



Society for Immunotherapy of Cancer

Cancer Immunotherapy

GUIDELINES

Clinical Practice Guideline Webinar –
**Immunotherapy for the Treatment
of Lymphoma**

Monday, January 25, 2021

5 – 6 p.m. EST

Jointly provided by Postgraduate Institute for Medicine and the Society for Immunotherapy of Cancer

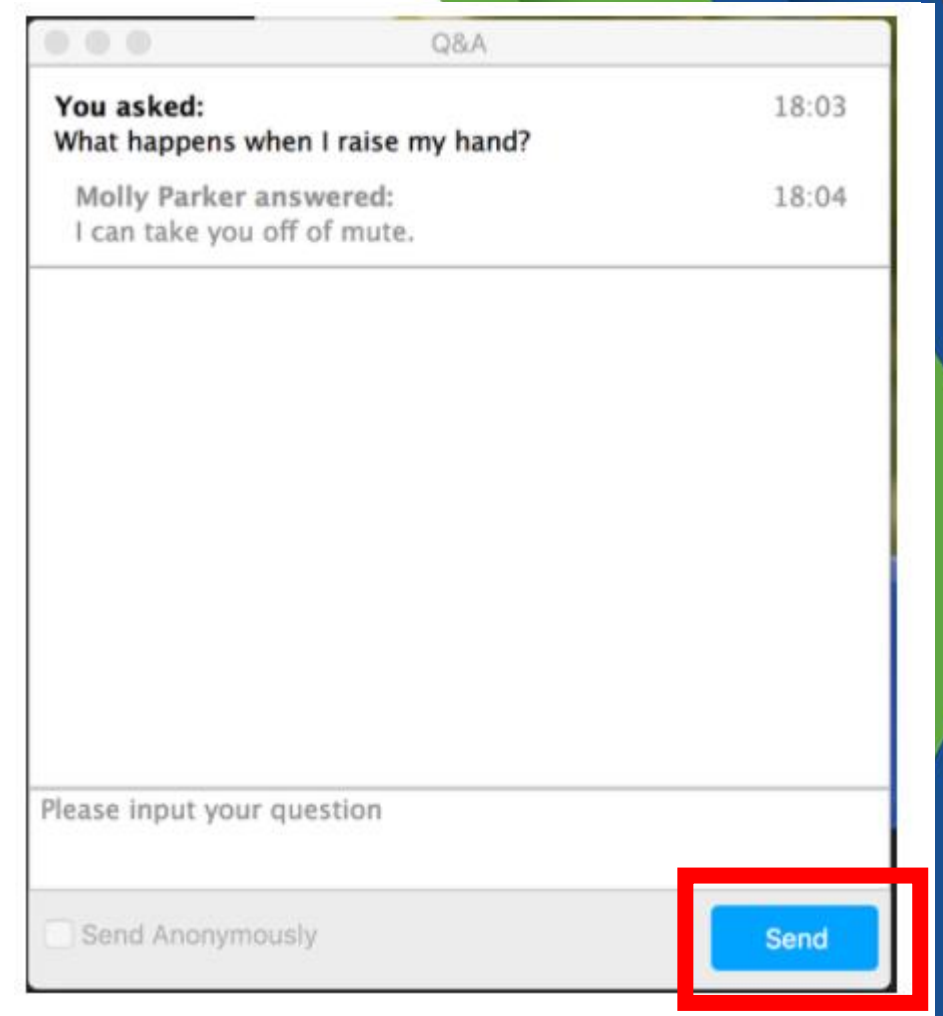
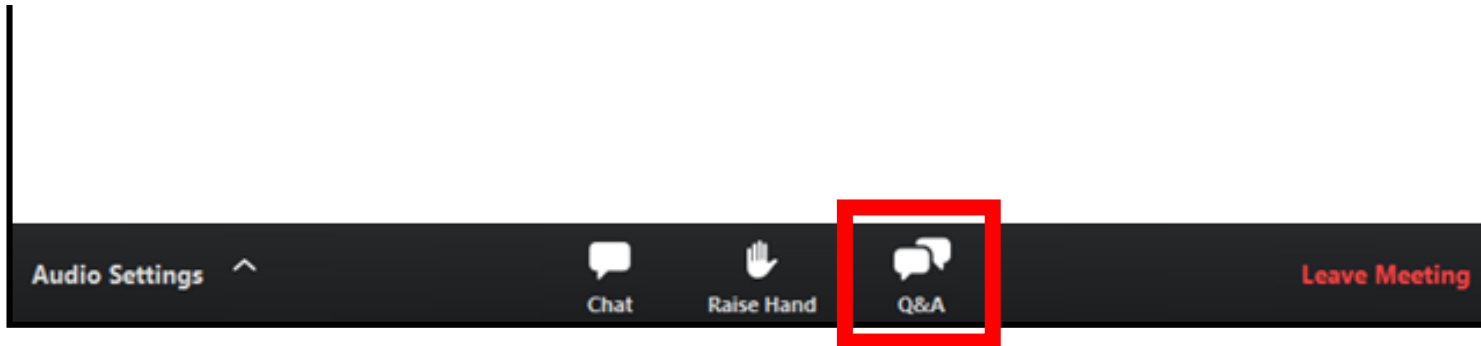
This webinar is supported, in part, by independent medical education grant funding from Amgen,
AstraZeneca Pharmaceuticals LP, Celgene Corporation and Merck & Co., Inc.

Webinar Agenda

5:00 – 5:05 p.m. ET	Overview: Welcome and Introductions
5:05 – 5:45 p.m. ET	Presentation and discussion of guideline content
5:45 – 5:55 p.m. ET	Question and Answer Session
5:55 – 6:00 p.m. ET	Closing Remarks

How to Submit Questions

- Click the “Q&A” icon located on at the bottom of your Zoom control panel
- Type your question in the Q&A box, then click “Send”
- Questions will be answered in the Question & Answer session at the end of the webinar (as time permits)



Webinar faculty



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Outline

- Introduction to lymphoma
- Management of B-cell non-Hodgkin lymphoma
- Management of Hodgkin lymphoma, chronic lymphocytic leukemia and T cell lymphoma
- Toxicity management

Lymphoma

- Most common type of hematologic cancer
- Estimated 85,720 new cases and 20,910 deaths in 2020
- Treatment modalities include chemotherapy, radiotherapy, stem cell transplantation, targeted therapies and immunotherapy

Guideline development


- *The Institute of Medicine's Standards for Developing Trustworthy Practice Guidelines* were used to develop these recommendations
- Panel consisted of 12 participants, including medical oncologists, a pediatric oncologist, a nurse practitioner, and a patient advocate
- Recommendations come from literature evidence, supplemented with clinical experience of the panel members where necessary
- Consensus defined as $\geq 75\%$ agreement

Guideline development

Position article and guidelines

Society for Immunotherapy of Cancer (SITC) clinical practice guideline on immunotherapy for the treatment of lymphoma



Sattva S Neelapu¹, Sherry Adkins¹, Stephen M Ansell², Joshua Brody³,  Mitchell S Cairo⁴, Jonathan W Friedberg⁵, Justin P Kline⁶, Ronald Levy⁷, David L Porter⁸, Koen van Besien⁹, Michael Werner¹⁰ and Michael R Bishop⁶

[Author affiliations](#) +

Abstract

The recent development and clinical implementation of novel immunotherapies for the treatment of Hodgkin and non-Hodgkin lymphoma have improved patient outcomes across subgroups. The rapid introduction of immunotherapeutic agents into the clinic, however, has presented significant questions regarding optimal treatment scheduling around existing chemotherapy/radiation options, as well as a need for improved understanding of how to properly manage patients and recognize toxicities. To address these challenges, the Society for Immunotherapy of Cancer (SITC) convened a panel of experts in lymphoma to develop a clinical practice guideline for the education of healthcare professionals on various aspects of immunotherapeutic treatment. The panel discussed subjects including treatment scheduling, immune-related adverse events (irAEs), and the integration of immunotherapy and stem cell transplant to form recommendations to guide healthcare professionals treating patients with lymphoma.

General recommendations for lymphoma

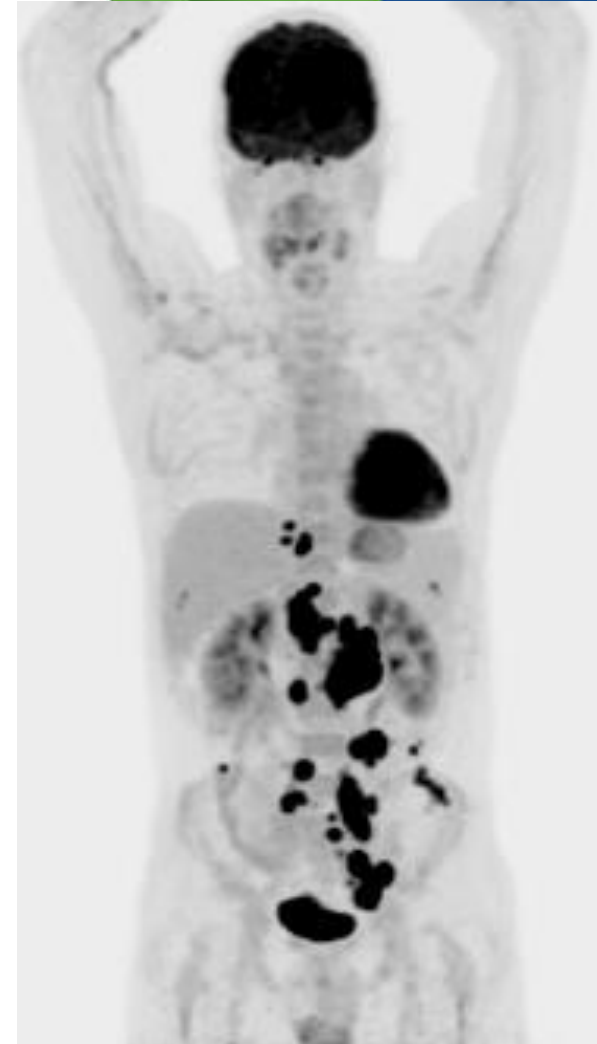
- **Clinical trials** should be strongly considered as a treatment option at each stage of therapy for eligible patients with lymphoma.
- All patients newly diagnosed with lymphoma should receive initial imaging via **FDG-PET/CT**.
- Patients should be routinely administered **complete blood count (CBC) and serum IgG tests**. Infection precautions may be considered in patients with decreased neutrophil and absolute lymphocyte counts from CBC tests, as well as low levels of serum IgG.
- All patients with newly diagnosed lymphoma should receive assessment of their **cardiovascular history** and risk factors prior to receiving potentially cardiotoxic therapies.

Outline

- Introduction to lymphoma
- **Management of B-cell non-Hodgkin lymphoma**
- Management of Hodgkin lymphoma, chronic lymphocytic leukemia and T cell lymphoma
- Toxicity management

Diffuse Large B-cell Lymphoma Case

- 47 yo male who presented with stage IVB DLBCL with bulky retroperitoneal lymphadenopathy of up to 15 cm in size
- Had partial response after 4 cycles of DA-EPOCH-R but progressed after cycle 6
- After 1 cycle of R-DHAP he had increasing back pain and a CT scan revealed progressive disease
- Treatment options approved for 2nd or 3rd line DLBCL:
 - CAR T-cell therapy
 - Polatuzumab + bendamustine + rituximab
 - Tafasitamab + lenalidomide
- What is the best treatment option for this patient?



Treatment of NHL

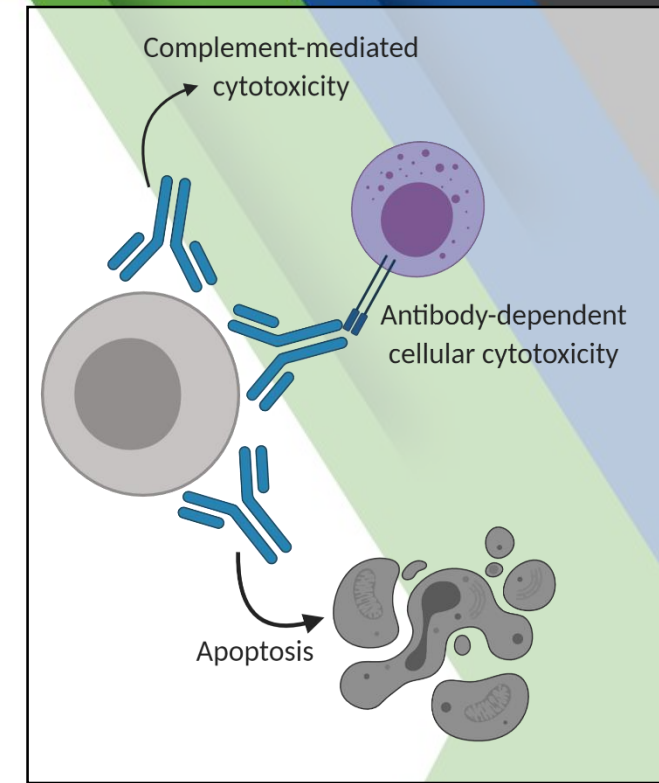
Immunotherapy options include:

- Monoclonal antibodies
 - Rituximab
 - Obinutuzumab
 - Mogamulizumab-kpkc
 - Tafasitamab-cxix
- Antibody-drug conjugates
 - Ibritumomab tiuxetan
 - Brentuximab vedotin
 - Polatuzumab vedotin-piiq
- Cellular therapies
 - Axicabtagene ciloleucel
 - Tisagenlecleucel
 - Brexucabtagene autoleucel
- Immunomodulators
 - Lenalidomide
- Immune checkpoint inhibitors
 - Pembrolizumab

Rituximab

Anti-CD20 antibody

- Approved for:
 - R/R low grade or follicular CD20-positive B-cell NHL as a single agent
 - Previously untreated follicular, CD20-positive, B-cell NHL in combination with first-line chemotherapy and, in patients achieving a CR or PR to rituximab + chemotherapy, as single-agent maintenance
 - Non-progressing low-grade CD20-positive B-cell NHL as single agent after first-line cyclophosphamide, vincristine and prednisone
 - Previously untreated diffuse large B-cell, CD20-positive NHL in combination with CHOP or other anthracycline chemotherapy



Obinutuzumab

Anti-CD20 antibody

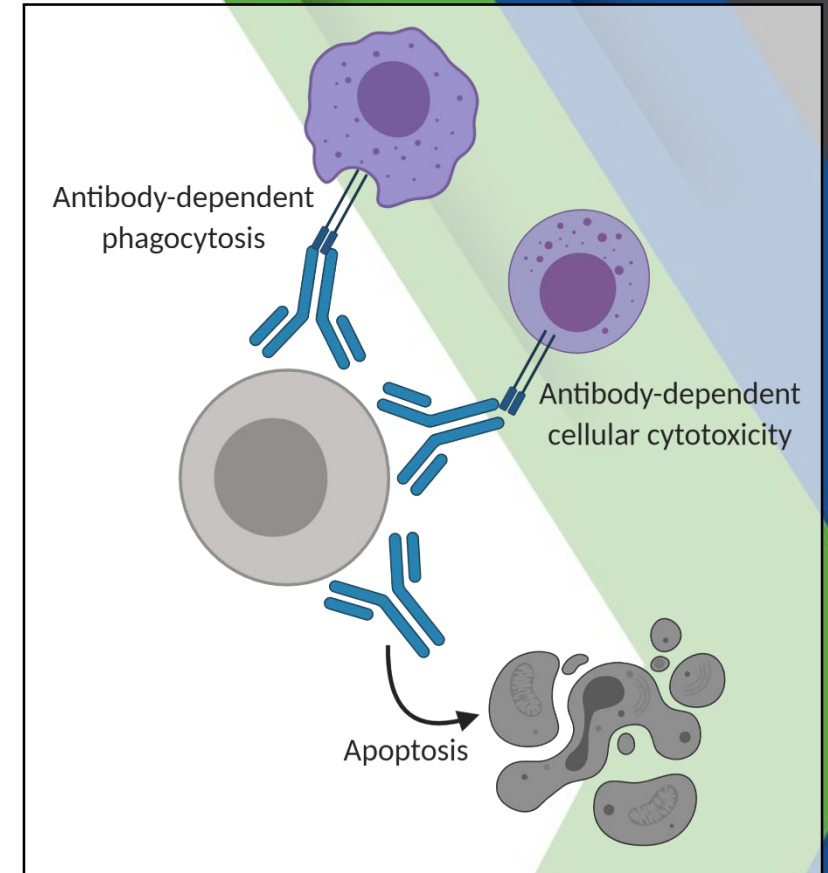
- Approved for:
 - R/R follicular lymphoma after rituximab, in combination with bendamustine, followed by obinutuzumab monotherapy
 - Previously untreated stage II bulky, III or IV follicular lymphoma, in combination with chemotherapy, followed by obinutuzumab monotherapy if achieving at least a PR

Rituximab	Obinutuzumab
Type I antibody	Type II antibody
Localization of CD20 into lipid rafts	No localization of CD20 into lipid rafts
Minimal direct cell death (DCD)	More potent direct cell death (DCD)
Prominent complement-dependent cytotoxicity (CDC)	Minimal complement-dependent cytotoxicity (CDC)
Some antibody-dependent cellular cytotoxicity	More potent antibody-dependent cellular cytotoxicity
Some antibody-dependent phagocytosis	More potent antibody-dependent phagocytosis

Tafasitamab-cxix

Anti-CD19 antibody

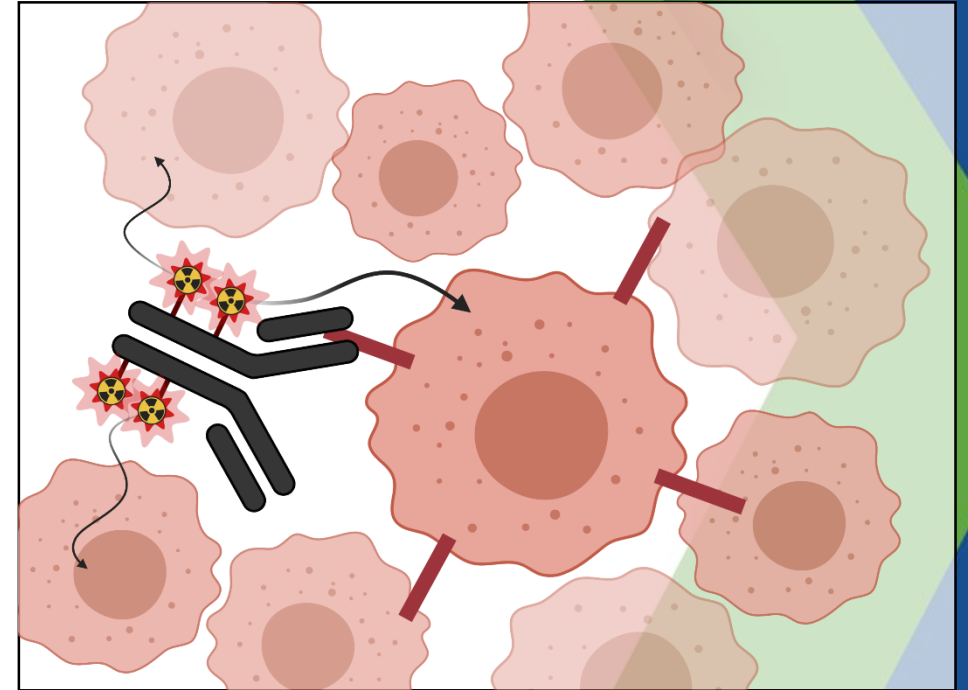
- Approved for: R/R DLBCL in combination with lenalidomide for patients ineligible for autoSCT
- Fc engineering enhances ADCC and ADP compared to unmodified IgG
- Panel noted tafasitamab + lenalidomide as a treatment option for second-line treatment of transplant-ineligible DLBCL



Ibritumomab tiuxetan

Anti-CD20 antibody + ^{90}Y

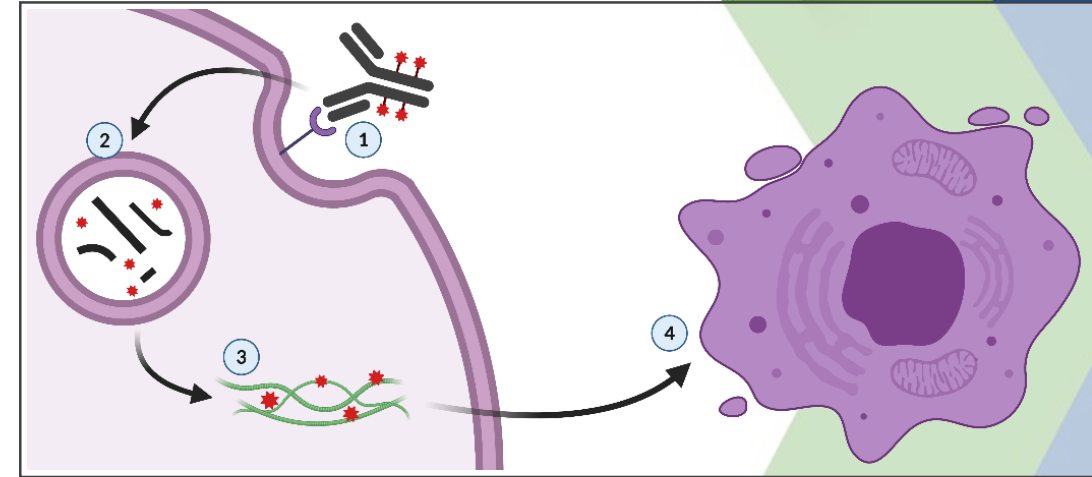
- Delivers cytotoxic radiation to CD20-expressing cells
- Approved for:
 - R/R low-grade or follicular NHL
 - Follicular NHL with a PR or CR to first-line chemotherapy
- Requires additional handling/safety considerations, since radioactive
- Dosing in units of millicurie (mCi) per kg



Polatuzumab vedotin-piiq

Anti-CD79b antibody + monomethyl auristatin E

- Approved for:
 - R/R DLBCL after at least two prior therapies, in combination with rituximab and bendamustine
- Committee recommends PV as the third-line treatment for patients with DLBCL who are ineligible for CAR T therapy.

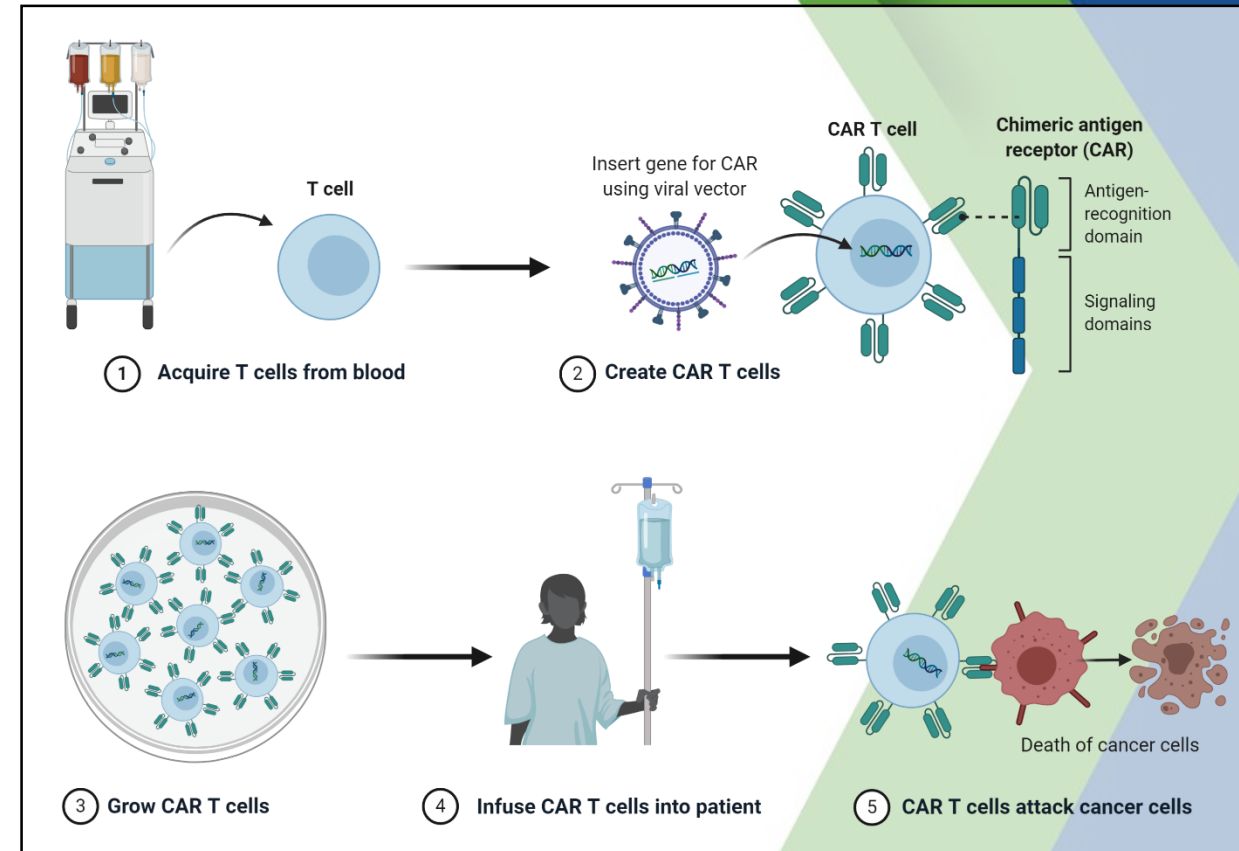


Axicabtagene ciloleucel, tisagenlecleucel and brexucabtagene autoleucel

CD19 CAR T therapies

Agent	Approved indication
Axicabtagene ciloleucel	R/R large B cell lymphomas after 2+ prior therapies
Tisagenlecleucel	R/R large B cell lymphomas after 2+ prior therapies
Brexucabtagene autoleucel	R/R MCL

Axi-cel and brexu-cel have the same CAR construct; however, the manufacturing of brexu-cel involves enrichment of specific lymphocytes to improve therapeutic potential.



Recommendations for DLBCL

First-line treatment	Second-line treatment	Third-line treatment (or later)
<ul style="list-style-type: none">Adults: R-CHOPPediatric: rituximab + FAB chemotherapy	<ul style="list-style-type: none">Transplant eligible: chemoimmunotherapy regimen that includes rituximab, followed by autoSCT if CR achieved<i>Transplant-ineligible: no consensus. Options: lenalidomide, lenalidomide + tafasitamab, polatuzumab vedotin + BR, or salvage chemoimmunotherapy</i>	<ul style="list-style-type: none">Anti-CD19 CAR T therapyCAR-ineligible: polatuzumab vedotin + rituximab + bendamustine

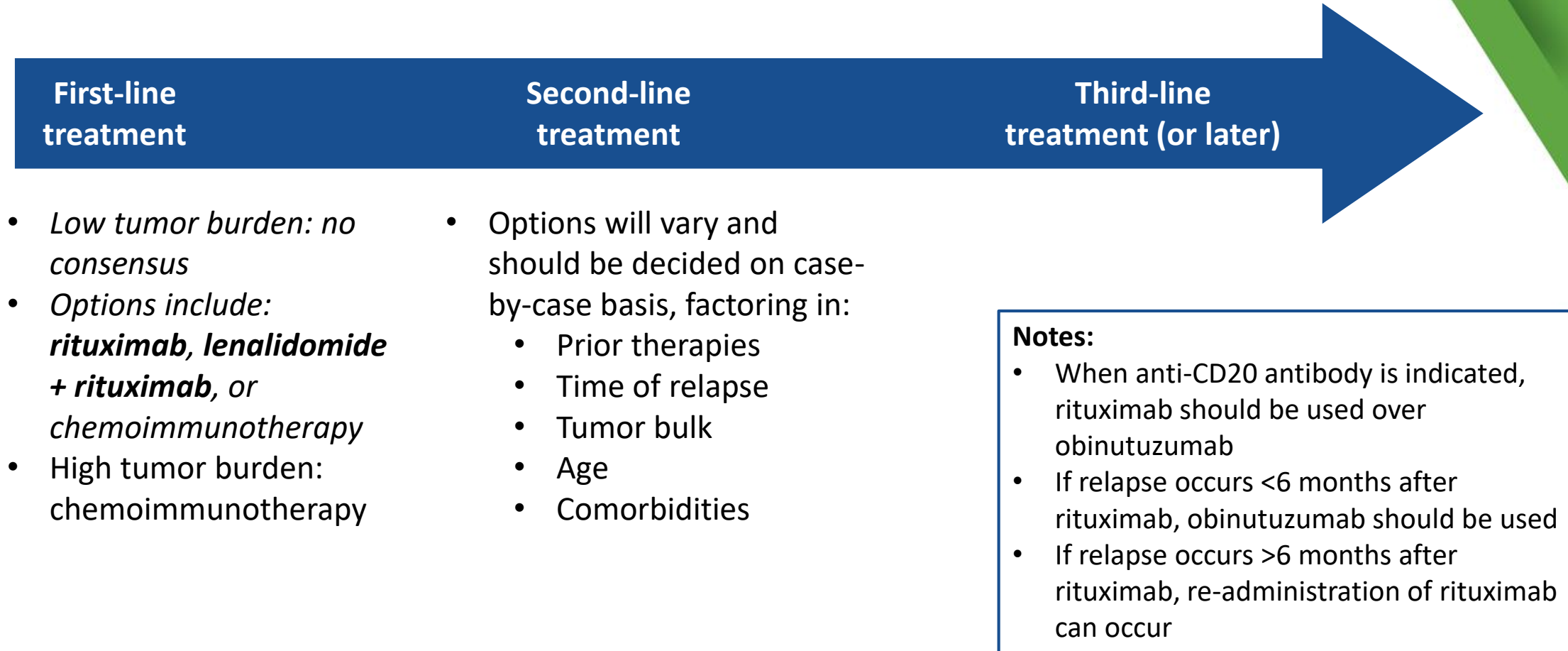
DLBCL Case Study

- The **first-line regimen** for newly diagnosed DLBCL in adult patients should be R-CHOP or R-CHOP-like regimens.
- For the **second-line therapy** of DLBCL, transplant-eligible patients should receive a chemoimmunotherapy regimen that includes rituximab followed by autoSCT consolidation if CR is achieved.
- The **third-line treatment** for DLBCL in fit patients should be anti-CD19 CAR T cell therapy.
 - Anti-CD19 CAR T-cell therapy should be considered prior to tafasitamab + lenalidomide therapy in CART-eligible patients
- Patients who are **ineligible for third-line anti-CD19 CAR T** cell therapy should instead receive polatuzumab vedotin-piiq+ rituximab+bendamustine.
 - Bendamustine should be avoided prior to apheresis in CART-eligible patients

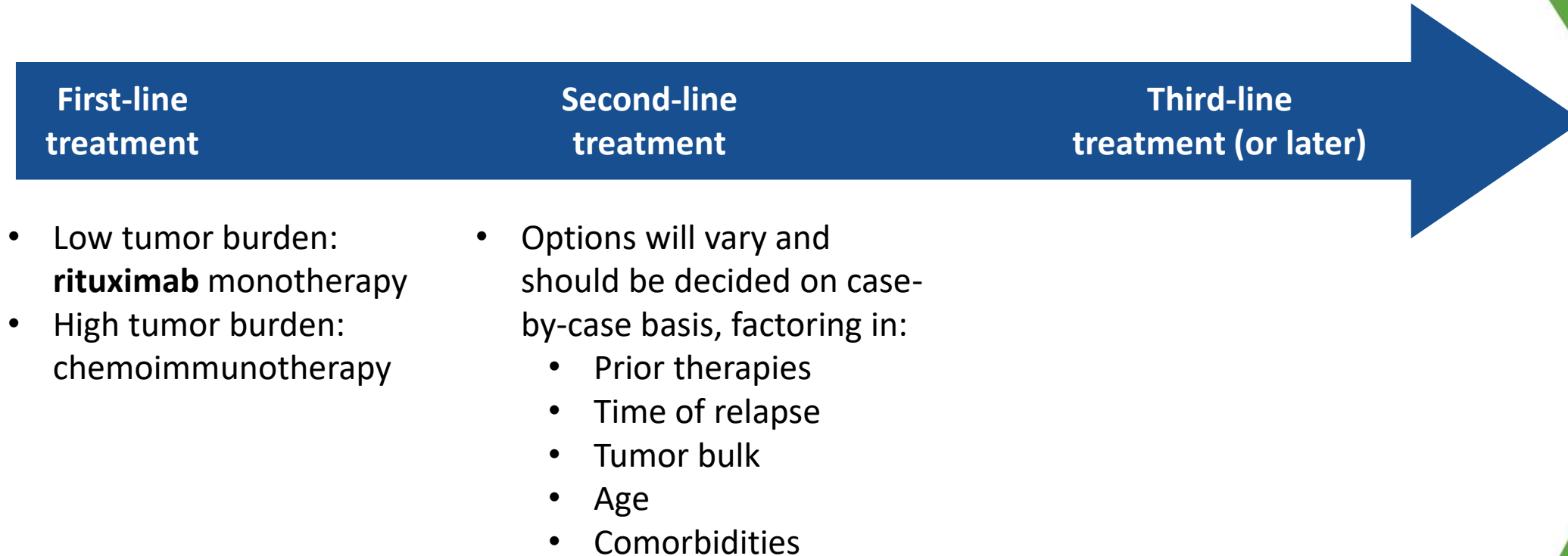
Recommendations for MCL

First-line treatment	Second-line treatment	Third-line treatment (or later)
<ul style="list-style-type: none">• <i>Transplant-eligible: No consensus</i>• <i>Options: chemoimmunotherapy + autoSCT or chemoimmunotherapy alone</i>• <i>Transplant-ineligible: chemoimmunotherapy + rituximab maintenance</i>	<ul style="list-style-type: none">• <i>No consensus</i>• <i>Options: brexucabtagene autoleucel, proteasome inhibitors, BTK inhibitors, BTK inhibitors + rituximab, or lenalidomide + rituximab</i>	<ul style="list-style-type: none">• <i>No consensus</i>

Recommendations for FL



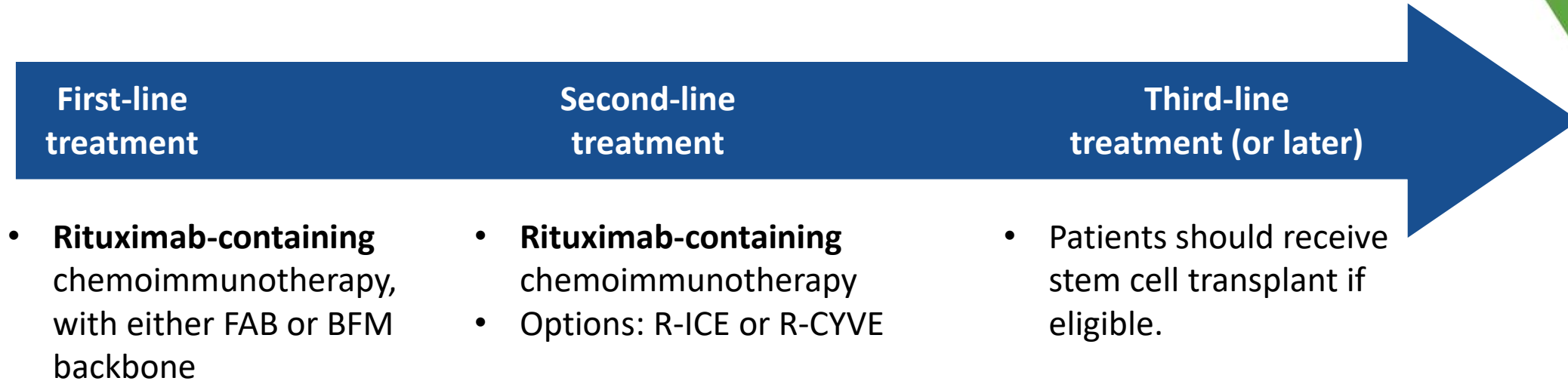
Recommendations for MZL



Recommendations for PMBCL

First-line treatment	Second-line treatment	Third-line treatment (or later)
<ul style="list-style-type: none">• DA-R-EPOCH	<ul style="list-style-type: none">• Transplant eligible: chemoimmunotherapy regimen that includes rituximab, followed by autoSCT if CR achieved.• <i>Transplant-ineligible: no consensus. Options: lenalidomide, lenalidomide + tafasitamab, polatuzumab vedotin + BR, or salvage chemoimmunotherapy.</i>	<ul style="list-style-type: none">• <i>No consensus.</i>• <i>Options: axicabtagene ciloleucel, BV + pembrolizumab, salvage chemoimmunotherapy.</i>

Recommendations for BL - pediatric



Recommendations for BL - adult

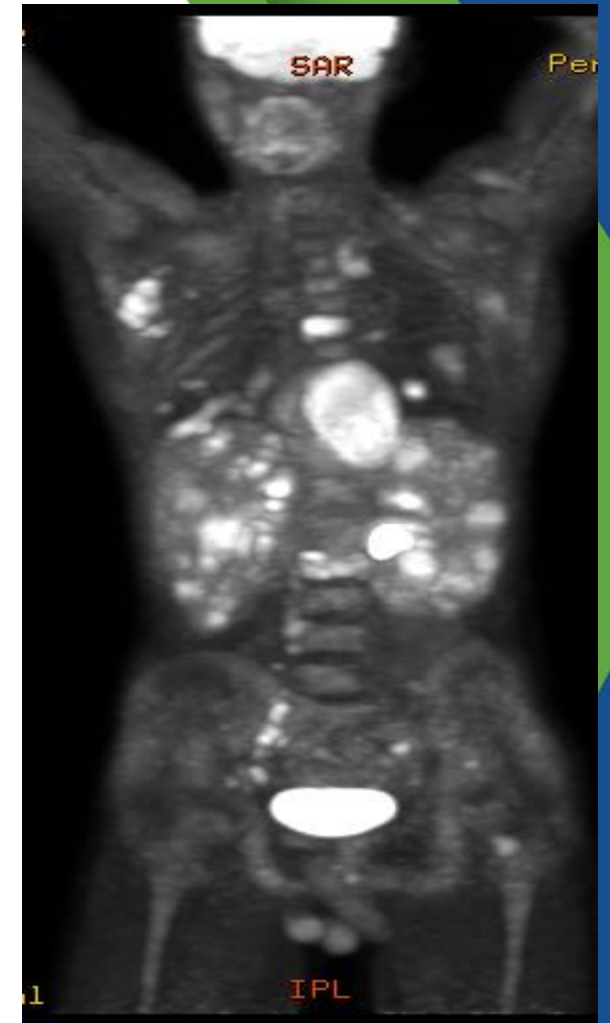
First-line treatment	Second-line treatment	Third-line treatment (or later)
<ul style="list-style-type: none">• Rituximab-containing chemoimmunotherapy.• Options: rituximab + CODOXM/IVAC alternating with rituximab + HyperCVAD, rituximab + LMB	<ul style="list-style-type: none">• Similar rituximab-containing chemoimmunotherapy• Consolidation similar to DLBCL	

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- Introduction to lymphoma
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Hodgkin lymphoma case

- A 27 year old male presents with stage IVA nodular sclerosis Hodgkin lymphoma.
- He has diffuse lymphadenopathy; liver, lung and splenic lesions and multiple bone lesions on PET scan.
- He receives brentiximab vedotin + AVD x 6 cycles and has a CR
- He has a biopsy proven relapse 9 months later
- He receives ICE chemotherapy followed by an autologous stem cell transplant and brentuximab vedotin for 1 year
- The patient relapses again 6 months after completing 16 cycles of brentuximab vedotin and is treated with nivolumab.
- He has a CR and is offered an allogenic transplant, but declines.
- He remains in remission 4 years later

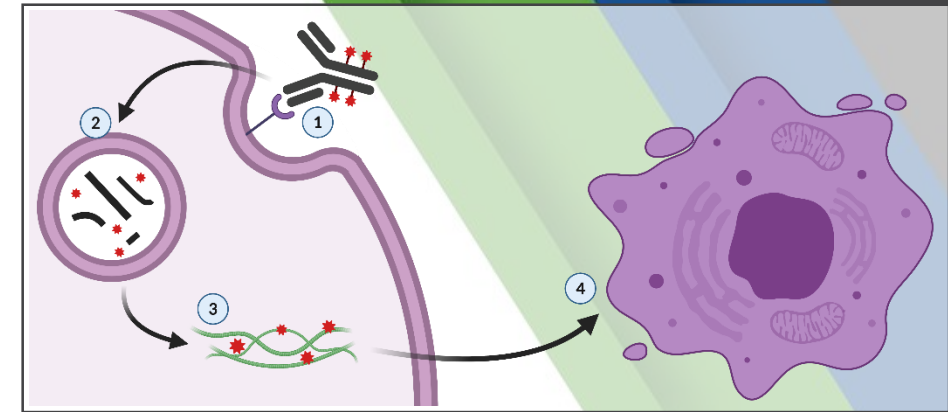


Approved immunotherapies for Hodgkin lymphoma

Agent	Therapy type	Indication(s)
Brentuximab vedotin	ADC	<u>First-line</u> stage III-IV cHL (combination with doxorubicin, vinblastine and dacarbazine)
		<u>Consolidation</u> therapy for cHL after autoSCT and high risk of relapse
		<u>R/R</u> cHL after autoSCT
Nivolumab	ICI	<u>R/R</u> cHL after autoSCT and brentuximab vedotin
		<u>R/R</u> cHL after 3+ prior therapies
Pembrolizumab	ICI	<u>R/R</u> cHL after 3+ prior therapies

Brentuximab vedotin

Anti-CD30 antibody + monomethyl auristatin E



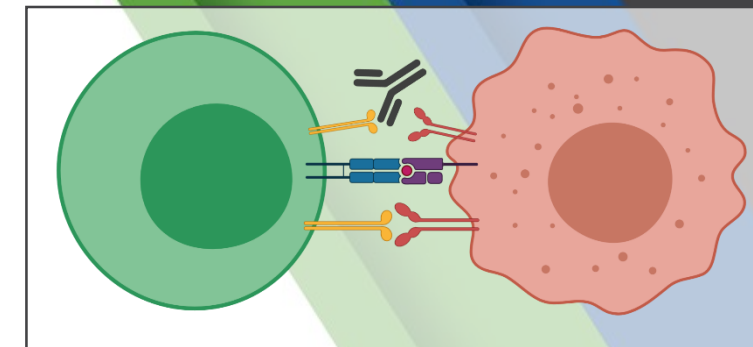
Trial	Study design	Patient population	Enrolled patients	Primary endpoint	Results
ECHELON-1	Randomized phase III; comparator: ABVD	First line stage III or IV cHL	1334	Modified PFS	2-yr PFS: 82.1 vs 77.2% 2-yr OS: 96.6 vs 94.9%
AETHERA	Randomized phase III; comparator: BSC	cHL at high risk of relapse after autoSCT	329	PFS	5-yr PFS: 59 vs 41%
NCT00848926	Phase II, single-arm	R/R cHL with prior autoSCT	102	ORR	ORR: 75% CR rate: 34%

Recommended uses in HL:

- Pre-autoSCT with chemotherapy, ICI, or monotherapy
- First-line stage III-IV with AVD
- Third-line treatment

Nivolumab and pembrolizumab

Anti-PD-1 antibodies



Trial	Study design	Patient population	Enrolled patients	Primary endpoint	Results
CheckMate 205	Phase II single-arm, nivolumab	R/R cHL with prior autoSCT +/- BV	243	ORR	ORR: 69% Median PFS: 14.7 mo
NCT02572167	Phase I/II single-arm, nivolumab + BV	R/R cHL second-line	62	CR rate	CR rate: 61% ORR: 83%
KEYNOTE-087	Phase II single-arm, pembrolizumab	R/R cHL	210	ORR and safety	ORR: 69% 6-month PFS: 72.4%

Recommended

uses in HL:

- Pre-autoSCT with BV
- Third-line treatment

Recommendations for HL

First-line treatment	Second-line treatment	Third-line treatment (or later)
<ul style="list-style-type: none">• Stage I-II: doxorubicin, bleomycin, vinblastine and dacarbazine (ABVD)• <i>Stage III-IV: no consensus. Options:</i><ul style="list-style-type: none">• ABVD• Brentuximab vedotin, doxorubicin, vinblastine and dacarbazine (A-AVD)	<ul style="list-style-type: none">• Salvage chemotherapy or immunotherapy, and autoSCT if eligible. Pre-autoSCT options include:<ul style="list-style-type: none">• Brentuximab vedotin + bendamustine• Ifosfamide + carboplatin + etoposide• Brentuximab vedotin + nivolumab• Brentuximab vedotin monotherapy	<ul style="list-style-type: none">• <i>No consensus. Options:</i><ul style="list-style-type: none">• <i>Salvage chemotherapy or immunotherapy + autoSCT if eligible</i>• PD-1 inhibitor therapy• Brentuximab vedotin

Hodgkin lymphoma case

1. Brentuximab vedotin is standardly included in initial chemotherapy combinations
2. Brentuximab vedotin should be given as consolidation therapy after autologous stem cell transplantation in high-risk patients
3. Anti-PD1 antibodies are standard of care in relapsed Hodgkin lymphoma patients post autologous transplant
4. Consider allogeneic transplant or a clinical trial if the disease progresses

Recommendations for PTCL

First-line treatment	Second-line treatment	Third-line treatment (or later)
<ul style="list-style-type: none">• <i>CD30+:</i> no consensus• Options: BV + CHP, chemotherapy, chemotherapy + autoSCT• CD30-negative: chemotherapy + autoSCT	<ul style="list-style-type: none">• <i>Eligible for transplant:</i> no consensus.• Options: chemotherapy + autoSCT, chemotherapy + alloSCT, HDAC inhibitors• CD30+, SCT-ineligible: BV up to 16 doses• CD30-, SCT-ineligible: HDAC inhibitors	

Approved therapies for CLL

Agent	Treatment type	Indication(s)
Rituximab	Anti-CD20 antibody	Untreated CD20-positive CLL in combination with FC
		R/R CD20-positive CLL in combination with FC
Obinutuzumab	Anti-CD20 antibody	Untreated CLL in combination with chlorambucil
Ofatumumab	Anti-CD20 antibody	Untreated , fludarabine-ineligible CLL in combination with chlorambucil
		Relapsed CLL in combination with FC
		Extended treatment of CLL in CR or PR after 2+ prior therapies
		CLL refractory to fludarabine and alemtuzumab
Alemtuzumab	Anti-CD52 antibody	Untreated or R/R CLL

The panel did not reach consensus on preferred regimens for the first-line or second-line treatment of CLL. Options include targeted therapy (if eligible) and chemoimmunotherapy regimens, which may include rituximab, obinutuzumab, ofatumumab, and alemtuzumab.

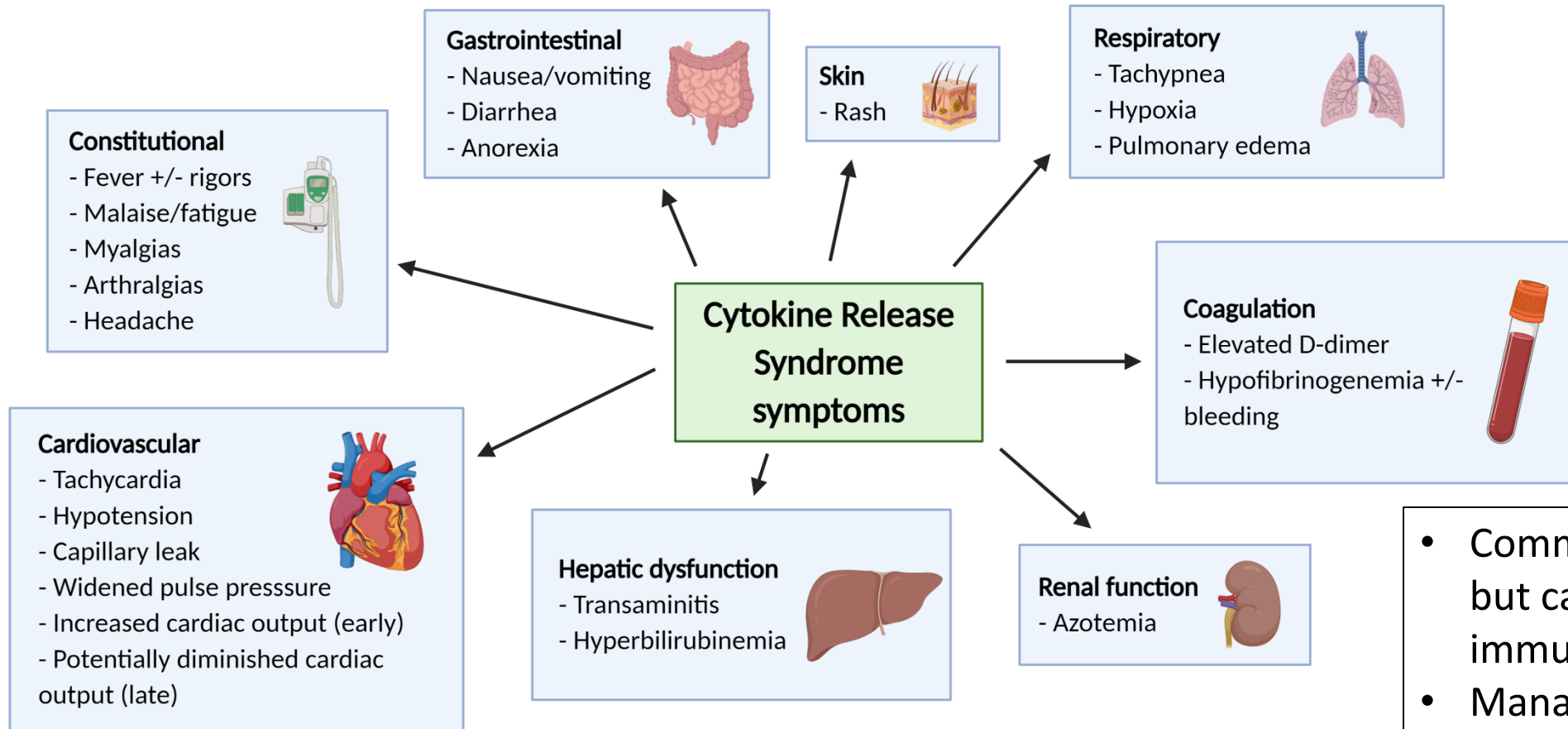
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“Black box” warnings on lymphoma immunotherapies

Therapy	Warning due to	Therapy	Warning due to
Alemtuzumab	<ul style="list-style-type: none"> • Autoimmune conditions • Severe infusion reactions • Anaphylaxis • Cancer • Infections 	Ibritumomab tiuxetan	<ul style="list-style-type: none"> • Severe infusion reactions • Severe cytopenia • Severe cutaneous/mucocutaneous reactions • Do not administer if altered biodistribution
Axicabtagene ciloleucel	<ul style="list-style-type: none"> • CRS • ICANS • Do not administer if active infection or inflammation 	Lenalidomide	<ul style="list-style-type: none"> • Embryo-fetal toxicity • Significant neutropenia, thrombocytopenia
Brexucabtagene autoleucel	<ul style="list-style-type: none"> • CRS • ICANS • Do not administer if active infection or inflammation 	Rituximab and biosimilars	<ul style="list-style-type: none"> • Severe infusion reactions • TLS • Severe mucocutaneous reactions • PML • Hepatitis B reactivation
Brentuximab vedotin	<ul style="list-style-type: none"> • PML 	Tisagenlecleucel	<ul style="list-style-type: none"> • CRS • ICANS • Do not administer if active infection or inflammation
Obinutuzumab	<ul style="list-style-type: none"> • Hepatitis B reactivation • PML 		

Cytokine release syndrome



- Common with CAR T therapy but can occur with other immunotherapies.
- Management includes tocilizumab and corticosteroids.

Neurotoxicity

- Also called CAR-T Related Encephalopathy Syndrome (CRES) or IEC-associated neurologic syndrome (ICANS)
- Manifests as confusion, delirium, seizures, cerebral edema
- Largely unknown mechanisms
- Incidence increases with more doses, increased age, more prior therapies
- Management options:
 - Supportive care
 - Corticosteroids

Neurotoxicity Domain	Grade 1	Grade 2	Grade 3	Grade 4
ICE score	7-9	3-6	0-2	0
Depressed level of consciousness	Awakens spontaneously	Awakens to voice	Awakens to tactile stimulus	Unroutable
Seizure	N/A	N/A	Any clinical seizure/on EEG	Prolonged/life-threatening seizure
Motor Findings	N/A	N/A	N/A	Hemi or paraparesis, deep focal motor weakness
Raised ICP/ cerebral edema	N/A	N/A	Focal edema on imaging	Diffuse cerebral edema on imaging, cranial N palsy, Cushing's triad, Decorticate posture

Infusion reactions

- Can be allergic or non-allergic
- Allergic reactions uncommon, but can lead to anaphylaxis
- Infusion reactions are common, particularly when mAbs are administered after SCT
- Most infusion reactions occur with first dose of therapy
- Among lymphoma immunotherapies, rituximab has highest incidence of infusion reactions, up to 77%

Tumor lysis syndrome

- Result of a sudden and massive release of metabolites after widespread lysis of tumor cells
- Particularly high risk in hematologic cancers with high tumor burden
- Management approaches include:
 - Prophylactic hydration
 - Prophylactic hypouricemic agents, like allopurinol
 - Dialysis

Patients with viral infections

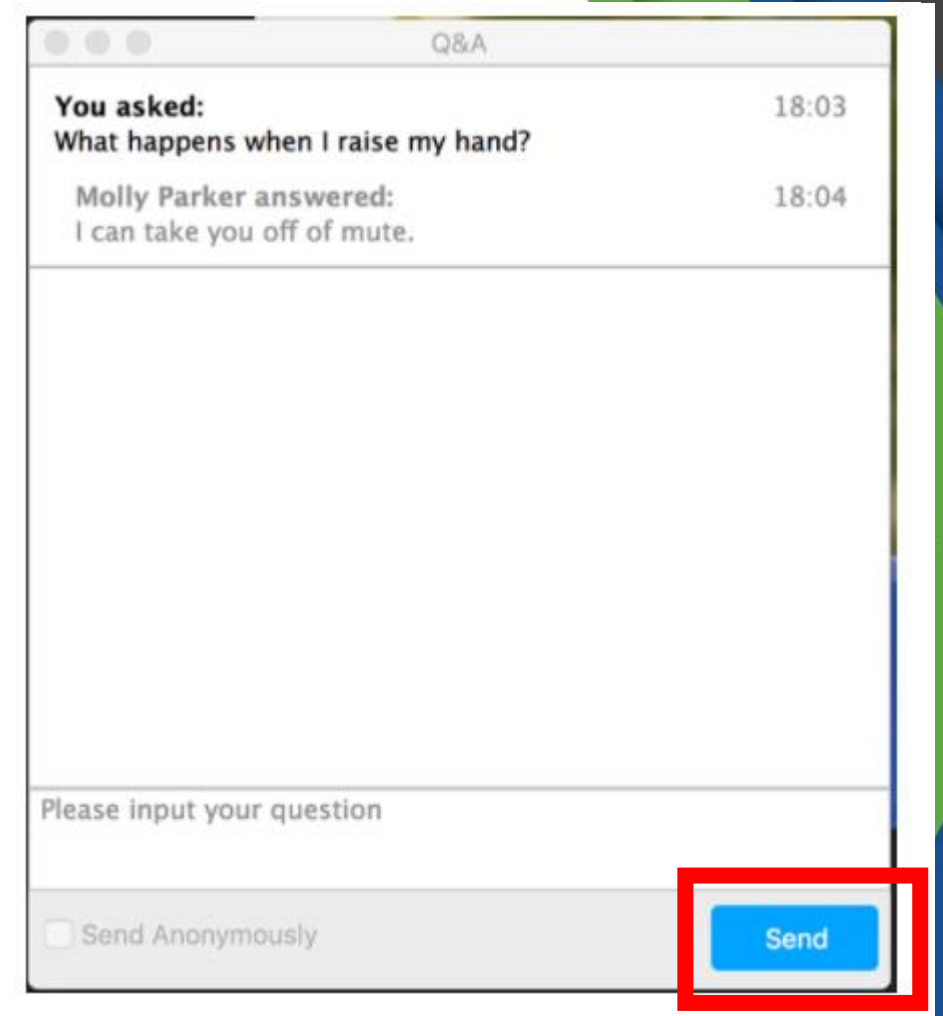
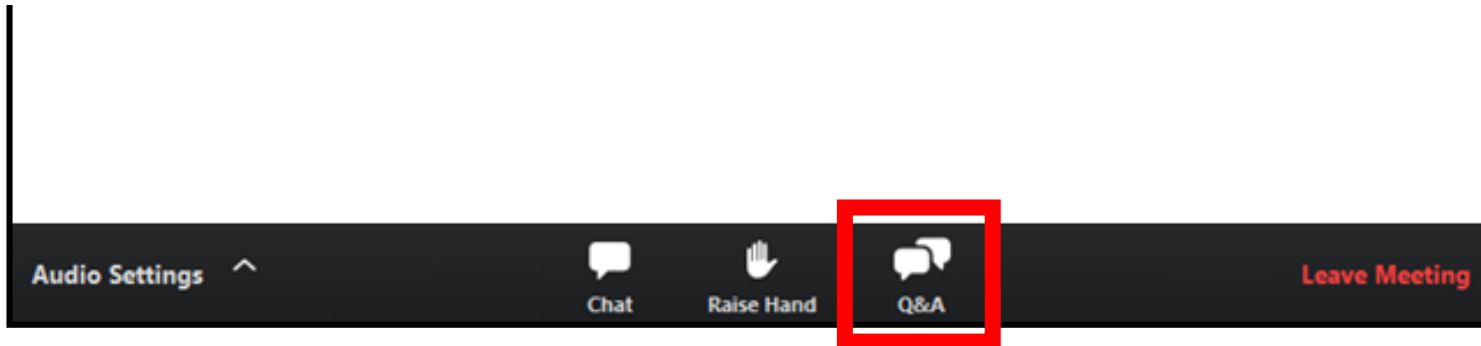
- Reactivation of hepatitis B infection has been reported after certain antibody therapies, including rituximab and BV
- Panel recommends **not treating patients with active viral infections** with CAR T therapy or alloSCT
- Patients should be **evaluated for HBV/HCV** prior to immunotherapy, and antivirals should be initiated if positive
- Patients with **HIV can be considered** for immunotherapy if their HIV is well-controlled

Conclusions

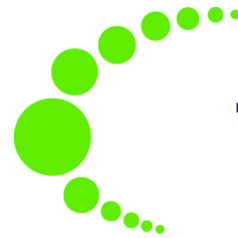
- **Clinical trials** should be strongly considered as a treatment option at each stage of therapy for eligible patients with lymphoma.
- The immunotherapy options for B-NHL are broad include rituximab as a standard for newly diagnose disease. CAR T cells have emerged as the preferred option for relapsed/refractory disease while polatuzumab vedotin is available for CAR-ineligible patients.
- Brentuximab vedotin has been incorporated into both frontline and second-line therapies for HL. Checkpoint inhibitors are standard options in the relapsed/refractory settings
- Careful consideration, monitoring and management are necessary when immunotherapies are utilized in lymphoma.

How to Submit Questions

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- Type your question in the Q&A box, then click “Send”
- Questions will be answered in the Question & Answer session at the end of the webinar (as time permits)



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Upcoming Webinar:

Clinical Practice Guideline Webinar – Immune Effector Cell-related Adverse Events

Friday, March 5 at 3 – 4 p.m. ET

Faculty:

Stephan Grupp, MD, PhD – *Children's Hospital of Philadelphia and U. of Pennsylvania*

Matthew J. Frigault, MD, MSc – *Massachusetts General Hospital*

Frederick L. Locke, MD – *Moffitt Cancer Center*

Bianca D. Santomaso, MD, PhD – *Memorial Sloan Kettering Cancer Center*



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Advances in Cancer Immunotherapy™ Virtual Programs

Thursday, February 18

Saturday, March 20

Thursday, April 8



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Thank you for attending the webinar!

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Acknowledgements

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