

Indications for Autologous HSCT for adults and children

Dr Anupam Chakrapani MD,DM(CMC Vellore)

Consultant, Hematology and Prog Director BMT

Apollo Multispeciality Hospital Kolkata



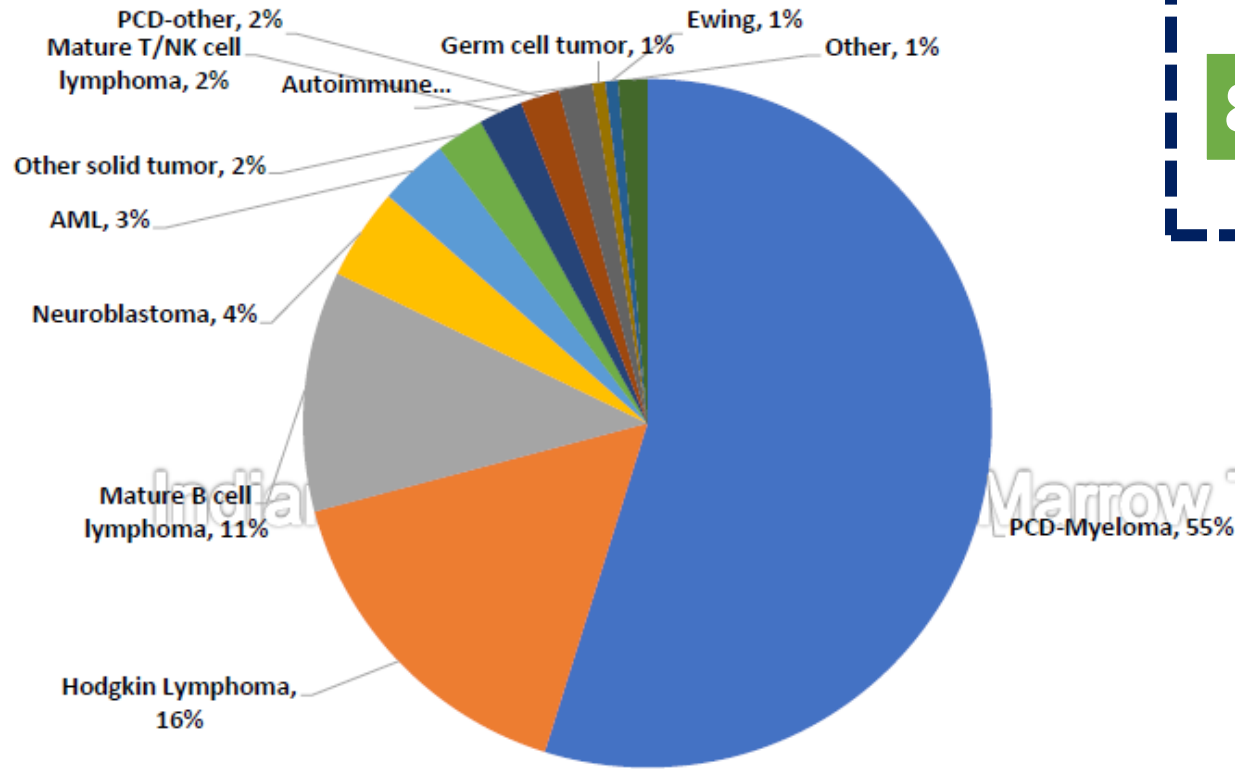
ISBMT

Indian Society for Blood & Marrow Transplantation

ISBMT REGISTRY

1983 to 2023 - Activity report

Indications for Autologous SCT (N=12605)



82%

Diagnosis	Number	%
PCD-Myeloma	6911	55%
Hodgkin Lymphoma	2023	16%
Mature B cell lymphoma	1423	11%
Neuroblastoma	543	4%
AML	408	3%
Other solid tumor	283	2%
Mature T/NK cell lymphoma	260	2%
PCD-other	233	2%
Autoimmune disease	198	2%
Germ cell tumor	77	1%
Ewing	74	1%
Other	172	1%
Total	12605	100%

> 80 Auto SCT is for MM/HL/NHL

Questions:

1) Auto SCT- in MM- Newly diagnosed

MM- Relapse

2) Tandem Auto in MM

3) Plasma Cell Leukemia

3) High Grade B NHL : in CR2 -- Yes

in CR 1: ?? Which one to choose

4) MCL [Mantle Cell Lymphoma]– in CR1/CR2

5) Hodgkins Lymphoma – in RR/CR2 in era of Novel therapy

in CR 1: ?? No

ASCT IN MM

Eligibility for ASCT

Yes

- In patients aged <70 years without comorbidities, induction therapy followed by HDM and ASCT is recommended [I, A].

Induction (4–6 cycles)

First option

- DaraVRd [I, A]
- IsaVRd [I, A]

If first option is not available

- DaraVTd [I, A]
- VRd [II, B]

200 mg/m² melphalan [I, A]
followed by ASCT [I, A]

Evidence-Based Guidelines | Published: 07 July 2025

EHA–EMN Evidence-Based Guidelines for diagnosis, treatment and follow-up of patients with multiple myeloma

- Collection of haematopoietic stem cells should be performed after three or four induction cycles [I, A].
- HDM (200 mg/m²) is the recommended SOC conditioning regimen before ASCT [I, A].

TANDEM ASCT IN MM

Consideration of Tandem Autologous Stem Cell Transplant for Patients with Multiple Myeloma- a Large UK Single Centre Retrospective Analysis

Anna Corby, Katharine Bailey, Arief Gunawan, Kirsty Cuthill, John Jones, Maria Cuadrado, Reuben Benjamin, Victoria Potter, Mili Shah

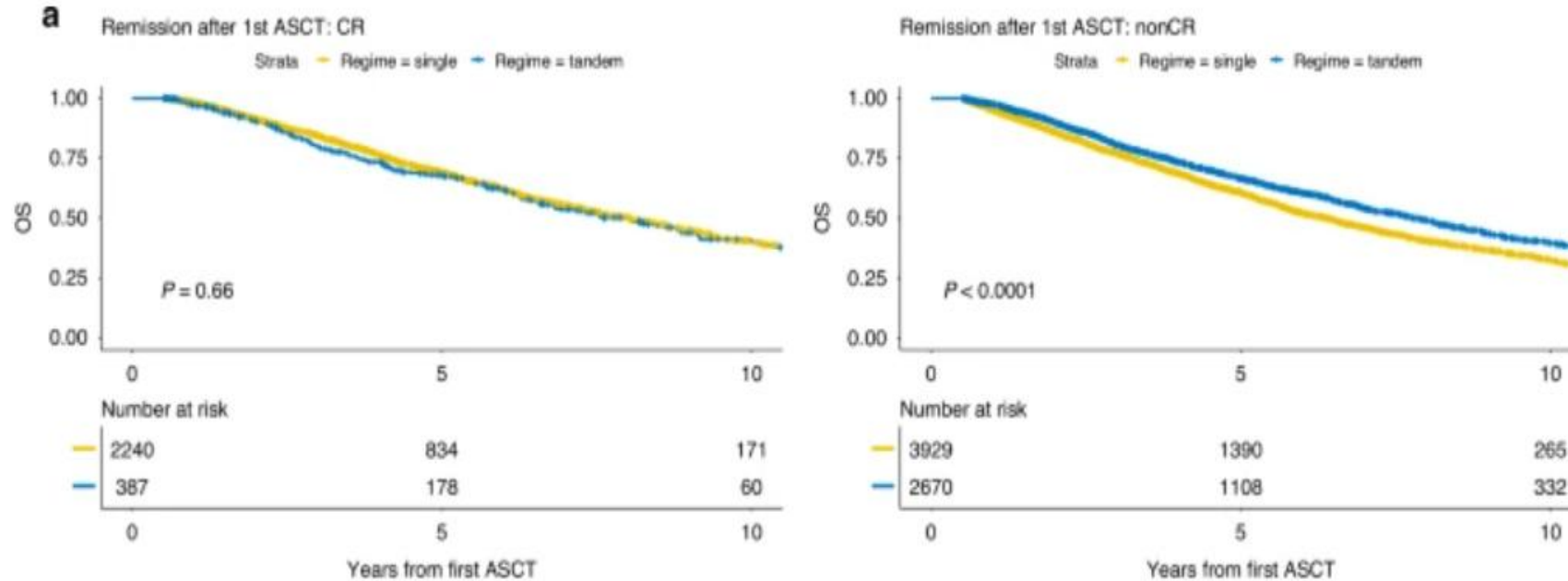
Oct 2018 and Sept 2023

Of the 392 patients having their first transplant, **50 (12.7%) were considered to have a tandem autoHSCT**

In our experience a minority of patients with multiple myeloma were considered for a tandem autoHSCT (12%), and of those considered, **only 17% proceeded to the planned second transplant. The most common reason for not proceeding was a deep remission on D100 BM.** This reflects the improving efficacy of available induction regimens. **We continue to consider that a tandem procedure has a role for a minority of patients with high risk MM** however further evaluation in prospective studies

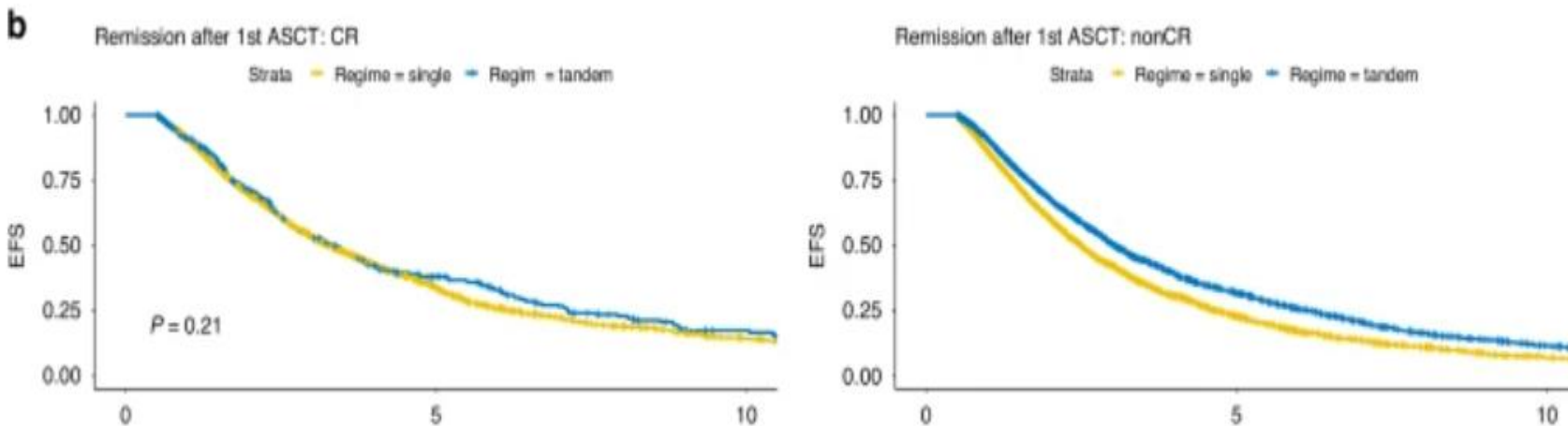
Single versus tandem autologous stem cell transplantation in newly diagnosed multiple myeloma

[Nora Grieb](#), [Alexander Oeser](#), [Maximilian Ferle](#), [Franziska Hanke](#), [Sarah Flossdorf](#), [Sandra Sauer](#), [Hartmut](#)



- significant benefit was noted in patients receiving tandem ASCT who did not achieve CR after the initial ASCT ($p < 0.001$ for OS).
- The significant benefit of tandem over single ASCT was also seen in patients who did not achieve CR after induction therapy.

Benefit of tandem transplantation for remission after ASCT based on a 6 month landmark analysis.



TANDEM ASCT IN MULTIPLE MYELOMA

Box 1 Summary of the IMS–IMWG 2024 consensus definition of high-risk MM

- del(17p)^a and/or *TP53* mutation^b
- t(4;14), t(14;16) or t(14;20), co-occurring with +1q^c and/or del(1p32)
- Monoallelic del(1p32) along with 1q gain, or biallelic del(1p32)
- High β_2 microglobulin (>5.5 mg/dl) with normal creatinine (<1.2 mg/dl)

- Tandem ASCT might be suitable in patients with genetically defined high-risk disease [II, B] or in all patients who have received induction with bortezomib, dexamethasone and cyclophosphamide (abbreviated as 'C' in combinations) [I, A].

B CELL NHL

ASTCT Clinical Practice Recommendations for Transplantation and Cellular Therapies in Diffuse Large B Cell Lymphoma

Article history:
Received 19 June 2023
Accepted 21 June 2023

Final Clinical Practice Guidelines Consensus Statements for Transplantation and CAR-T Therapy following First-Line Chemoimmunotherapy in DLBCL

Consensus Statement	Grading of Recommendations*	Percentage of Panelists in Agreement
1. The panel <u>does not recommend autologous HCT in DLBCL (regardless of IPI score) as consolidation in complete remission after first-line (R-CHOP or similar) therapy.</u>	A	96%
2. The panel <u>does not recommend autologous transplantation in HGBCL with MYC/BCL2 and or BCL6 rearrangement as consolidation therapy in PET negative complete remission after DA-R-EPOCH or similar high-intensity regimens.</u>	B	100%
3. Autologous HCT may be considered in eligible patients with HGBCL with MYC/BCL2 and or BCL6 rearrangement <u>as consolidation therapy in PET-negative complete remission after first-line R-CHOP or similar therapy.</u>	B	80%
4. The panel does not recommend CAR-T therapy in the frontline setting for high-risk DLBCL (regardless of IPI score or presence of MYC, BCL2, or BCL6 gene rearrangements), outside the setting of a clinical trial.	C	96%
5. Autologous HCT may be considered for eligible patients with DLBCL with secondary CNS involvement <u>at diagnosis achieving complete remission and with undetectable CNS disease after first-line therapy.</u>	C	100%
6. The panel recommends consolidation with autologous HCT for eligible primary CNS lymphoma patients in CR1.	A	96%
7. The panel recommends <u>a thiotepa-containing conditioning regimen when using autologous HCT consolidation for eligible primary CNS lymphoma patients in CR1.</u>	B	100%

Therapy in Primary Refractory and Early Relapse (Relapse Within 12 Months of First-Line Chemoimmunotherapy) DLBCL

Consensus Statement	Grading of Recommendations*	Percentage of Panelists in Agreement
1. The panel recommends CAR-T therapy as a standard of care option in patients with DLBCL who have refractory disease to first-line chemoimmunotherapy or relapse within 12 months of first-line chemoimmunotherapy.	A	96%
2. In DLBCL patients with early relapse who achieve a complete remission with salvage therapy, the panel considers autologous HCT an acceptable consolidation therapy in eligible patients.	B	88%
3. In DLBCL patients with early relapse who achieve a partial remission with salvage therapy, the panel considers autologous HCT an acceptable consolidation therapy in eligible patients.	B	96%

Late Relapsed (Relapse Beyond 12 Months of First-Line Chemo immunotherapy) DLBCL

Consensus Statement	Grading of Recommendations*	Percentage of Panelists in Agreement
1. In DLBCL patients with late relapse, the panel recommends autologous HCT consolidation therapy in eligible patients who have achieved a complete or partial remission after second-line therapies.	A	96%
2. In DLBCL patients with late relapse, the panel recommends CAR-T therapy in patients who have not achieved remission (complete or partial) after second-line therapies.	A	96%
3. In patients with DLBCL, the panel recommends CAR-T therapy in patients who are not eligible for autologous HCT (due to comorbidities or age) regardless of the timing of relapse.	B	96%

HODGKINS LYMPHOMA

Autologous Stem Cell Transplantation in Hodgkin Lymphoma—Latest Advances in the Era of Novel Therapies

▶ [Cancers \(Basel\)](#). 2022 Mar 29;14(7):1738.

- ✓ **Post salvage therapy consider for Auto HCT in PR/CR .**
- ✓ **We do not recommend omission of autoHCT for patients who achieve a CR to a salvage regimen including CPI and/or BV.**
- ✓ **Finally, patients who are refractory to cytotoxic chemotherapy but who respond well to CPI should still be considered for autoHCT, as sensitivity to chemotherapy should no longer be considered an absolute requirement for successful autoHCT.**

SUMMARY OF INDICATION AS PER EBMT GUIDELINE

Indications for haematopoietic cell transplantation for haematological diseases, solid tumours and immune disorders: current practice in Europe, 2022

Table 1. EBMT categorisation of type of indication for transplant procedures and strength of evidence.

Categories	Settings where HCT ought to be performed
Standard of care (S)	Indications reasonably well defined and results compare favourably (or are superior) to those of non-transplant treatment approaches. Obviously, defining an indication as the standard of care does not mean an HCT is necessarily the optimal therapy for a given patient in all clinical circumstances. 'Standard of care' transplants may be performed in a specialist centre with experience in HCT and an appropriate infrastructure as defined by the JACIE standards.
Clinical option (CO)	Indications for which the results of small patient cohorts show efficacy and acceptable toxicity of the HCT procedure, but confirmatory randomised studies are missing, often as a result of low patient numbers. The broad range of available transplant techniques combined with the variation of patient factors such as age and co-morbidity makes interpretation of these data difficult. Our current interpretation of existing data for indications placed in this category supports that HCT is a valuable option for individual patients after careful discussions of risks and benefits with the patient, but that for groups of patients the value of HCT needs further evaluation. Transplants for indications under this heading should be performed in a specialist centre with major experience in HCT with an appropriate infrastructure as defined by JACIE standards.
Developmental (D)	Indications when the experience is limited, and additional research is needed to define the role of HCT. These transplants should be done within the framework of a clinical protocol, normally undertaken by transplant units with acknowledged expertise in the management of that particular disease or that type of HCT. Protocols for D transplants will have been approved by local research ethics committees and must comply with current international standards. Rare indications where formal clinical trials are not possible should be performed within the framework of a structured registry analysis, ideally an EBMT non-interventional/observational study. Centres performing transplants under this category should meet JACIE standards.
Generally not recommended (GNR)	Comprises a variety of clinical scenarios in which the use of HCT cannot be recommended to provide a clinical benefit to the patient, including early disease stages when results of conventional treatment do not normally justify the additional risk of an HCT, very advanced forms of a disease in which the chance of success is so small that does not justify the risks for patient and donor, and indications in which the transplant modality may not be adequate for the characteristics of the disease. A categorisation as GNR does not exclude that centres with particular expertise on a certain disease can investigate HCT in these situations. Therefore, there is some overlap between GNR and D categories, and further research might be warranted within prospective clinical studies for some of these indications.
Grade	<i>Strength of the evidence supporting the assignment of a particular category</i>
Grade I	Evidence from at least one well-executed randomised trial.
Grade II	Evidence from at least one well-designed clinical trial without randomisation; cohort or case-controlled analytic studies (preferably from more than one centre); multiple time-series studies; or dramatic results from uncontrolled experiments.
Grade III	Evidence from opinions of respected authorities based on clinical experience, descriptive studies, or reports from expert committees.

Disease	Disease status
<i>Haematological malignancies</i>	
AML ^a	CR1 (favourable risk and MRD-) ^b
	CR1 (favourable risk and MRD+) ^b
	CR1 (intermediate risk) ^b
	CR1 (adverse risk) ^b
	CR2
	APL Molecular CR2
	Relapse or refractory

ALL ^a	Ph (-), CR1 (standard risk and MRD-) ^b
	Ph (-), CR1 (standard risk and MRD+) ^b
	Ph (-), CR1 (high risk) ^b
	Ph (+), CR1 (MRD-)
	Ph (+), CR1 (MRD+)
	CR2
	Relapse or refractory

CML	1st CP, failing 2nd or 3rd line TKI
	Accelerated phase, blast crisis or >1st CP

Myelofibrosis	Primary or secondary with an intermediate-2 or high DIPSS score
---------------	-----------------------------------------------------------------

MDS	Very low and low-risk (IPSS-R)
	Intermediate-risk without additional factors ^c (IPSS-R)
	Intermediate-risk with additional factors ^c (IPSS-R)
	High-, very high-risk (IPSS-R)
	sAML in CR1 or CR2

CMML	CMML-2 or MP-CMML
	CMML-0 or CMML-1 with additional risk factors ^d

Auto
CO/I ←
GNR/II
CO/I ←
GNR/I
CO/II ←
S/II ←
GNR/III

CO/III ←
GNR/II
GNR/III
CO/III ←
GNR/II
GNR/II
GNR/III










GNR/II
GNR/III

GNR/III

GNR/III
CO/II ←

GNR/III

GNR/III
GNR/III

Disease	Disease status	Auto
LBCL	CR1 (intermediate/high IPI at diagnosis)	CO/I 
	Untested relapse	GNR
	Chemosensitive early relapse, ≥CR2	CO/I 
	Chemosensitive late relapse, ≥CR2	S/II 
	Chemosensitive relapse after auto-HSCT failure	GNR/III
	Refractory disease	GNR/I
	Primary CNS lymphoma	S/II 
	FL	CR1, untransformed
CR1, transformed into high-grade lymphoma		CO/III 
Chemosensitive relapse, ≥CR2		S/II 
≥CR2 after auto-HSCT failure		GNR/III
Refractory		GNR/III
MCL	CR1	S/I 
	CR/PR >1, no prior auto-HCT	CO/II 
	CR/PR >1, after prior auto-HCT	GNR/II
	Refractory	GNR/II
WM	CR1	GNR/III
	Chemosensitive relapse, ≥CR2	CO/II 
	Poor risk disease	GNR/III

Disease	Disease status	Auto
	Poor risk disease	GNR/III
PTCL	CR1	CO/II ←
	Chemosensitive relapse, ≥CR2	CO/II ←
	Refractory	GNR/II
Primary CTCL	EORTC/ISCL Stages I-IIA (early)	GNR/III
	EORTC/ISCL Stages IIB-IV (advanced)	GNR/III
HL	CR1	GNR/I
	Chemosensitive relapse, no prior auto-HCT	S/I ←
	Chemosensitive relapse, after prior auto-HCT	CO/III ←
	Refractory	CO/III ←
MM	Upfront standard risk	S/I ←
	Upfront high risk	S/I ←
	Chemosensitive relapse, prior auto-HCT	S/I ←
	Refractory/relapse after three lines of prior therapy including an immunomodulatory agent, a proteasome inhibitor and an anti-CD38	
AL		CO/II ←

Disease	Disease status	Auto
Acquired SAA and AA/PNH	Newly diagnosed	NA
	Relapsed/refractory	NA
Haemolytic PNH		NA
Constitutional BMF syndromes/SAA ^e		NA
Breast Ca	Adjuvant high risk, selected population	D/CO/II ←
	Metastatic, chemosensitive	D/CO/II ←
Germ cell tumours	Second line, high risk	CO/II ←
	Primary refractory, second and further relapse	S/II ←
Ovarian Ca	High risk/recurrent	GNR/I
Medulloblastoma	Post-surgery, high risk/recurrent disease	CO/III ←
Small cell lung Ca	Limited	GNR/I
Soft tissue Sa	Advanced	D/II
Ewing's Sa	Locally advanced/metastatic, chemosensitive	CO/II ←
Renal cell Ca	Metastatic, refractory to conventional treatments	NA
Colorectal Ca, pancreatic Ca, other selected solid tumours	Metastatic, refractory to conventional treatments	NA
Multiple sclerosis	Highly active RR-MS failing DMT	S/I ←
	Progressive MS with AIC, and Aggressive MS ^f	CO/II ←
	Progressive MS without AIC	GNR/III
Systemic sclerosis		S/I ←
SLE		CO/II
Crohn's disease		CO/II
Rheumatoid arthritis		CO/II
JIA		CO/II
Monogenic AD		GNR/II
Vasculitis	ANCA+ve, BD, Takayasu, others	CO/II
PM-DM		CO/II
Autoimmune cytopenias		CO/II
Neuromyelitis optica		CO/II
CIDP, MG and SPS		CO/II

Take Home message

- ❑ MM – Upfront Auto SCT in all eligible patients
- ❑ Tandem SCT : in high risk group those not in CR after first SCT [MRD Based approach]
- ❑ Relapsed Myeloma : chemo-sensitive fit patients can be considered
- ❑ High Grade B NHL – Late relapse > 12 month in CR with Salvage therapy
- ❑ High grade B NHL : Double or Triple Hit treated with RCHOP in CR – may be consolidated with Auto SCT
- ❑ Hodgkins Lymphoma : in CR 2 [irrespective to use of Novel therapy] should be consolidated with Auto SCT
- ❑ Newer indications like : Multiple sclerosis and systemic sclerosis
- ❑ Lot of new indication in autoimmune disease : choose the patient carefully and take after proper discussion.

