Screened data bases

Pubmed 2007 - 2019, ASCO 2010 – 2019, SABCS 2010 – 2019, Cochrane Data Base (2019)

Screened guidelines

1. ABC Consensus Guidelines for Advanced Breast Cancer (ABC 1-4): Cardoso F, Costa A, Senkus E et al. 3rd ESO-ESMO International Consensus Guidelines for Advanced Breast Cancer (ABC 3). Ann Oncol. 2017 Jan 1;28(1):16-33.
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7. NCCN (National Comprehensive Cancer Network , 2019): http://www.nccn.org

8. S3-Leitlinie: Supportive Therapie:
Leitlinienprogramm Onkologie (Deutsche Krebsgesellschaft, Deutsche Krebshilfe, AWMF): Supportive Therapie bei onkologischen PatientInnen - Langversion 1.2 – November 2019 AWMF-Registernummer: 032/054OL Zugrifff 26.12.2019

Supportive Therapie und Nebenwirkungsmanagement

- **Version 2002–2020:**
  Albert / Bauerfeind / Brunnert / Bischoff / Costa / Dall / Diel / Fersis / Friedrich / Friedrichs / Gerber / Göhring / Hanf / Harbeck / Heinrich / Huober / Jackisch / Lisboa / Lück / Lüftner / von Minckwitz / Möbus / Müller / Nitz / Oberhoff / Rody / Schaller / Scharl / Schmidt / Schneeweiss / Schütz / Solomayer / Souchon / Stickeler / Thomssen / Untch

- **Version 2021:**
  Mundhenke / Nitz

AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2021.1D

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

- **Leitlinien - Umfeld**

1. S3-Leitlinie: Supportive Therapie:
   Leitlinienprogramm Onkologie (Deutsche Krebsgesellschaft, Deutsche Krebshilfe, AWMF): Supportive Therapie bei onkologischen PatientInnen - Langversion 1.2 – November 2019 AWMF-Registernummer: 032/054OL Zugriff 26.12.2019 https://www.leitlinienprogramm-onkologie.de/fileadmin/user_upload/Downloads/Leitlinien/Supportivtherapie/LL_Supportiv_Langversion_1.2.pdf

AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2021.1D

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- **Toxizitätsbeurteilung**
  - **Akute Toxizität (NCI-CTCAE)**
  - **Langzeittoxizität (ICPC, ICD-GM)**

Toxizitäts-Beurteilung

Akute Toxizität (nach WHO[1] oder NCI-CTC[2])

Akute Toxizität nach jedem Therapiezyklus abfragen und dokumentieren — LoE 5 D AGO ++

Grad	Notwendige Informationen
0 keine	Beteiligte Organe
1 mild	Art der Toxizität
2 mäßig	Zeitintervall nach Behandlung
3 ausgeprägt	Effekt auf den Allgemeinstatus
4 lebensbedrohlich	Behandlungsnotwendigkeit
5 therapiebedingter Tod	Erreichen einer Verbesserung

Langzeittoxizität (=Sekundärerkrankungen nach Tumortherapie)

Langzeitnachsorge und regelmäßige Dokumentation (symptomorientiert nach ICPC[3] oder diagnoseorientiert nach ICD-10-GM[4]) — LoE 5 D AGO ++

Akute Toxizität

1. WHO Handbook for reporting results of cancer treatment, N0 48 (1979) (WHO offset Publications, Geneva)
2. NCI, Bethesda, USA, Common Terminology Criteria for Adverse Events v5.0 (CTCAE; published 2017); https://ctep.cancer.gov/protocolDevelopment/electronic_applications/ctc.htm#ctc_50 (Download 18.01.2018)

Akute Toxizität nach jedem Therapiezyklus abfragen

1. Cirillo M, Lunardi G, Coati F, et al: Management of oral anticancer drugs: Feasibility and patient approval of a specific monitoring program. Tumori 100: 243-248, 2014

Langzeittoxizität

1. International Classification of Primary Care (ICPC) revised December 2016, http://www.who.int/classifications/icd/adaptations/icpc2/en/ (Download 18.01.2018) or http://www.globalfamilydoctor.com/groups/WorkingParties/wicc.aspx (Download 18.01.2018)
2. Deutschen Institut für Medizinische Dokumentation und Information (DIMDI), ICD-10-GM Version 2017; https://www.dimdi.de/static/de/klassi/icd-10-gm/kodesuche/onlinefassungen/htmlgm2017/ (Download 18.01.2018)
3. Kenyon M, Mayer DK, Owens AK. Late and long-term effects of breast cancer treatment and surveillance management for the general

practitioner. J Obstet Gynecol Neonatal Nurs. 2014 May-Jun;43(3):382-98.
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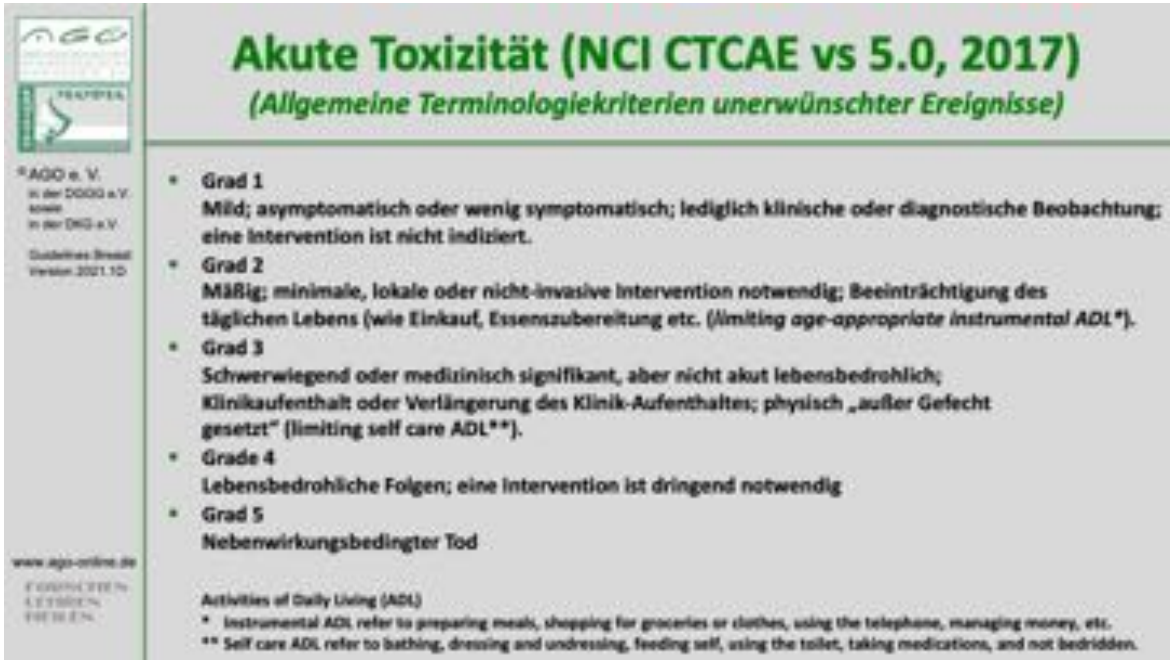
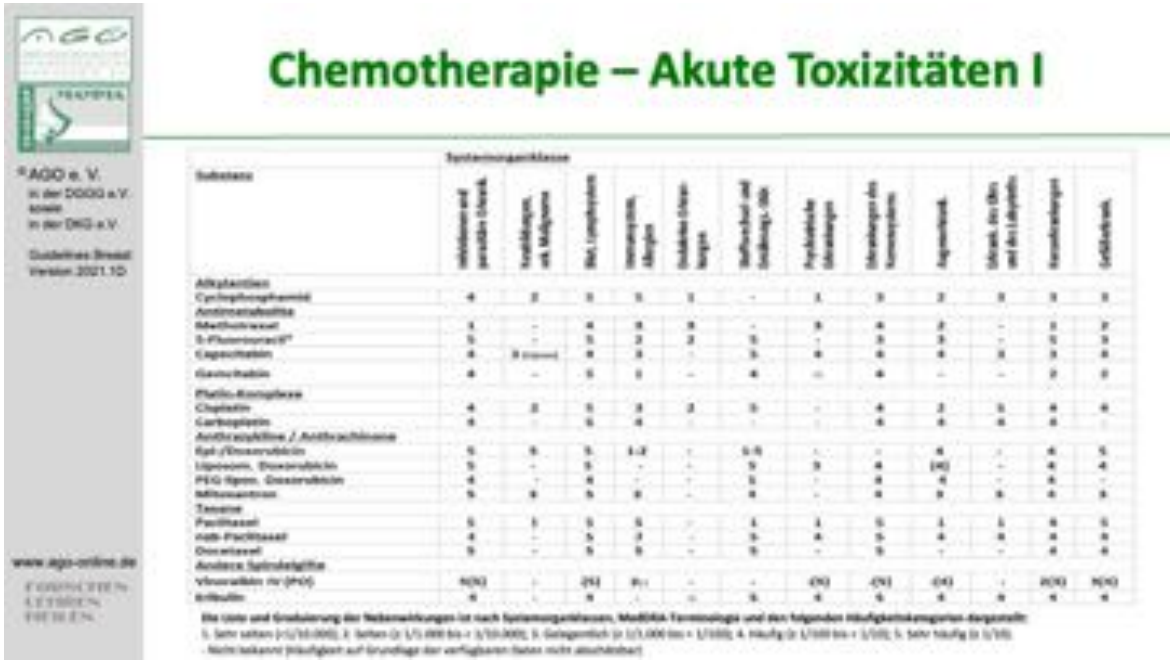


1. NCI, Bethesda, USA, Common Terminology Criteria for Adverse Events v5.0 (CTCAE; published 2017); https://ctep.cancer.gov/protocolDevelopment/electronic_applications/ctc.htm#ctc_50 (Download 18.01.2018)

*MedDRA - Medical Dictionary for Regulatory Activities

https://www.meddra.org/



Nebenwirkungskategorien - MedDRA (Medical Dictionary for Regulatory Activities)

MedDRA: https://www.meddra.org/ bzw.
https://www.meddra.org/sites/default/files/guidance/file/intguide_20_1_english_0.pdf

Quellen für die Fachinformationen (Download 19.01.2018)

Cyclophosphamid: http://www.baxter.de/de_DE/assets/downloads/fachinformation/endoxan.pdf
Methotrexat: https://www.gelbe-liste.de/produkte/MTX-HEXAL-10-mg-Tabletten_117469/fachinformation
5-Fluorouracil: https://www.gelbe-liste.de/produkte/Fluorouracil-HEXAL-50-mg-ml-Injektionsloesung-100-ml_546519/fachinformation
Capecitabin: https://www.zentiva.de/Produkte/Capecitabin-Zentiva/Downloads?id=a63946ee-51ce-46ac-8184-a468b705ed9b
Gemcitabin: http://www.success-studie.de/b/downloads/Fachinfo/GemzarFI07Jan.pdf
Cisplatin: https://www.gelbe-liste.de/produkte/Cisplatin-Teva-1-mg-ml-Konzentrat-zur-Herstellung-einer-Infusionsloesung-100-ml_543960/fachinformation
Carboplatin: http://www.teva.de/index.php?eID=dumpFile&t=f&f=37532&g=-1&r=11068%2C11068&token=eebfb22e78f1cc8d9935d59c087e80630146f49e
Epirubicin:

Doxorubicin:
Liposomales Doxorubicin: https://www.gelbe-liste.de/produkte/Myocet-50-mg-Pulver-Dispersion-u-Loesungsmittel-fuer-ein-Konzentrat-zur-Herstellung-einer-Infusionsdispersion_359323/fachinformation
PEG-lipo. Doxorubicin: https://www.gelbe-liste.de/produkte/Caelyx-2-mg-ml-Konzentrat-zur-Herstellung-einer-Infusionsloesung-10-ml_121890/fachinformation
Mitoxantron: https://www.gelbe-liste.de/produkte/Mitoxantron-Teva-2-mg-ml-Injektionsloesung-15ml_543783/fachinformation
Paclitaxel: https://medikamio.com/de-de/medikamente/paclitaxel-ratiopharm/pil
Nab-Paclitaxel: https://www.gelbe-liste.de/produkte/Abraxane-5-mg-ml-Pulver-zur-Herstellung-einer-Infusionssuspension_514889/fachinformation
Docetaxel: https://mein.sanofi.de/produkte/Taxotere/Downloads?id=89447754-dfb2-450b-b35a-36950de8a74d
Vinorelbin: http://www.detect-studien.de/dokumente/d3/fachinfo/Navelbine.pdf
Eribulin: http://www.detect-studien.de/dokumente/d4/fachinfo/Fachinfo_Eribulin_Halaven.pdf

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2. Petrelli F et al: Mortality, leukemic risk, and cardiovascular toxicity of adjuvant anthracycline and taxane chemotherapy in breast cancer: a meta-analysis. Breast Cancer Res Treat. 2012 Sep;135(2):335-46
3. Jim HS et al: Meta-analysis of cognitive functioning in breast cancer survivors previously treated with standard-dose chemotherapy. J Clin Oncol. 2012 Oct 10;30(29):3578-87
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metastatic breast cancer previously treated with anthracyclines and taxanes.See comment in PubMed Commons below Breast. 2017 Jan 2;32:66-72. doi: 10.1016/j.breast.2016.12.017.
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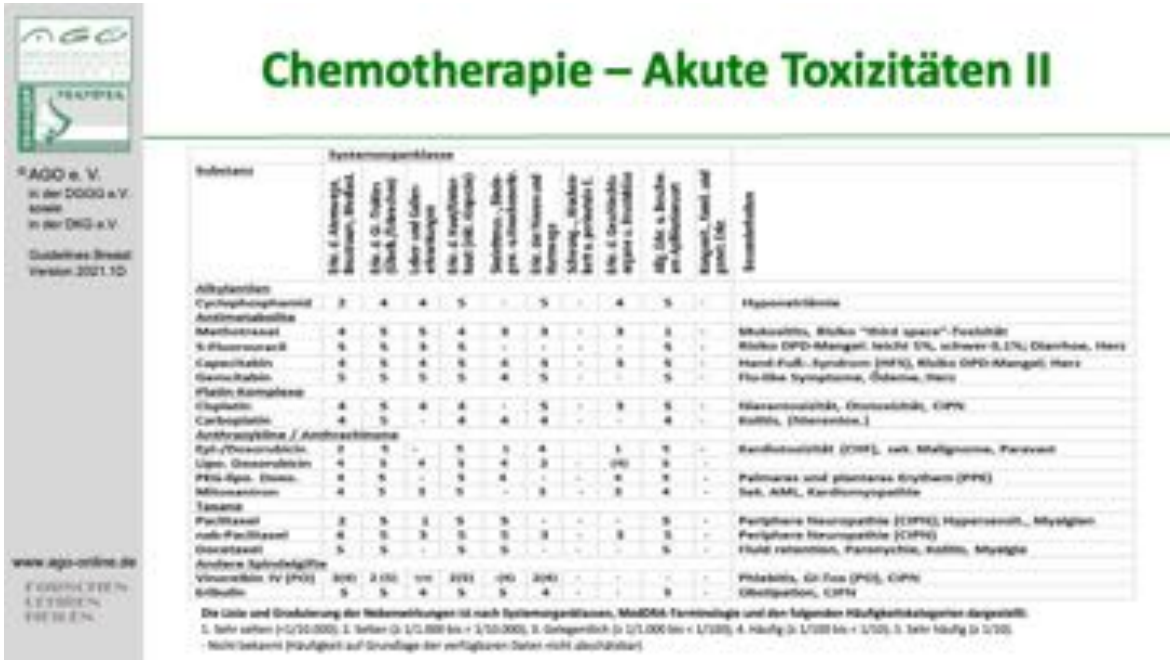
11. NCCN, editor. NCCNR Practice Guidelines in Oncology - v.1.2011; Myeloid Growth Factors. National Comprehensive Cancer Network 2011. 18-7-2011.
12. Madeddu C, Deidda M, Piras A, et al. Pathophysiology of cardiotoxicity induced by nonanthracycline chemotherapy. J Cardiovasc Med (Hagerstown). 2016 May;17 Suppl 1 Special issue on Cardiotoxicity from Antiblastic Drugs and Cardioprotection:e12-e18. Review.



Abkürzungen

AML = Akute myeloische Leukämie; DPD = Dihydropyrimidin-Dehydrogenase); CHF = Kardiomyopathie; CIPN = Chemotherapie induzierte periphere Neuropathie; HFS = Hand-Fuß-Syndrom; PPE = Palmares und plantares Erythem.

Nebenwirkungskategorien - MedDRA (Medical Dictionary for Regulatory Activities)

MedDRA: https://www.meddra.org/ bzw. https://www.meddra.org/sites/default/files/guidance/file/intguide_20_1_english_0.pdf

Quellen für die Fachinformationen (Download 19.01.2018)

Cyclophosphamid: http://www.baxter.de/de_DE/assets/downloads/fachinformation/endoxan.pdf
Methotrexat: https://www.gelbe-liste.de/produkte/MTX-HEXAL-10-mg-Tabletten_117469/fachinformation
5-Fluorouracil: https://www.gelbe-liste.de/produkte/Fluorouracil-HEXAL-50-mg-ml-Injektionsloesung-100-ml_546519/fachinformation
Capecitabin: https://www.zentiva.de/Produkte/Capecitabin-Zentiva/Downloads?id=a63946ee-51ce-46ac-8184-a468b705ed9b
Gemcitabin: http://www.success-studie.de/b/downloads/Fachinfo/GemzarFI07Jan.pdf
Cisplatin: https://www.gelbe-liste.de/produkte/Cisplatin-Teva-1-mg-ml-Konzentrat-zur-Herstellung-einer-

Infusionsloesung-100-ml_543960/fachinformation
Carboplatin: http://www.teva.de/index.php?eID=dumpFile&t=f&f=37532&g=-1&r=11068%2C11068&token=eebfb22e78f1cc8d9935d59c087e80630146f49e
Epirubicin:
Doxorubicin:
Liposomales Doxorubicin: https://www.gelbe-liste.de/produkte/Myocet-50-mg-Pulver-Dispersion-u-Loesungsmittel-fuer-ein-Konzentrat-zur-Herstellung-einer-Infusionsdispersion_359323/fachinformation
PEG-lipo. Doxorubicin: https://www.gelbe-liste.de/produkte/Caelyx-2-mg-ml-Konzentrat-zur-Herstellung-einer-Infusionsloesung-10-ml_121890/fachinformation
Mitoxantron: https://www.gelbe-liste.de/produkte/Mitoxantron-Teva-2-mg-ml-Injektionsloesung-15ml_543783/fachinformation
Paclitaxel: https://medikamio.com/de-de/medikamente/paclitaxel-ratiopharm/pil
Nab-Paclitaxel: https://www.gelbe-liste.de/produkte/Abraxane-5-mg-ml-Pulver-zur-Herstellung-einer-Infusionssuspension_514889/fachinformation
Docetaxel: https://mein.sanofi.de/produkte/Taxotere/Downloads?id=89447754-dfb2-450b-b35a-36950de8a74d
Vinorelbin: http://www.detect-studien.de/dokumente/d3/fachinfo/Navelbine.pdf
Eribulin: http://www.detect-studien.de/dokumente/d4/fachinfo/Fachinfo_Eribulin_Halaven.pdf

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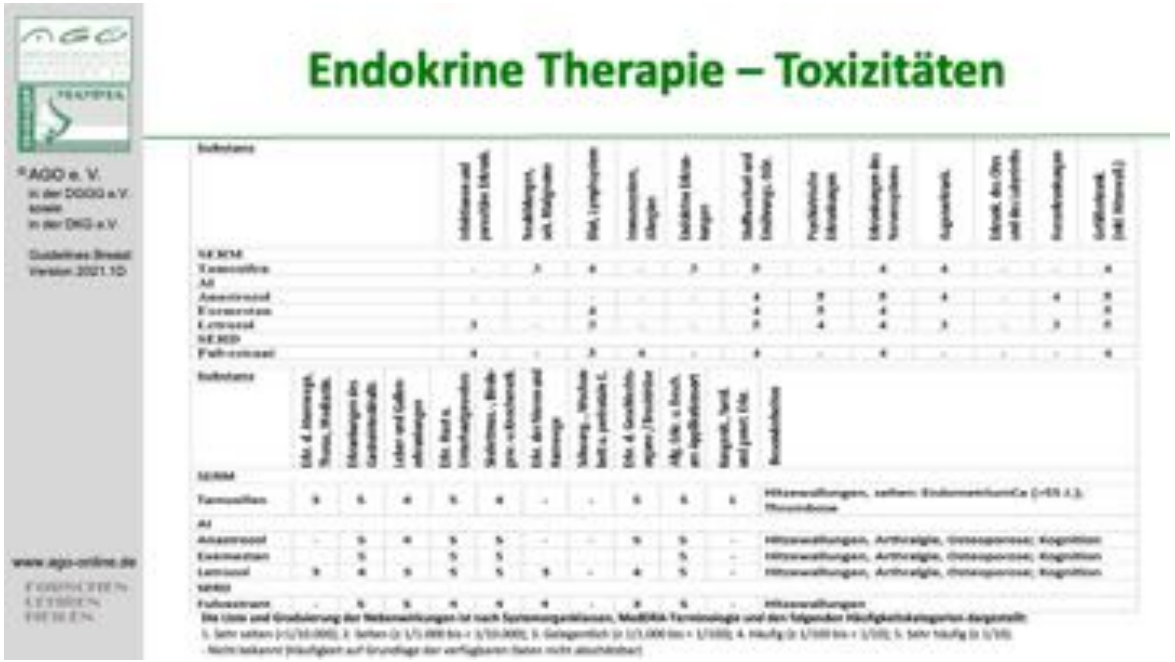

Nebenwirkungskategorien - MedDRA (Medical Dictionary for Regulatory Activities)

MedDRA: https://www.meddra.org/ bzw.
https://www.meddra.org/sites/default/files/guidance/file/intguide_20_1_english_0.pdf

Quellen für die Fachinformationen (Download 19.01.2018)

Tamoxifen: https://www.gelbe-liste.de/produkte/Tamoxifen-20-mg-HEXAL-Filmtbl_8660/fachinformation

Anastrozol: https://imedikament.de/anastrozol-ratiopharm-1-mg-filmtabletten/fachinformation

Exemestan: http://www.success-studie.de/c/downloads/Fachinfo/FI_ExemestanAromasin.pdf

Letrozol: http://www.success-studie.de/b/downloads/Fachinfo/Femara_Juli_2014.pdf

Fulvestrant: https://www.gelbe-liste.de/produkte/Fulvestrant-HEXAL-250-mg-Injektionsloesung-in-einer-Fertigspritze_912622/fachinformation

Nebenwirkungen – Antikörper/ Antikörper-Wirkstoff-Konjugate

	Oxford LoE	Oxford GR
Trastuzumab		
• Kardiotoxizität in der adjuvanten Therapie (1,0–2,0%)	1b	A
• Troponin I als Marker für Kardiotoxizität	2b	B
Pertuzumab		
• Ekzem, Diarrhoe, Mukositis	1b	A
Trastuzumab-Emtansin (T-DM1)		
• Thrombozytopenie, Anstieg Leberenzyme Fieber, Kopfschmerzen, Pneumonitis, Polyneuropathie	1b	A
Bevacizumab		
• Hypertonus, linksventrikuläre Dysfunktion Blutung, Proteinurie	1a	A
Trastuzumab-Deruxtecan		
• Interstitielle Lungenerkrankung, Neutropenie, Übelkeit	2b	B

Cardiotoxicity….

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Troponin I….

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Pertuzumab

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T-DM1

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Trastuzumab-Deruxtecan

1. Modi S, Saura C, Yamashita T, et al.: Trastuzumab deruxtecan in previously treated her2-positive breast cancer. N Engl J Med 2019.
2. Tamura K, Tsurutani J, Takahashi S, et al.: Trastuzumab deruxtecan (ds-8201a) in patients with advanced her2-positive breast cancer previously treated with trastuzumab emtansine: A dose-expansion, phase 1 study. Lancet Oncol 2019;20:816-826.

Nebenwirkungen antiHER2-TKI: Neratinib, Lapatinib

Lapatinib

UE, %	Alle Grade	Grad >/=3
Diarrhöe	61%	6%
Nausea	18%	4%
Hautausschlag	60%	6%
Fatigue	16%	4%
Kardiale NW	3%	< 1% SAE
Hepatobiliäre NW	8%	
Alle UE	92%	SAE 6%

Neratinib

UE, %	Alle Grade (%)	Grad >/=3 (%)
Diarrhöe	90	40,1
Nausea	43	2
Bauchschmerzen	36	2
Fatigue	27	2
Erbrechen	26	3
Hautausschlag	18	0,6
Stomatitis	14	0,6
Appetitverlust	12	0,2
Dyspepsie	10	0,4
ALAT-Erhöhungen	9	1,2
ASAT-Erhöhungen	7	0,7
Nagelstörungen	8	0,3
Trockene Haut	6	0

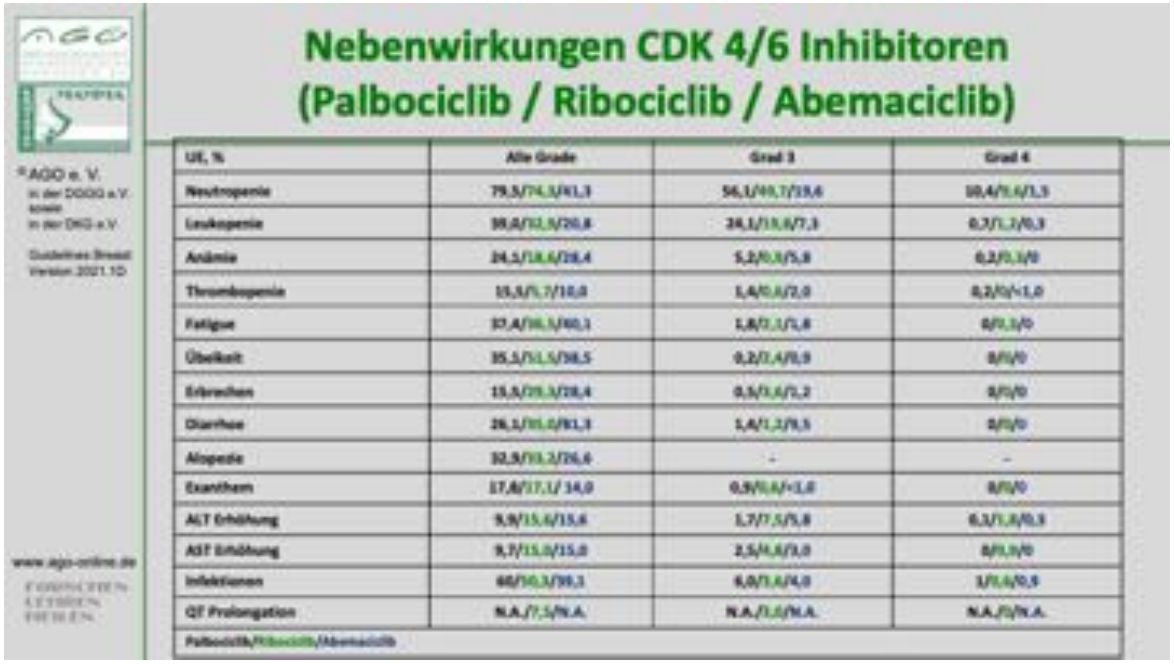
	LoE	GR	AGO
Primäre Prophylaxe mit Loperamid	2b	B	++

1. Chan A, Delagoge S, Holmes FA et al Neratinib after trastuzumab –based adjuvant therapy in patients with HER2 positive breast cancer (ExteNET): a multicentr, randomized, double.-blind, placebo controlled , phase III trial. Lancet Oncol 17(39: 367-377, 2016
2. Piccart-Gebhart M , Holmes E., Baselga J et al Adjuvant Lapatinib and Trastuzumab for Early Human Epidermal Growth Factor Receptor 2-positive Breast Cancer:Results From the Randomized Phase III Adjuvant Lapatinib and/or Trastuzumab Treatment Optimization Trial. JCO 34:1034-1042, 2015
3. Neratinib: FDA Produktinformation 2017

Nebenwirkungen anti-HER2 TKI
Tucatinib+ Trastuzumab+ Capecitabin

NW	Alle Grade (%)	≥ Gad 3 (%)
Alle Ereignisse	99.3	55.2
Diarrhoe	80.9	12.9
PPE Syndrom	63.4	13.1
Übelkeit	58.4	3.7
Fatigue	45.0	4.7
Erbrechen	35.9	3.0
Stomatitis	25.5	2.5
Red. Appetit	24.8	0.5
Kopfschmerz	21.5	0.5

1. Murthy RK, Loi S, Okines A, Paplomata E, Hamilton E, Hurvitz SA, Lin NU, Borges V, Abramson V, Anders C, Bedard PL, Oliveira M, Jakobsen E, Bachelot T, Shachar SS, Müller V, Braga S, Duhoux FP, Greil R, Cameron D, Carey LA, Curigliano G, Gelmon K, Hortobagyi G, Krop I, Loibl S, Pegram M, Slamon D, Palanca-Wessels MC, Walker L, Feng W, Winer EP. Tucatinib, Trastuzumab, and Capecitabine for HER2-Positive Metastatic Breast Cancer. N Engl J Med. 2020 Feb 13;382(7):597-609. doi: 10.1056/NEJMoa1914609. Epub 2019 Dec 11.



UE, %	Alle Grade	Grad 3	Grad 4
Neutropenie	79,5/74,3/41,3	56,1/40,7/19,6	10,4/1,6/1,3
Leukopenie	38,6/32,9/20,8	24,1/11,6/7,3	0,7/1,2/0,3
Anämie	24,5/18,6/16,4	5,2/0,3/5,8	0,2/0,3/0
Thrombopenie	15,3/1,7/10,0	1,4/0,3/2,0	0,2/0/<1,0
Fatigue	37,4/30,3/40,1	1,8/1,1/1,8	0/0,3/0
Übelkeit	35,5/11,5/38,5	0,2/1,4/0,9	0/0/0
Erbrechen	15,5/09,3/28,4	0,5/1,6/1,2	0/0/0
Diarrhoe	26,1/31,0/41,3	1,4/1,2/0,5	0/0/0
Alopezie	32,9/33,2/26,6	-	-
Exanthem	17,6/17,1/ 14,0	0,9/0,6/<1,0	0/0/0
ALT Erhöhung	9,9/15,6/15,6	1,7/7,1/5,8	0,3/1,8/0,3
AST Erhöhung	9,7/15,0/15,0	2,5/4,6/3,0	0/0,9/0
Infektionen	40/30,3/39,3	6,0/3,6/4,0	1/0,6/0,9
QT Prolongation	N.A./7,1/N.A.	N.A./1,0/N.A.	N.A./0/N.A.
Palbociclib/Ribociclib/Abemaciclib			

Palbociclib

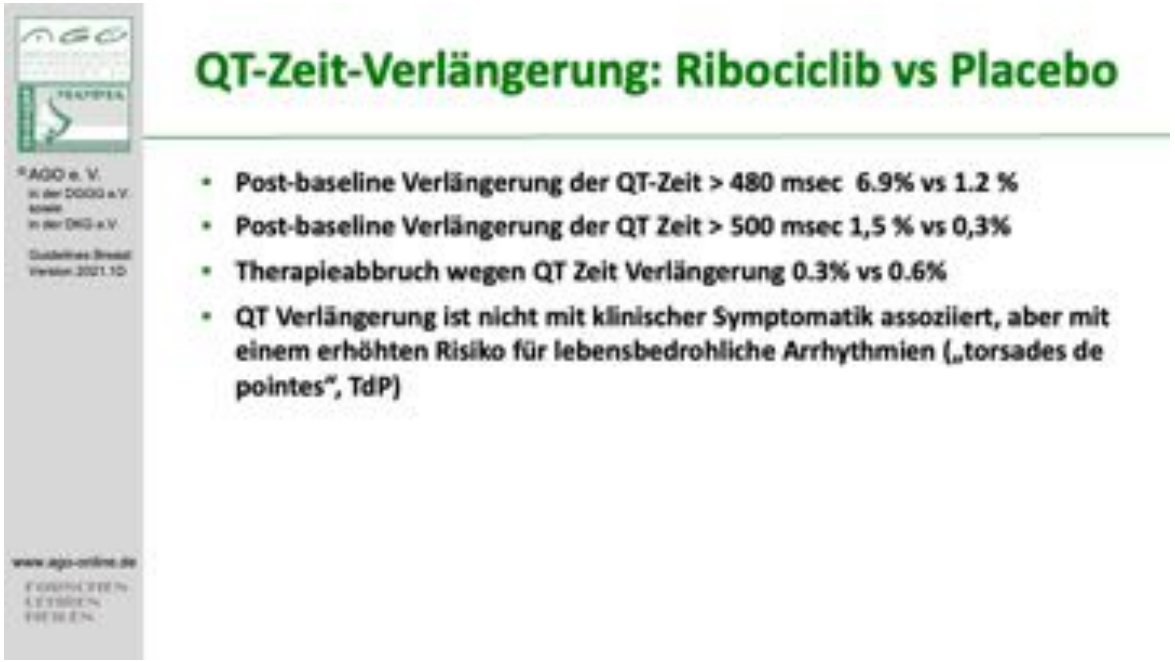
1. Verma S, Bartlett CH, Schnell P, et al. Palbociclib in Combination With Fulvestrant in Women With Hormone Receptor-Positive/HER2-Negative Advanced Metastatic Breast Cancer: Detailed Safety Analysis From a Multicenter, Randomized, Placebo-Controlled, Phase III Study (PALOMA-3). Oncologist. 2016 Oct;21(10):1165-1175. Epub 2016 Jul 1.
2. N.Harbeck, J. Ettl, Palbociclib, CDK 4/ 6 Inhibition als neue Therapieoption bei Patientinnen mit fortgeschrittenem HR+/ Her – Mammakarzinom. Drug Report, 2017

Ribociclib

1. Hortobagyi GN, Stemmer SM, Burris HA, et al. Ribociclib as First-Line Therapy for HR-Positive, Advanced Breast Cancer. N Engl J Med. 2016 Nov 3;375(18):1738-1748. Epub 2016 Oct 7.

Abemaciclib

1. Sledge GW, Jr., Toi M, Neven P, et al: Monarch 2: Abemaciclib in combination with fulvestrant in women with hr+/her2- advanced breast cancer who had progressed while receiving endocrine therapy. J Clin Oncol 2017;35:2875-2884.
2. Goetz MP, Toi M, Campone M, et al: Monarch 3: Abemaciclib as initial therapy for advanced breast cancer. J Clin Oncol 2017;35:3638-3646.



1. Tripathy D, Im SA, Colleoni M, et al. Ribociclib plus endocrine therapy for premenopausal women with hormone-receptor-positive, advanced breast cancer (MONALEESA-7): a randomized phase 3 trial. Lancet Oncol. 2018 Jul;19(7):904-915.
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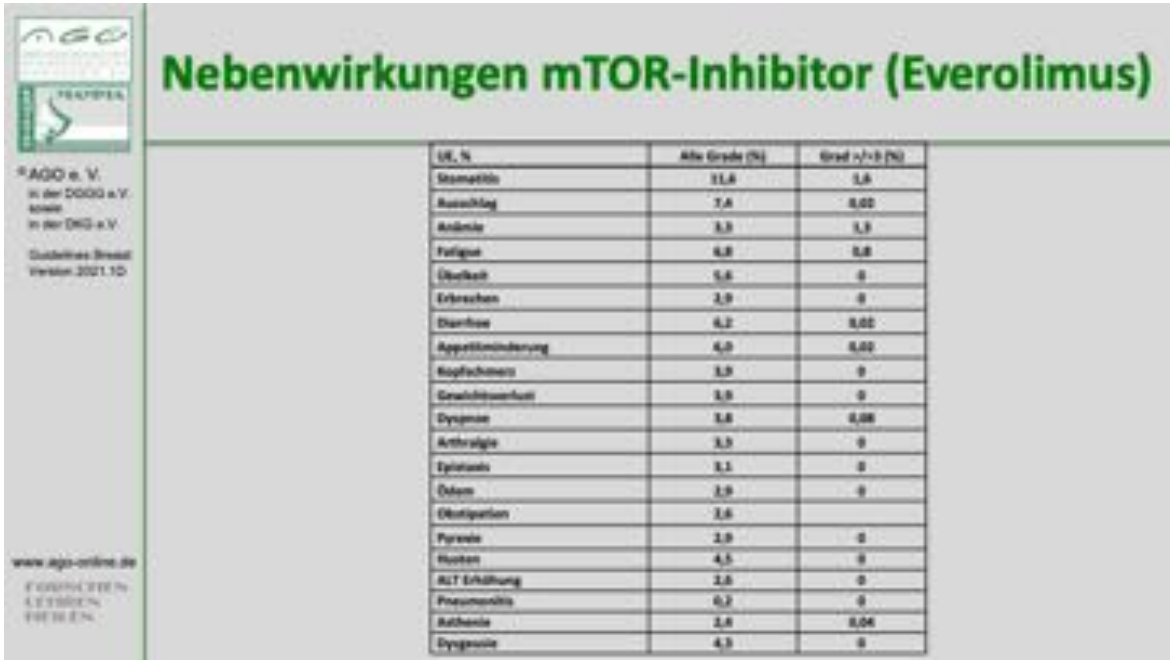

UE, %	Alle Grade (%)	Grad >/=3 (%)
Stomatitis	11,6	1,6
Ausschlag	7,4	0,02
Anämie	3,3	1,3
Fatigue	6,8	0,8
Übelkeit	5,6	0
Erbrechen	3,9	0
Diarrhoe	6,2	0,02
Appetitminderung	4,0	0,02
Kopfschmerz	3,9	0
Gewichtsverlust	3,9	0
Dyspnoe	3,8	0,08
Arthralgie	3,3	0
Epistaxis	3,1	0
Ödem	2,9	0
Obstipation	2,6	
Pyrexie	2,9	0
Husten	4,5	0
ALT Erhöhung	2,0	0
Pneumonitis	0,2	0
Asthenie	2,0	0,04
Dysgeusie	4,3	0

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Nebenwirkungen PARP-Inhibitoren – Olaparib, Talazoparib

Olaparib		
UE, %	Alle Grade (%)	Grad >/=3 (%)
Jegliche UE	97,1	36,6
Neutropenie	27,3	9,3
Anämie	40,0	16,1
Fatigue	28,8	2,9
Übelkeit	58,0	0
Erbrechen	29,8	0
Diarrhoe	20,1	0,5
Appetitminderung	16,1	0
Kopfschmerz	20,0	1
Pyrexie	14,1	0
Husten	17,1	0
ALT Erhöhung	11,3	1,5
AST Erhöhung	9,3	2,4
PPE	0,5	
Therapieabbruch	4,9	

Talazoparib		
UE, %	Alle Grade (%)	Grad >/=3 (%)
Jegliche UE	98,6	31,8
Neutropenie	34,6	20,9
Anämie	52,8	39,2
Fatigue	50,3	1,7
Übelkeit	48,6	0,3
Erbrechen	24,8	2,4
Diarrhoe	22,0	0,7
Appetitminderung	21,3	0,3
Kopfschmerz	32,5	1,7
Pyrexie	21,0	2,4
Husten	17,5	2,4
ALT Erhöhung	3,1	1,7
AST Erhöhung	1,4	0,3
PPE	98,6	31,8
Therapieabbruch	34,6	20,9

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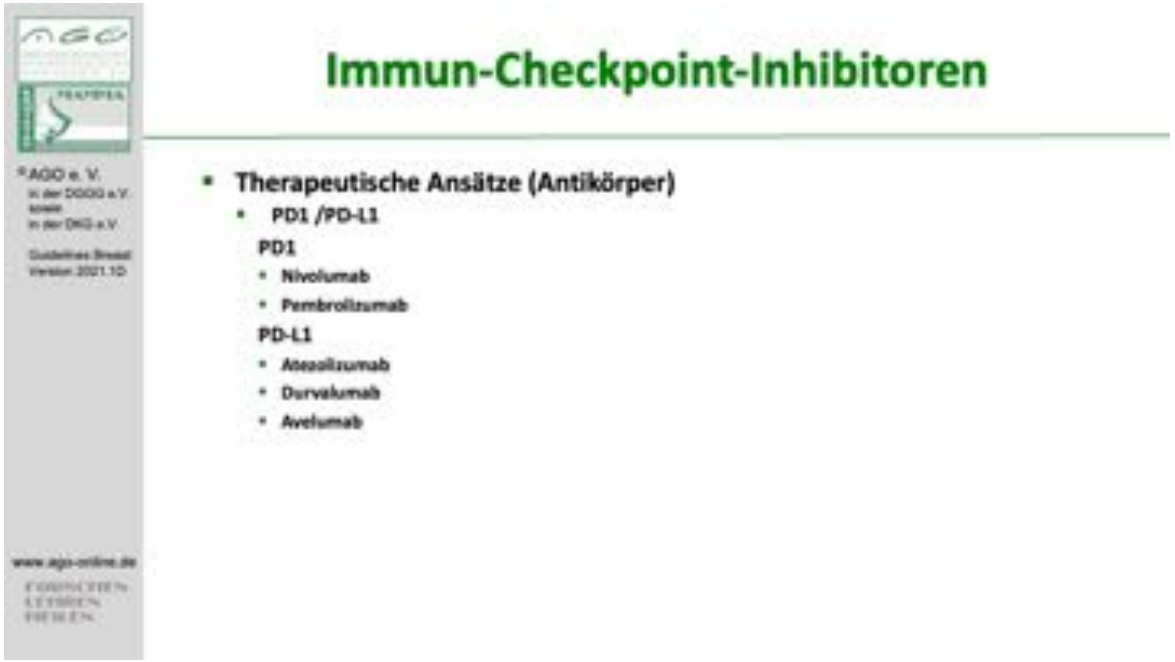

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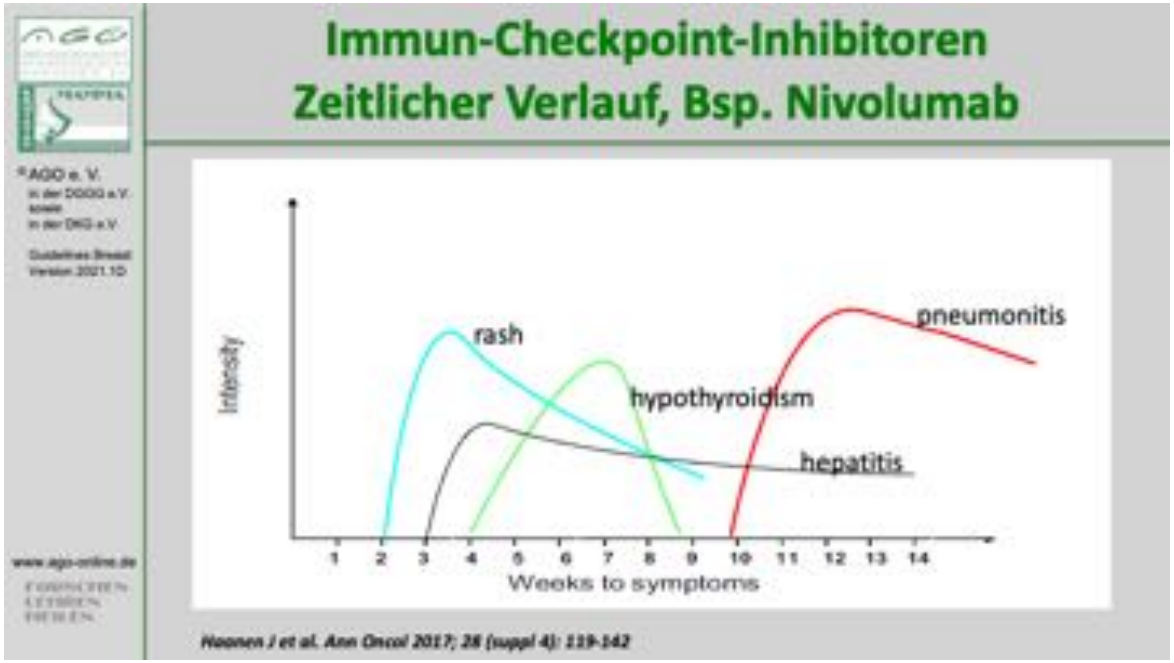

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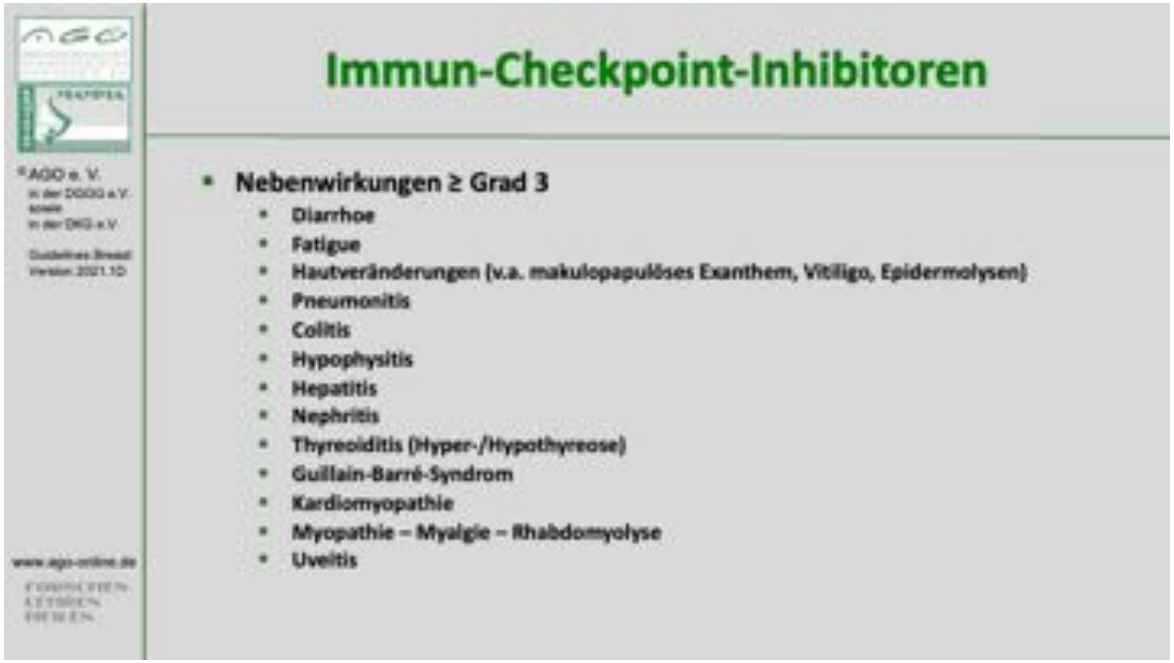

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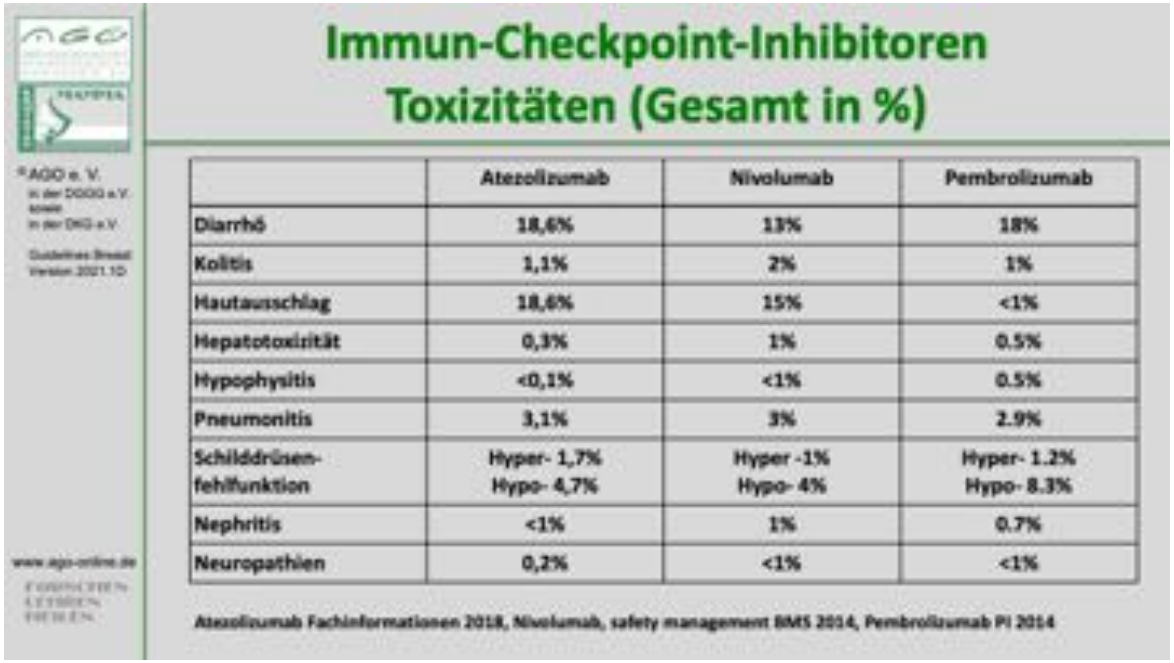
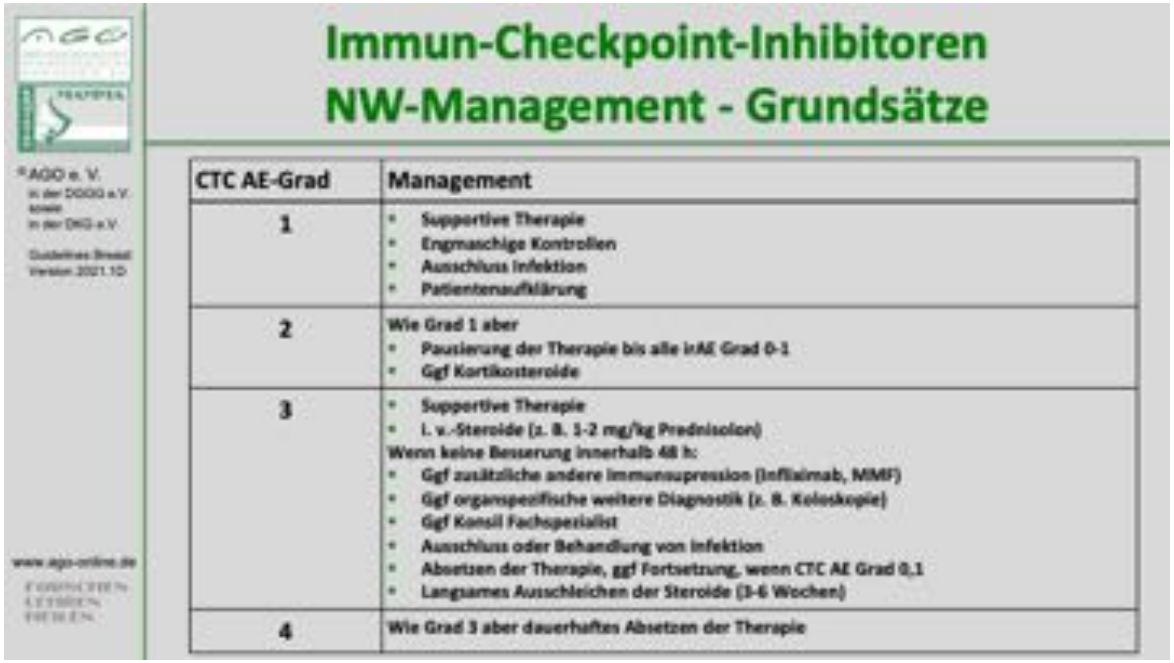


Immun-Checkpoint-Inhibitoren
Toxizitäten (Gesamt in %)

	Atezolizumab	Nivolumab	Pembrolizumab
Diarrhö	18,6%	13%	18%
Kolitis	1,1%	2%	1%
Hautausschlag	18,6%	15%	<1%
Hepatotoxizität	0,3%	1%	0.5%
Hypophysitis	<0,1%	<1%	0.5%
Pneumonitis	3,1%	3%	2.9%
Schilddrüsen-fehlfunktion	Hyper- 1,7% Hypo- 4,7%	Hyper -1% Hypo- 4%	Hyper- 1.2% Hypo- 8.3%
Nephritis	<1%	1%	0.7%
Neuropathien	0,2%	<1%	<1%

Atezolizumab Fachinformationen 2018, Nivolumab, safety management BMS 2014, Pembrolizumab PI 2014

Atezolizumab: https://www.fachinfo.de/suche/fi/021700
Nivolumab: https://www.fachinfo.de/suche/fi/020675
Pembrolizumab: https://www.fachinfo.de/suche/fi/020716



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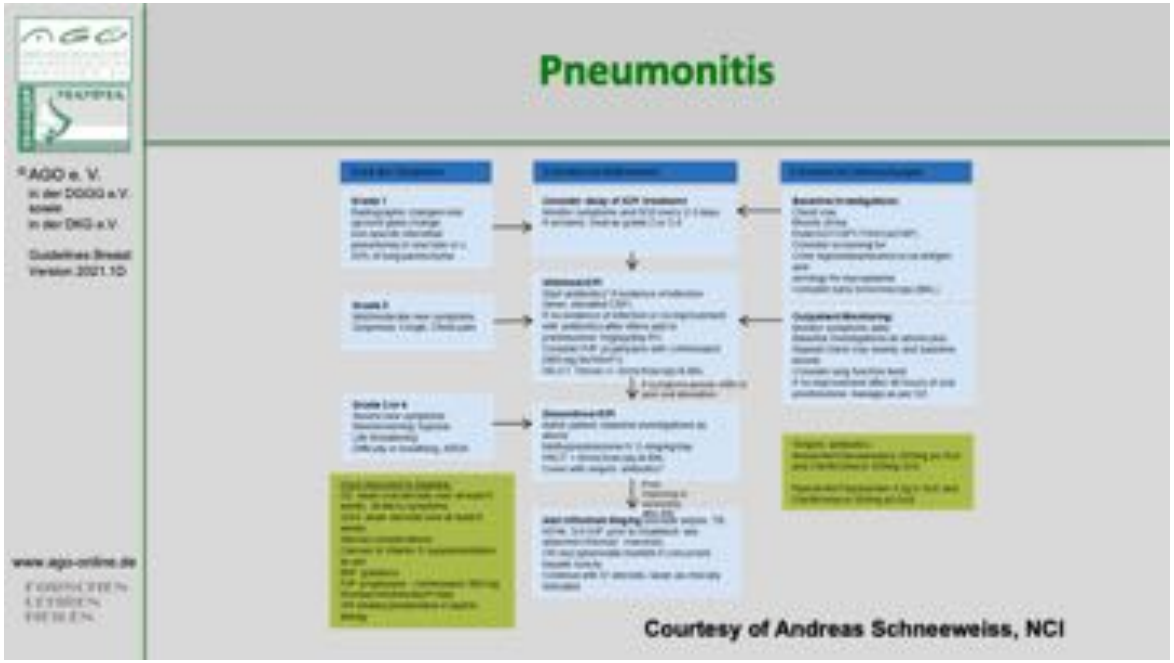

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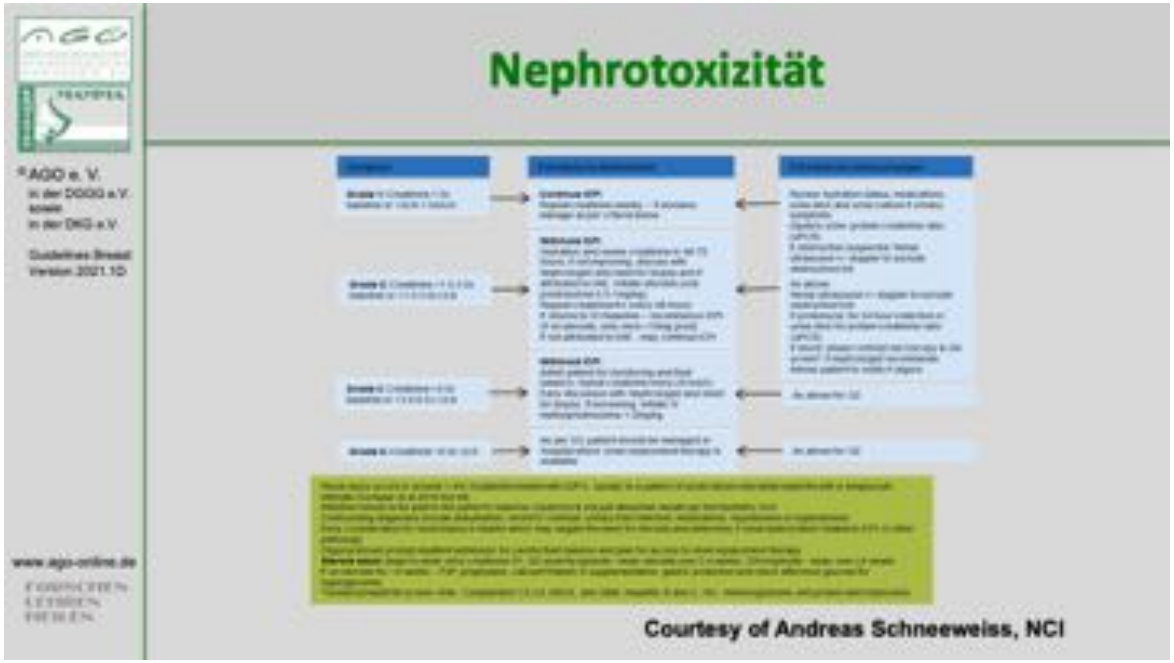

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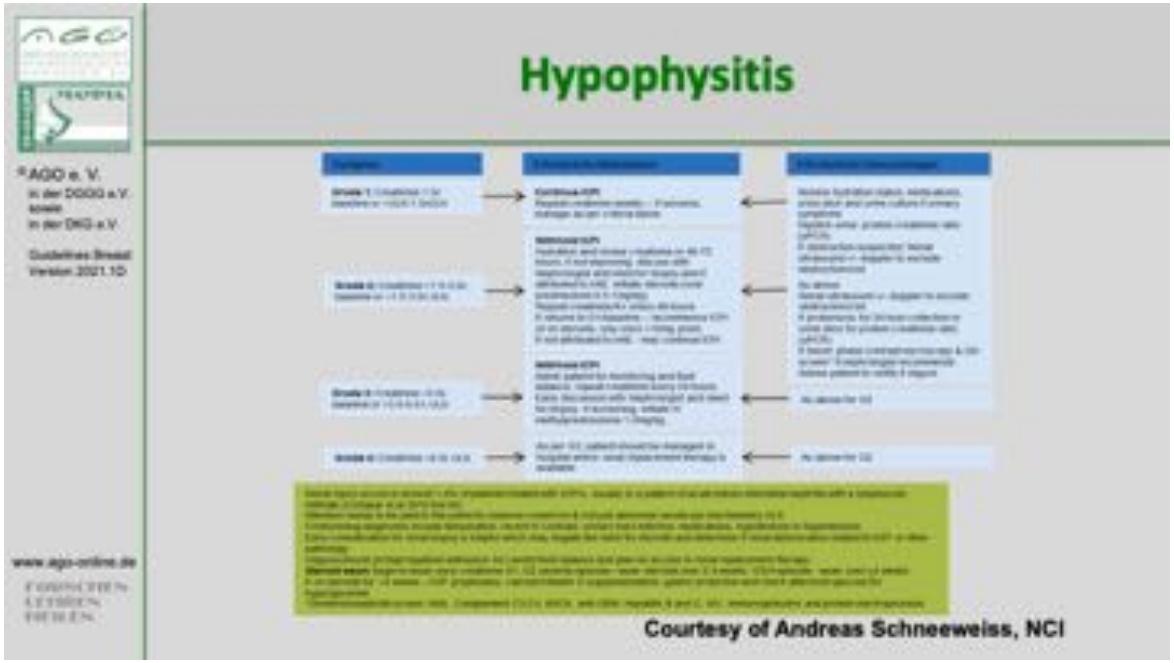

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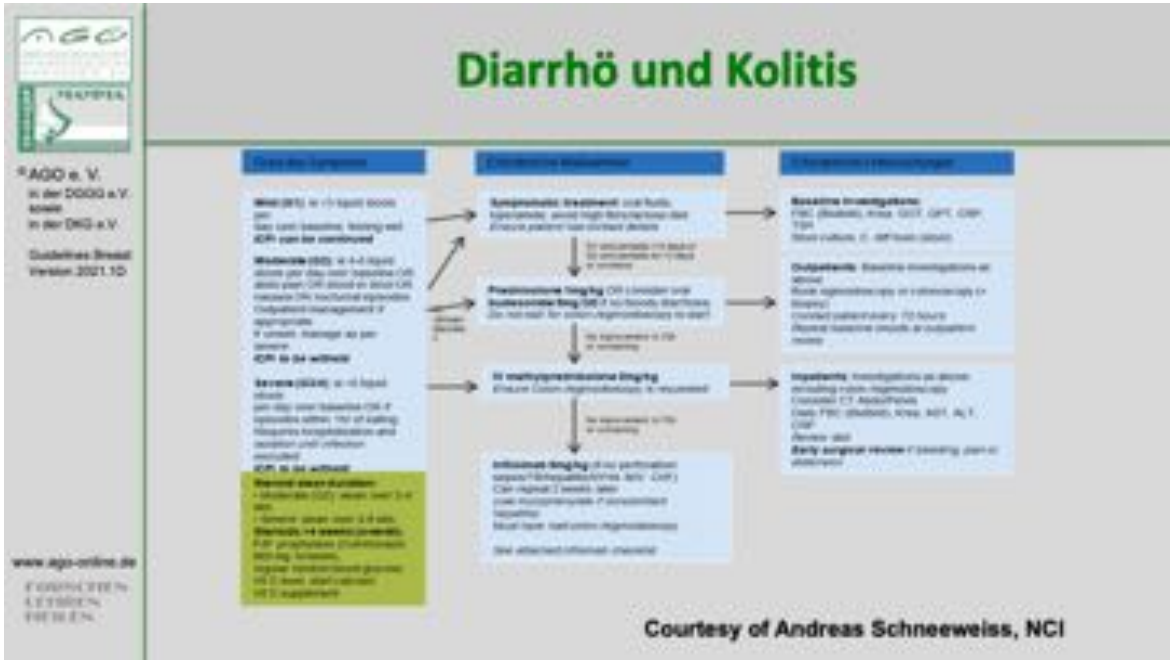

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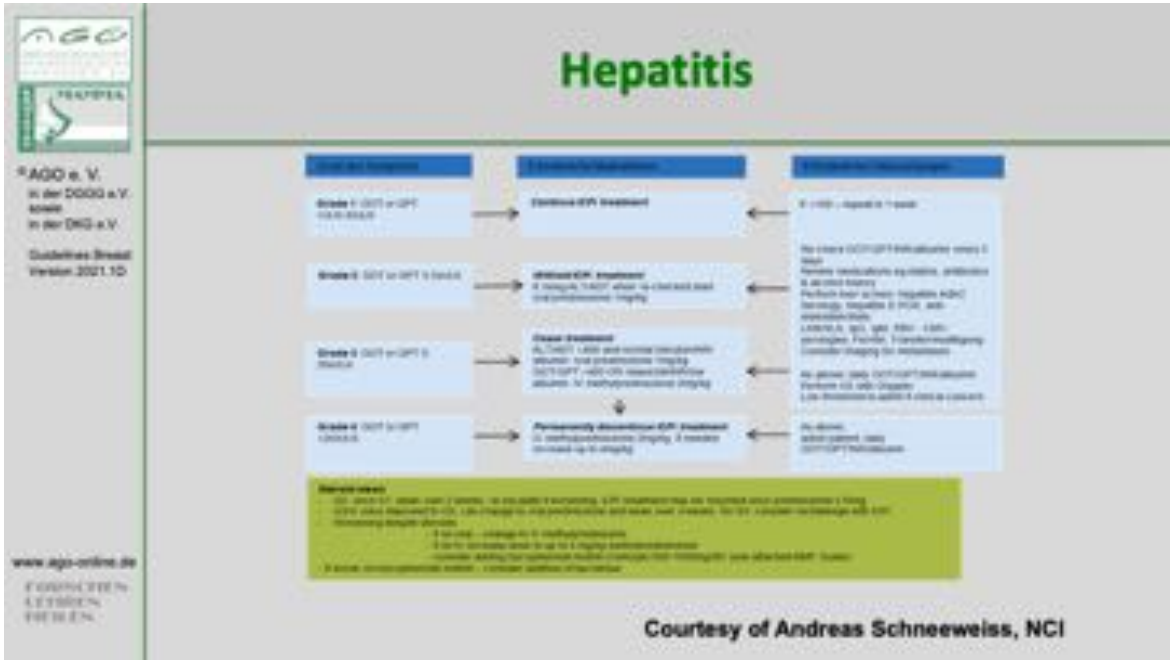

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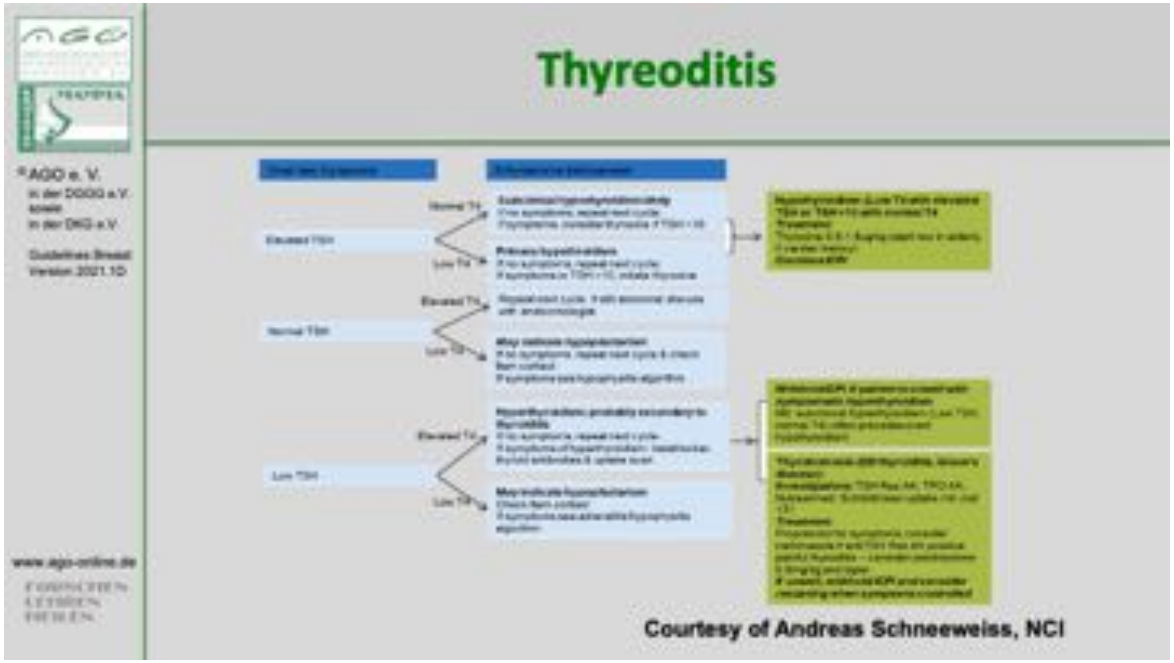

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Nebenwirkungen nach Organsystemen

Inzidenz, Prävention, Therapie

1. Infektionen

- Allgemeine Infektionsprophylaxe
- Hepatitis B-Screening
- Covid-19 (s. gemeinsame Stellungnahme mit DGHO)

ASCO:
Taplitz RA, Kennedy EB, Bow EJ, Crews J, Gleason C, Hawley DK, Langston AA, Nastoupil LJ, Rajotte M, Rolston K, Strasfeld L, Flowers CR: Outpatient management of fever and neutropenia in adults treated for malignancy: American society of clinical oncology and infectious diseases society of america clinical practice guideline update. J Clin Oncol 2018;36:1443-1453.

NCCN:
NCCN Guidelines Version 1.2020 Prevention and Treatment of Cancer-Related Infections. https://www.nccn.org/professionals/physician_gls/PDF/infections.pdf

1. Sandherr M, Hentrich M, von Lilienfeld-Toal M, et al. Antiviral prophylaxis in patients with solid tumours and haematological malignancies--update of the Guidelines of the Infectious Diseases Working Party (AGIHO) of the German Society for Hematology and Medical Oncology (DGHO). Ann Hematol. 2015 Sep;94(9):1441-50.
2. Robert-Koch-Institut. Epidemiologisches Bulletin**.** 20. Juli 2015 / Nr. 29
3. Di Bisceglie AM, Lok AS, Martin P, et al. Recent US Food and Drug Administration warnings on hepatitis B reactivation with immune-suppressing and anticancer drugs: just the tip of the iceberg? Hepatology. 2015 Feb;61(2):703-11.
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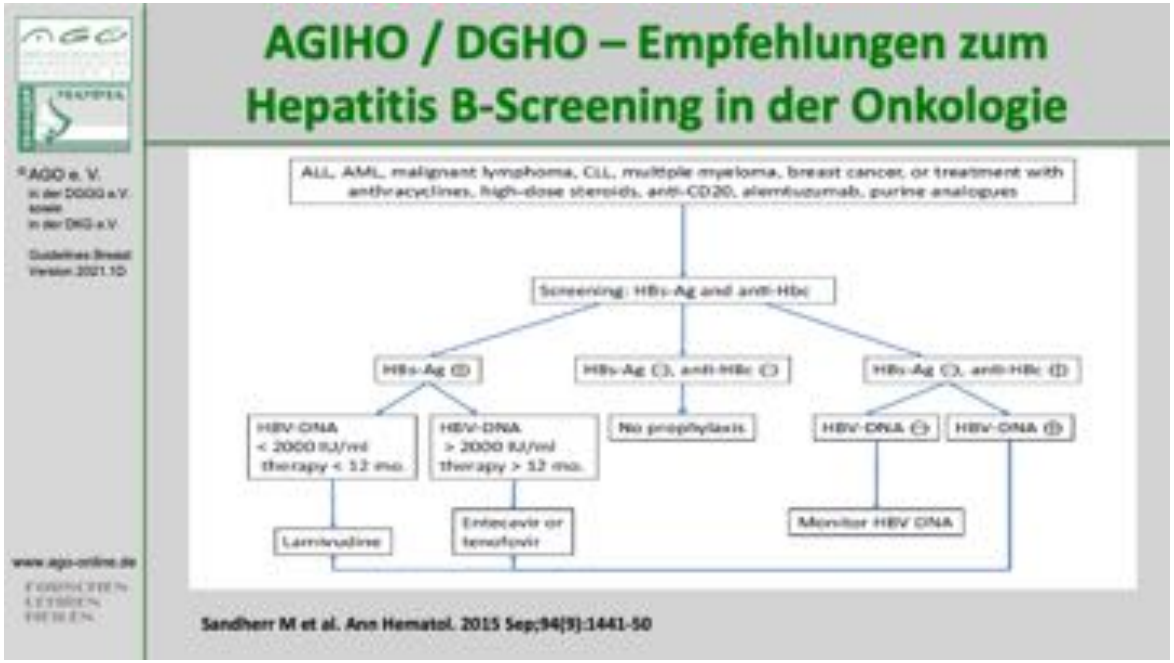

1. Sandherr M, Hentrich M, von Lilienfeld-Toal M, et al. Antiviral prophylaxis in patients with solid tumours and haematological malignancies--update of the Guidelines of the Infectious Diseases Working Party (AGIHO) of the German Society for Hematology and Medical Oncology (DGHO). Ann Hematol. 2015 Sep;94(9):1441-50.
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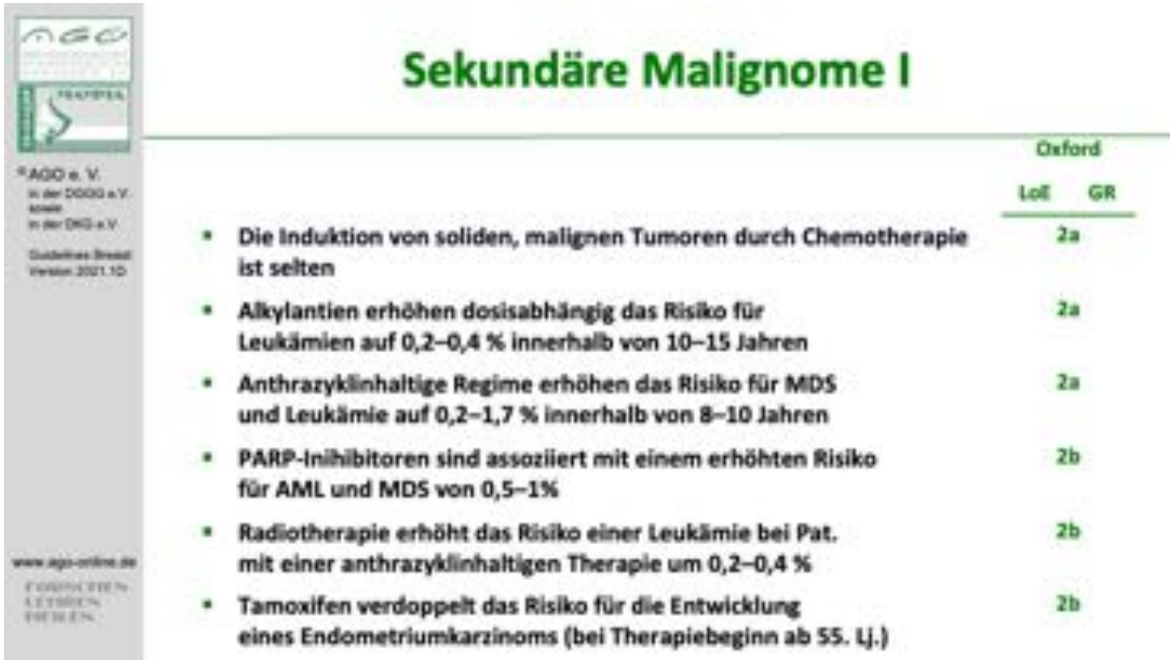
Nebenwirkungen nach Organsystemen

Inzidenz, Prävention, Therapie

2. **Gutartige, bösartige und nicht spezifizierte Neubildungen (einschl. Zysten und Polypen)**



Statements 1-4

1. Schaapveld M, Visser O, Louweman M et al.(2008) Risk of primary non breast cancers after breast cancer treatment: a dutch population-based study. J Clin Oncol 26: 1239-46.
2. Kirova Y, De Rycke Y, Gambotti L et al.(2008) Second malignancies after breast cancer: the impact of different treatment modalities. B J Cancer 98: 870-4.
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Tamoxifen and endometrial cancer

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Nebenwirkungen nach Organsystemen

Inzidenz, Prävention, Therapie

3. **Erkrankungen des Blutes und des Lymphsystems**
   - **Anämie**
   - **Neutropenie**
   - **Febrile Neutropenie**

Anämie – Indikationen für den Einsatz von Erythropoese-stimulierenden Faktoren (ESF)

	Oxford LoE	GR	AGO
• Indiziert bei asymptomatischer Anämie	1a	B	-
• Therapie und sekundäre Prophylaxe bei CTx-induzierter Anämie	1a	A	+
◦ Adjuvante Situation	1b	A	+
◦ Neoadjuvante/metastasierte Situation	1a	A	+/-
◦ Bei dosisdichter/dosisenkalierter CTx (ddETC)	1b	A	+
• Therapie beginnt bei Hb-Werten < 10g/dl	1a	A	+
• Ziel-Hb 11–12 g/dL	1a	A	+
• Verbesserung der Prognose (krankheitsfreies Intervall, Gesamtüberleben)	1a	B	–
• ESF erhöht das Risiko von thromboembolischen Komplikationen	1a	A	

Leitlinie:
Leitlinienprogramm Onkologie (Deutsche Krebsgesellschaft, Deutsche Krebshilfe, AWMF): Supportive Therapie bei onkologischen PatientInnen - Langversion 1.3, 2020,
AWMF Registernummer: 032/054OL

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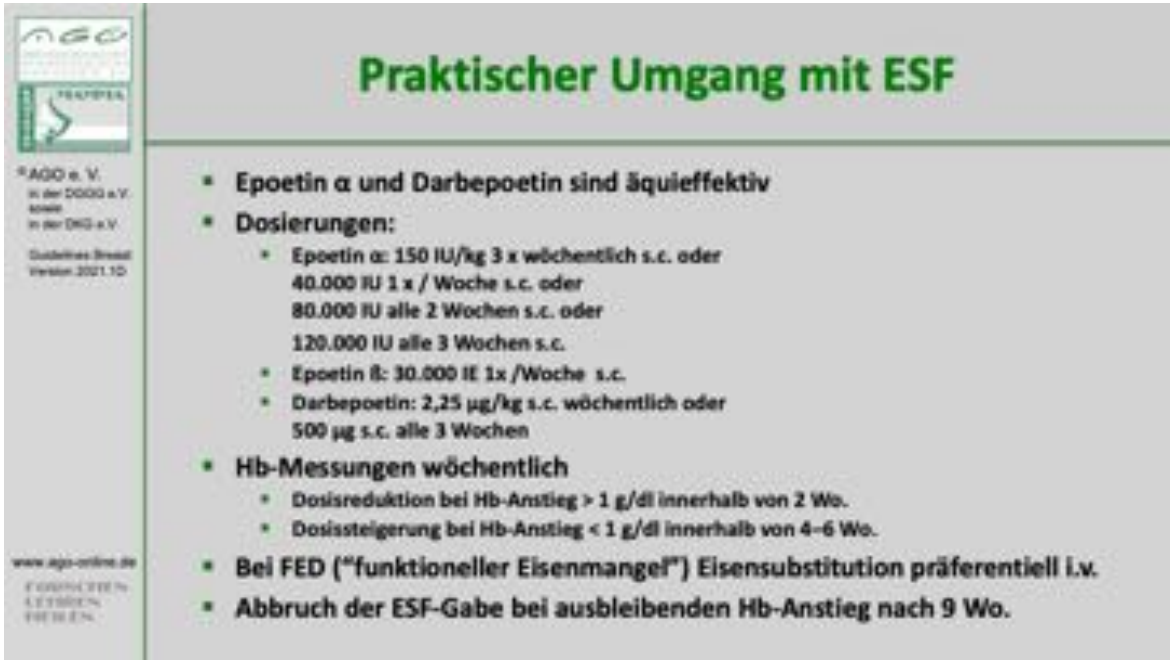

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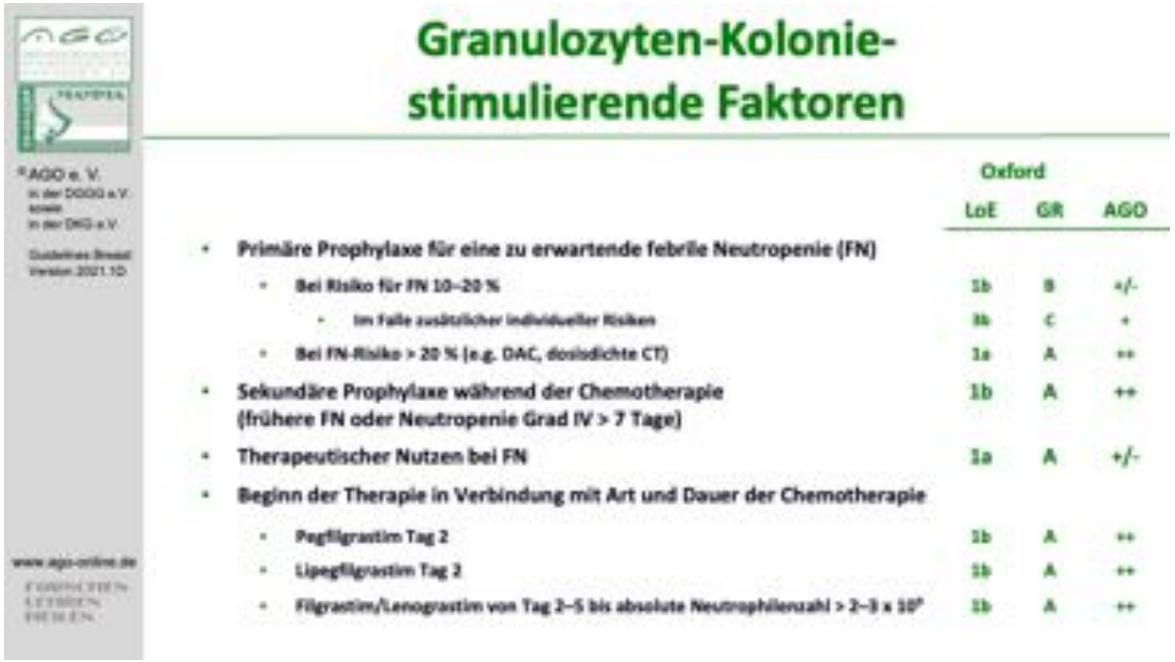

Granulozyten-Kolonie-stimulierende Faktoren

	Oxford LoE	Oxford GR	AGO
• Primäre Prophylaxe für eine zu erwartende febrile Neutropenie (FN)			
◦ Bei Risiko für FN 10–20 %	1b	B	+/-
▪ Im Falle zusätzlicher individueller Risiken	3b	C	+
◦ Bei FN-Risiko > 20 % (e.g. DAC, dosisdichte CT)	1a	A	++
• Sekundäre Prophylaxe während der Chemotherapie (frühere FN oder Neutropenie Grad IV > 7 Tage)	1b	A	++
• Therapeutischer Nutzen bei FN	1a	A	+/-
• Beginn der Therapie in Verbindung mit Art und Dauer der Chemotherapie			
◦ Pegfilgrastim Tag 2	1b	A	++
◦ Lipegfilgrastim Tag 2	1b	A	++
◦ Filgrastim/Lenograstim von Tag 2–5 bis absolute Neutrophilenzahl > 2–3 x 10^9	1b	A	++

<u>Relevante Leitlinien</u>

1. S3-Leitlinie: Supportive Therapie:
   Leitlinienprogramm Onkologie (Deutsche Krebsgesellschaft, Deutsche Krebshilfe, AWMF): Supportive Therapie bei onkologischen PatientInnen - Langversion 1.3 – Februar 2020
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Management der febrilen Neutropenie

Arbeitsgemeinschaft Infektionen in der Hämatologie und Onkologie (AGIHO)
der Deutschen Gesellschaft für Hämatologie und Onkologie e.V. (DGHO) www.dgho-infektionen.de

Definition (orale Temp. > 38,5□ C oder zwei konsekutive Messungen > 38□ C über 2 h in einer Patientin mit einem ANC < 500 cells/mm³ oder erwarteter Abfall < 500 cells/mm³)

	Oxford		
	LoE	GR	AGO
• Klinische Untersuchung	5	D	++
• Tägliche Kontrollen	5	D	++
• Hospitalisierung von Hochrisikopatienten	1b	A	++
• Ambulante Therapie bei Niedrigrisikopat. möglich	1b	A	+
• Differentialblutbild	5	D	++
• Blutkulturen	5	D	++
• Bildgebung der Lunge	3	C	++
• Sofortige empirische antibiot. Therapie	1a	A	++
• Empirische antimykotische Therapie nach 4–7d bei keiner Besserung unter der antibiotischen Therapie	1b	A	++
• G-CSF als therapeutische Maßnahme	2b	B	+/-

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EORTC and ASCO G-CSF Guideline-Based FN Risk Assessment

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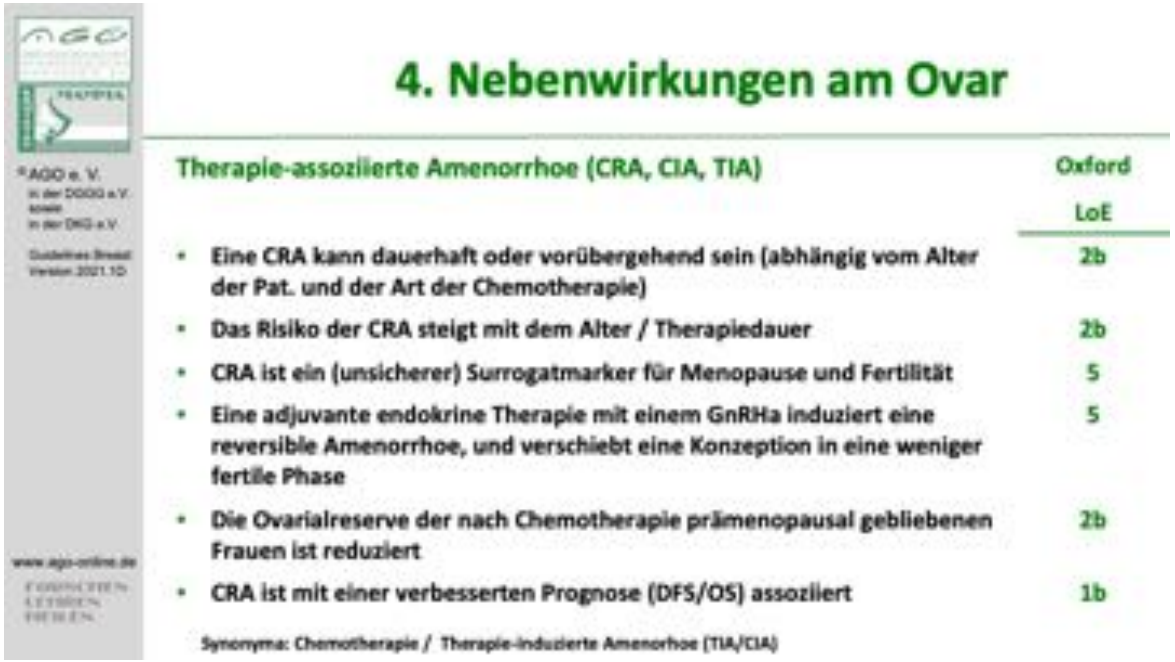

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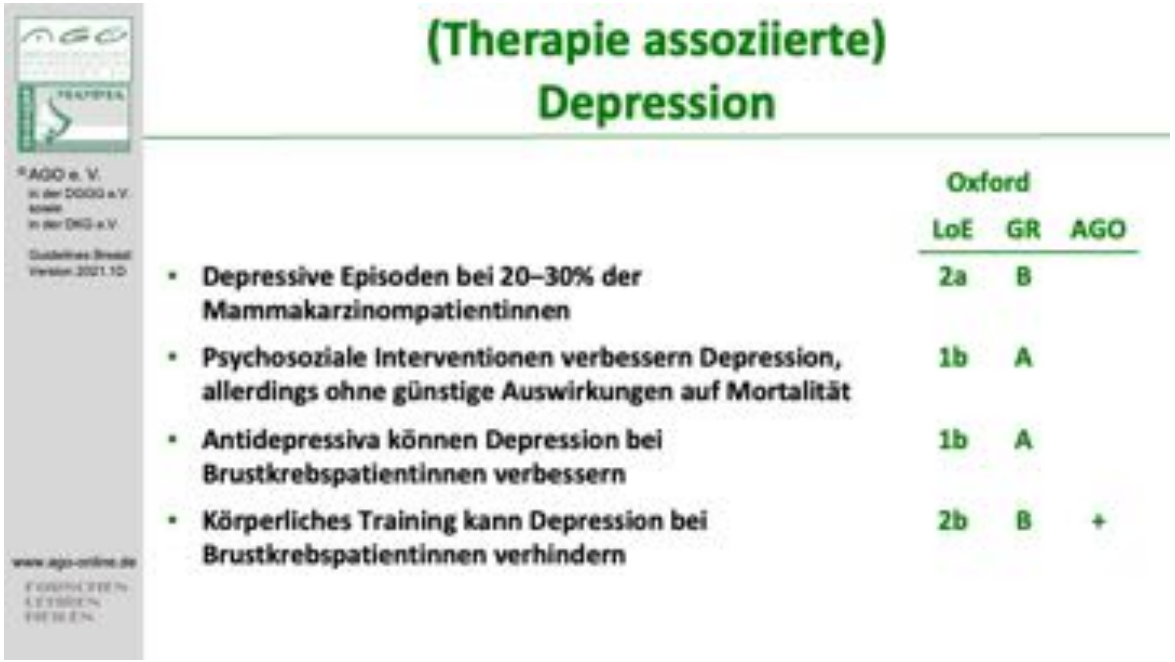
Nebenwirkungen nach Organsystemen

Inzidenz, Prävention, Therapie

5. **Psychiatrische Erkrankungen**
   - **Depression**
   - **Fatigue**
   - **Kognitive Störungen**
   - **Schlafstörungen**



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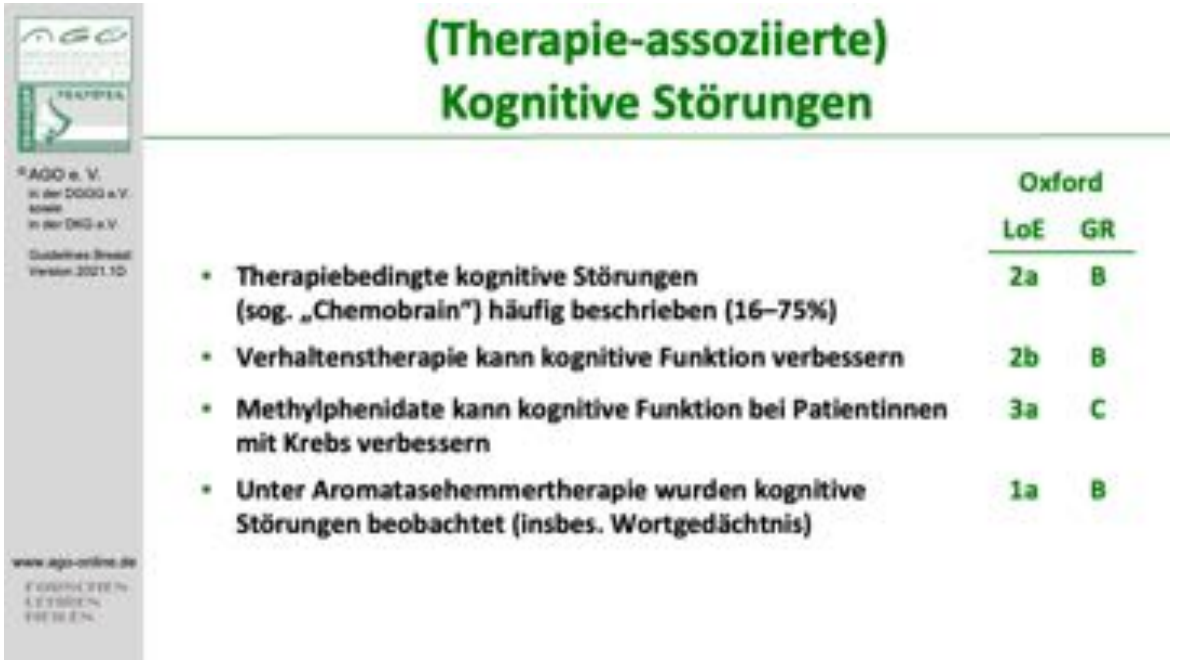

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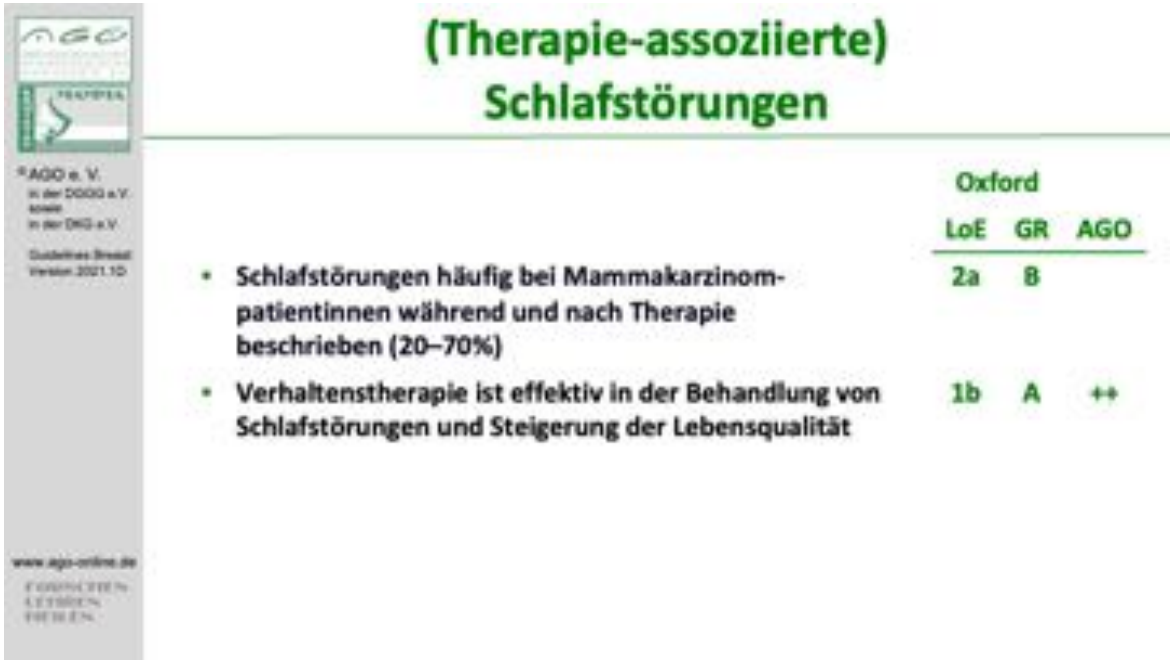

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Nebenwirkungen nach Organsystemen

Inzidenz, Prävention, Therapie

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6. Erkrankungen des Nervensystems

- **Chemotherapie induzierte periphere Neuropathie (CIPN)**

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	LoE	GR	AGO
Nicht-medikamentöse Prävention			
• Funktionstraining (Fitness, sensomotorisches Stimulationstraining etc.)	5	D	+
• Kompressionstherapie (chirurgische Handschuhe, Kompressionsstrümpfe)	2b	B	+
• Kühlhandschuhe und Kühlstrümpfe	2b*	B	+
• Elektro-Akupunktur	1b	B	-
Medikamentöse Prävention			
Es besteht keine wirksame medikamentöse Prophylaxe der CIPN			
• Venlafaxin	2a	C	+/-
• Palmitoylethanolamid (PEA) topisch oder p.o.	5	D	+/-
• Alpha-Liponsäure, Amifostin, Amitriptylin, Acetyl-L-Carnitin, Carbamazepin, Elektrolytlösungen, Glutathion, Goshajinkigan (GJG), Oxcarbazepin, Vitamin B, Vitamin E oder andere Substanzen[1]	1b	A	-

* Liste nicht empfohlener Medikamente bei Hershman et al. 2014

Reviews/Leitlinien

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Nicht-medikamentöse Prävention

Funktionstraining

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Kompression

1. Tsuyuki S, Senda N, Kanng Y, et al.: Evaluation of the effect of compression therapy using surgical gloves on nanoparticle albumin-bound paclitaxel-induced peripheral neuropathy: a phase II multicenter study by the Kamigata Breast Cancer Study Group. Breast Cancer Res Treat. 2016 Nov;160(1):61-67.
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Kühlung

1. Hanai A, Ishiguro H, Sozu T et al. (2016) The effects of frozen gloves and socks on paclitaxel-induced peripheral neuropathy among patientswith breast cancer: A selfcontrolled clinical trial. J ClinOncol 34(suppl): (abstr 10022). http://meetinglibrary.asco.org/content/166655-176.
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Elektro-Akupunktur

1. Greenlee H, Crew KD, Capodice J, et al.: Randomized sham-controlled pilot trial of weekly electro-acupuncture for the prevention of taxane-induced peripheral neuropathy in women with early stage breast cancer. Breast Cancer Res Treat. 2016 Apr;156(3):453-464.

Medikamentöse Prävention

Venlafaxin

1. Aziz MT, Good BL, Lowe DK. Serotonin-norepinephrine reuptake inhibitors for the management of chemotherapy-induced peripheral neuropathy. Ann Pharmacother. 2014 May;48(5):626-32.
2. Durand JP, Deplanque G, Montheil V, et al.: Efficacy of venlafaxine for the prevention and relief of oxaliplatin-induced acute neurotoxicity: results of EFFOX, a randomized, double-blind, placebo-controlled phase III trial. Ann Oncol. 2012 Jan;23(1):200-5
3. Gallagher HC, Gallagher RM, Butler M, et al.: Venlafaxine for neuropathic pain in adults. Cochrane Database Syst Rev. 2015 Aug 23;(8):CD011091.

Palmitoylethanolamid (PEA)

1. Lombardi G, Miglio G, Varsaldi F, et al.: Oxyhomologation of the amide bond potentiates neuroprotective effects of the endolipid N-palmitoylethanolamine.
   J Pharmacol Exp Ther. 2007 Feb;320(2):599-606
2. Di Cesare Mannelli L, Pacini A, Corti F, et al.: Antineuropathic profile of N-palmitoylethanolamine in a rat model of oxaliplatin-induced neurotoxicity. PLoS One. 2015 Jun 3;10(6):e0128080.
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Verschiedene Substanzen

1. Schloss J, Colosimo M, Vitetta L. Herbal medicines and chemotherapy induced peripheral neuropathy (CIPN): A critical literature review. Crit Rev Food Sci Nutr. 2017 Apr 13;57(6):1107-1118.
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3. Kuriyama A, Endo K. Goshajinkigan for prevention of chemotherapy-induced peripheral neuropathy: a systematic review and meta-analysis. Support Care Cancer. 2017 Dec 26.
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5. Schloss JM, Colosimo M, Airey C, et al.: A randomised, placebo-controlled trial assessing the efficacy of an oral B group vitamin in

preventing the development of chemotherapy-induced peripheral neuropathy (CIPN). Support Care Cancer. 2017 Jan;25(1):195-204.
6. Leal AD, Qin R, Atherton PJ, et al.: Alliance for Clinical Trials in Oncology. North Central Cancer Treatment Group/Alliance trial N08CA-the use of glutathione for prevention of paclitaxel/carboplatin-induced peripheral neuropathy: a phase 3 randomized, double-blind, placebo-controlled study. Cancer. 2014 Jun 15;120(12):1890-7
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Acetyl-L-Carnitin

1. Hershman DL, Unger JM, Crew KD, et al.: Randomized double-blind placebo-controlled trial of acetyl-L-carnitine for the prevention of taxane-induced neuropathy in women undergoing adjuvant breast cancer therapy. J Clin Oncol. 2013 Jul 10;31(20):2627-33.
2. Hershman DL, Unger JM, Crew KD, et al.: Two-Year Trends of Taxane-Induced Neuropathy in Women Enrolled in a Randomized Trial of Acetyl-L-Carnitine (SWOG S0715). J Natl Cancer Inst. 2018 Jan 18.

Chemotherapie-induzierte periphere Neuropathie – Therapie –

	Oxford LoE	Oxford GR	AGO
Nicht-medikamentöse Therapie			
• Funktionstraining (Fitness, sensomotorisches Stimulationstraining etc.)	2a	C	+
• Physiotherapie / physikalische Therapie	5	D	+
• Akupunktur	2b	B	+
Medikamentöse Therapie			
• Menthol lokal (1%), Capsaicin/Lidocain lokal	5	D	+
• Baclofen/Amitryptilin/Ketamin-Creme	2b	B	+
• Duloxetin zur Behandlung von Schmerzen durch CIPN	1b	B	+
• Opioide zur Behandlung von Schmerzen durch CIPN	5	D	+
• Palmitoylethanolamid (PEA) topisch oder p.o.	5	D	+/-
• Venlafaxin	5	D	+/-
• Gabapentin, Pregabalin	1b	B	+/-
• Amitryptilin/ Nortripylin, Imipramin/Desipramin	1b	B	+/-
• Acetyl-L-Carnitin, Lamotrigin oder andere Substanzen[1]	1b	B	-

[1] Liste nicht empfohlener Medikamente bei Hershman et al. 2014

Reviews / Leitlinien

1. Hershman DL, Lacchetti C, Dworkin RH, et al.: American Society of Clinical Oncology. Prevention and management of chemotherapy-induced peripheral neuropathy in survivors of adult cancers: American Society of Clinical Oncology clinical practice guideline. J Clin Oncol. 2014 Jun 20;32(18):1941-67.
2. Hu LY, Mi WL, Wu GC, et al.: Prevention and Treatment for Chemotherapy-Induced Peripheral Neuropathy: Therapies Based on CIPN Mechanisms. Current Neuropharmacology, 2018, 16, 1-12
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chemotherapy-induced painful peripheral neuropathy: a randomized clinical trial." JAMA 309(13): 1359-1367.
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Nicht-medikamentöse Therapie

Funktionstraining

1. Duregon F, Vendramin B, Bullo V, et al.: Effects of exercise on cancer patients suffering chemotherapy-induced peripheral neuropathy undergoing treatment: A systematic review. Crit Rev Oncol Hematol. 2018 Jan;121:90-100.
2. Smith TJ, Razzak AR, Blackford AL, Ensminger J, Saiki C, Longo-Schoberlein D, Loprinzi CL: A pilot randomized sham-controlled trial of mc5-a scrambler therapy in the treatment of chronic chemotherapy-induced peripheral neuropathy (cipn). Journal of palliative care 2020;35:53-58.
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4. Lu W, Giobbie-Hurder A, Freedman RA, Shin IH, et al.: Acupuncture for chemotherapy-induced peripheral neuropathy in breast cancer survivors: A randomized controlled pilot trial. Oncologist 2019.

Medikamentöse Therapie

Menthol / Capsaicin

1. Fallon MT, Storey DJ, Krishan A, et al.: Cancer treatment-related neuropathic pain: proof of concept study with menthol--a TRPM8 agonist. Support Care Cancer. 2015 Sep;23(9):2769-77
2. Derry S, Rice AS, Cole P, et al.: Topical capsaicin (high concentration) for chronic neuropathic pain in adults. Cochrane Database Syst Rev. 2017 Jan 13;1:CD007393
3. Moon JY, Lee PB, Kim YC, et al.: Efficacy and Safety of 0.625% and 1.25% Capsaicin Patch in Peripheral Neuropathic Pain: Multi-Center, Randomized, and Semi-Double Blind Controlled Study. Pain Physician. 2017 Feb;20(2):27-35.
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5. Anand P. Capsaicin and menthol in the treatment of itch and pain: recently cloned receptors provide the key. Gut. 2003 Sep;52(9):1233-5.

Baclofen/Amitryptilin/Ketamin-Creme

1. Barton DL, Wos EJ, Qin R, et al.: A double-blind, placebo-controlled trial of a topical treatment for chemotherapy-induced peripheral neuropathy: NCCTG trial N06CA. Support Care Cancer. 2011 Jun;19(6):833-41.
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Duloxetin

1. Smith EM, Pang H, Cirrincione C, et al.: Alliance for Clinical Trials in Oncology. Effect of duloxetine on pain, function, and quality of life among patients with chemotherapy-induced painful peripheral neuropathy: a randomized clinical trial. JAMA. 2013 Apr 3;309(13):1359-67

Akupunktur:

1. Han X, Wang L, Shi H, *et al.* Acupuncture combined with methylcobalamin for the treatment of chemotherapy- induced peripheral neuropathy in patients with multiple myeloma. *BMC Cancer* 2017;17:40.
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Palmitoylethanolamid (PEA)

1. Lombardi G, Miglio G, Varsaldi F, et al.: Oxyhomologation of the amide bond potentiates neuroprotective effects of the endolipid N-palmitoylethanolamine.
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4. Petrosino S, Di Marzo V. The pharmacology of palmitoylethanolamide and first data on the therapeutic efficacy of some of its new formulations. Br J Pharmacol. 2017 Jun;174(11):1349-1365.

Venlafaxin

1. Aziz MT, Good BL, Lowe DK. Serotonin-norepinephrine reuptake inhibitors for the management of chemotherapy-induced peripheral neuropathy. Ann Pharmacother. 2014 May;48(5):626-32.
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neurotoxicity: results of EFFOX, a randomized, double-blind, placebo-controlled phase III trial. Ann Oncol. 2012 Jan;23(1):200-5
3. Gallagher HC, Gallagher RM, Butler M, et al.: Venlafaxine for neuropathic pain in adults. Cochrane Database Syst Rev. 2015 Aug 23;(8):CD011091.

Gabapentin, Pregabalin:

1. Rao RD, Michalak JC, Sloan Jaet al.: Efficacy of gabapentin in the management of chemotherapy-induced peripheral neuropathy: a phase 3 randomized, double-blind, placebo-controlled, crossover trial (N00C3). Cancer. 2007 Nov 1;110(9):2110-8.
2. Nishikawa T, Hasegawa K, Shintani D, et al.: Combination Therapy of Pregabalin with Tramadol for Treatment of Peripheral Neuropathy in Patients with Gynecological Cancer Receiving Taxane Containing Chemotherapy. Gan To Kagaku Ryoho. 2017 Mar;44(3):227-231.

Amitryptilin/Nortriptylin

1. Kautio AL, Haanpää M, Saarto T, et al.: Amitriptyline in the treatment of chemotherapy-induced neuropathic symptoms. J Pain Symptom Manage. 2008 Jan;35(1):31-9.
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Acetyl-L-Carnitin, Lamotrigin oder andere Substanzen:

1. Rao RD, Flynn PJ, Sloan JA, et al.: Efficacy of lamotrigine in the management of chemotherapy-induced peripheral neuropathy: a phase 3 randomized, double-blind, placebo-controlled trial, N01C3. Cancer. 2008 Jun 15;112(12):2802-8
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double-blind, placebo-controlled study. Cancer. 2014 Jun 15;120(12):1890-7
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13. Duregon F, Vendramin B, Bullo V, et al.: Effects of exercise on cancer patients suffering chemotherapy-induced peripheral neuropathy undergoing treatment: A systematic review. Crit Rev Oncol Hematol. 2018 Jan;121:90-100.
14. The prescription of medical cannabis by a transitional pain service to wean a patient with complex pain from opioid use following liver transplantation: a case report.
15. Meng H, Hanlon JG, Katznelson R, et al. Can J Anaesth. 2016 Mar;63(3):307-10.
16. Lynch ME, Cesar-Rittenberg P, Hohmann AG. A double-blind, placebo-controlled, crossover pilot trial with extension using an oral mucosal cannabinoid extract for treatment of chemotherapy-induced neuropathic pain. J Pain Symptom Manage. 2014 Jan;47(1):166-73.
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18. Hershman DL, Lacchetti C, Dworkin RH, et al.: Prevention and management of chemotherapy-induced peripheral neuropathy in survivors of adult cancers: American Society of Clinical Oncology clinical practice guideline. J Clin Oncol. 2014 Jun 20;32(18):1941-67.
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Nebenwirkungen nach Organsystemen

Inzidenz, Prävention, Therapie

7. Herzerkrankungen

Statements

"Equivalent cardiotoxicity of doxorubicin and epirubicin at recommended dose levels (450–500 and 900–1000 mg/m² cum. dose, resp.)"

"Liposome encapsulated anthracyclines (doxorubicin) induce less cardiotoxicity"

1. van Dalen EC Different anthracycline derivates for reducing cardiotoxicity in cancer patients. Cochrane Database Syst Rev. 2010 Mar 17;(3):CD005006. Review. Update in: Cochrane Database Syst Rev. 2010;(5):CD005006.

"Anthracycline- or trastuzumab-associated cardiotoxicity may occur earlier/more frequently…"

1. Petrelli F: Mortality, leukemic risk, and cardiovascular toxicity of adjuvant anthracycline and taxane chemotherapy in breast cancer: a meta-analysis. Breast Cancer Res Treat. 2012 Sep;135(2):335-46
2. Azim HA Jr, de Azambuja E, Colozza M,et al.: Long-term toxic effects of adjuvant chemotherapy in breast cancer. Ann Oncol. 2011 Sep;22(9):1939-47.

"Trastuzumab-related cardiotoxicity in the elderly: a role for cardiovascular risk factors."

1. Serrano C, Cortés J, De Mattos-Arruda L, et al.: Trastuzumab-related cardiotoxicity in the elderly: a role for cardiovascular risk factors. Ann Oncol. 2011 Aug 9.
2. de Azambuja E, Ponde N, Procter M, et al: A pooled analysis of the cardiac events in the trastuzumab adjuvant trials. Breast Cancer

Res Treat 2019.
3. Kabore EG, Guenancia C, Vaz-Luis I, et al: Association of body mass index and cardiotoxicity related to anthracyclines and trastuzumab in early breast cancer: French canto cohort study. PLoS medicine 2019;16:e1002989.
4. Leemasawat K, Phrommintikul A, Chattipakorn SC, Chattipakorn N: Mechanisms and potential interventions associated with the cardiotoxicity of erbb2-targeted drugs: Insights from in vitro, in vivo, and clinical studies in breast cancer patients. Cell Mol Life Sci 2019.
5. Tarantini L, Gori S, Faggiano P, et al.: ICARO (Italian CARdio-Oncologic) Network. Adjuvant trastuzumab cardiotoxicity in patients over 60 years of age with early breast cancer: a multicenter cohort analysis. Ann Oncol. 2012 Dec;23(12):3058-63.
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"Monitoring of cardiac function before / during / after treatment: Echocardiography (LVEF or SF in %)"

1. Ewer MS, Ewer SM. Cardiotoxicity of anticancer treatments: what the cardiologist needs to know. Nat Rev Cardiol. 2010 Oct;7(10):564-75. Review.
2. Slamon D: Breast Cancer International Research Group. Adjuvant trastuzumab in HER2-positive breast cancer. N Engl J Med. 2011 Oct 6;365(14):1273-83
3. Verma S: Is cardiotoxicity being adequately assessed in current trials of cytotoxic and targeted agents in breast cancer? Ann Oncol. 2011 May;22(5):1011-8. Epub 2010 Nov 22..
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5. Costa RB: Efficacy and cardiac safety of adjuvant trastuzumab-based chemotherapy regimens for HER2-positive early breast cancer. Ann Oncol. 2010 Nov;21(11):2153-60.
6. Yancy CW, Jessup M, Bozkurt B, et al. 2016 ACC/AHA/HFSA Focused Update on New Pharmacological Therapy for Heart Failure: An Update of the 2013 ACCF/AHA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Failure Society of America. J Card Fail. 2016 Sep;22(9):659-69. doi: 10.1016/j.cardfail.2016.07.001. Epub 2016 Jul 6.
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noninvasive imaging evidence of subclinical cardiovascular disease. JACC Cardiovasc Imaging. 2013 Aug;6(8):877-85. doi: 10.1016/j.jcmg.2012.11.017. Epub 2013 May 1.
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10. NCCN (National Comprehensive Cancer Network , 2016): http://www.nccn.org
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12. Lorenzini C, Lamberti C, Aquilina M, et al.: Reliability of Left Ventricular Ejection Fraction from Three-Dimensional Echocardiography for Cardiotoxicity Onset Detection in Patients with Breast Cancer. J Am Soc Echocardiogr. 2017 Nov;30(11):1103-1110.

Troponin as Early Predictor for Cardiotoxicity

1. Ponde N, Bradbury I, Lambertini M, et al. Cardiac biomarkers for early detection and prediction of trastuzumab and/or lapatinib-induced cardiotoxicity in patients with HER2-positive early-stage breast cancer: a NeoALTTO sub-study (BIG 1-06). Breast Cancer Res Treat. 2017 Dec 27.
2. Kitayama H, Kondo T, Sugiyama J, et al.: High-sensitive troponin T assay can predict anthracycline- and trastuzumab-induced cardiotoxicity in breast cancer patients. Breast Cancer. 2017 Nov;24(6):774-782.

Betablocker-Prophylaxe

1. Gujral DM, Lloyd G, Bhattacharyya S. Effect of prophylactic betablocker or ACE inhibitor on cardiac dysfunction & heart failure during anthracycline chemotherapy ± trastuzumab. Breast. 2018 Feb;37:64-71.
2. Oliva S, Cioffi G, Frattini S, et al.: Administration of angiotensin-converting enzyme inhibitors and β-blockers during adjuvant trastuzumab chemotherapy for nonmetastatic breast cancer: marker of risk or cardioprotection in the real world? Oncologist. 2012;17(7):917-24.
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Statement: Cardiac Monitoring (5 D ++)

Vote result of the AGO recommendation: 100%

1. Perez EA, Suman VJ, Davidson NE, et al.: Cardiac safety analysis of doxorubicin and cyclophosphamide followed by paclitaxel with or without trastuzumab in the North Central Cancer Treatment Group N9831 adjuvant breast cancer trial. J Clin Oncol. 2008 Mar 10;26(8):1231-8. Epub 2008 Feb 4.
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"Trastuzumab simultaneous to radiotherapy"

1. Halyard MY, Pisansky TM, Dueck AC: Radiotherapy and adjuvant trastuzumab in operable breast cancer: tolerability and adverse event data from the NCCTG Phase III Trial N9831.J Clin Oncol 27: 2638-2644, 2009
2. Viani GA, Afonso SL, Stefano EJ, et al.: Adjuvant trastuzumab in the treatment of Her2 positive early breast cancer: a metaanalysis of published randomized trials. BMC Cancer 2007; 7:153-164
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"Trastuzumab simultaneous to epirubicin"

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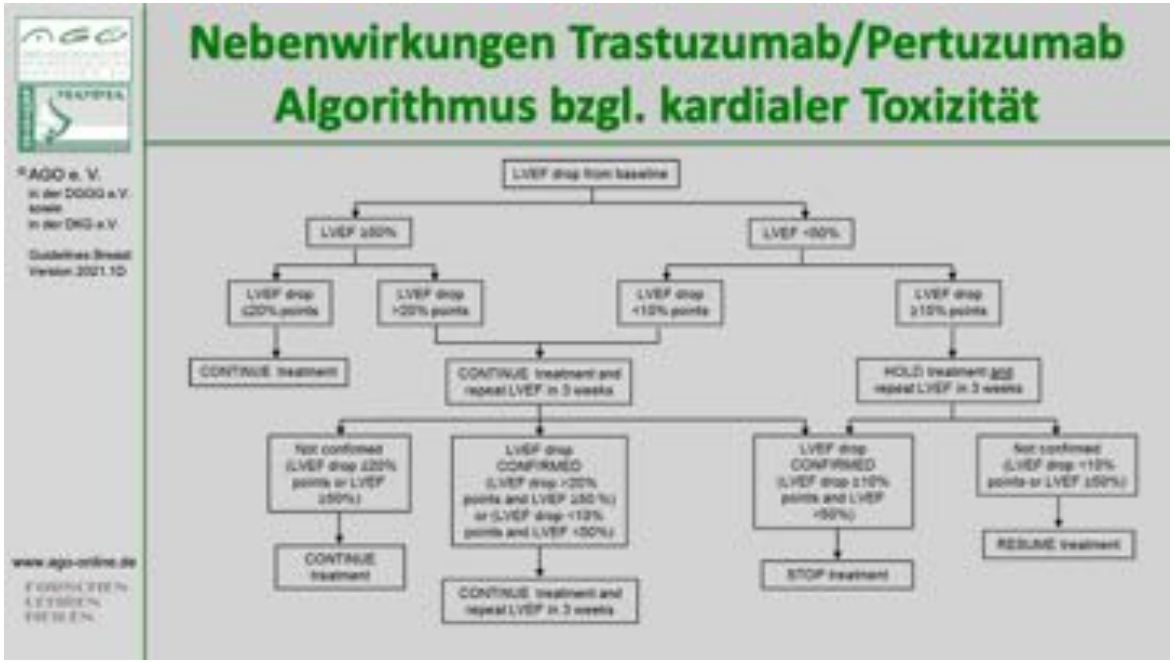

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Nebenwirkungen nach Organsystemen

Inzidenz, Prävention, Therapie

8. **Erkrankungen des Gastrointestinaltrakts**
   - **Nausea, Emesis (Übelkeit, Erbrechen)**
   - **Mukositis**
     - **Stomatitis (Evrolimus)**
   - **Diarrhoe**
   - **Obstipation**

Antiemetische Therapie

nach MASCC und ASCO

AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2021.1D

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	Oxford		
	LoE	GR	AGO
• Abschätzen des emetogenen Potenzials des jeweiligen Chemotherapie-Protokolls	5	D	++
• Neurokinin-1-Rezeptor-Antagonisten	1b	A	++
• Dexamethason (auch bei Kombinationen mit ICPi)	1a	A	++
• 5-HT_3-Antagonisten	1b	A	++
• Feste Kombination mehrerer Substanzen	1b	A	++
• Reserveantiemetika (Rescue Medication)			
◦ Olanzapin	1b	A	+
◦ Levomepromazin, Benzodiazepine	3b	C	+
◦ Cannabinoide, Ingwer	3b	C	+

ICPi=Immuncheckpointinhibitor

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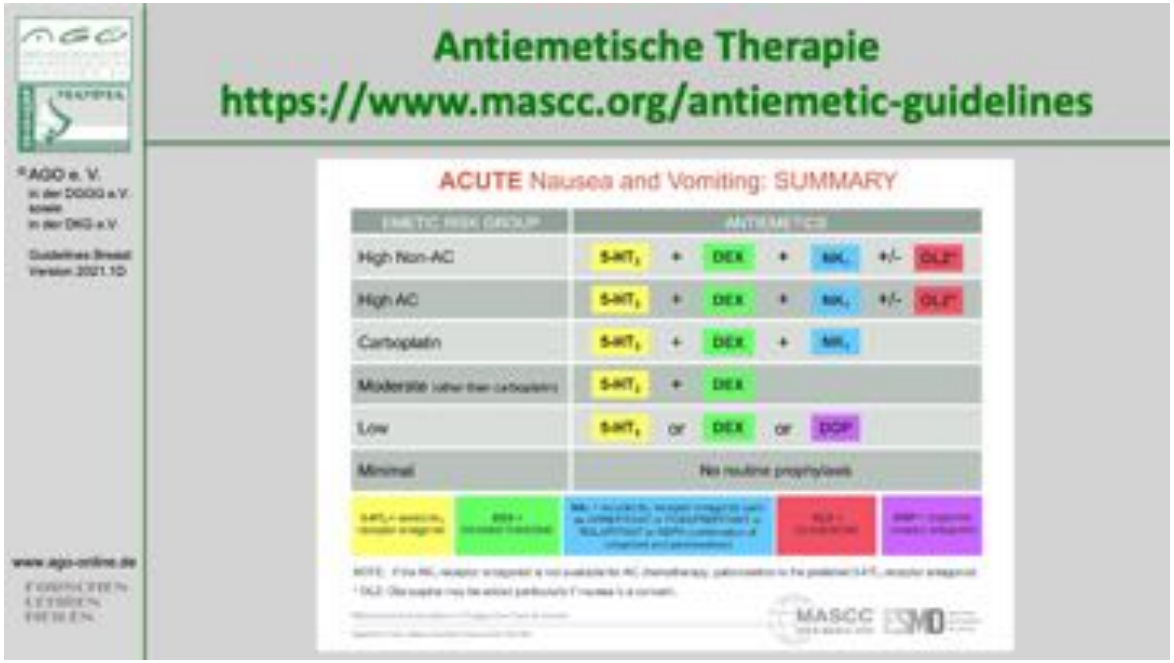

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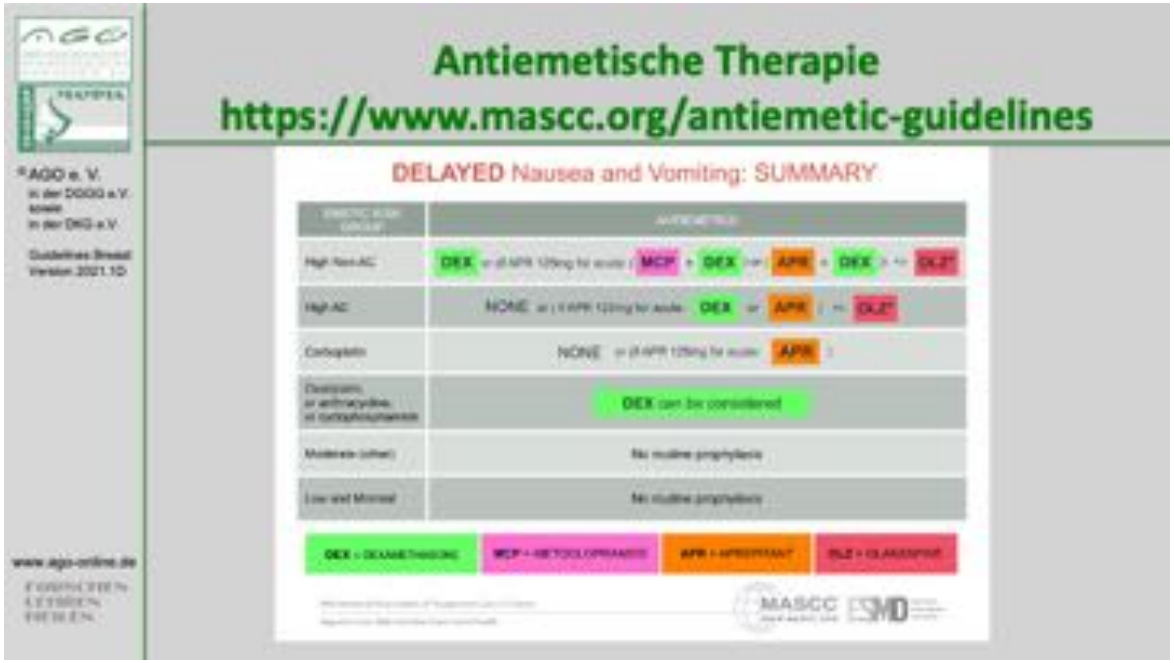

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Olanzapine

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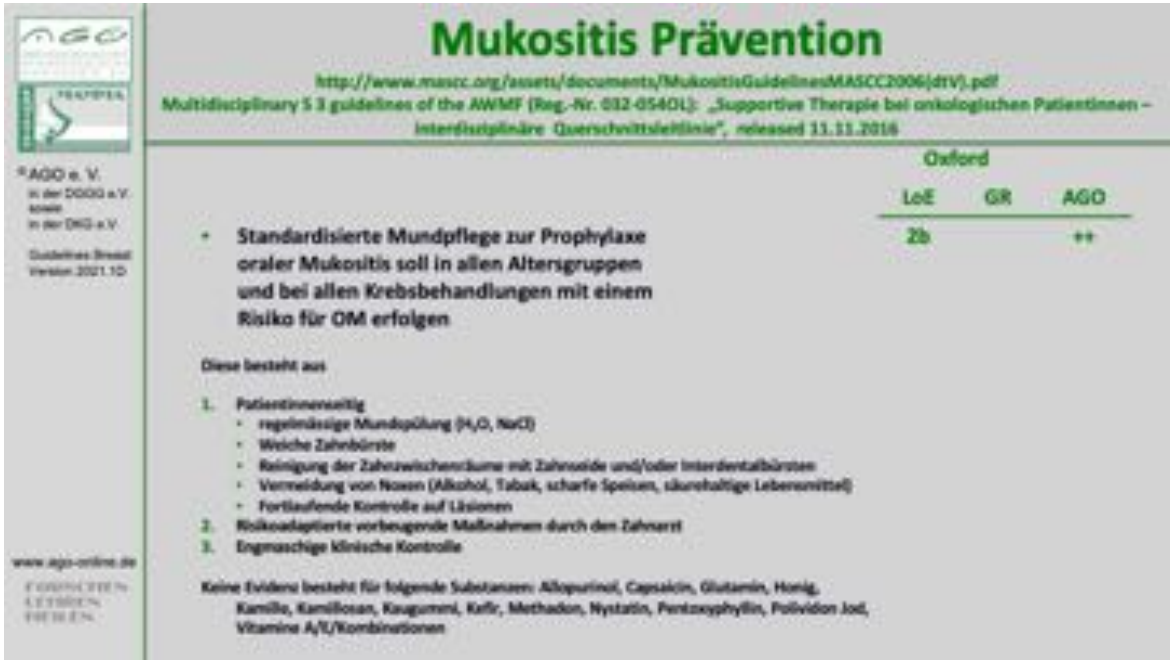

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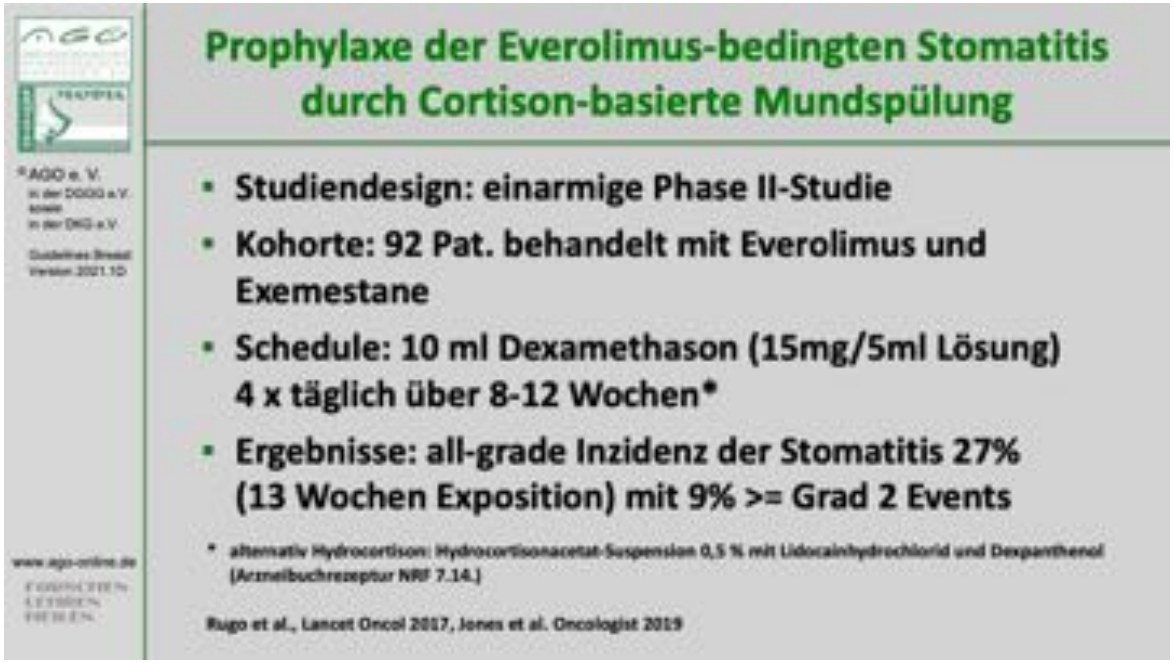

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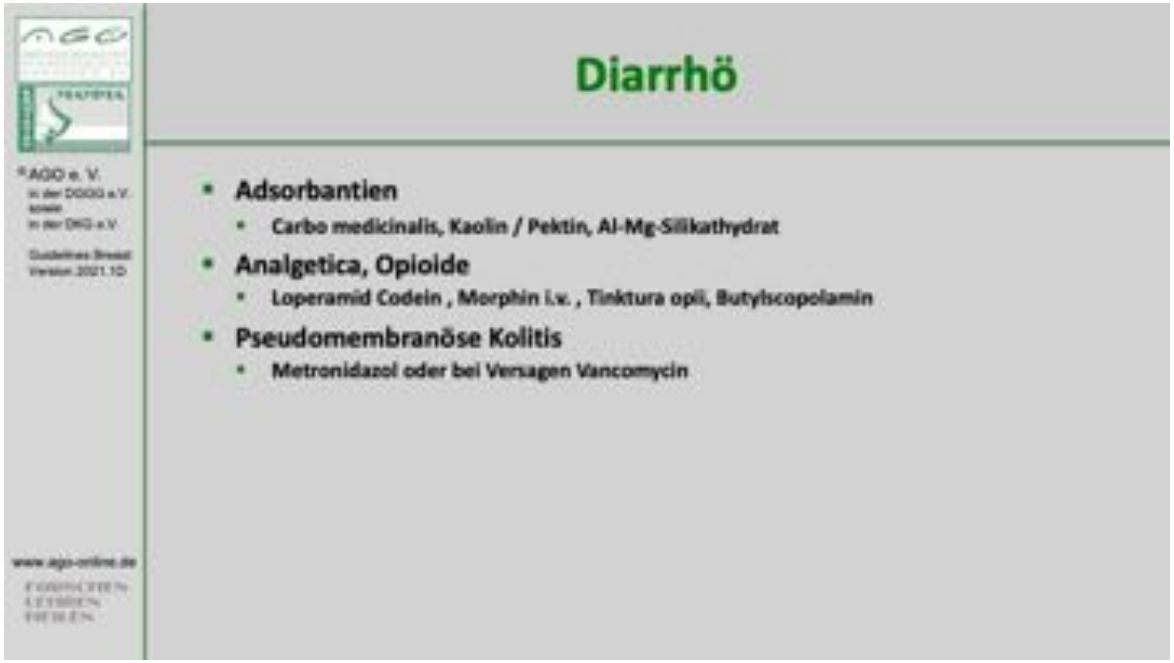

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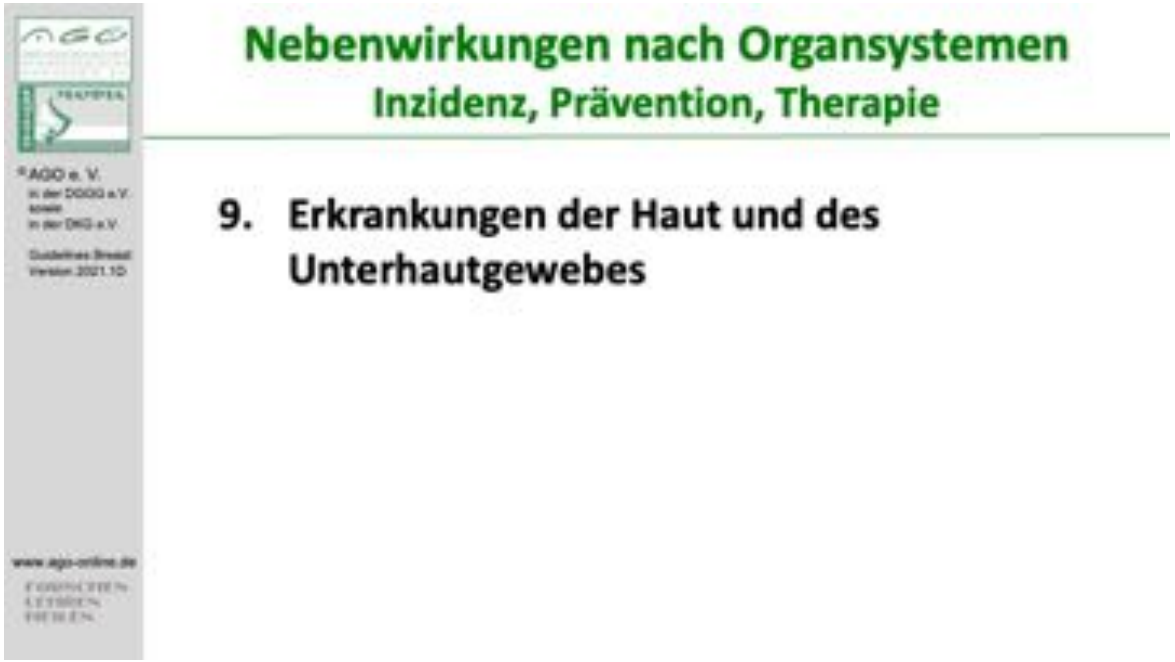

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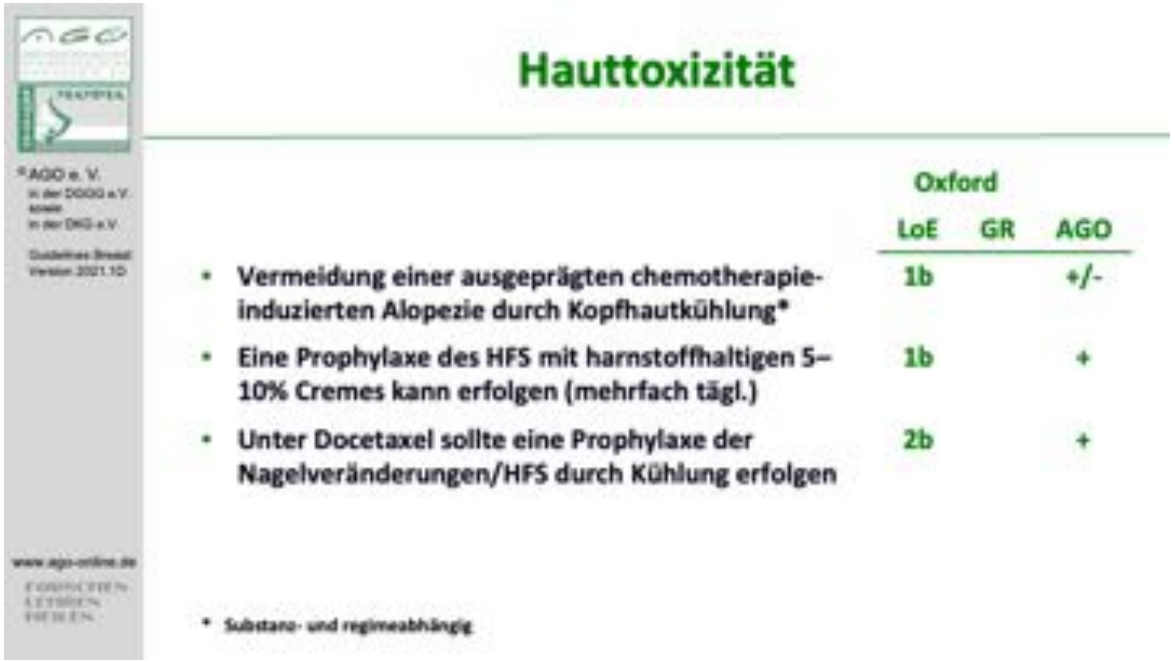

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Scalp Cooling:

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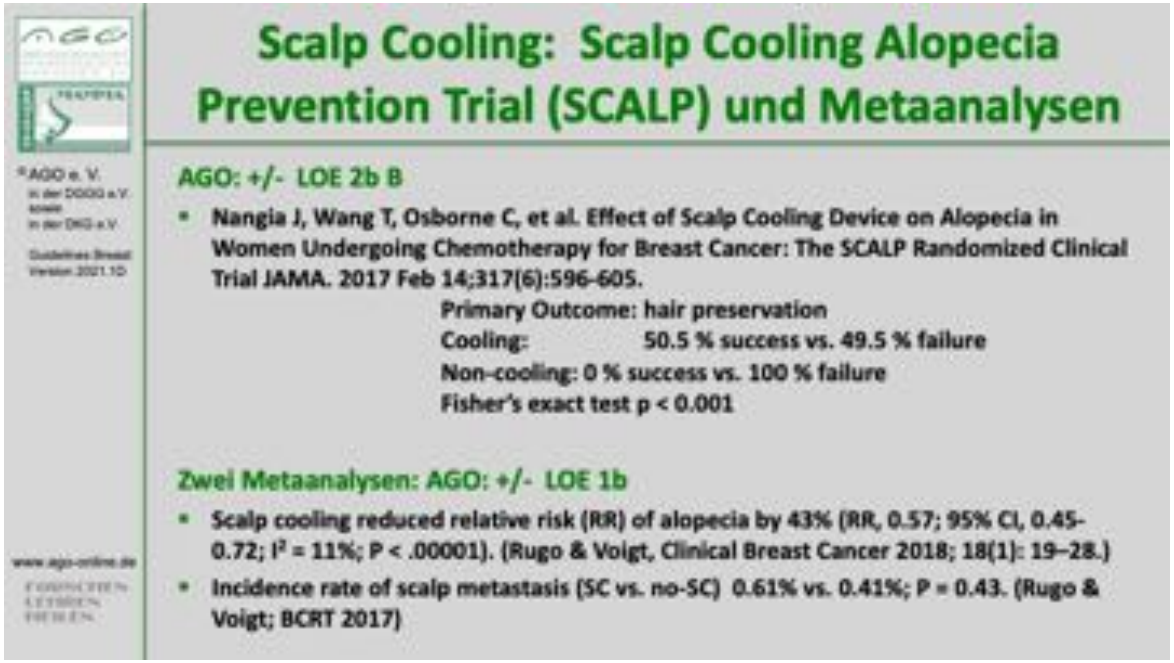

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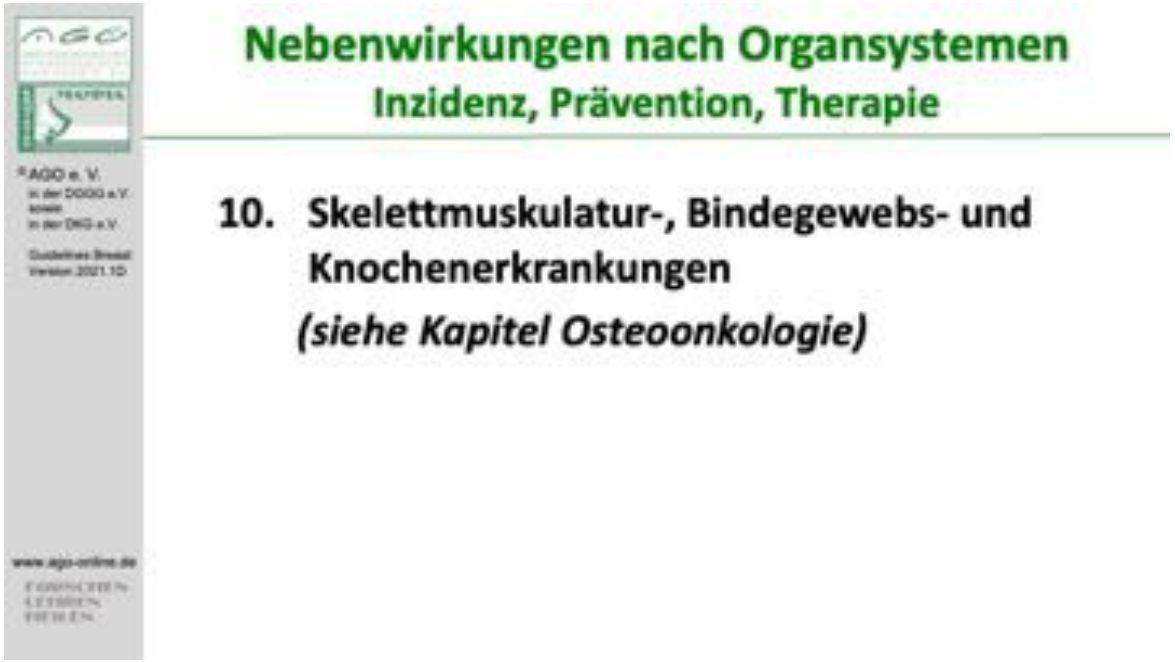

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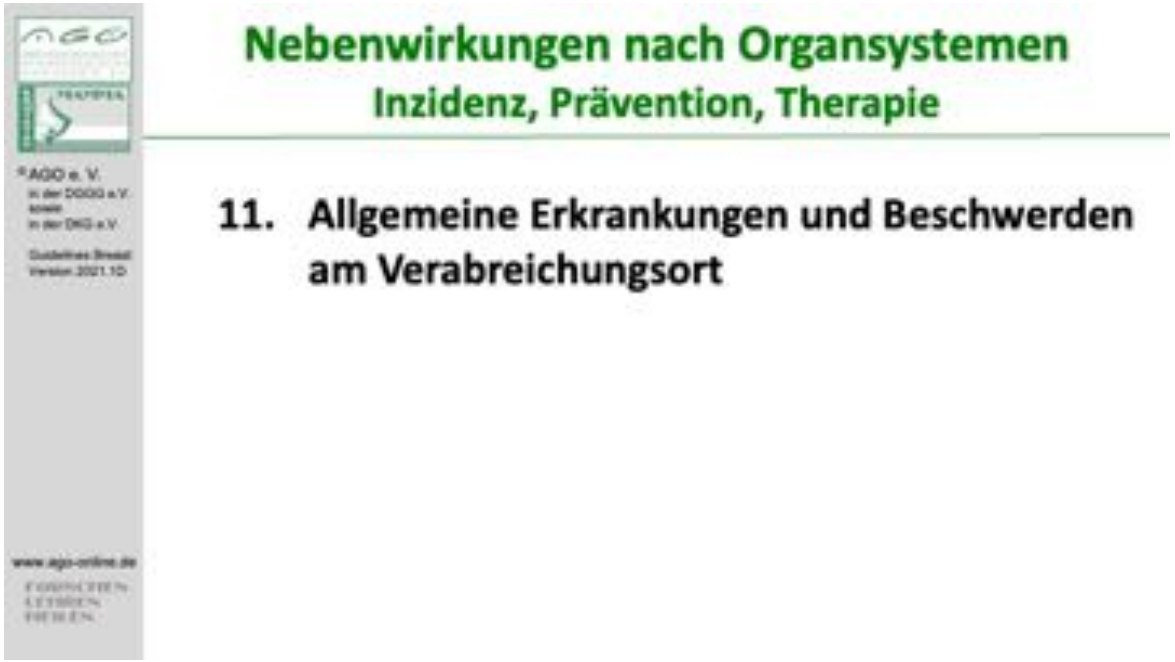

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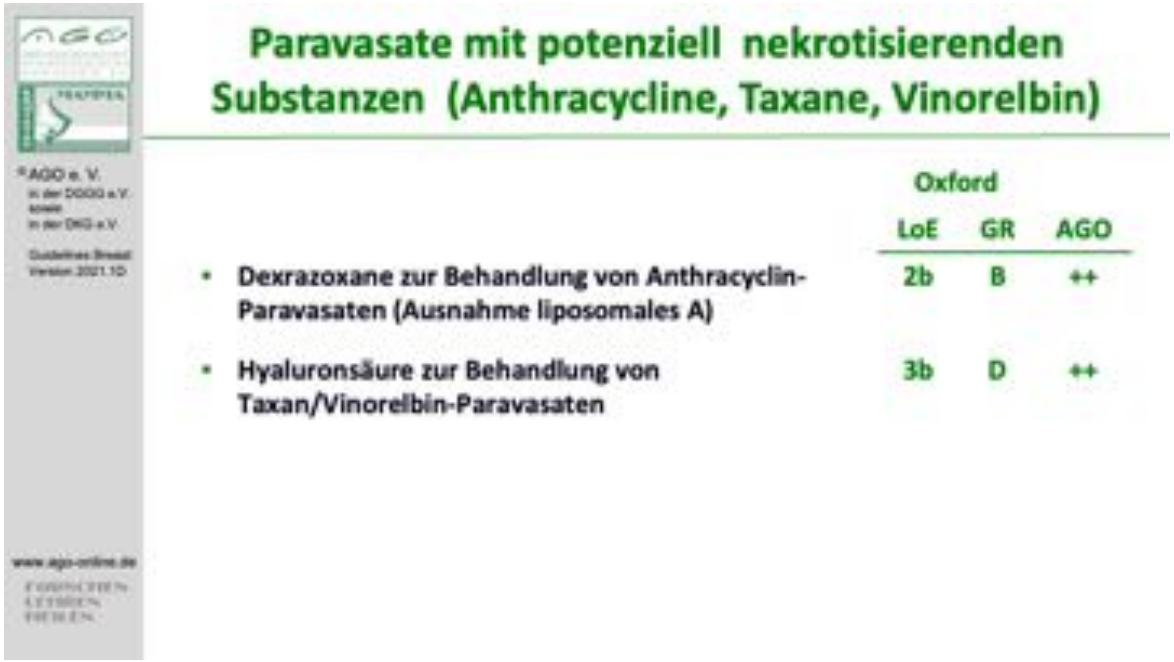

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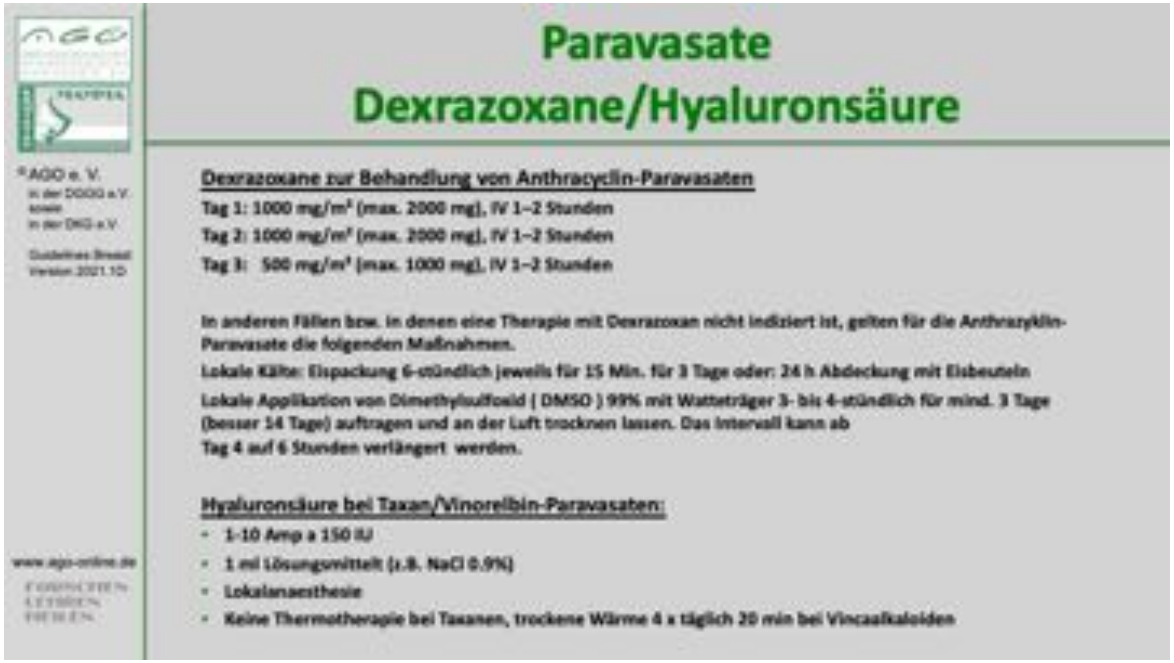

Relevant practice guideline

Leitlinienprogramm Onkologie (Deutsche Krebsgesellschaft, Deutsche Krebshilfe, AWMF): Supportive Therapie bei onkologischen PatientInnen - Langversion 1.2, 2019,
AWMF Registernummer: 032/054OL, http://leitlinienprogramm- onkologie.de/Supportive-Therapie.95.0.html (Zugriff am 08.01.2020)

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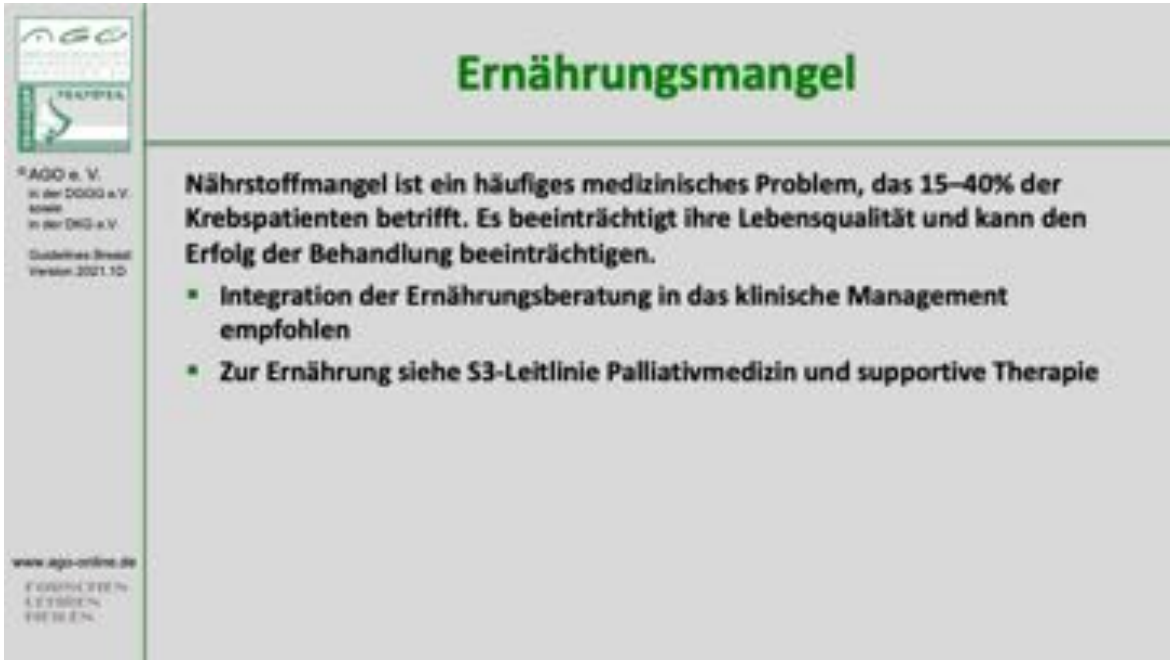

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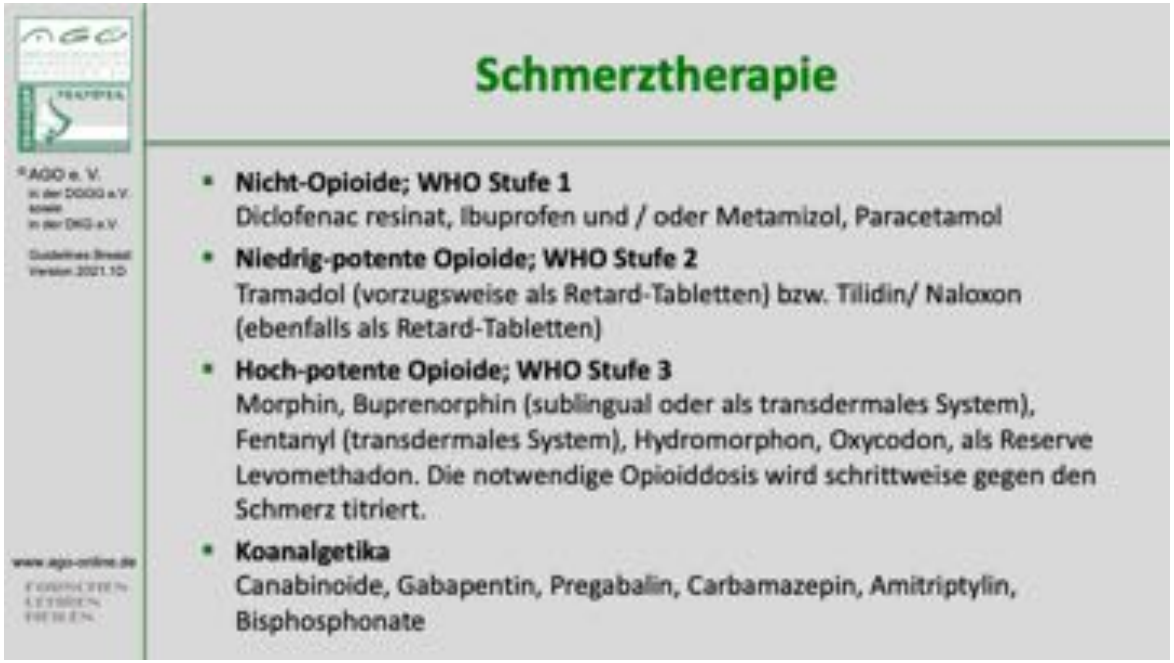

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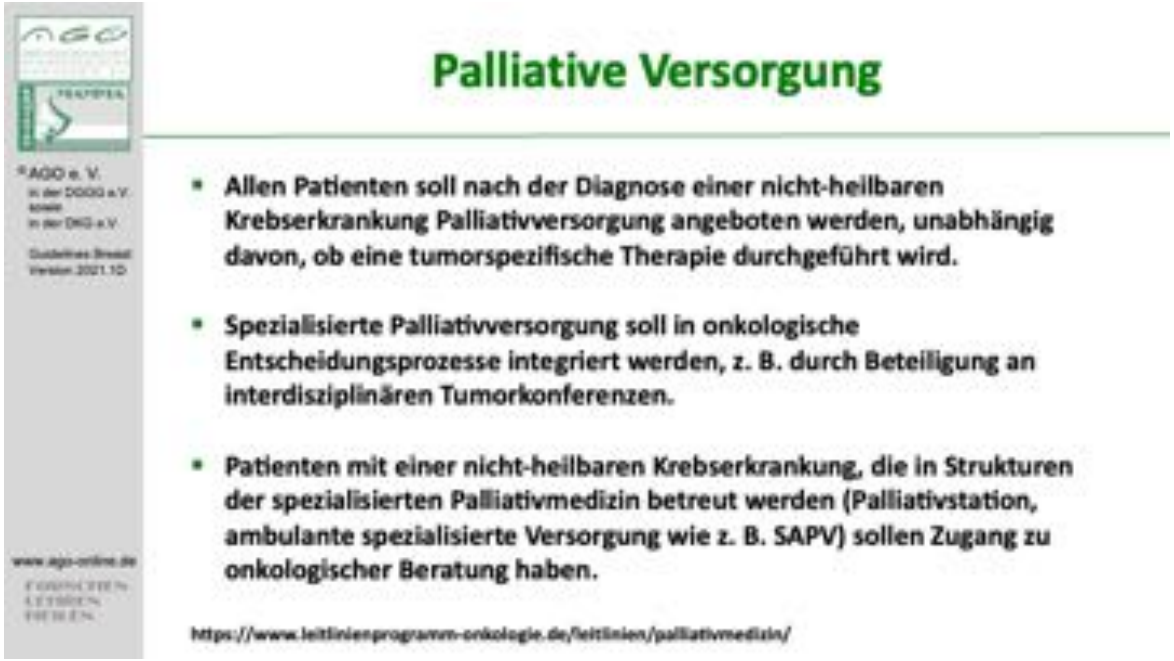

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