Diagnosis and Treatment of Patients with early and advanced Breast Cancer

Early Detection and Diagnosis
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 DGfG

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


21. Siu AL, on behalf of the US Preventive Services Task Force Screening for breast cancer: U.S. Preventive Services Task Force


24. Walter LC, Schonberg MA. Screening mammography in older women: a review. JAMA 2014;311(13):1336-1347


**Tomosynthese**

2. Houssami N, Bernardi D, Pellegrini M et al.: Breast cancer detection using single-reading of breast tomosynthesis (3D-
mammography) compared to double-reading of 2D-mammography: Evidence from a population-based trial. (Storm-2)

3. Aujero MP, Gavenonis SC, Benjamin R et al.: Clinical Performance of Synthesized Two-dimensional Mammography Combined with

4. Raghu M, Durand MA, Andrejeva L et al.: Tomosynthesis in the Diagnostic Setting: Changing Rates of BI-RADS Final Assessment over

Tomosynthesis Screening Trial (MBTST): a prospective, population-based, diagnostic accuracy study. Lancet Oncol. 2018

6. Hofvind S, Hovda T, Holen ÅS et al.: Digital Breast Tomosynthesis and Synthetic 2D Mammography versus Digital Mammography:
2018 Mar 1.

7. Albert US, Schreer I; Arbeitsgruppe der Stufe-3-Leitlinie Mammarkarzinom.[S3 guideline breast cancer: update on early detection,

8. Marinovich ML, Hunter KE, Macaskill P, Houssami N. Breast Cancer Screening Using Tomosynthesis or Mammography: A Meta-

https://doi.org/10.1007/s12282-018-0859-3

in women with dense breasts – a systematic review and meta-analysis. BMC Cancer 2018:18:380; https://doi.org/10.1186/s12885-
018-4263-3

Radiation Dose


Mammography density assessment


Breast cancer mortality reduction


## Breast cancer: incidence and mortality

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

<table>
<thead>
<tr>
<th>Age</th>
<th>Incidence/1000</th>
<th>Mortality/1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 to 44</td>
<td>1.2</td>
<td>0.1</td>
</tr>
<tr>
<td>45 to 49</td>
<td>1.7</td>
<td>0.2</td>
</tr>
<tr>
<td>50 to 69</td>
<td>2.7</td>
<td>0.5</td>
</tr>
<tr>
<td>70 to 74</td>
<td>3.0</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Mammography-Screening Benefit and Harm

Data background: Breast Cancer Surveillance Consortium Registry Data per 10,000 Women screened over 10 years

<table>
<thead>
<tr>
<th>Age</th>
<th>40-49</th>
<th>50-59</th>
<th>60-69</th>
<th>70-74</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer death avoided (CI95%)</td>
<td>3 (0-9)</td>
<td>8 (2-17)</td>
<td>21 (11-32)</td>
<td>13 (0-32)</td>
</tr>
<tr>
<td>False-positive (n)</td>
<td>1212</td>
<td>932</td>
<td>808</td>
<td>696</td>
</tr>
<tr>
<td>Breast biopsies (n)</td>
<td>164</td>
<td>159</td>
<td>165</td>
<td>175</td>
</tr>
<tr>
<td>False-negative (n)</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
</tbody>
</table>

Siu AL on behalf of the USPSTF 2016, 164:279–296
Breast ultrasound as an adjunct to screening mammography


ABUS/AVUS


5. Golatta M, Baggs C, Schweitzer-Martin M, et al. Evaluation of an automated breast 3D-ultrasound system by comparing it with hand-
held ultrasound (HHUS) and mammography. Arch Gynecol Obstet 2015;291:889-895


US-Screening


Dense Breast

Elevated Risk

**Recommendations International**


**MRI-Screening:**


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**Early Detection Clinical Examination**

<table>
<thead>
<tr>
<th>As stand alone procedure</th>
<th>Oxford</th>
<th>LoE</th>
<th>GR</th>
<th>AGO</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Self-examination</td>
<td>1a</td>
<td>A</td>
<td>-*</td>
<td></td>
</tr>
<tr>
<td>• Clinical breast examination (CBE) by health professionals</td>
<td>3b</td>
<td>C</td>
<td>-*</td>
<td></td>
</tr>
<tr>
<td>• CBE because of mammographic/sonographic lesion</td>
<td>5</td>
<td>D</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>• CBE in combination with imaging</td>
<td></td>
<td></td>
<td></td>
<td>BCP</td>
</tr>
</tbody>
</table>

* May increase breast awareness

Assessment of Breast Symptoms or Lesions

<table>
<thead>
<tr>
<th>Oxford</th>
<th>LoE</th>
<th>GR</th>
<th>AGO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical examination</td>
<td>3b</td>
<td>B</td>
<td>++</td>
</tr>
<tr>
<td>Mammography</td>
<td>1b</td>
<td>A</td>
<td>++</td>
</tr>
<tr>
<td>Tomosynthesis</td>
<td>2b</td>
<td>B</td>
<td>+</td>
</tr>
<tr>
<td>Contrast-enhanced mammography (alone or as adjunct)</td>
<td>3a</td>
<td>B</td>
<td>+/-</td>
</tr>
<tr>
<td>Sonography</td>
<td>2b</td>
<td>B</td>
<td>++</td>
</tr>
<tr>
<td>Elastography (shear-wave)</td>
<td>2b</td>
<td>B</td>
<td>+</td>
</tr>
<tr>
<td>Automated 3D-sonography</td>
<td>3b</td>
<td>B</td>
<td>+/-</td>
</tr>
<tr>
<td>Minimally invasive biopsy</td>
<td>1c</td>
<td>A</td>
<td>++</td>
</tr>
<tr>
<td>MRI**</td>
<td>1b</td>
<td>B</td>
<td>+</td>
</tr>
</tbody>
</table>

* Adjunct assessment
** If clinical examination, mammography and sonography incl. needle biopsy do not allow a definite diagnosis

Combined DM + DBT + US + MRI

US-Axilla +FNA/CNB
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

Biopsie
   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)

MRT
   Breast Cancer Res Treat 2010; 119: 415-422
   based study. JAMA Oncol 2015;1(9):1238-1250
6. Houssami N, Turner R, Macaskill P, et al. An individual person data meta-analysis of preoperative magnetic resonance imaging and


Reviews CESM:


CESM Originalarbeiten:


Combined DM + DBT + US + MRI


US-Axilla +FNA/CNB


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**Pre-therapeutic Assessment of Breast and Axilla**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Oxford LoE</th>
<th>Oxford GR</th>
<th>AGO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical examination</td>
<td>5</td>
<td>D</td>
<td>++</td>
</tr>
<tr>
<td>Mammography</td>
<td>2b</td>
<td>B</td>
<td>++</td>
</tr>
<tr>
<td>+ Tomosynthesis (DBT)</td>
<td>3b</td>
<td>B</td>
<td>+</td>
</tr>
<tr>
<td>Contrast-enhanced mammography (alone or as adjunct)</td>
<td>3a</td>
<td>B</td>
<td>+/-</td>
</tr>
<tr>
<td>Sonography (breast and axilla)</td>
<td>2b</td>
<td>B</td>
<td>++</td>
</tr>
<tr>
<td>MRI*</td>
<td>1b</td>
<td>B</td>
<td>+</td>
</tr>
<tr>
<td>Minimally invasive biopsy**</td>
<td>1b</td>
<td>A</td>
<td>++</td>
</tr>
<tr>
<td>Breast-CT</td>
<td>5</td>
<td>D</td>
<td>-</td>
</tr>
</tbody>
</table>

* MRI-guided vacuum biopsy is mandatory in case of MRI-detected additional lesions.
  Individual decision for patients at high familiar risk, with dense breast (density 3-4/diagnostic assessability C-D), lobular invasive tumours, suspicion of multilocular disease. No reduction in re-excision rate.

** Histopathology of lesions if relevant for treatment.

Biopsie
2. Lourenco AP, Mainiero MB Incorporating imaging into the locoregional management of breast cancer. Semin Radiat Oncol 2016;26(1)

MRT
6. Houssami N, Turner R, Macaskill P, et al. An individual person data meta-analysis of preoperative magnetic resonance imaging and


Reviews CESM:

CESM original papers:
MRI: Preoperative Staging

- 9 eligible studies
  (2 randomized trials; 7 comparative cohorts)
- 3112 patients with BC
- MRI versus no-MRI:
  - Initial mastectomy 16.4% versus 8.1%
    [OR, 2.22 (P < 0.001); adjusted OR, 3.06 (P < 0.001)]
  - Re-excision after initial breast conservation 11.6% versus 11.4%
    [OR, 1.02 (P = 0.87); adjusted OR, 0.95 (P = 0.71)]
  - Overall mastectomy 25.5% versus 18.2%
    [OR, 1.54 (P < 0.001); adjusted OR, 1.51 (P < 0.001)]


## Sensitivities CESM

<table>
<thead>
<tr>
<th>Author</th>
<th>n</th>
<th>MG</th>
<th>CESM</th>
<th>MRI</th>
<th>US</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dromain 2011</td>
<td>110</td>
<td>78</td>
<td>92</td>
<td></td>
<td></td>
<td>Per patient</td>
</tr>
<tr>
<td>Fallenberg 2014</td>
<td>118</td>
<td>77.9</td>
<td>94.7</td>
<td></td>
<td></td>
<td>Per patient</td>
</tr>
<tr>
<td>Makkar 2014</td>
<td>80</td>
<td>93.2</td>
<td>97.7</td>
<td></td>
<td></td>
<td>Per patient</td>
</tr>
<tr>
<td>Lobes 2014*</td>
<td>113</td>
<td>96.9</td>
<td>100</td>
<td></td>
<td></td>
<td>Per patient</td>
</tr>
<tr>
<td>Perez 2015 ECR</td>
<td>98</td>
<td>78</td>
<td>66</td>
<td></td>
<td></td>
<td>Per lesion</td>
</tr>
<tr>
<td>Luczniska 2014</td>
<td>152</td>
<td>91</td>
<td>100</td>
<td></td>
<td></td>
<td>Per lesion</td>
</tr>
<tr>
<td>Jochelson 2012</td>
<td>52</td>
<td>81</td>
<td>96</td>
<td>96</td>
<td></td>
<td>Per patient</td>
</tr>
<tr>
<td>Fallenberg 2013</td>
<td>80</td>
<td>81</td>
<td>100</td>
<td>97</td>
<td></td>
<td>Per patient</td>
</tr>
<tr>
<td>Fallenberg 2016</td>
<td>155</td>
<td>81</td>
<td>94</td>
<td>95</td>
<td>76</td>
<td>Index</td>
</tr>
<tr>
<td>Latj 2016*</td>
<td>199</td>
<td>93</td>
<td>96.9</td>
<td></td>
<td></td>
<td>Per patient</td>
</tr>
<tr>
<td>Tennant 2016</td>
<td>100</td>
<td>84</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luczniska 2016</td>
<td>116</td>
<td>90</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Recall from Screening

CESM is comparable to MRI regarding index, a bit inferior for additional lesions.
Statement: history and physical examination
1. GCP

Statement: high metastatic potential / symptoms


