Diagnosis and Treatment of Patients with early and advanced Breast Cancer

Guidelines Breast
Version 2019.1

Ductal Carcinoma in Situ (DCIS)

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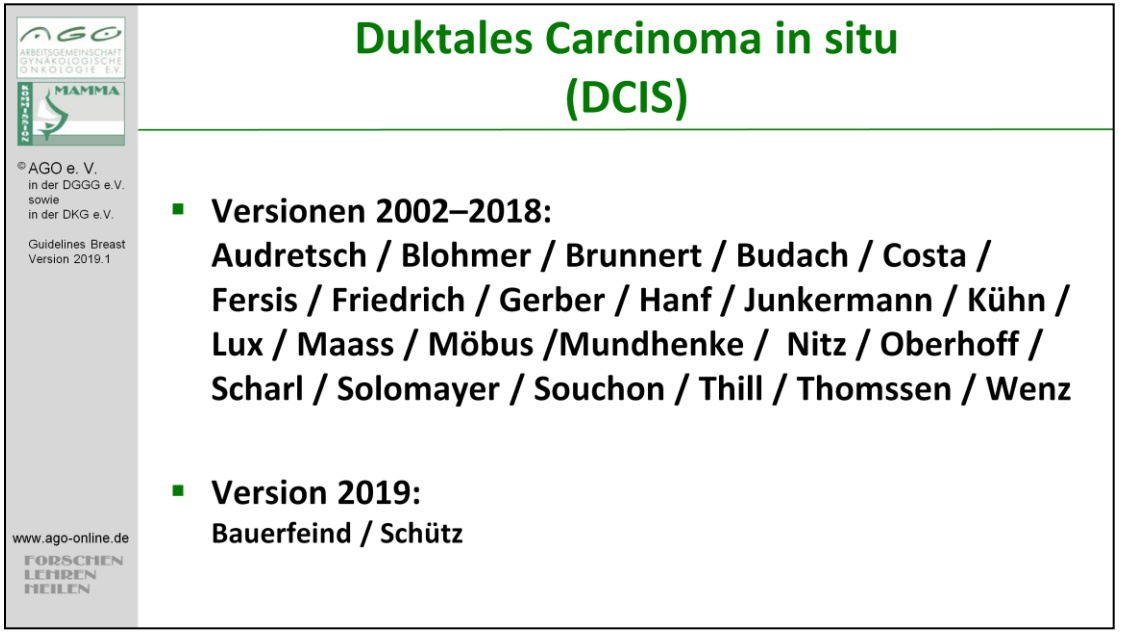


Mammographie

Vergrößerungsaufnahmen von Mikroverkalkungen

Steigerung der Detektionsrate von G1/G2 DCIS durch digitale Mammographie (versus konventionell)

1. D'Orsi C: (2010) "Imaging for the Diagnosis and Management of Ductal Carcinoma In Situ" J Natl Cancer Inst Monogr (41) 214 – 217
2. Allegra CJ, Alberle DR, Ganschow P et al. National Institutes of Health State-of-the –Science Conference Statement: Diagnosis and Management of Ductal Carcinoma in Situ September 22-24,2009. JNCI 2009;102:161-169
3. Allen L, Lago_Toro C, Hughes JH et al. Is there a role for preoperative assessment of patients with DCIS? Ann Surg 2010; 17: 2395-2400
4. Farshid G, Sullivan T, Downey P et al. Independent predictors of breast malignancy in screen-detected microcalcifactions: biopsy results in 2545 cases. Br J Cancer 2011; 105: 1669 – 1675
5. Hayward L, Oeppen RS, Grima AV, et al. The influence of clinicopathological features on the predictive accuracy of conventional breast imaging in determining the extent of screen-detected high-grade pure ductal carcinoma in situ. Ann R Coll Surg Engl 2011; 93:385-390

6. Lee RJ, Vallow LA, McLaughlin SA, Tzou KS, Hines SL, Peterson J et al. . Ductal carcinoma in situ of the breast. Int J Surg Oncol. 2012;2012:123549. doi:10.1155/2012/123549. Epub 2012 Jul 18.
7. Nederend J, Duijm LE, Louwman MW, et al. Impact of transition from analog screening mammography to digital screening mammography on screening outcome in The Netherlands: a population-based study. Ann Oncol. 2012 Dec;23(12):3098-103. doi: 10.1093/annonc/mds146. Epub 2012 Jun 27.
8. Badruddoja M. Ductal carcinoma in situ of the breast: a surgical perspective. Int J Surg Oncol. 2012;2012:761364. doi: 10.1155/2012/761364. Epub 2012 Sep 4.
9. Lynge E, Ponti A, James T, et al. ICSN DCIS Working group. Variation in detection of ductal carcinoma in situ during screening mammography: A survey within the International Cancer Screening Network. Eur J Cancer. 2014 Jan;50(1):185-92. doi: 10.1016/j.ejca.2013.08.013. Epub 2013 Sep 13.

Stereotaktische Stanzbiopsie / Vakuumbiopsie (VAB)

1. Houssami, N, D Ambrogetti et al. Accuracy of a Preoperative Model for Predicting Invasive Breast Cancer in Women with Ductal Carcinoma-in-situ on Vacuum-Assisted Core Needle Biopsy. Ann Oncol 2011;18(5):1364-71

Präparateradiographie

Setzen eines Markierungsclips in der Biopsieregion, wenn die Läsion komplett entfernt wurde

MRT zur Festlegung der Ausdehnung

1. Kim do, Y., W. K. Moon, et al. (2007). "MRI of the breast for the detection and assessment of the size of ductal carcinoma in situ." Korean J Radiol 8(1): 32-39.
2. Marcotte-Bloch, C., C. Balu-Maestro, et al. (2009). "MRI for the size assessment of pure ductal carcinoma in situ (DCIS): A prospective study of 33 patients." Eur J Radiol.
3. Neira, P., B. Aguirre, et al. (2009). "[Breast MRI--histologic correlation for ductal carcinoma in situ]." Radiologia 51(4): 396-402.
4. Onesti, J. K., B. E. Mangus, et al. (2008). "Breast cancer tumor size: correlation between magnetic resonance imaging and pathology

measurements." Am J Surg 196(6): 844-848; discussion 849-850.

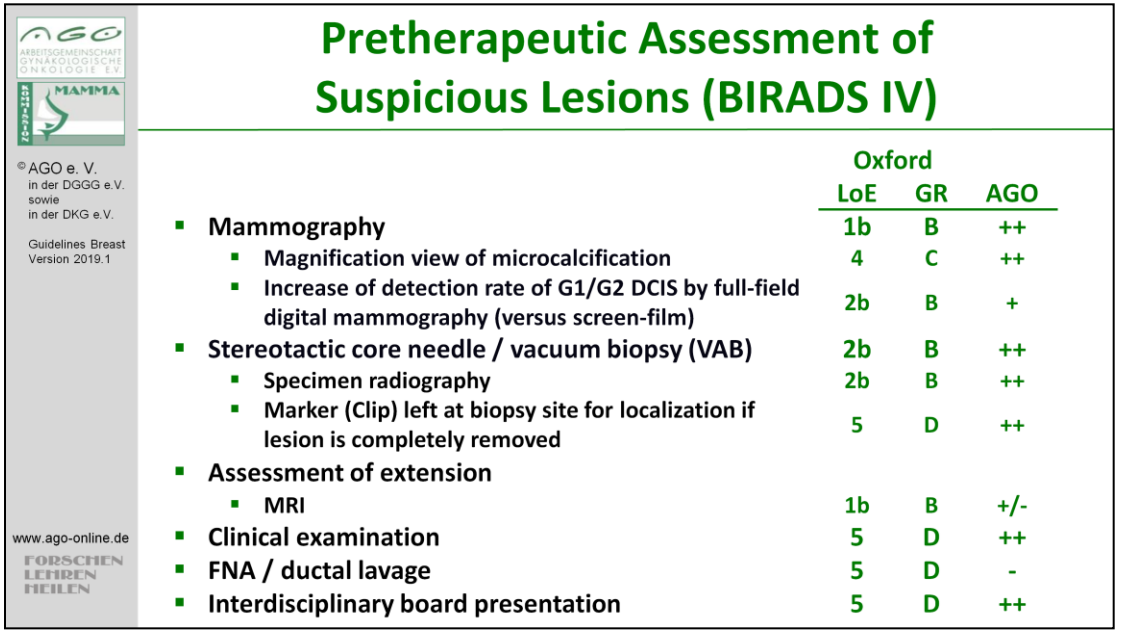
5. Schouten van der Velden, A. P., C. Boetes, et al. (2009). "Magnetic resonance imaging in size assessment of invasive breast carcinoma with an extensive intraductal component." BMC Med Imaging 9: 5.
6. Schouten van der Velden, A. P., M. S. Schlooz-Vries, et al. (2009). "Magnetic resonance imaging of ductal carcinoma in situ: what is its clinical application? A review." Am J Surg 198(2): 262-269.
7. Vag, T., P. A. Baltzer, et al. (2008). "Diagnosis of ductal carcinoma in situ using contrast-enhanced magnetic resonance mammography compared with conventional mammography." Clin Imaging 32(6): 438-442.
8. Vanderwalde LH, Dang CM, Bresee C et al. Discordance between pathologic and radiologic tumor size on breast MRI may contribute to increased re-excision rates. Am Surg 2011; 77(10):1361-3.
9. Itakura K, Lessing J, Sakata T, et al. The Impact of Preoperative Magnetic Resonance Imaging on Surgical Treatment and Outcomes for Ductal carcinoma In Situ. Clin Breast Cancer 2011; 11: 33-38.
10. Mossa-Basha M, Fundaro GM, Shah BA, et al. Ductal carcinoma in Situ of the Breast: MR Imaging Findings with Histopathologica Correlation. RadioGraphics 2010; 30: 1673-1687
11. Warner E, Causer PA, Wong J, et al. Improvement in DCIS Detection Rates by MRI over Time in a High Risk Breast Screening Study. The Breast Journal 2011; 17: 9-17
12. Liu H, Peng W. MRI morphological classification of ductal carcinoma in situ correlating with different biological behavior. Eur J Radiol. 2012 Feb;81(2):214-7
13. Stehouwer BL, Merckel LG, Verkooijen HM, et al. 3-T breast magnetic resonance imaging in patients with suspicious microcalcifications on mammography. Eur Radiol. 2013 Sep 29. [Epub ahead of print]
14. Miyashita M, Amano G, Ishida T, et al.The clinical significance of breast MRI in the management of ductal carcinoma in situ diagnosed on needle biopsy. Jpn J Clin Oncol. 2013 Jun;43(6):654-63.
15. Pilewskie M, Kennedy C, Shappell C, et al. Effect of MRI on the management of ductal carcinoma in situ of the breast. Ann Surg Oncol. 2013 May;20(5):1522-9. doi: 10.1245/s10434-012-2771-y. Epub 2012 Dec 7.
16. Baur A, Bahrs SD, Speck S, et al. Breast MRI of pure ductal carcinoma in situ: sensitivity of diagnosis and influence of lesion characteristics. Eur J Radiol. 2013 Oct;82(10):1731-7.

17. A. Fancellu et al: Meta-analysis of the effect of preoperative breast MRI on the surgical management of ductal carcinoma in situ BJS 2015; 102:883-893
18. E.L. Voss et al: Benefits of preoperative MRI in breast cancer surgery studied in a large population-based cancer registry. BJS 2015: 102; 1649-1657.

Klinische Untersuchung

Feinnadelpunktion / duktale Lavage

Interdisziplinäre Tumorboard-Präsentation



Pretherapeutic Assessment of Suspicious Lesions (BIRADS IV)

	Oxford LoE	Oxford GR	AGO
▪ Mammography	1b	B	++
▪ Magnification view of microcalcification	4	C	++
▪ Increase of detection rate of G1/G2 DCIS by full-field digital mammography (versus screen-film)	2b	B	+
▪ Stereotactic core needle / vacuum biopsy (VAB)	2b	B	++
▪ Specimen radiography	2b	B	++
▪ Marker (Clip) left at biopsy site for localization if lesion is completely removed	5	D	++
▪ Assessment of extension			
▪ MRI	1b	B	+/-
▪ Clinical examination	5	D	++
▪ FNA / ductal lavage	5	D	-
▪ Interdisciplinary board presentation	5	D	++

Mammographie

Li J, Zhang H, Jiang H, Guo X et al. Diagnostic Performance of Digital Breast Tomosynthesis for Breast Suspicious Calcifications From Various Populations: A Comparison With Full-field Digital Mammography. Comput Struct Biotechnol J. 2018 Dec 20;17:82-89.

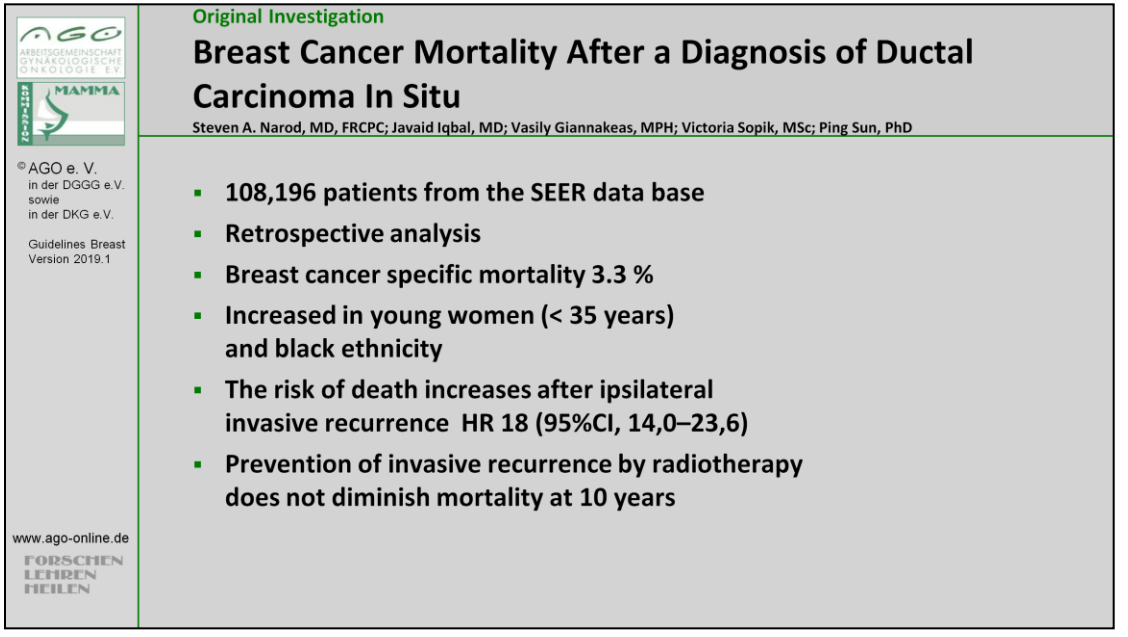
Präoperatives MRT hat keinen Einfluss auf die LRR und das OS

1. 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;123(8):1324-1332.
2. Ryan R, Tawfik O, Jensen RA et al. . Current Approaches to Diagnosis and Treatment of Ductal Carcinoma In Situ and Future Directions. Prog Mol Biol Transl Sci. 2017;151:33-80.
3. Preibsch H, Beckmann J, Pawlowski J et al. Accuracy of Breast Magnetic Resonance Imaging Compared to Mammography in the Preoperative Detection and Measurement of Pure Ductal Carcinoma In Situ: A Retrospective Radiol. 2018 Aug 24. pii: S1076-6332(18)30383-0.
4. So A, De La Cruz LM, Williams AD et al. impact of preoperative magnetic resonance imaging and lumpectomy cavity shavings on re-

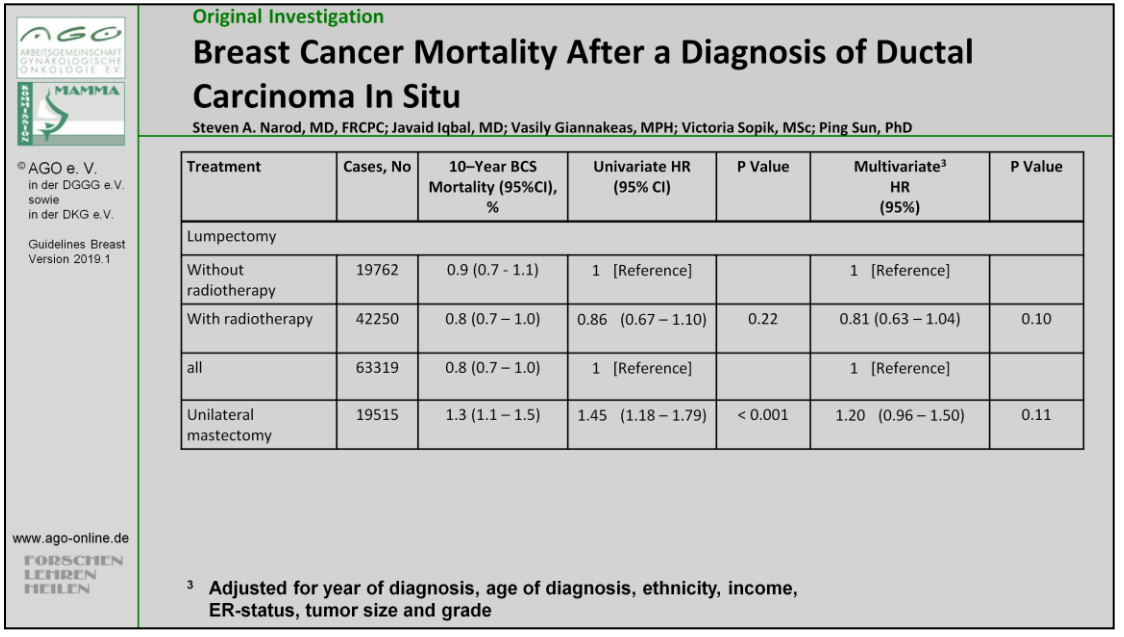
excision rate in pure ductal carcinoma in situ-A single institution's experience. J Surg Oncol. 2018 Mar;117(4):558-566.

Molecular Subtyping

1. Nofech-Mozes S, Hanna W, Rakovitch E. Molecular Evaluation of Breast Ductal Carcinoma in Situ with Oncotype DX DCIS. Am J Pathol. 2018 Dec 31. pii: S0002-9440(18)30581-9.



1. Steven A. Narod, MD, FRCPC; Javaid Iqbal, MD; Vasily Giannakeas, MPH; et al; JAMA Oncol. doi:10.1001/jamaoncol.2015.2510 Published online August 20, 2015.



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Original Investigation

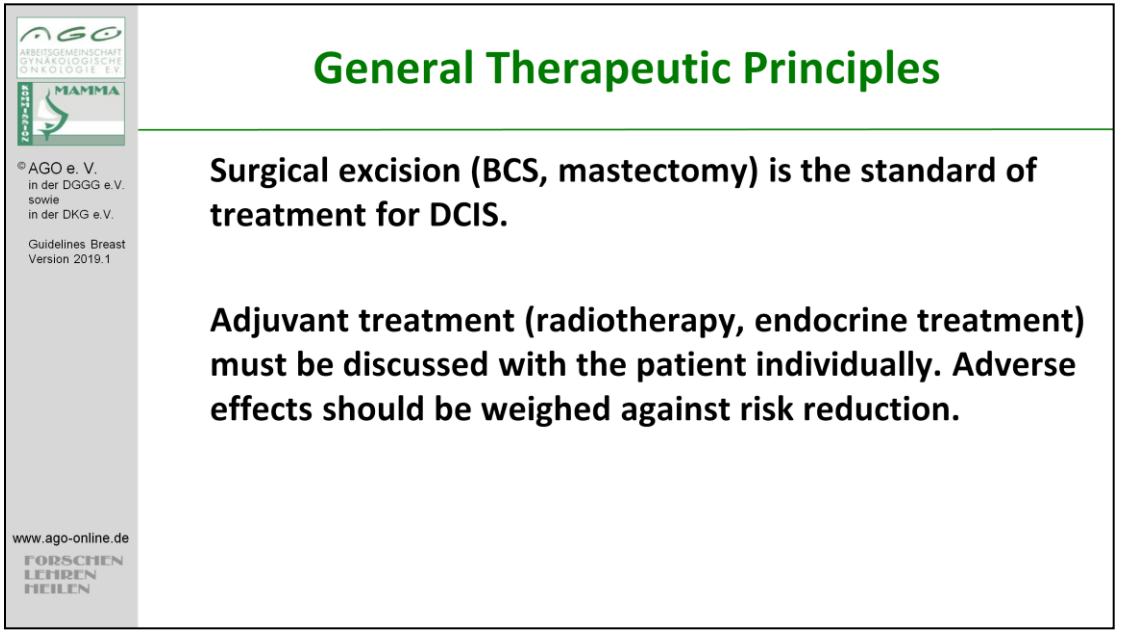
Breast Cancer Mortality After a Diagnosis of Ductal Carcinoma In Situ

Steven A. Narod, MD, FRCPC; Javaid Iqbal, MD; Vasily Giannakeas, MPH; Victoria Sopik, MSc; Ping Sun, PhD

Treatment	Cases, No	10–Year BCS Mortality (95%CI), %	Univariate HR (95% CI)	P Value	Multivariate[3] HR (95%)	P Value
Lumpectomy						
Without radiotherapy	19762	0.9 (0.7 - 1.1)	1 [Reference]		1 [Reference]	
With radiotherapy	42250	0.8 (0.7 – 1.0)	0.86 (0.67 – 1.10)	0.22	0.81 (0.63 – 1.04)	0.10
all	63319	0.8 (0.7 – 1.0)	1 [Reference]		1 [Reference]	
Unilateral mastectomy	19515	1.3 (1.1 – 1.5)	1.45 (1.18 – 1.79)	< 0.001	1.20 (0.96 – 1.50)	0.11

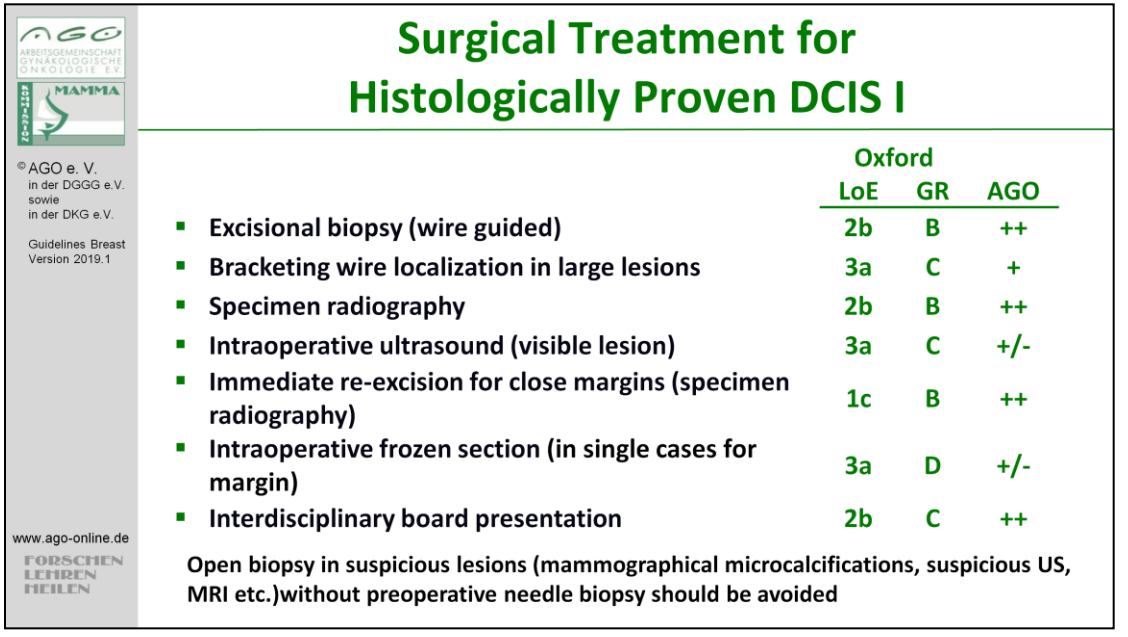
[3] Adjusted for year of diagnosis, age of diagnosis, ethnicity, income, ER-status, tumor size and grade

1. Steven A. Narod, MD, FRCPC; Javaid Iqbal, MD; Vasily Giannakeas, MPH; et al; JAMA Oncol. doi:10.1001/jamaoncol.2015.2510 Published online August 20, 2015.



1. Kirsty E. Stuart, Nehmat Houssami, Richard Taylor, et al. Long-term outcomes of ductal carcinoma in situ of the breast: a systematic review, meta-analysis and meta-regression analysis. BMC Cancer (2015) 15:890.
2. Katrina B. Mitchell and Henry Kuerer. Ductal Carcinoma In Situ: Treatment Update and Current Trends. Curr Oncol Rep (2015) 17: 48
3. Elizabeth M. Ward, Carol E. DeSantis, Chun Chieh Lin,et al. Cancer Statistics: Breast Cancer In Situ. CA Cancer J Clin 2015;65:481–495.
4. Benjamin D. Smith. When Is Good Enough Really Good Enough? Defining the Role of Radiation in Low-Risk Ductal Carcinoma In Situ. J Clin Oncol 2015; 33(7): 686 – 692.
5. Laura Esserman, Christina Yau. Rethinking the Standard for Ductal Carcinoma In Situ Treatment. JAMA Oncology Published online August 20, 2015.
6. Steven A. Narod, Javaid Iqbal, Vasily Giannakeas, et al. Breast Cancer Mortality After a Diagnosis of Ductal Carcinoma In Situ. JAMA Oncol. doi:10.1001/jamaoncol.2015.2510 Published online August 20, 2015.
7. Hamilton SN, Nichol A, Wai E et al. Local Relapse After Breast-Conserving Therapy Versus Mastectomy for Extensive Pure Ductal Carcinoma In Situ ≥4 cm. Int J Radiat Oncol Biol Phys. 2018 Sep 22. pii: S0360-3016(18)33801-X

8. Gradishar WJ, Anderson BO, Balassanian R et al. Breast Cancer, Version 4.2017, NCCN Clinical Practice Guidelines in Oncology. J Natl Compr Canc Netw. 2018 Mar;16(3):310-320.



Surgical Treatment for Histologically Proven DCIS I

	Oxford LoE	GR	AGO
▪ Excisional biopsy (wire guided)	2b	B	++
▪ Bracketing wire localization in large lesions	3a	C	+
▪ Specimen radiography	2b	B	++
▪ Intraoperative ultrasound (visible lesion)	3a	C	+/-
▪ Immediate re-excision for close margins (specimen radiography)	1c	B	++
▪ Intraoperative frozen section (in single cases for margin)	3a	D	+/-
▪ Interdisciplinary board presentation	2b	C	++

Open biopsy in suspicious lesions (mammographical microcalcifications, suspicious US, MRI etc.)without preoperative needle biopsy should be avoided

Exzision (drahtmarkiert)

1. Houssami N, Ambrogetti D, Marinovich L et al. Accuracy of a preoperative model for predicting invasive breast cancer in women with ductal carcinoma in situ on vacuum assisted core needle biopsy. Ann Surg Oncol 2011;18(5):1364-71
2. Saadai P, Moezzi M et al. Preoperative and intraoperative predictors of positive margins after breast-conserving surgery: a retrospective review. Breast Cancer 2011; 18: 221-225
3. Kumar S, Sacchini V. The Surgical Management of Ductal Carcinoma In Situ. The Breast Journal 2010; 16: S 49-S52
4. Hwang ES. The Impact of Surgery on Ductal Carcinoma In Situ Outcomes: The Use of Mastectomy. J Natl Cancer Inst Monogr 2010; 41: 197-199.
5. Ryan R, Tawfik O, Jensen RA, et al. Current Approaches to Diagnosis and Treatment of Ductal Carcinoma In Situ and Future Directions. Prog Mol Biol Transl Sci. 2017;151:33-80.
6. Janssen NNY, van la Parra RFD, Loo CE et al. Breast conserving surgery for extensive DCIS using multiple radioactive seeds. Eur J Surg Oncol. 2018 Jan;44(1):67-73.

Flankierende Drahtmarkierung bei großen Läsionen

Präparatradiographie

1. Kuerer HM, Smith BD, Chavez-MacGregor M, et al. DCIS Margins and Breast Conservation: MD Anderson Cancer Center Multidisciplinary Practice Guidelines and Outcomes. J Cancer. 2017;8(14):2653-2662.

Ohne Einfluss auf NRR

1. DVerstehenden DPA, Keizer LGG, Schlooz-Vries MS, et al: Performance characteristics of specimen radiography for margin assessment for ductal carcinoma in situ: a systematic review. Breast Cancer Res Treat 2017:166:669–679.

„A literature search was conducted for diagnostic studies up to April 2017 concerning SR for intra-operative margin assessment of breast lesions with pure DCIS or with DCIS components. Studies reporting sensitivity and specificity calculated using final pathology report as ref- erence test were included. Due to improved imaging technology, studies published more than 15 years ago were excluded. Methodological quality was assessed using quality assessment of diagnostic accuracy studies-2 checklist. Due to clinical and methodological diversity, meta-analysis was considered not useful.

Results Of 235 citations identified, 9 met predefined inclusion criteria and documented diagnostic efficacy data. Sensitivity ranged from 22 to 77% and specificity ranged from 51 to 100%. Positive predictive value and negative predictive value ranged from 53 to 100% and 32 to 95%, respectively. High or unclear risk of bias was found in reference standard in 5 of 9 studies. High concerns regarding applicability of index test were found in 6 of 9 studies.

Conclusions The present results do not support the routine use of intra-operative specimen radiography to reduce the rate of positive margins in patients undergoing breast- conserving surgery for pure DCIS or the DCIS component in invasive cancer. Future studies need to differentiate between initial and final specimen margin involvement. This could provide surgeons with a number needed to treat for a more applicable outcome.“

Intraoperative Sonographie (darstellbarer Befund)

1. Ahmed M, Douek M. Intra-operative ultrasound versus wire-guided localization in the surgical management of non-palpable breast cancers: systematic review and meta-analysis. Breast Cancer Res Treat. 2013; 140(3): 435-446.

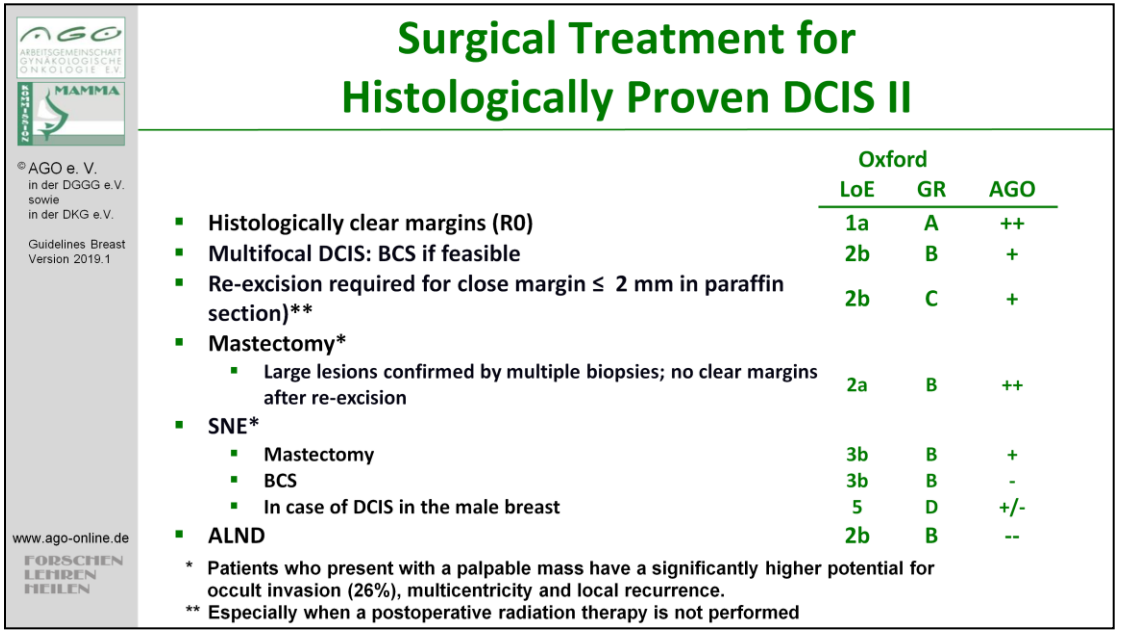
Sofortige Nachresektion bei knappen Resektionsrändern (Präparateradiographie)

1. Thill M, Röder K, Diedrich K et al. Intraoperative assessment of surgical margins during breast conserving surgery of durctal carcinoma in situ by use of radiofrequency spectroscopy. The Breast 2011(11) 579-580
2. Guidroz JA, Larrieux G, Liao J et al. Sampling of secondary margins decreases the need for re-excision after partial mastectomy Surgery. 2011; 150: 802 – 809
3. Fisher CS, Klimberg S, Khan S, et al. Margin Index is not a reliable toll for predicting residual disease after breast- conserving surgery for DCIS. Ann Surg Oncol 2011; 18: 3155-3159
4. Kumar S, Sacchini V. the Surgical Management of Ductal Carcinoma In Situ. The Breast Journal 2010; 16: S49 – S52
5. Kennedy S, Geradts J, Bydlon T, et al. Optical breast cancer margin assessment: an observational study of the effects of tissue heterogeneity on optical contrast. Breast Cancer Res 2010
6. Javid SH, Anderson BO. Tailored Strategies for DCIS Management. Oncology 2011; 25 (9):861-3
7. Kulkarni S. Management of DCIS: A Work in Progress. Oncology 2011; 25 (9): 852-6
8. Thill M, Dittmer C, Baumann K, et al. MarginProbe®--final results of the German post-market study in breast conserving surgery of ductal carcinoma in situ. Breast. 2014 Feb;23(1):94-6. doi: 10.1016/j.breast.2013.11.002. Epub 2013 Dec 2.
9. Kuerer HM, Smith BD, Chavez-MacGregor M, et al. DCIS Margins and Breast Conservation: MD Anderson Cancer Center Multidisciplinary Practice Guidelines and Outcomes. J Cancer. 2017;8(14):2653-2662.

Intraoperative Schnellschnittdiagnostik

1. Kuerer HM, Smith BD, Chavez-MacGregor M et al. DCIS Margins and Breast Conservation: MD Anderson Cancer Center Multidisciplinary Practice Guidelines and Outcomes. J Cancer. 2017;8(14):2653-2662.
2. Laws A, Brar MS, Bouchard-Fortier A, et al. surgery for ductal carcinoma in situ. J Surg Oncol. 2018 Dec;118(7):1205-1211.

Interdisziplinäre Tumorboard-Präsentation



Histologisch freie Resektionsränder (pR0)

1. Lagios MD, Page DL, Silverstein MJ. Prospective study of wide excision alone for ductal carcinoma in situ of the breast. J Clin Oncol 2006;24:3809-11
2. MacAusland SG, Hepel JT, Chong FK, et al. An attempt to independently verify the utility of the Van Nuys Prognostic Index for ductal carcinoma in situ. Cancer 2007;110:2648-53
3. Macdonald HR, Silverstein MJ, Lee LA, et al. Margin width as the sole determinant of local recurrence after breast conservation in patients with ductal carcinoma in situ of the breast. Am J Surg 2006 192:420-2
4. Meijnen P, Oldenburg HS, Peterse JL, et al. Clinical outcome after selective treatment of patients diagnosed with ductal carcinoma in situ of the breast. Ann Surg Oncol 2007 Nov 7; [Epub ahead of print]
5. Lee RJ, Vallow LA, McLaughlin SA, et al. Ductal carcinoma in situ of the breast.Int J Surg Oncol. 2012;2012:123549. doi: 10.1155/2012/123549. Epub 2012 Jul 18.
6. Badruddoja M. Ductal carcinoma in situ of the breast: a surgical perspective. Int J Surg Oncol. 2012;2012:761364. doi: 10.1155/2012/761364. Epub 2012 Sep 4.
7. Hassani A, Griffith C, Harvey J. Size does matter: High volume breast surgeons accept smaller excision margins for wide local

excision--a national survey of the surgical management of wide local excision margins in UK breast cancer patients. Breast. 2013 Oct;22(5):718-22.

8. Morrow M., et al: Society of Surgical Oncology –American Society for Radiation Oncology-American Society of Clinical Oncology Consensus Guideline on Margins for Breast-Conserving Surgery with Whole-Breast Irradiation in Ducctal Carcinoma in Situ J CO 2016 34;33 :4040-4046

Multifokalität: BET falls möglich (inkl. RT)

1. Meijnen P, Bartelink H. Multifocal ductal carcinoma in situ of the breast: A contraindication for breast-conserving treatment? J Clin Oncol 2007;25:5548–5549
2. Rakovitch E, Pignol JP, Hanna W, et al. Significance of multifocality in ductal carcinoma in situ: outcomes of women treated with breast-conserving therapy. J Clin Oncol 2007;25:5591–5596

Nachresektion bei knappem Resektionsrand (< 2 mm im Paraffinschnitt)

1. Dunne, C., J. P. Burke, et al. (2009). "Effect of margin status on local recurrence after breast conservation and radiation therapy for ductal carcinoma in situ." J Clin Oncol 27(10): 1615-1620.
2. Van Cleef A, Altintas S, Huizing M et al. Current view on ductal carcinoma in situ and importance of the margin thresholds: A review. Facts Views Vis Obgyn. 2014;6(4):210-8.

**besonders wenn nicht nachbestrahlt wird

3. Kuerer HM, Smith BD, Chavez-MacGregor M et al. DCIS Margins and Breast Conservation: MD Anderson Cancer Center Multidisciplinary Practice Guidelines and Outcomes. J Cancer. 2017;8(14):2653-2662.
4. Morrow M. De-escalating and escalating surgery in the management of early breast cancer. Breast. 2017 Aug;34 Suppl 1:S1-S4.

„The panelists emphasized that clinical judgment is necessary to determine whether patients with nega- tive margin widths less than 2 mm require re-excision based on the long-term rates of local control seen in National Surgical Adjuvant Breast and Bowel Project

(NSABP) trials, which used the negative margin definition of no ink on tumor [10] and on the results of the large single-institution study of Van Zee et al. [11] in which nega- tive margin width was not a predictor of local recurrence in patients receiving radiotherapy after controlling for multiple clinical vari- ables of interest. In the study of Van Zee et al., crude rates of local recurrence among the 2996 patients receiving radiotherapy were 10% for those with negative margins 2 mm or less in size, 7% for those with margins >2 mme10 mm, and 9% for margins >10 mm. Examples of factors to consider when deciding whether to re-excise a negative margin <2 mm include the extent of DCIS in proximity to the margin, which margin is close, the presence of residual calci- fications on mammogram, the cosmetic impact of re-excision, and the patient's life expectancy."

Mastektomie* (große Läsionen; keine sicheren Ränder im Nachresektat)

1. Ringberg A, Nordgren H, Thorstensson S, et al. Histopathological risk factors for ipsilateral breast events after breast conserving treatment for ductal carcinoma in situ of the breast--results from the Swedish randomised trial. Eur J Cancer 2007;43:291-8
2. NCCN and National Comprehensive Cancer Network. Clinical Practice Guidelines in Oncology: Breast Cancer - Version V.1.2007.
3. Solin LJ. Is excision alone adequate treatment for low-risk ductal carcinoma-in-situ of the breast? J Clin Oncol 2006;24:1017-1019
4. Vargas C, Kestin L, Go N, et al. Factors associated with local recurrence and cause-specific survival in patients with ductal carcinoma in situ of the breast treated with breast-conserving therapy or mastectomy. Int J Radiat Oncol Biol Phys 2005;63:1514-21
5. Carlson, G. W., A. Page, et al. (2007). "Local recurrence of ductal carcinoma in situ after skin-sparing mastectomy." J Am Coll Surg 204(5): 1074-1078; discussion 1078-1080.
6. Rudloff U, E Brogi et al. (2010): "The Influence of Margin Width and Volume of Disease Near Margin on Benefit of Radiation Therapy for Women With DCIS Treated With Breast-Conserving Therapy" Ann Surg (251) 583 – 591
7. Polyak K. Molecular markers for the diagnosis and management of ductal carcinoma in situ. J Natl Cancer Inst Monogr 2010; 41: 210-213
8. Houssami N, Ambrogetti D, Marinovich L et al. Accuracy of a preoperative model for predicting invasive breast cancer in women with ductal carcinoma in situ on vacuum assisted core needle biopsy. Ann Surg Oncol 2011;18(5):1364-71

SNE*

1. Killelea BK, Long JB, Dang W, et al. Associations Between Sentinel Lymph Node Biopsy and Complications for Patients with Ductal Carcinoma In Situ. Ann Surg Oncol. 2018 Jun;25(6):1521-1529.

Mastektomie

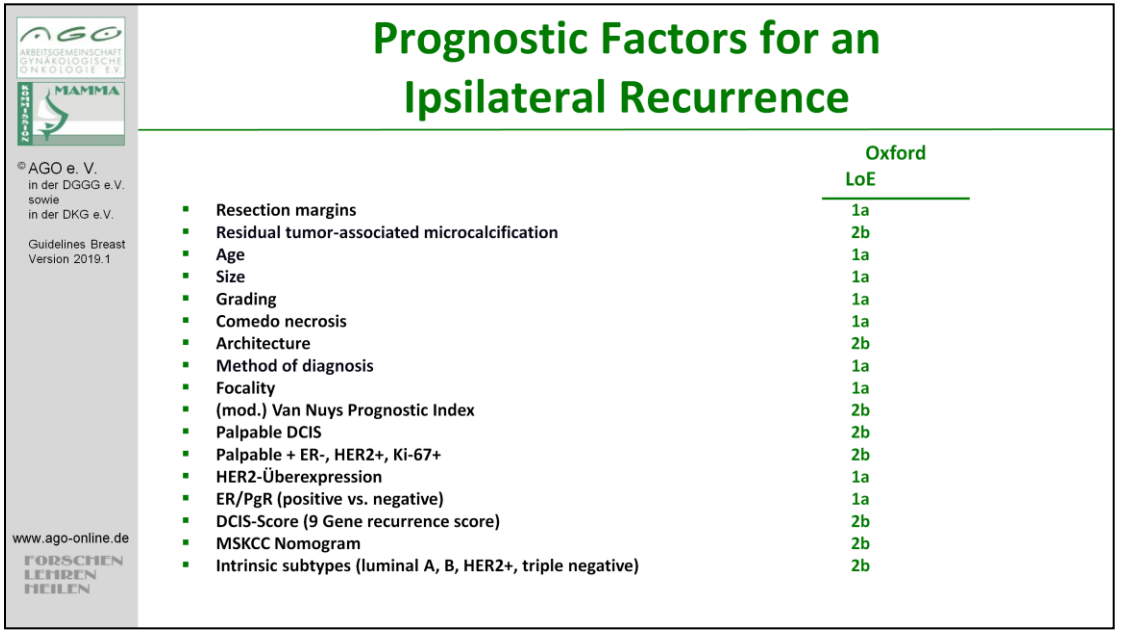
DCIS beim Mann

1. Chern J, Liao L, Baraldi R, et al. Case report: ductal carcinoma in situ in the male breast. Case Rep Radiol. 2012;2012:532527. doi: 10.1155/2012/532527. Epub 2012 Sep 26.

BET

1. Meijnen P, Oldenburg HS, Loo CE, et al. Risk of invasion and axillary lymph node metastasis in ductal carcinoma in situ diagnosed by core-needle biopsy. Br J Surg 2007;94:952-6
2. Miyake T, Shimazu K, Ohashi H, et al. Indication for sentinel lymph node biopsy for breast cancer when core biopsy shows ductal carcinoma in situ. The American Journal of Surgery 2011; 202: 59-65 :394095. doi: 10.5402/2012/394095. Epub 2012 May 14.
3. De Lorenzi F, Di Bella J, Maisonneuve P et al. Oncoplastic breast surgery for the management of ductal carcinoma in situ (DCIS): is it oncologically safe? A retrospective cohort analysis. Eur J Surg Oncol. 2018 Jul;44(7):957-962.

Axilladissektion



Prognostic Factors for an Ipsilateral Recurrence

	Oxford LoE
▪ Resection margins	1a
▪ Residual tumor-associated microcalcification	2b
▪ Age	1a
▪ Size	1a
▪ Grading	1a
▪ Comedo necrosis	1a
▪ Architecture	2b
▪ Method of diagnosis	1a
▪ Focality	1a
▪ (mod.) Van Nuys Prognostic Index	2b
▪ Palpable DCIS	2b
▪ Palpable + ER-, HER2+, Ki-67+	2b
▪ HER2-Überexpression	1a
▪ ER/PgR (positive vs. negative)	1a
▪ DCIS-Score (9 Gene recurrence score)	2b
▪ MSKCC Nomogram	2b
▪ Intrinsic subtypes (luminal A, B, HER2+, triple negative)	2b

Resektionsränder

Residualer tumorassoziierter Mikrokalk

Alter

Größe

Grading

Komedonekrose

Architektur

1. Ringberg A, Nordgren H, Thorstensson S, et al. Histopathological risk factors for ipsilateral breast events after breast conserving treatment for ductal carcinoma in situ of the breast--results from the Swedish randomised trial. Eur J Cancer 2007;43:291-8
2. NCCN and National Comprehensive Cancer Network. Clinical Practice Guidelines in Oncology: Breast Cancer - Version V.1.2007.
3. Vargas C, Kestin L, Go N, et al. Factors associated with local recurrence and cause-specific survival in patients with ductal carcinoma in situ of the breast treated with breast-conserving therapy or mastectomy. Int J Radiat Oncol Biol Phys 2005;63:1514-21

4. Farhat G, R Walker et al. (2010): “Changes in Invasive Breast Cancer and Ductal Carcinoma In Situ Rates in Relation to the Decline in Hormone Therapy Use” J Clin Oncol (28)
5. Pinder SE, C Duggan et al. A new pathological system for grading DCIS with improved prediction of local recurrence: results from the UKCCCR/ANZ DCIS trial. Br J Cancer 2010; 103: 94 – 100
6. Kerlikowske K, AM Molinaro et al. Biomarker Expression and Risk of Subsequent Tumors After Initial Ductal Carcinoma In Situ Diagnosis. J Natl Cancer Inst 2010; 102: 627 – 637
7. Rudloff U, LM Jacks et al. Normogram for Predicting the Risk of Local Recurrence After Breast-Conserving Surgery for Ductal Carcinoma In Situ. J Clin Oncol 2010; 28: 3762 – 3769
8. Cuzick J, I Sestak et al. Effect of Tamoxifen and radiotherapy in women with locally excised ductal carcinoma in situ: long-term results form the UK / ANZ DCIS trial. Lancet Oncol 2011; 12: 21- 29
9. Lari S, Kuerer HM. Review: Biological Merkers in DCIS and Risk of Breast Recurrence: A Systematic Review. Journal of Cancer 2011; 2: 232-261
10. Harada S, Mick R, Roses R, et al. The significance of HER-2/neu Resceptor positivity and Immunophenotype in Ductal Carcinoma In Situ with Early Invasive Disease. J Surg Oncol 2011; 104: 458-465
11. Han K, Nofech-Mozes S, Narod S, et al. Expression of Her2neu in Ductal Carcinoma in situ is associated with Local Recurrence. Clinical Oncology 2011; 1-7 (epub ahead)
12. King TA, Sakr RA, Muhsen S, et al. Is there a Low-Grade Precursor Pathway in Breast Cancer? Ann Surg Oncol 2011;(epub ahead)
13. Chan P, Lim S. Predictors of Invasive Breast Cancer in Ductal Carcinoma In Situ initially diagnosed by Core Biopsy. Asian J Surg 2010; 33: 76-82
14. Liao N, Zhang GC, Liu YH, et al. HER2-positive status is an independent predictor for coexisting invasion of ductal carcinoma in situ of the breast presenting extensive DCIS component. Pathology Res Practice 2011; 207: 1-7
15. Dick AW, Sorbero MS, Ahrendt GM, et al. Comparative Effectiveness of Ductal Carcinoma In Situ Managemnt and the Roles of margins and Surgeons. J natl Cancer Inst 2011; 103:92-104
16. Brennan ME, Turner RM, Ciatto S, et al. Ductal Carcinoma in Situ at Core-Needle Biopsy: Meta-Aanlysis of Underestimation and Predictors of Invasive Breast Cancer. Radiology 2011; 260: 119-128

17. Wang S, Shamliyan T, Virnig BA, et al. Tumor characteristics as predictors of local recurrence after treatment of ductal carcinoma in situ: a meta-analysis. Breast Cancer Res Treat 2011; 127: 1-14
18. Holmes P, Lloyd J, Chervoneva I, et al. Prognostic Markers and Long-Term Outcomes in Ductal Carcinoma In Situ of the Breast Treated With Excision Alone. Cancer 2011; 117: 3650-7
19. Visser LL, Elshof LE, Schaapveld M et al. Clinicopathological Risk Factors for an Invasive Breast Cancer recurrence after Ductal Carcinoma *In Situ*-A Nested Case-Control Study. Clin Cancer Res. 2018 Aug 1;24(15):3593-3601.
20. Rakovitch E, Gray R, Baehner FL et al. Refined estimates of local recurrence risks by DCIS score adjusting for clinicopathological features: a combined analysis of ECOG-ACRIN E5194 and Ontario DCIS cohort studies. Breast Cancer Res Treat. 2018 Jun;169(2):359-369

Diagnostische Methode

1. Han JS, Molberg KH, Sarode V. Predictors of Invasion and Axillary Lymph Node Metastasis in Patients with a Core Biopsy Diagnosis of Ductal carcinoma In Situ: An Analysis of 255 Cases. The Breast Journal 2011; 17: 223-229
2. Barbalaco Neto G, Rossetti C, Fonseca FL, et al. Ductal carcinoma in situ in core needlebiopsies and its association with extensive in situ component in the surgical specimen. Int Arch Med. 2012 Jun 20;5(1):19.
3. Park HS, Kim HY, Park S et al. A nomogram for predicting underestimation of invasiveness in ductal carcinoma in situ diagnosed by preoperative needle biopsy. Breast. 2013 Oct;22(5):869-73.
4. Park HS, Park S, Cho J, et al. Risk predictors of underestimation and the need for sentinel node biopsy in patients diagnosed with ductal carcinoma in situ by preoperative needle biopsy. J Surg Oncol. 2013 Mar;107(4):388-92. doi: 10.1002/jso.23273. Epub 2012 Sep 24.

5. Schulz S, Sinn P, Golatta M, et al. Prediction of underestimated invasiveness in patients with ductal carcinoma in situ of the breast on percutaneous biopsy as rationale for recommending concurrent sentinel lymph node biopsy. Breast. 2013 Aug;22(4):537-42.
6. Elshof LE, Schmidt MK, Rutgers EJ, et al. Cause-specific Mortality in a Population-based Cohort of 9799 Women Treated for Ductal Carcinoma In Situ. Ann Surg. 2017 Apr 3. doi: 10.1097/SLA.0000000000002239. [Epub ahead of print]
7. Punglia RS, Jiang W, Lipsitz SR, et al. Clinical risk score to predict likelihood of recurrence after ductal carcinoma in situ treated with breast-conserving surgery. Breast Cancer Res Treat. 2017 Oct 28. doi: 10.1007/s10549-017-4553-5. [Epub ahead of print]

Fokalität

1. Meijnen P, Bartelink H. Multifocal ductal carcinoma in situ of the breast: A contraindication for breast-conserving treatment? J Clin Oncol 2007;25:5548–5549
2. Rakovitch E, Pignol JP, Hanna W, et al. Significance of multifocality in ductal carcinoma in situ: outcomes of women treated with breast-conserving therapy. J Clin Oncol 2007;25:5591–5596

(mod.) Van Nuys Prognose Index und MSKCC Nomogramm

1. Lagios MD, Page DL, Silverstein MJ. Prospective study of wide excision alone for ductal carcinoma in situ of the breast. J Clin Oncol 2006;24:3809-11
2. MacAusland SG, Hepel JT, Chong FK, et al. An attempt to independently verify the utility of the Van Nuys Prognostic Index for ductal carcinoma in situ. Cancer 2007;110:2648-53
3. Macdonald HR, Silverstein MJ, Lee LA, et al. Margin width as the sole determinant of local recurrence after breast conservation in patients with ductal carcinoma in situ of the breast. Am J Surg 2006 192:420-2
4. Meijnen P, Oldenburg HS, Peterse JL, et al. Clinical outcome after selective treatment of patients diagnosed with ductal carcinoma in situ of the breast. Ann Surg Oncol 2007 Nov 7; [Epub ahead of print]
5. Altintas S, Toussaint J, Durbecq V, et al. Fine Tuning of the Van Nuys Prognostic Index (VNPI) 2003 by Integrating the Genomic Grade Index (GGI): New Tools for Ductal Carcinoma In Situ (DCIS). The Breast Journal 2011; 17: 343-351

6. Fisher CS, Klimberg S, Khan S, et al. margin Index Is Not a Reliable Tool for Predeicting Residual Disease after Breast-Conserving Surgery for DCIS. Ann Surg Oncol (2011): 18: 3155-3159
7. Silverstein MJ, Lagios MD. Choosing Treatment for Patients With Ductal Carcinoma In Situ: Fine Tuning the University of Southern california/Van Nuys Prognostic Index. J natl Cancer Inst Monogr 2010; 41: 193-196
8. Rudloff U, Jacks LM, Goldberg JL, et al. Nomogram for predicting the risk of local recuurence after breast conserving surgery for ductal carcinoma in situ. J Clin Oncol 2010; 28(23): 3762-9
9. Van Zee KJ, Patil S. Validation of a nomogram for predicting risk of local recurrence for ductal carcinoma in situ. J Clin Oncol 2012; 30(25): 3143-4.
10. Sweldens C, Peeters S, van Limbergen E, et al. Öocal relapse after breast-conserving therapy for ductal carcinoma in situ: a Eurpüean single-center experience and external validation of the Memorial Sloan-Kettering Cancer Center DCIS nomogram. Cancer J 2014; 20(1): 1-7.

Palpables DCIS

Palpabel + COX-2+p16+Ki-67+

Palpabel + ER-, HER2, +Ki-67+

HER2-Überexpression

ER/PgR (positiv vs. negativ)

DCIS-Score

1. Solin LJ, Gray R, Baehner FL, et al. A multigene expression assay to predict local recurrence risk for ductal carcinoma in situ of the breast. J Natl Cancer Inst. 2013 May 15;105(10):701-10.
2. Sarah Patricia Cate, Alyssa Gillego, Manjeet Chadha, et al. Does the Oncotype DCIS score impact treatment decisions? J Clin Oncol 31, 2013 (suppl 26; abstr 91)
3. Rakovitch E, Nofech-Mozes S, Hanna W et al. A large prospectively-designed study of the DCIS score. Predicting recurrence risk after local excision for ductal carcinoma in situ patients with and without irradiation. SABCS 2015. S5-04

4. Wood WC, Alvarado M, Buchholz DJ, et al. The current clinical value of the DCIS Score. Oncology (Williston Park). 2014 May;28 Suppl 2:C2, 1-8, C3.

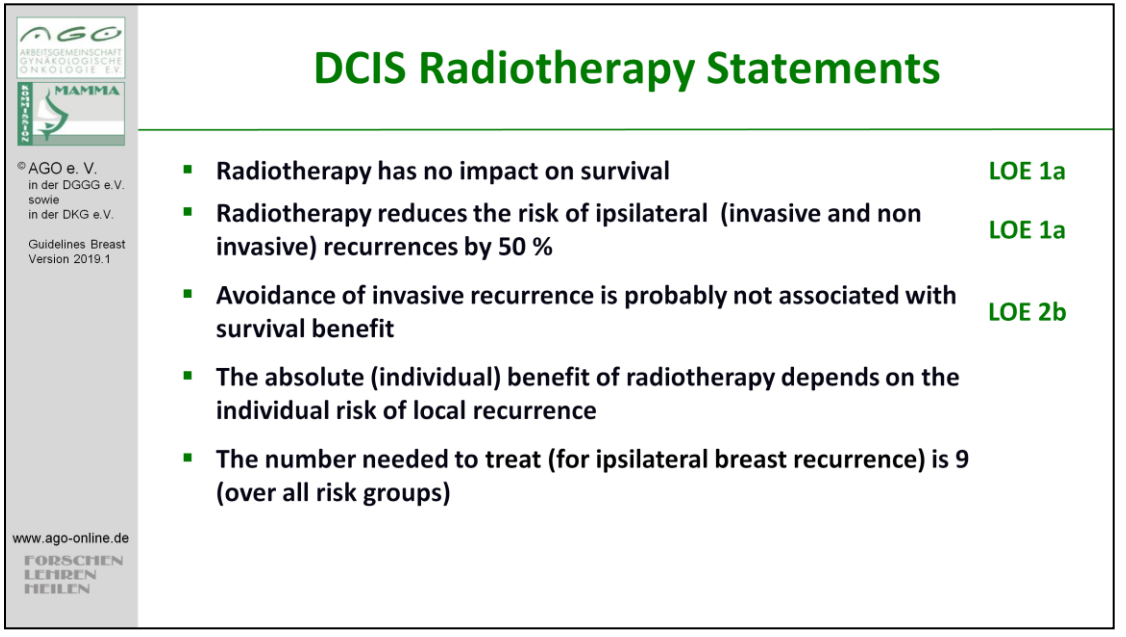
DCIS mit Mikroinvasion – Behandlung analog zum invasiven Karzinom

1. Meijnen P, Oldenburg HS, Loo CE, et al. Risk of invasion and axillary lymph node metastasis in ductal carcinoma in situ diagnosed by core-needle biopsy. Br J Surg 2007;94:952-6
2. Eng-Wong J, JP Costantino et al. The Impact of Systemic Therapy Following Ductal Carcinoma In Situ. J Natl Cancer Inst Monogr 2010; 41: 200 – 203
3. Ryan R, Tawfik O, Jensen RA, Anant S. Current Approaches to Diagnosis and Treatment of Ductal Carcinoma In Situ and Future Directions. Prog Mol Biol Transl Sci. 2017;151:33-80.

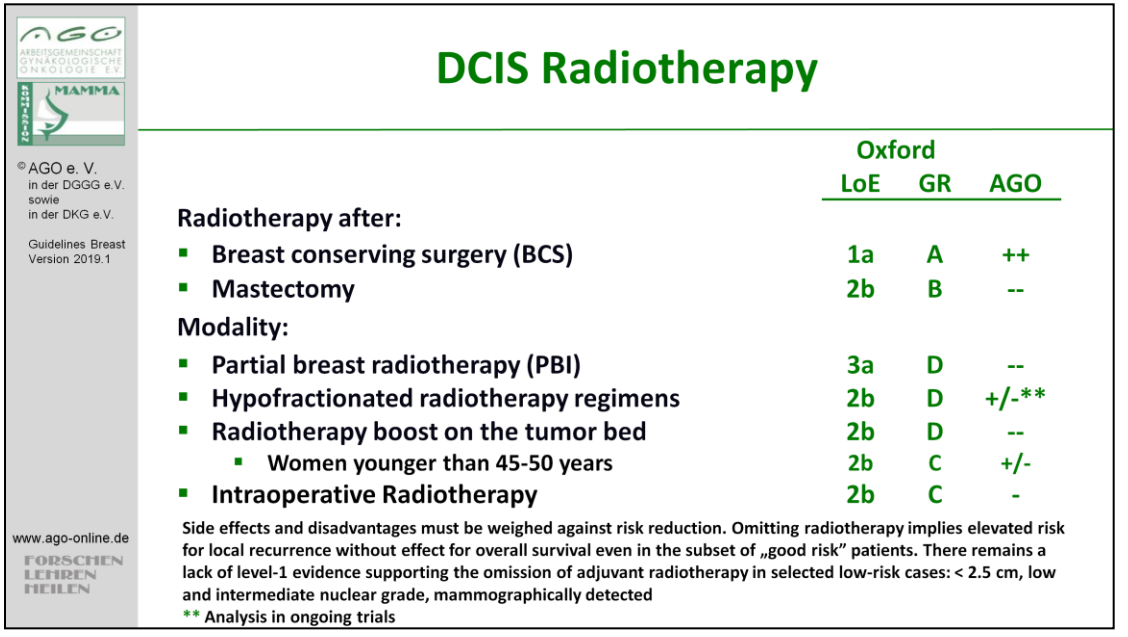
Intrinsische Subgruppen (Luminal A,B, HER+, triple negativ)

1. Vidali C, Caffo O, Aristei C, et al. Conservative treatment of breast ductal carcinoma in situ: results of an Italian multi-institutional retrospective study. Radiat Oncol. 2012 Oct 25;7(1):177. [Epub ahead of print]
2. Lambert K, Patani N, Mokbel K. Ductal carcinoma in situ: recent advances and future prospects. Int J Surg Oncol. 2012;2012:347385. doi: 10.1155/2012/347385. Epub 2012 May 17.
3. Zhou W, Johansson C, Jirström K, et al. A Comparison of Tumor Biology in Primary Ductal Carcinoma In Situ Recurring as Invasive Carcinoma versus a New In Situ. Int J Breast Cancer. 2013;2013:582134.
4. Collins LC, Achacoso N, Haque R et al.Risk factors for non-invasive and invasive local recurrence in patients with ductal carcinoma in situ. Breast Cancer Res Treat. 2013 Jun;139(2):453-60.
5. Kong Y, Yang L, Tang H, et al. A nation-wide multicenter retrospective study of the epidemiological, pathological and clinical characteristics of breast cancer in situ in Chinese women in 1999 - 2008. PLoS One. 2013 Nov 20;8(11):e81055.
6. Noh JM, Lee J, Choi DH, et al. HER-2 overexpression is not associated with increased ipsilateral breast tumor recurrence in DCIS

treated with breast-conserving surgery followed by radiotherapy. Breast. 2013 Oct;22(5):894-7.



El Hage Chehade H, Mokbel K. Is Adjuvant Endocrine Therapy Indicated for DCIS Patients After Complete Surgical Excision? Anticancer Res. 2018 Mar;38(3):1263-1266. Review.



Radiotherapie nach: Brusterhaltender Operation (BEO) (gesamte Brust, WBI)

1. Bijker N, Meijnen P, Peterse JL, et al. Breast-conserving treatment with or without radiotherapy in ductal carcinoma-in-situ: ten-year results of European Organisation for Research and Treatment of Cancer randomized phase III trial 10853--a study by the EORTC Breast Cancer Cooperative Group and EORTC Radiotherapy Group. J Clin Oncol 2006;24:3381-7
2. Emdin SO, Granstrand B, Ringberg A, et al. Swedish Breast Cancer Group. SweDCIS. Radiotherapy after sector resection for ductal carcinoma in situ of the breast. Results of a randomised trial in a population offered mammography screening. Acta Oncol 2006;45:536-43
3. Viani GA, Stefano EJ, Afonso SL, et al. Breast-conserving surgery with or without radiotherapy in women with ductal carcinoma in situ: a meta-analysis of randomized trials. Radiat Oncol 2007:2:2
4. Wong JS, SC Lester, Smith BL. Reply Wong to Lagios Wong Letter. J Clin Oncol 2006;24:3811-2
5. Poortmans P. Evidence based radiation oncology: breast cancer. Radiother Oncol 2007;84:84-101
6. Sautter-Bihl ML, Budach W, Dunst J, Feyer P, Haase W, Harms W, Sedlmayer F, Souchon R, Wenz F, Sauer R. DEGRO Practical guidelines for radiotherapy of breast cancer I: Breast-conserving therapy. Strahlenther Onkol 2007;183:661-666
7. Solin LJ. Is excision alone adequate treatment for low-risk ductal carcinoma-in-situ of the breast? J Clin Oncol 2006;24:1017-1019

8. The Consensus Conference on the treatment of in situ ductal carcinoma of the breast, April 22-25, 1999. Schwartz GF, Solin LJ, Olivotto IA, Ernster VL, Pressman PI.
9. J Clin Oncol. 2009 Oct 20;27(30):4939-47. Epub 2009 Aug 31.Impact of pathological characteristics on local relapse after breast-conserving therapy: a subgroup analysis of the EORTC boost versus no boost trial. Jones HA, Antonini N, Hart AA, Peterse JL,et al.
10. Bijker N, G van Tienhoven (2010): "Local and Systemic Outcomes in DCIS Based on Tumor and Patient Characteristics: The Radiation Oncologist's Perspective" J Natl Cancer Inst Monogr (41) 178 – 180
11. Solin LJ (2010): "The Impact of Adding Radiation Treatment After Breast Conservation Surgery for Ductal Carcinoma In Situ of the Breast" J Natl Cancer Inst Monogr (41) 187 – 192
12. Kane RL, BA Virnig et al. (2010) : "The Impact Surgery, Radiation, and Systemic Treatment on Outcomes in Patients With Ductal Carcinoma In Situ" J Natl Cancer Inst Monogr (41) 130 – 133
13. Hughes LL, Wong M, Page DL et al. Local excision alone without irradiation for ductal carcinoma in situ of the breast: a trial of the Eastern Cooperative Oncology Group. J Clin Oncol 2009; 27(32): 5319-24
14. Jeruss JS, Kuerer HM, Beitsch P et al. Update on DCIS outcomes from the American Society of Breast Surgeons Accelerated Partial Breast Irradiation Registry trial. Ann Surg Oncol. 2011; 18(1): 65-71
15. Wapnir IL, Dignam JJ, Fisher B, et al. Long-Term Outcomes of invasive ipsilateral breast tumor recurrences after lumpectomy in NSABP B-17 and B-24 randomized clinical trials for DCIS. J Natl Cancer Inst 2011; 103: 478-488
16. EBCTCG Correa C et al. Overview of the randomized trials of radiotherapy in ductal carcinoma in situ of the breast. J Natl Cancer Inst Monogr. 2010 (41); 162 – 77
17. Motwani SB, Goyal S, Moran MS et al: Ductal carciinoma In Situ Treated With Breast-Conserving Surgery and Radiotherapy: A Comparison With ECOG Study 5194. Cancer 2011; 117: 1156-62.
18. EBCTCG Correa C et al. Overview of the randomized trials of radiotherapy in ductal carcinoma in situ of the breast. J Natl Cancer Inst Monogr. 2010 (41); 162 – 77
19. Motwani SB, Goyal S, Moran MS et al: Ductal carciinoma In Situ Treated With Breast-Conserving Surgery and Radiotherapy: A Comparison With ECOG Study 5194. Cancer 2011; 117: 1156-62.
20. Childs SK, Chen YH, Duggan MM, et al. Impact of margin status on local recurrence after mastectomy for ductal carcinoma in situ. Int

J Radiat Oncol Biol Phys 2012 Sep 10. doi:pii: S0360-3016(12)03334-2. 10.1016/j.ijrobp.2012.07.2377. [Epub ahead of print]

21. Cobleigh MA, Anderson SJ, Julian TB, et al. NSABP B-43: A phase III clinical trial to compare trastuzumab (T) given concurrently with radiation therapy (RT) to RT alone for women with HER2+ DCIS resected by lumpectomy (Lx). SABCS 2012; OT1-2-01
22. Halasz LM, Sreedhara M, Chen YH, et al. Improved outcomes of breast-conserving therapy for patients with ductal carcinoma in situ. Int J Radiat Oncol Biol Phys 2012;82:e581-6.
23. Shaitelman SF, Wilkinson JB, Kestin LL, et al. Long-term outcome in patients with ductal carcinoma in situ treated with breast-conserving therapy: implications for optimal follow-up strategies. Int J Radiat Oncol Biol Phys 2012;83:e305-12.
24. Vidali C, Caffo O, Aristei C, et al. Conservative treatment of breast ductal carcinoma in situ: results of an Italian multi-institutional retrospective study. Radiat Oncol. 2012 Oct 25;7(1):177. [Epub ahead of print]
25. Donker M, Litière S, Werutsky G, et al.Breast-conserving treatment with or without radiotherapy in ductal carcinoma In Situ: 15-year recurrence rates and outcome after a recurrence, from the EORTC 10853 randomized phase III trial. J Clin Oncol. 2013 Nov 10;31(32):4054-9.
26. Goodwin A, Parker S, Ghersi D, et al. Post-operative radiotherapy for ductal carcinoma in situ of the breast. Cochrane Database Syst Rev. 2013 Nov 21;11:CD000563. doi: 10.1002/14651858.CD000563.pub7.
27. Allred DC, Anderson SJ, Paik S, et al. Adjuvant tamoxifen reduces subsequent breast cancer in women with estrogen receptor-positive ductal carcinoma in situ: a study based on NSABP protocol B-24. J Clin Oncol 2012;30:1268-73
28. Alvarado R, Lari SA, Roses RE, et al. Biology, treatment, and outcome in very young and older women with DCIS. Ann Surg Oncol 2012;19:3777-84.
29. Amichetti M, Vidali C. Radiotherapy after conservative surgery in ductal carcinoma in situ of the breast: a review. Int J Surg Oncol 2012;2012:635404. doi: 10.1155/2012/635404. Epub 2012 May 13.
30. Australian New Zealand Clinical Trials Registry website. The Trans Tasman Radiation Oncology Group (TROG) 07.01: A randomised phase III study of radiodoses and fractionation schedules in non-low risk Ductal Carcinoma In Situ (DCIS) of the breast to improve time to recurrence. http://www.anzctr.org.au/trial_view.a.... Accessed June 27, 2012.
31. Lambert K, Patani N, Mokbel K. Ductal carcinoma in situ: recent advances and future prospects. Int J Surg Oncol. 2012;2012:347385. doi: 10.1155/2012/347385. Epub 2012 May 17.

32. Lee RJ, Vallow LA, McLaughlin SA, et al.Ductal carcinoma in situ of the breast. Int J Surg Oncol. 2012;2012:123549. doi: 10.1155/2012/123549. Epub 2012 Jul 18.
33. Leitlinienprogramm Onkologie der AWMF, Deutschen Krebsgesellschaft e.V. und Deutschen Krebshilfe e.V. Interdisziplinäre S3-Leitlinie für die Diagnostik, Therapie und Nachsorge des Mammakarzinoms. 3. Auflage: Aktualisierung 2012. Zuckschwerdt Verlag, 2012 ISBN: 978-3-86371-073-6; siehe auch: http://www.awmf.org/leitlinien/detail/ll/032-045OL.html
34. McCormick B. RTOG 9804: A prospective randomized trial for “good risk” ductal carcinoma in situ (DCIS), comparing radiation (RT) to observation (OBS). J Clin Oncol 2012;30 (suppl; abstr 1004).
35. McCormick B, Moughan J, Hudis C, et al. Low-risk breast ductal carcinoma in situ (DCIS): results from the Radiation Therapy Oncology Group 9804 Phase 3 Trial. Int J Radiat Oncol Biol Phys 2012;84(5) Suppl., S5 abstract 11
36. Morrow M. Refining the use of endocrine therapy for ductal carcinoma in situ. J Clin Oncol 2012;30:1249-51.
37. Morrow M, Katz SJ. Margins in ductal carcinoma in situ: is bigger really better? J Natl Cancer Inst 2012;104:494-5
38. Fredrik Wärnberg, Hans Garmo, Stefan Emdin, et al. Effect of Radiotherapy After Breast-Conserving Surgery for Ductal Carcinoma in Situ: 20 Years Follow-Up in the Randomized SweDCIS Trial. J Clin Oncol 2014; 32:3613-3618.
39. Abram Recht. Are the Randomized Trials of Radiation Therapy for Ductal Carcinoma in Situ Still Relevant? J Clin Oncol 2014; 32(22): 3588
40. Lawrence J. Solin, Robert Gray, Lorie L. Hugheset al. Surgical Excision Without Radiation for Ductal Carcinoma in Situ of the Breast: 12-Year Results From the ECOG-ACRIN E5194 Study. J Clin Oncol 2015; 33 (33):3938
41. Beryl McCormick, Kathryn Winter, Clifford Hudis, et al. RTOG 9804: A Prospective Randomized Trial for Good-Risk Ductal Carcinoma In Situ Comparing Radiotherapy With Observation. J Clin Oncol 2015; 33(7): 709
42. David Krug, Rainer Souchon. Radiotherapy of Ductal Carcinoma In Situ. Breast Care 2015;10:259–264.
43. Wang L, Xia Y, Liu D, Zeng Y, Chang L, Li L, Hou Y, Ge L, Li W, Liu Z. Evaluating the efficacy of post-surgery adjuvant therapies used for ductal carcinoma (ca. in situ) patients: a network meta-analysis. Oncotarget. 2017;8(45):79257-79269.
44. Garg PK, Jakhetiya A, Pandey R, et al. Adjuvant radiotherapy versus observation following lumpectomy in ductal carcinoma in-situ: A meta-analysis of randomized controlled trials.Breast J. 2017 Aug 22. doi: 10.1111/tbj.12889. [Epub ahead of print]
45. Giannakeas V, Sopik V, Narod SA. Association of Radiotherapy With Survival in Women Treated for Ductal Carcinoma In Situ With

Lumpectomy or Mastectomy. JAMA Netw Open. 2018 Aug 3;1(4):e181100.

Mastektomie

1. Chadha M, Portenoy J, Boolbol SK, et al. Is there a role for postmastectomy radiation therapy in ductal carcinoma in situ? Int J Surg Oncol 2012;2012:423520. doi: 10.1155/2012/423520. Epub 2012 Jun 13.

Sonderformen der Radiotherapie:

Teilbrustbestrahlung

1. Monticciolo DL, Biggs K, Gist AK, et al Breast Conserving Therapy with accelerated partial breast versus external beam whole breast irradiation: comparison of imaging sequela and complications in a matched population. The Breast Journal 2011; 17(2) 187-190
2. Aburabia M, Roses RE, Kuerer HM, et al. Axillary failure in patients treated with MammoSite accelerated partial breast irradiation. Ann Surg Oncol 2011; 18:3415-3421
3. Goyal S, Vicini F, beitsch PD et al. Ductal carciinoma In Situ Treated With Breast-Conserving Surgery and Accelerated Partial Breast Irradiation: A Comparison of Mammosite Registry Trial With Intergroup Study 5194. Cancer 2011; 117: 1149-55.
4. Stull TS, Goodwin MC, Gracely EJ, et al. A Single Institution Review of Accelerated Partial Breast Irradiation in Patients considered “Cautionary” by the American Society for Radiation Oncology. Ann Surg Oncol 2011; (epub ahead)
5. Punglia RS, Burstein HJ, Weeks JC et al. Radiation Therapy for Ductal Carcinoma In Situ. Cancer 2011; (epub ahead)
6. Khan AJ, Arthur D, Vicini F, et al. Six-Year Analysis of Treatment-Related Toxicities in Patients Treated with Accelerated Partial Breast Irradiation on the American Society of Breast Surgeons MammoSite Breast Brachytherapy Registry Trial. Ann Surg Oncol 2011; (epub ahead)
7. National Cancer Institute website. NSABP B-39: Phase III randomized study of adjuvant whole-breast versus partial-breast irradiation in women with ductal carcinoma in situ or stage I or II breast cancer. http://www.cancer.gov/clinicaltrials/search/view?cdrid=409590&version=HealthProfessional. Accessed June 26, 2012.

8. Riou O, Lemanski C, Guillaumon V et al. Role of the radiotherapy boost on local control in ductal carcinoma in situ. Int J Surg Oncol. 2012;2012:748196. doi: 10.1155/2012/748196. Epub 2012 Apr 8.
9. Wong JS, Chen YH, Gadd MA, et al. Eight-year update of a prospective study of wide excision alone for small low- or intermediate-grade ductal carcinoma in situ (DCIS). Breast Cancer Res Treat. 2014 Jan;143(2):343-50.
10. John Paul Einck, Steven E. Finkelstein, Ben Han et al. Accelerated partial-breast irradiation using strut-based brachytherapy in ductal carcinoma in situ patients: A report on 321 patients with median 25-month follow-up. J Clin Oncol 31, 2013 (suppl 26; abstr 92)
11. S. S. Park, I. S. Grills, P. Y. Chen, et al. Outcomes for accelerated partial-breast irradiation (APBI) in pure ductal carcinoma in situ (DCIS) patients. J Clin Oncol 31, 2013 (suppl 26; abstr 100)
12. B. E. Amendola, C. P. Amendola, N. C. Perez. DCIS of the breast treated with balloon brachytherapy: 7-year follow-up. J Clin Oncol 31, 2013 (suppl 26; abstr 142)
13. Ying L., Derek T. Schloemann, Min Lian et al. Accelerated partial breast irradiation through brachytherapy for ductal carcinoma in situ: factors influencing utilization and risks of second breast tumors. Breast Cancer Res Treat (2015) 151:199–208.
14. Vratislav Strnad, Oliver J Ott, Guido Hildebrandt, et al. on behalf of the Groupe Européen de Curiethérapie of European Society for Radiotherapy and Oncology (GEC-ESTRO). 5-year results of accelerated partial breast irradiation using sole interstitial multicatheter brachytherapy versus whole-breast irradiation with boost after breast-conserving surgery for low-risk invasive and in-situ carcinoma of the female breast: a randomised, phase 3, non-inferiority trial. www.thelancet.com Published online October 20, 2015
15. Banks A, Coronado G, Zimmerman R, et al. Breast conserving surgery with targeted intraoperative radiotherapy for the management of ductal carcinoma in situ. J Surg Oncol. 2018 Dec 27. doi: 10.1002/jso.25347. [Epub ahead of print]

Hypofraktionierte Radiotherapie

1. Hathout L, Hijal T, Théberge V, et al. Hypofractionated radiation therapy for breast ductal carcinoma in situ. Int J Radiat Oncol Biol Phys. 2013 Dec 1;87(5):1058-63.
2. De Rose F, Fogliata A, Franceschini D, et al. Hypofractionated volumetric modulated arc therapy in ductal **carcinoma** in situ: toxicity and cosmetic outcome from a prospective series. Br J Radiol. **2018** May;91(1085):20170634.

Boost-RT des Tumorbettes

1. Wong P, Lambert C, Agnihotram RV, et al. Ductal Carcinoma In Situ – The Influence of the Radiotherapy Boost on Local Control. Int J Radiation Oncology Biol Phys 2011; (epub ahead)
2. Rakovitch E, Narod SA, Nofech-Moses S, et al. Impact of boost radiation in the treatment of ductal carcinoma in situ: a population-based analysis. Int J Radiat Oncol Biol Phys. 2013 Jul 1;86(3):491-7.
3. Guenzi M, Giannelli F, Bosetti D, et al. Two different hypofractionated breast radiotherapy schedules for 113 patients with ductal carcinoma in situ: preliminary results. Anticancer Res. 2013 Aug;33(8):3503-7.

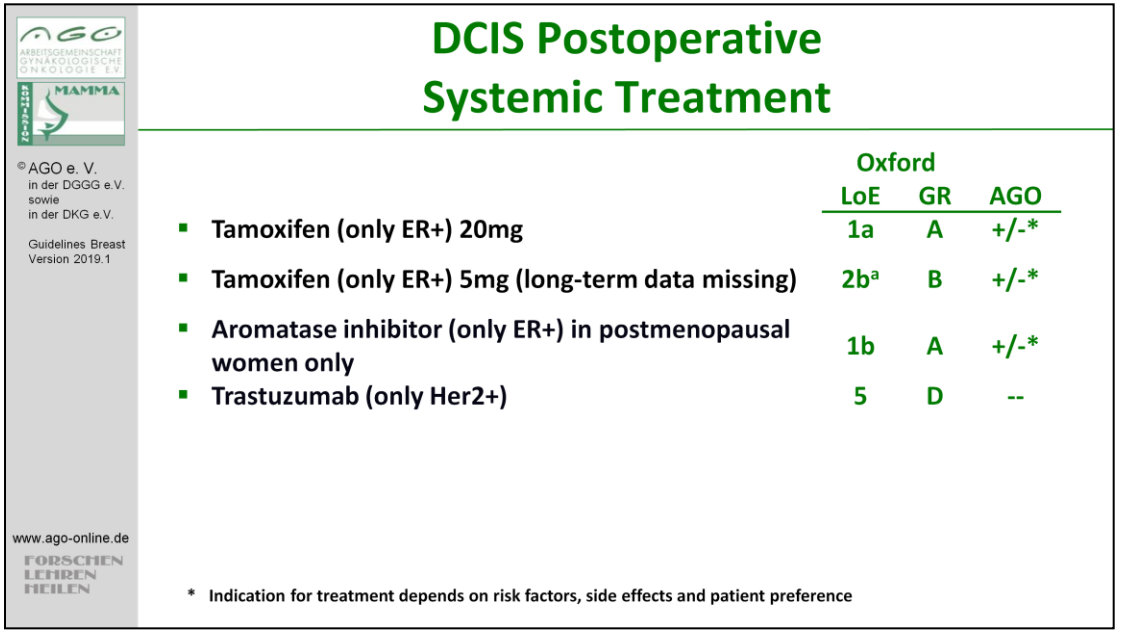
Intraoperative Strahlentherapie beim DCIS

1. Banks A, Coronado G, Zimmerman R et al. Breast conserving surgery with targeted intraoperative radiotherapy for the management of ductal carcinoma in situ. J Surg Oncol. 2018 Dec 27. doi: 10.1002/jso.25347. [Epub ahead of print]

DCIS Postoperative
Systemic Treatment - Statements

- Postoperative endocrine treatment has no impact on survival — LOE 1a
- Postoperative endocrine treatment may have a small effect on ipsilateral invasive recurrences — LOE 1a
- Endocrine treatment for DCIS has an effect on contralateral invasive cancer and ipsilateral and contralateral DCIS — LOE 1a
- The number needed to treat for any ipsilateral breast event is 15 — LOE 1a

Guidelines Breast
Version 2019.1



Tamoxifen (nur ER+, nur BET)

1. Fisher B, Dignam J, Wolmark N, et al. Tamoxifen in treatment of intraductal breast cancer: National Surgical Adjuvant Breast and Bowel Project B-24 randomised controlled trial. Lancet. 1999 Jun 12;353(9169):1993-2000.
2. Allred DC Breast Cancer Research and Treatment Vol 76 Suppl 1 Dec 2002: abstract 30
3. Virnig BA, Tuttle TM, Shamliyan T, et al. Ductal Carcinoma In Situ of the Breast: A Systematic Review of Incidence, Treatment, and Outcomes. J Natl Cancer Inst. 2010 Jan 13. [Epub ahead of print]
4. Cuzick J, I Sestak et al. (2010): “Effect of Tamoxifen and radiotherapy in women with locally excised ductal carcinoma in situ: long-term results form the UK / ANZ DCIS trial” Lancet Oncol (12) 21- 29
5. Eng-Wong J, JP Costantino et al. (2010): “The Impact of Systemic Therapy Following Ductal Carcinoma In Situ” J Natl Cancer Inst Monogr (41) 200 – 203
6. Wapnir IL, Dignam JJ, Fisher B, et al. Long-Term Outcomes of invasive ipsilateral breast tumor recurrences after lumpectomy in NSABP B-17 and B-24 randomized clinical trials for DCIS. J Natl Cancer Inst 2011; 103: 478-488
7. Badruddoja M. Ductal carcinoma in situ of the breast: a surgical perspective. Int J Surg Oncol. 2012;2012:761364. doi: 10.1155/2012/761364. Epub 2012 Sep 4.

8. Staley H, McCallum I, Bruce J. Postoperative tamoxifen for ductal carcinoma in situ. Cochrane Database Syst Rev. 2012 Oct 17;10:CD007847. doi: 10.1002/14651858.CD007847.pub2.
9. Lee DY, Lewis JL, Wexelman BA et al. The consequence of undertreatment of patients treated with breast conserving therapy for ductal carcinoma in-situ. Am J Surg. 2013 Nov;206(5):790-7.
10. Sprague BL, McLaughlin V, Hampton JM, et al. Disease-free survival by treatment after a DCIS diagnosis in a population-based cohort study. Breast Cancer Res Treat. 2013 Aug;141(1):145-54.
11. Staley H, McCallum I, Bruce J. Postoperative Tamoxifen for ductal carcinoma in situ: Cochrane systematic review and meta-analysis. Breast. 2014 Oct;23(5):546-51. doi: 10.1016/j.breast.2014.06.015. Epub 2014 Jul 9
12. Jack Cuzick, Ivana Sestak, Simon Cawthorn, et al. Tamoxifen for prevention of breast cancer: extended longterm follow-up of the IBIS-I breast cancer prevention trial. Lancet Oncol 2015; 16: 67–75

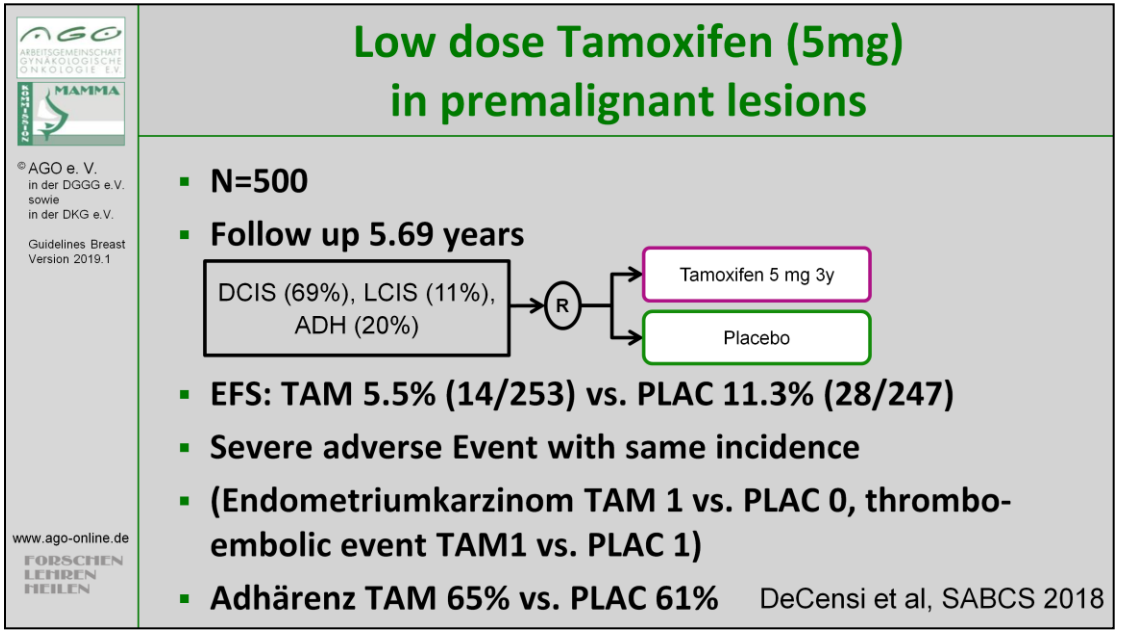
<u>AI (wenn postmenopausal und Kontraindikationen gegen Tamoxifen)</u>

<u>Andere endokrine Optionen Trastuzumab (nur HER2+)</u>

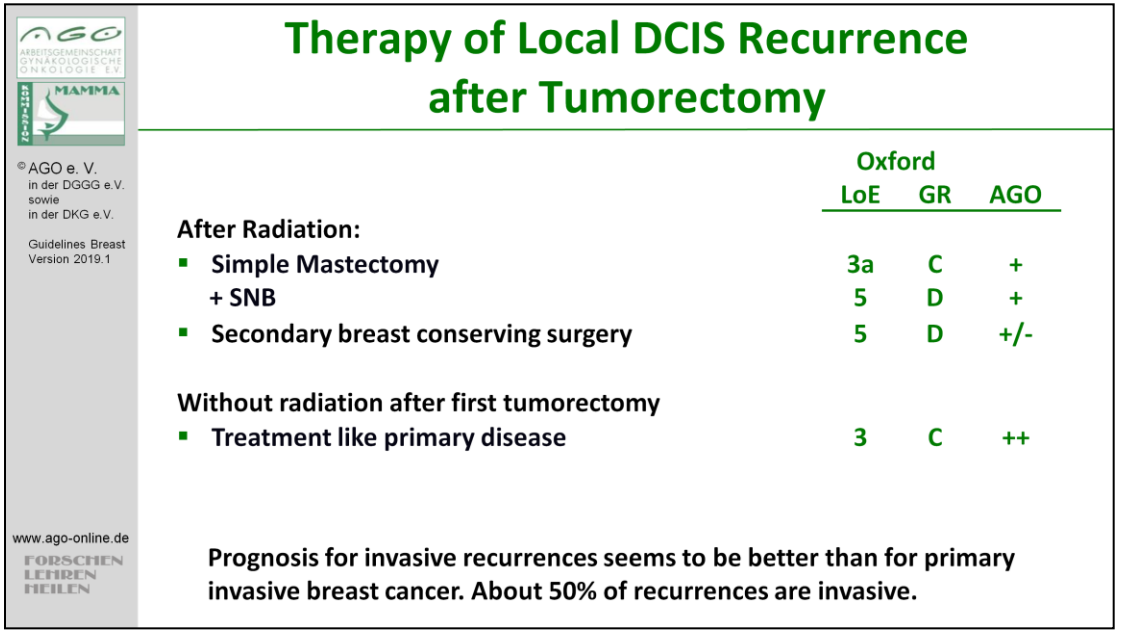
1. Cobleigh MA, Anderson SJ, Julian Tbet al. NSABP B-43: A phase III clinical trial to compare trastuzumab (T) given concurrently with radiation therapy (RT) to RT alone for women with HER2+ DCIS resected by lumpectomy (Lx). SABCS 2012; OT1-2-01
2. Siziopikou KP, Anderson SJ, Cobleigh MA et al. Preliminary results of centralized HER2 testing in ductal carcinoma in situ (DCIS): NSABP B-43. Breast Cancer Res Treat. 2013 Nov;142(2):415-21.
3. Richard G Margolese, Reena S Cecchini, Thomas B Julian, et al. Anastrozole versus tamoxifen in postmenopausal women with ductal carcinoma in situ undergoing lumpectomy plus radiotherapy (NSABP B-35): a randomised, double-blind, phase 3 clinical trial. www.thelancet.com Published online December 10, 2015
4. Patricia A Ganz, Reena S Cecchini, Thomas B Julian, et al. Patient-reported outcomes with anastrozole versus tamoxifen for postmenopausal patients with ductal carcinoma in situ treated with lumpectomy plus radiotherapy (NSABP B-35): a randomised, double-blind, phase 3 clinical trial. www.thelancet.com Published online December 10, 2015
5. John F Forbes, Ivana Sestak, Anthony Howell, et al. Anastrozole versus tamoxifen for the prevention of locoregional and contralateral

breast cancer in postmenopausal women with locally excised ductal carcinoma in situ (IBIS-II DCIS): a double-blind, randomized controlled trial. www.thelancet.com Published online December 11, 2015.

6. Wang L, Xia Y, Liu D, et al. Evaluating the efficacy of post-surgery adjuvant therapies used for ductal carcinoma (ca. in situ) patients: a network meta-analysis. Oncotarget. 2017;8(45):79257-79269.



1. H. Staley, I. McCallum, J. Bruce. The Breast 23 (2014) 546e551



Nach Radiatio

Einfache Mastektomie

+ SN B

1. Silverstein MJ, MD Lagios et al (1998): "Outcome After Invasive Local Recurrence in Patients With Ductal Carcinoma In Situ of the Breast" J Clin Oncol 16:1367-1373

Sekundäre Tumorektomie führt zu Rezidiven in bis zu 30 % der Fälle (NSABP B17)

1. Fisher ER, Dignam J, Tan-Chiu E et al. (1999): "Pathologic findings from the National Surgical Adjuvant Breast Project (NSABP) eight-year update of Protocol B-17: intraductal carcinoma" Cancer 86: 429 – 438

Keine Radiotherapie

Therapieindikation wie bei primär Erkrankung