes. Ann Surg. 2013 Feb;257(2):249-55.
2. Houssami N, Turner RM, Morrow M. Meta-analysis of pre-operative magnetic resonance imaging (MRI) and surgical treatment for breast cancer. Breast Cancer Res Treat. 2017 Sep;165(2):273-283
3. Houssami N, Turner R, Macaskill P, et al. An individual person data meta-analysis of preoperative magnetic resonance imaging and breast cancer recurrence. J Clin Oncol 2014;32(5):392-401

MRT: Präoperatives Staging bei Lobular Invasive Breast Cancer

- **766 patients with invasive lobular cancer (ILC)**
 - Initial mastectomy: 31.1% versus 24.9%
[OR, 1.36 (P = 0.056); adjusted OR, 2.12 (P = 0.008)]
 - Re-excision after initial breast conservation 10.9% versus 18.0%
[OR, 0.56 (P = 0.031); adjusted OR, 0.56 (P = 0.09)]
 - Overall mastectomy 43.0% versus 40.2%
[OR, 1.12 (P = 0.45); adjusted OR, 1.64 (P = 0.034)]

N Houssami et al. Ann Surg 2013; 257

1. Houssami N, Turner R, Morrow M. Preoperative magnetic resonance imaging in breast cancer: meta-analysis of surgical outcomes. Ann Surg. 2013 Feb;257(2):249-55. doi: 10.1097/SLA.0b013e31827a8d17.
2. El Sharouni M, Postma EL, Menezes GLG, et al. High prevalence of MRI-detected contralateral and ipsilateral malignant findings in patients with invasive ductolobular breast cancer: Impact on surgical management. Clin Breast Cancer. 2016 Aug;16(4):269-75.
3. Menezes GL, van den Bosch MA, et al. Invasive ductolobular carcinoma of the breast: spectrum of mammographic, ultrasound and magnetic resonance imaging findings correlated with proportion of the lobular component. Springerplus. 2013 Nov 20;2:621. doi: 10.1186/2193-1801-2-621.

MRT und DCIS

Studie	Anzahl Unter- suchungen	Zuverlässig- keit (%)	Sensiti- vität (%)	Spezifität (%)
Gilles et al 1996	172	70	95	51
Westerhof et al 1998	63	56	45	72
Bazzocchi et al 2006	112	80	79	68
Kuhl et al 2007	75	-	88	-
Baur et al. 2013	58		79,3	

„Ein negativer MRT-Befund kann nicht als Beweis für Gutartigkeit gewertet werden.“

1. Bazzocchi M, Zuiani C, Panizza P, et al. Contrast-enhanced breast MRI in patients with suspicious microcalcifications on mammography; results of a multicenter trial. AJR Am J Roentnol. 2006; 186 (6): 1723-32
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Sensitivities CESM

Author	n	MG	CESM	MRI	US	Analyse
Dromain 2011	110	78	92			Per patient
Fallenberg 2014	118	77.9	94.7			Per patient
Mokhtar 2014	60	93.2	97.7			Per patient
Lobbes 2014*	113	96.9	100			Per patient
Perez 2015 ECR	98		78		66	Per lesion
Luczinska 2014	152	91	100			
Jochelson 2012	52	81 59	96 83	96 93		Per patient Per lesion
Fallenberg 2013	80	81	100	97		Per patient
Fallenberg 2016	155	81 55	94 72	95 76		Index Per Lesion
Lalji 2016*	199	93	96.9			Per patient 10 reader
Tennant 2016	100	84	95			
Luczynska 2016	116	90	100		92	

* Recall from Screening

CESM is comparable to MRI regarding index, a bit inferior for additional lesions

Prätherapeutisches Staging

	Oxford		
	LoE	GR	AGO
▪ Anamnese und klinische Untersuchung	5	D	++
Nur bei hohem Risiko für Fernmetastasen und / oder Symptomen oder bei geplanter Entscheidung zur (neo-)adjuvanten Chemo-/Antikörpertherapie:			
▪ CT Thorax/Abdomen	2a	B	+
▪ Skelettszintigraphie	2b	B	+
▪ Röntgen-Thorax	5	C	+/-
▪ Leberultraschall	5	D	+/-
▪ Weiterführende Diagnostik je nach Befund (z.B. Leber-MRT/CEUS*/Biopsie etc.)	2a	B	+
▪ FDG-PET oder FDG-PET /CT	3a	C	+/-
▪ Ganzkörper MRT	4	C	+/-

* Contrast enhanced ultrasound

Statement: history and physical examination

1. GCP

Statement: high metastatic potential / symptoms

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