Clinical impact of allogeneic stem cells cryopreservation during COVID-19 pandemic

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ESFH Online Meeting May
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- **Emergenza Corona Virus - Aggiornamento 1** — creato da Renato Marciano — ultima modifica 05/03/2020 11:46
- **Emergenza Corona Virus - Aggiornamento 2** — creato da Renato Marciano — ultima modifica 05/03/2020 12:22
- **Emergenza Corona Virus - Aggiornamento 3** — creato da Renato Marciano — ultima modifica 06/03/2020 14:06
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- **Emergenza Corona Virus - Aggiornamento 6** — creato da Renato Marciano — ultima modifica 12/03/2020 14:23
- **prot. 592_CNT_2020** — creato da Nicoletta Sacchi — ultima modifica 16/03/2020 11:30
- **Emergenza Coronavirus - AGGIORNAMENTO 7 - 16 marzo 2020** — creato da Renato Marciano — ultima modifica 16/03/2020 16:44
- **Emergenza Corona Virus - Aggiornamento 8 - 17.03.2020** — creato da Renato Marciano — ultima modifica 18/03/2020 08:19
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- **Nota CNT - 18.03.2020** — creato da Renato Marciano — ultima modifica 30/03/2020 13:12
- **Emergenza Coronavirus - AGGIORNAMENTO 12 - 31 marzo 2020** — creato da Renato Marciano — ultima modifica 01/04/2020 12:12
- **Emergenza Coronavirus - AGGIORNAMENTO 12 - 31 marzo 2020** — creato da Renato Marciano — ultima modifica 01/04/2020 12:12
- **Emergenza Coronavirus - AGGIORNAMENTO 13 - 02.04.2020** — creato da Renato Marciano — ultima modifica 03/04/2020 14:07
- **Emergenza Corona Virus - Aggiornamento 14 - 10.04.2020** — creato da Renato Marciano — ultima modifica 10/04/2020 11:13
- **Nota CNT - 24.04.2020** — creato da Renato Marciano — ultima modifica 24/04/2020 12:57
- **Nota ministero - attività di reclutamento** — creato da Renato Marciano — ultima modifica 29/04/2020 17:34
- **Emergenza Coronavirus - AGGIORNAMENTO 15 - 04 giugno 2020** — creato da Renato Marciano — ultima modifica 05/06/2020 14:32
- **prot 1030_CNT2020 nota modifica indicazione criopreservazione** — creato da Nicoletta Sacchi — ultima modifica 09/06/2020 11:04
- **Nota CNT - 28.09.2020** — creato da Renato Marciano — ultima modifica 28/09/2020 11:24
- **Emergenza Coronavirus - AGGIORNAMENTO 16 - 29 settembre 2020** — creato da Renato Marciano — ultima modifica 29/09/2020 13:32
- **Emergenza Coronavirus - AGGIORNAMENTO 17 - 19 ottobre 2020** — creato da Renato Marciano — ultima modifica 19/10/2020 10:45
- **Nota CNT/IBMDR/GITMO - 04.11.2020** — creato da Renato Marciano — ultima modifica 05/11/2020 10:13
- **Emergenza Coronavirus - AGGIORNAMENTO 18 - 09 novembre 2020** — creato da Renato Marciano — ultima modifica 09/11/2020 13:51
- **Emergenza Coronavirus - AGGIORNAMENTO 19 - 22 gennaio 2021** — creato da Renato Marciano — ultima modifica 25/01/2021 10:00

Nasofaringeal molecular swab for SARS-Cov2 for donors and recipients during the pandemic waves

practical summary

- Recipients undergo two consecutive (with a 48 hours time interval) swabs for SARS-Cov2 RNA prior to hospital admittance for Tx. The second swab is performed 24 hours prior to admittance in the Tx unit
- Donors undergo the same swab sequence prior hospital admittance (in case of BM donation) or prior mobilization followed by a careful donor's follow up till 28 days post donation for Covid 19 symptoms

Nasofaringeal molecular swab for SARS-Cov2 for donors and recipients during the pandemic waves

- From a practical point of view , these complex sequence of donor/recipient monitoring for the presence of SARS-Cov2, with the proper time interval for laboratory response, translates into the need of BM/PBPC cryopreservation in most cases
- Cryopreservation of PBPC is a procedure with a small processing impact (as for the autologous setting), for BM the generation of a buffy coat is required prior to cryopreservation, with the method used for ABO major mismatched

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Full-length article

Coronavirus disease 2019 pandemic and allogeneic hematopoietic stem cell transplantation: a single center reappraisal

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ABSTRACT

Background: The coronavirus disease 2019 (COVID-19) pandemic has deeply modified the complex logistical process underlying allogeneic hematopoietic stem cell transplant practices. *Aim:* In light of these changes, the authors compared data relative to allogeneic transplants carried out from 2018 at their center before (n = 167) and during the pandemic (n = 45). *Methods:* The authors examined patient characteristics, donor and graft types, cell doses and main transplant outcomes. Moreover, the authors evaluated the rise of costs attributable to additional COVID-19-related procedures as well as the risk of adverse events these procedures conveyed to grafts or recipients. *Results:* Overall, the number of transplants did not decrease during the pandemic, whereas patients at high relapse risk were prioritized. Transplants were mainly from matched unrelated donors, with a significant decrease in haploidentical related donors. Moreover, the use of bone marrow as a graft for haploidentical transplant was almost abandoned. Cryopreservation was introduced for all related and unrelated apheresis products, with a median storage time of 20 days. Notably, transplant outcomes (engraftment, acute graft-versus-host disease and non-relapse mortality) with cryopreserved products were comparable to those with fresh products. *Conclusions:* Considering that the emergency situation may persist for months, cryopreserving allogeneic grafts can offer a lifesaving opportunity for patients whose allogeneic transplant cannot be postponed until after the end of the COVID-19 pandemic.

A B S T R A C T

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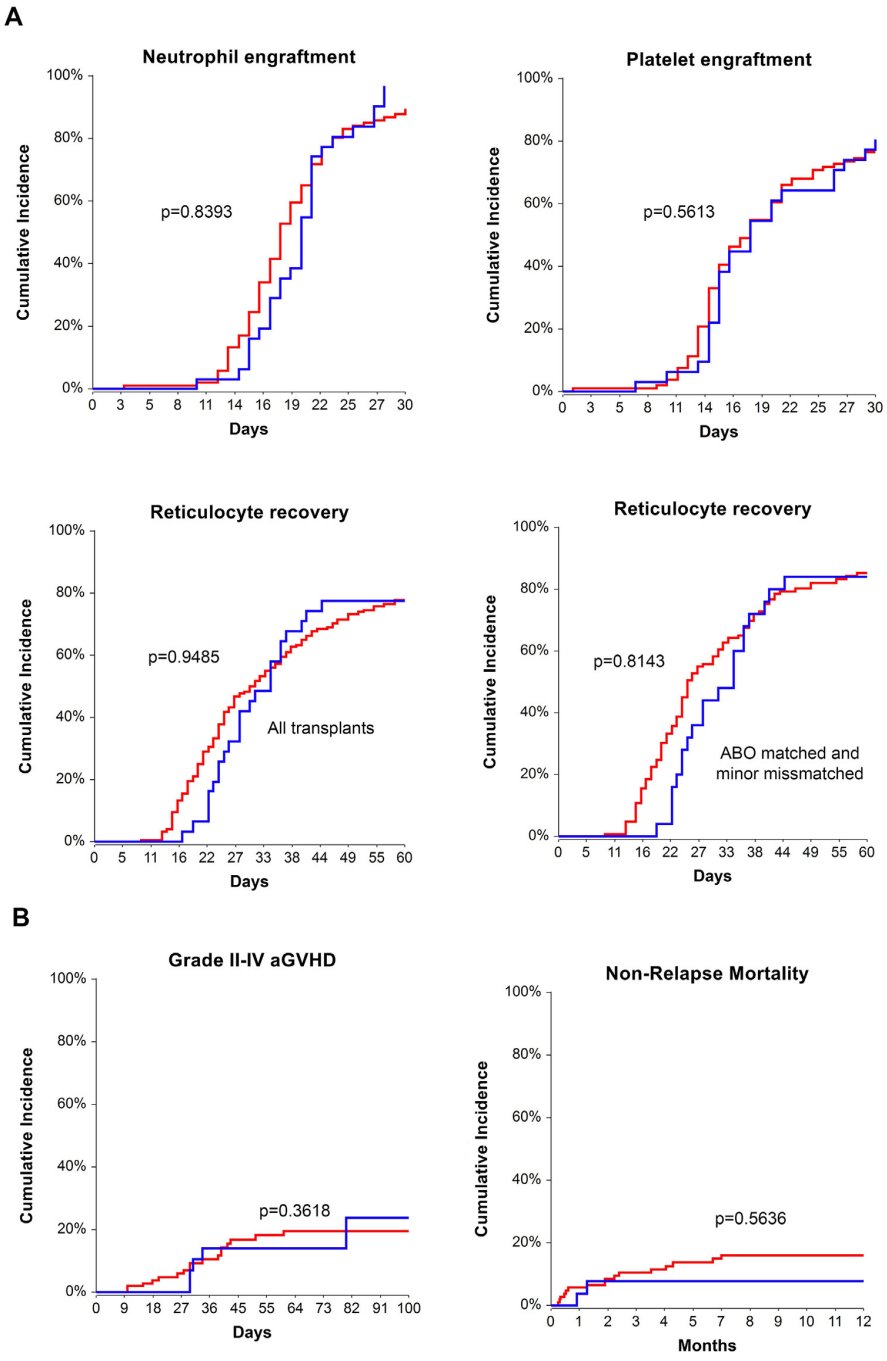
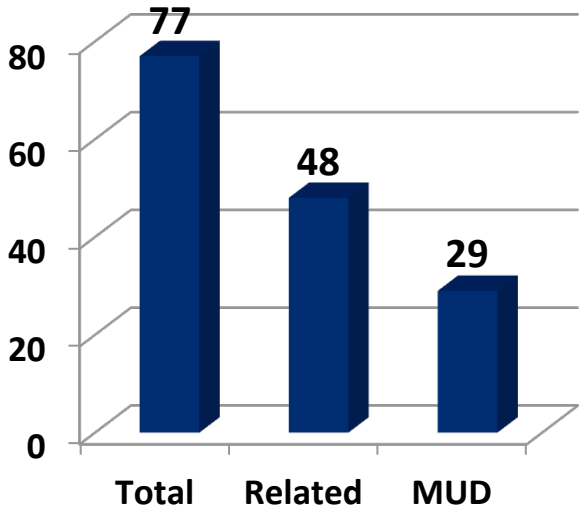


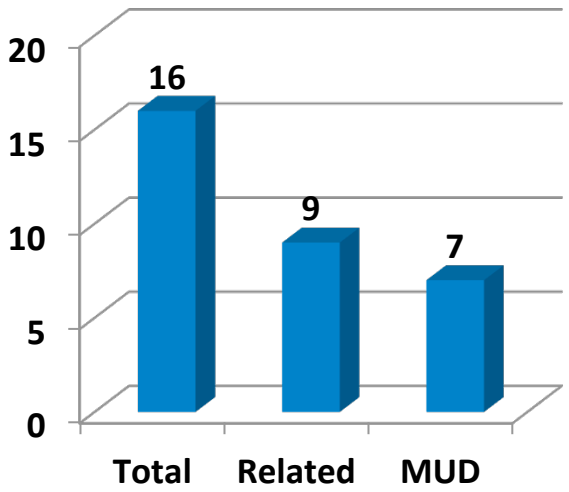
Figure 1. Transplant outcomes in patients receiving fresh (red lines) or cryopreserved (blue lines) products. (A) Cumulative incidence of neutrophil, platelet and reticulocyte engraftment. Reticulocyte engraftment is separately reported in total population and ABO matched/minor mismatched patients. (B) Cumulative incidence of grade II–IV acute GVHD and NRM.

San Camillo Forlanini experience serving Tx units which perform also haplo-alloTx using the BM G-CSF-primed or the BM source prior post-Tx CTX

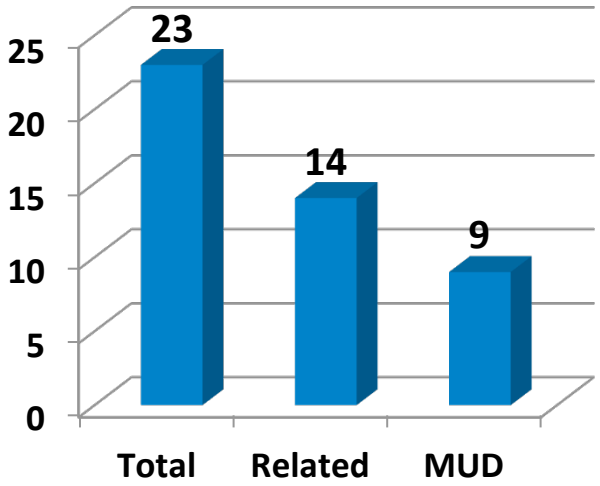
Allogeneic Transplants
01-01-20 → 26-03-21



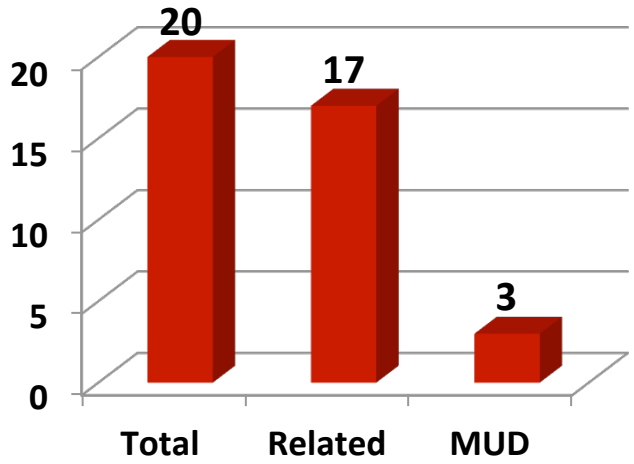
Allogeneic Transplants (fresh)
01-01-20 → 30-03-20



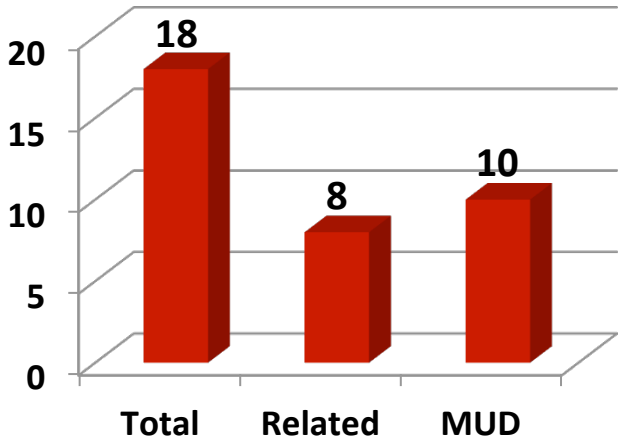
Allogeneic Transplants (fresh)
01-07-20 → 31-10-20



Allogeneic Transplants
(cryo) 01-04-20 →30-06-20
1st Covid19 wave



Allogeneic Transplats
(cryo) 01-11-20-23-03-21
2nd Covid Wave



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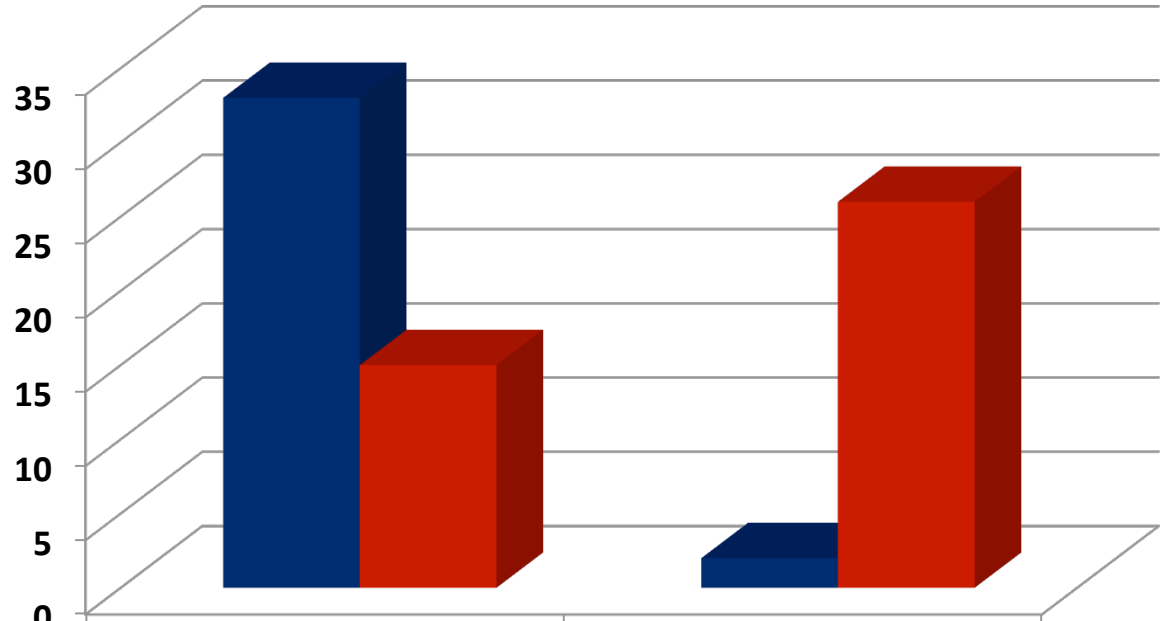
Allogeneic Transplants
01-01-20 → 26-03-21

PATIENTS	FRESH n 35	CRYOPRESERVED n 42
Male	21	24
Female	14	18

Diagnosis	Fresh		Cryopreserved		
	BM	PBSC	BM	PBSC	Cord Blood
Acute Myeloid Leukemia	13	6	4	17	1
Acute Lymphoblastic Leukemia	6	3	4	2	-
Hodgkin/ non-Hodgkin Lymphoma	-	1	6	2	-
Multiple Myeloma	1	-	-	1	-
Myelodisplastic Syndrome	1	-	-	2	-
Myelofibrosys	1	1	-	3	
Severe Acute Anemia	1	1	-	-	-

Donors and Graft Source

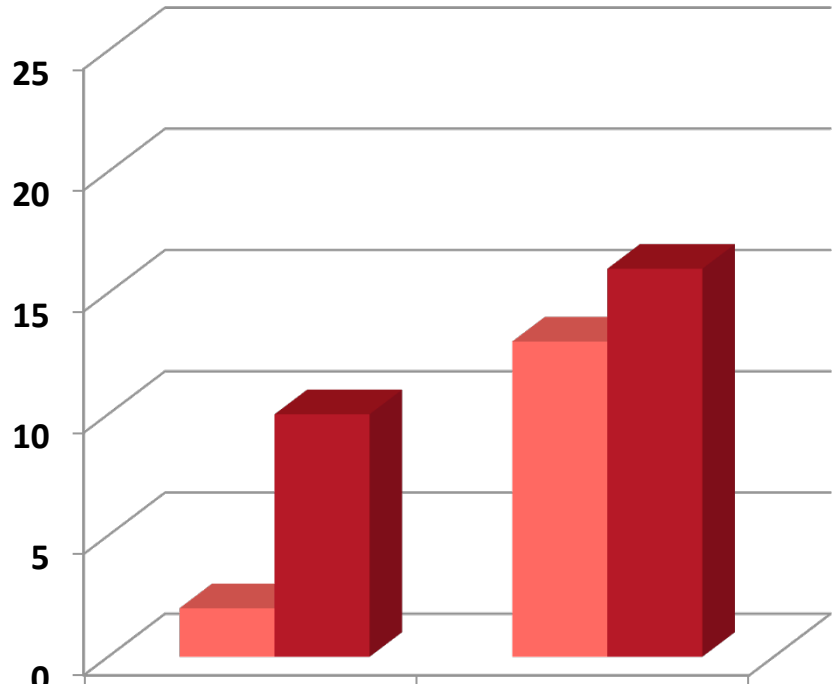
All Transplants



	Related	MUD
BM	33	2
PBSC	15	26
		1 CORD BLOOD

Donors and Graft Source
Fresh and Cryopreserved

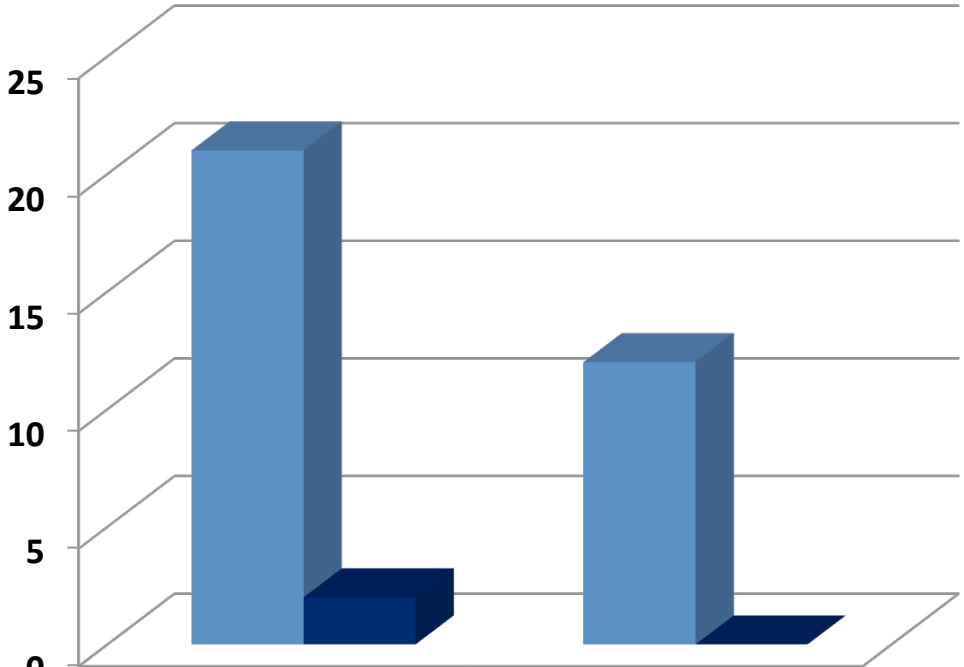
PBSC



	FRESH	Cryopeserved
Related	2	13
MUD	10	16

Related MUD

BM

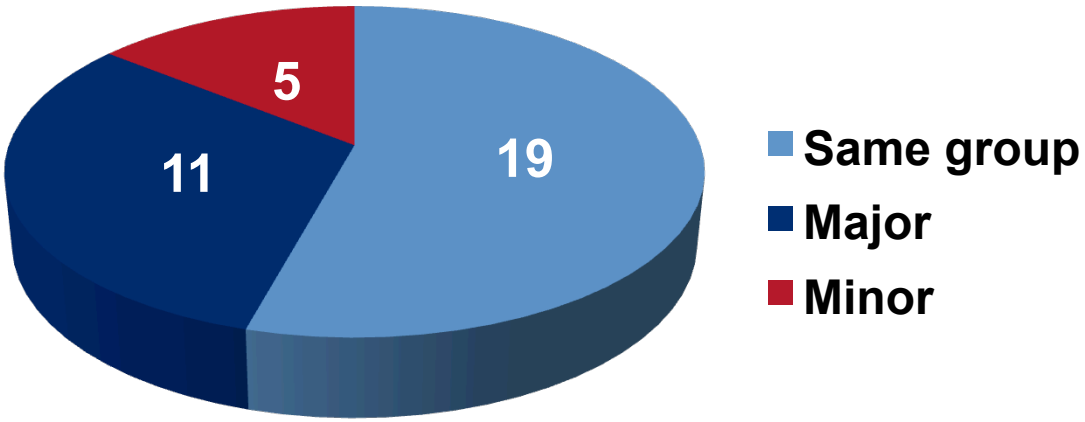


	FRESH	Cryopreserved
Related	21	12
MUD	2	0

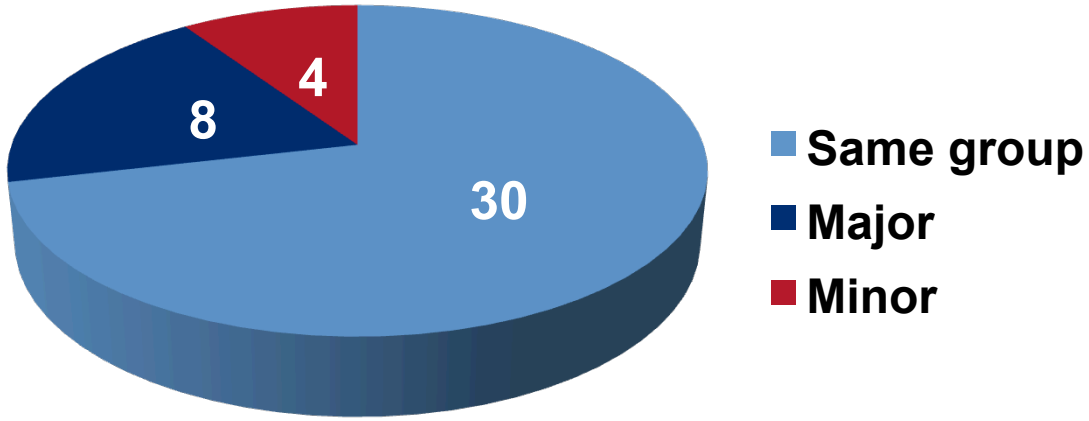
Related MUD

Donor/Recipient ABO compatibility

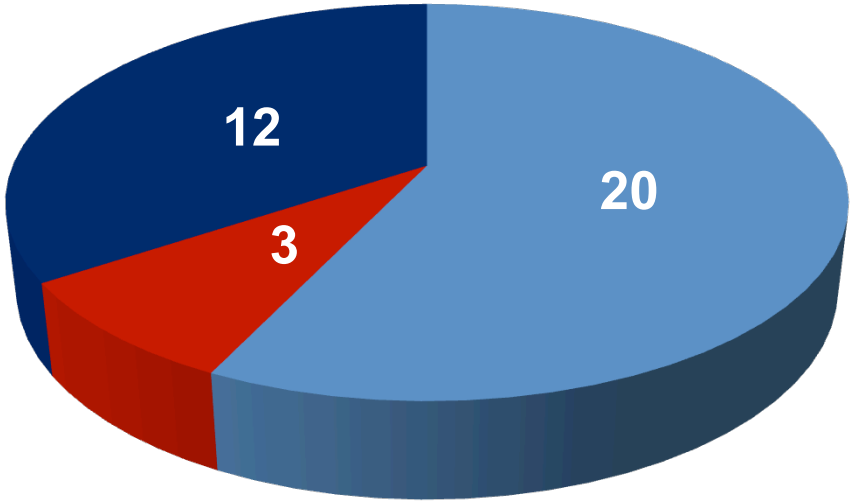
Fresh



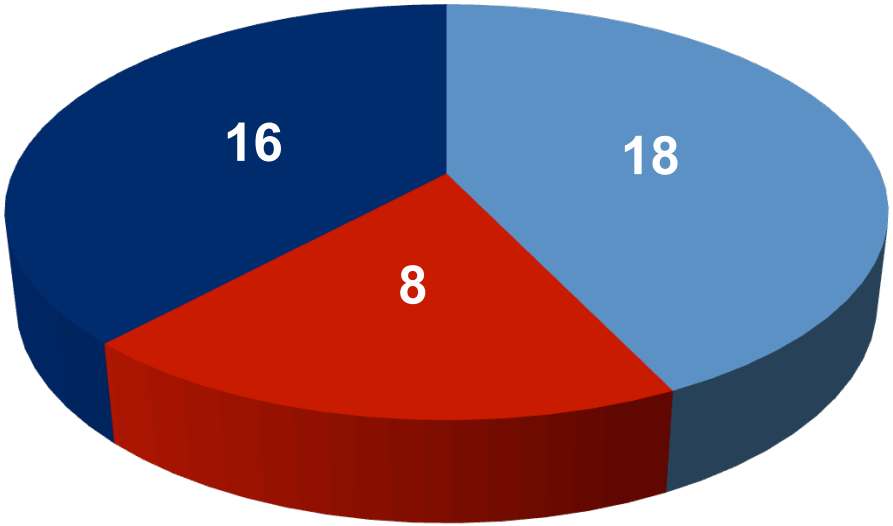
Cryopreserved



Fresh



Cryopreserved



COMPARISON BETWEEN CELL COUNTS EVALUATED IN FRESH BM SAMPLES AND IN BM SAMPLES AT DIFFERENT STEPS BEFORE AND AFTER CRYOPRESERVATION

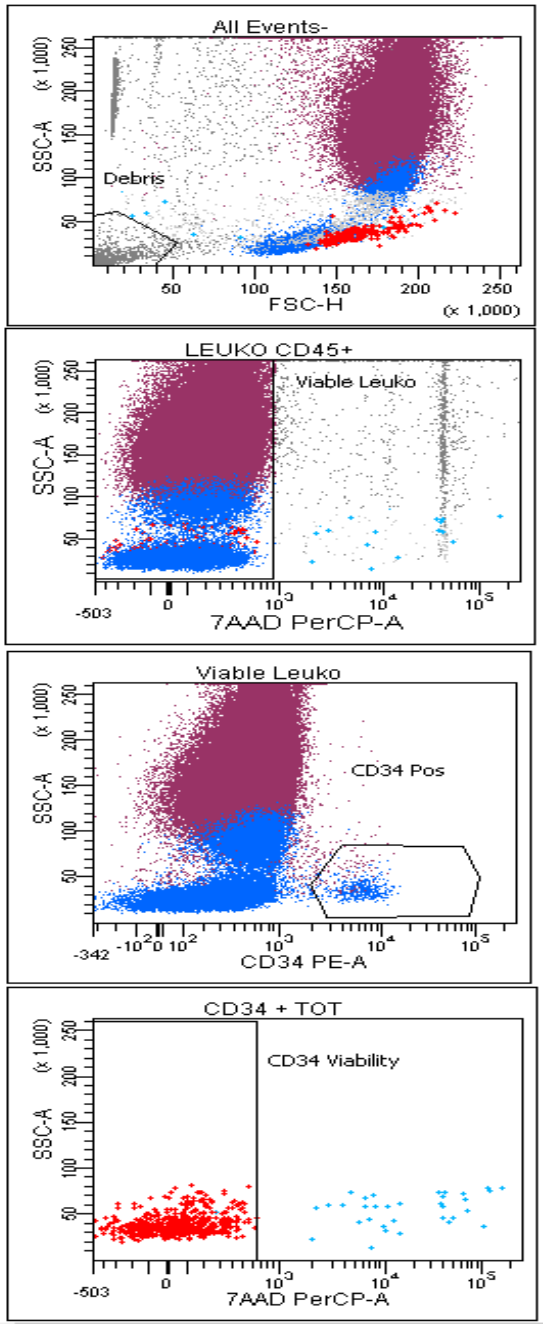
BM Fresh n 23	
	TNC x 10^8/Kg
mean	8.53
range	7.75– 14.89

BM Cryopreserved n 12		
	TNC x 10^8/Kg	
	Harvest	After Erythro
mean	8.22	1.55
range	7.62– 11.44	0.76 – 2.74

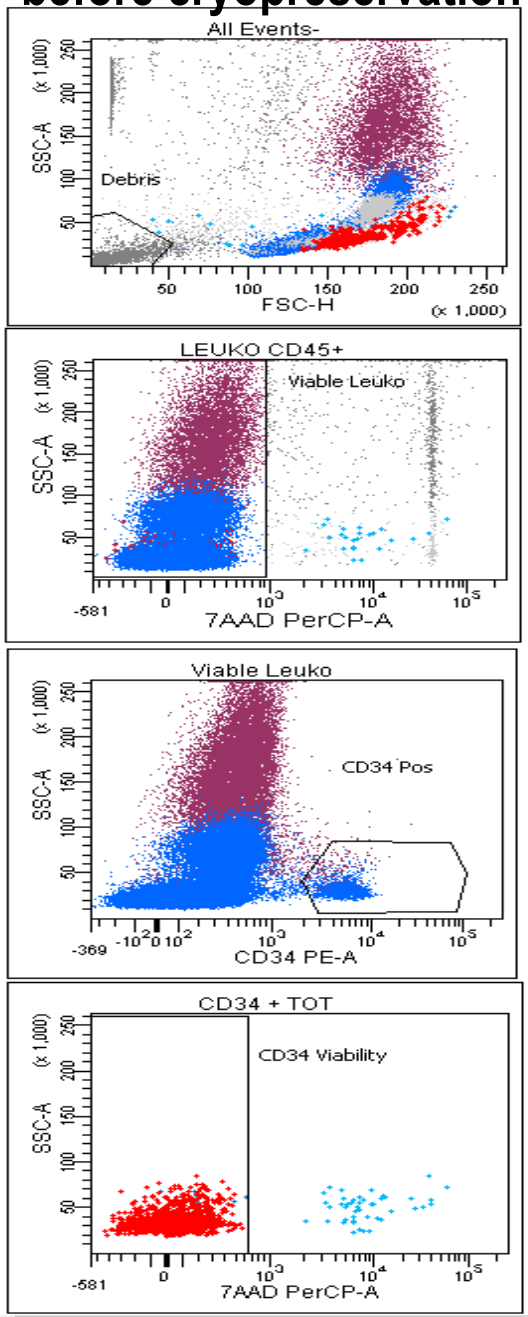
BM Fresh n 23		
	CD34 x 10^6/Kg	CD3 x 10^6/Kg
mean	2.14	44
range	0.48 – 4.9	9 - 82

BM Cryopreserved n 12						
	CD34 x 10^6/Kg			CD3 x 10^6/Kg		
	Harvest	after erythro before freezing	after thawing	Harvest	after erythro before freezing	after thawing
mean	2.53	2.25	2.15	44.5	38	37
range	1.08– 4.60	1.12 – 3.62	1.31 – 3.47	31 - 59	51 - 58	22 - 56

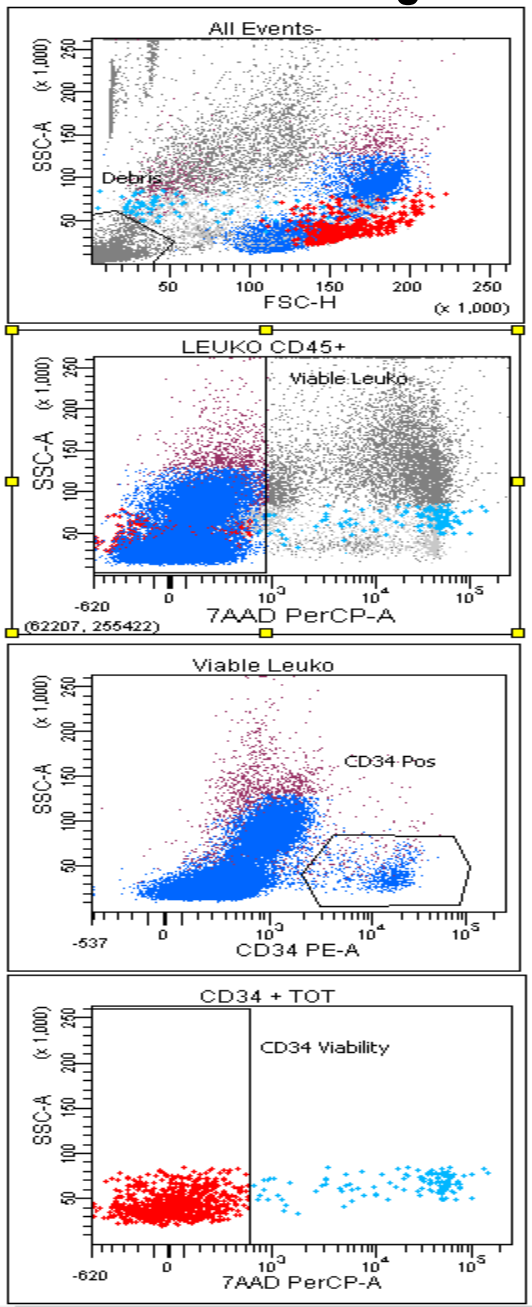
BM before erithroapheresis



BM after erithroapheresis before cryopreservation



BM Cell viability after thawing



PBSC Fresh n 12		
	CD34 x 10^6/Kg	CD3 x 10^6/Kg
mean	7.88	265
range	5.3 – 10.2	106 - 753

COMPARISON BETWEEN CELL COUNTS EVALUATED IN FRESH PBSC SAMPLES AND IN PBSC SAMPLES BEFORE AND AFTER CRYOPRESERVATION

PBSC Cryopreserved n 28				
	CD34 x 10^6/Kg Before freezing	CD34 x 10^6/Kg After thawing	CD3 x 10^6/Kg Before freezing	CD3 x 10^6/Kg After thawing
mean	7.06	6,81	264	246
range	3.9 - 13	3.4 - 12.9	107 - 488	97 - 448

	WBC Engraftment (1x10e9/L)		PLT Engraftment (independence from transf)	
	Fresh days	Cryopreserved days	Fresh days	Cryopreserved days
BM	17	21	23	30
PBSC	17	20	20	22

Engraftment	
	CORD BLOOD days
WBC	30
PLT	51
n	1

	Fresh	Cryopreserved
Graft Failure	0/35	2/42
Tx related deaths	6/35	5/42

GVHD

Fresh
14 cases out of 35
40%
8 skin / 1 gut / 4 gut + skin/1 skin + liver

Fresh	Cases	Total Tranplants	%
BM	11	23	48
PBSC	2	12	17

Cryopreserved
12 cases out of 42
29%
10 skin /2 gut + skin

Cryo	Cases	Total Transplants	%
BM	4	12	33
PBSC	8	30	27

GVHD

	Cases	Total Tranplants	%
BM Fresh	**11** **9 skin** **2 skin+gut**	**23**	**48**
BM Cryo	**4** **9 skin** **2 skin+gut**	**12**	**33**

	BM Fresh CD3 x 10^6/Kg	BM Cryo CD3 x 10^6/Kg after thawing
mean	**44**	**37**
range	**9 - 82**	**22-56**

	Cases	Total Transplants	%
PBSC Fresh	**2** **1 skin** **1 skin+liver**	**12**	**17**
PBSC Cryo	**8** **7 skin** **1 skin+gut**	**30**	**27**

	PBSC Fresh CD3 x 10^6/Kg	PBSC Cryo CD3 x 10^6/Kg after thawing
mean	**265**	**246**
range	**106 - 753**	**97 - 448**

Conclusions (I)

a) Pandemic is a complex scenario in which hematopoietic transplants must be carried out safely

b) Monitoring of donors and recipients seems to be mandatory

c) The complexity to obtain a proper timing between swab molecular responses and stem cell collection , conditioning and reinfusion induces operators of transplant programs to freeze the stem cell product

Conclusions (II)

a) Freezing of peripheral allogeneic stem cells is a simple procedure and consents similar results as compared to fresh grafts
b) In case a of a transplant platform where the collection of a bone marrow graft is mandatory or highly recommended, bone marrow must be subjected to red cell removal by separators , freezing and additional quality controls
c) Quality controls should include functional tests (CFU) that might predict better a possible slow platelet recovery

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