First Meeting of the African Blood and Marrow Transplantation Group

Casablanca 2018
April 19th - 21st
Sheraton hotel

PROGRAM & ABSTRACT BOOK
By Your Side

That’s where you’ll find us.

We are committed to advancing apheresis through procedure support and training, education and our focus on disease indications.

Questions after the conference? Email us at advancingapheresis@terumobct.com

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We warmly welcome you to the African Society for Blood and Marrow Transplantation and Worldwide Network for Blood and Marrow Transplantation (WBMT) Workshop and Symposium in cooperation with the World Health Organization (WHO) in Casablanca, Morocco. This is a memorable occasion which represents a significant effort of many individuals and societies around the world to continue collaboration with countries having restricted resources develop more transplantation activity. It is exciting that many societies active in the field of hematopoietic stem cell transplantation (HSCT) around the world are collaborating under the umbrella of the WBMT to offer their decades of experience to improve and build programs to provide modern curative treatments for many hematologic and non-hematologic diseases.

In line with the guiding principles of the WHO, we will discuss with the delegates of African and regional countries as well as those from North America, South America, Asia Pacific and Europe topics of mutual interest on how to establish and improve a stem cell transplantation program, on current indications for HSCT, donor selection, graft processing, developing an outcome database and the need for a global accreditation system. Since HSCT is a very costly procedure, the challenges for programs in developing countries may be of even greater importance and will be considered.

However, HSCT remains cost effective with its capability to extend patients’ survival and thus offers great importance for advancing health in all countries. The development of critical supportive infrastructure including high quality transfusion support, infectious disease monitoring and treatment, cell processing procedures and genetic typing for proper donor identification and selection are important for providing a quality HSCT to every eligible recipient and may, in turn, enhance healthcare systems more broadly. Through this workshop, speakers from many centers worldwide will present the sum of their experiences and establish collegial dialogue for all participants to share and learn.

We hope to provide a platform where emerging and established HSCT programs can learn from each other and improve HSCT outcome in their own centers. We are looking forward to opportunities for mentoring and partnering relationships between emerging and well-established centers.

The guiding principles of the WHO declare regulation of transplantation on a national level as a governmental responsibility. In this Workshop we hope to encourage the integration of HSCT within the healthcare portfolio of developing countries. This will advance best with the active participation of politicians, national health authorities and representatives of regulatory bodies.

The WBMT and its 22 member societies are taking another step towards excellence in stem cell transplantation around the world. The 2006 global survey published in JAMA, the first meeting in Hanoi, Vietnam, the second meeting in Salvador, Brazil, the third meeting in Cape Town, South Africa, the fourth in Riyadh, Saudi Arabia and the recently published global survey continue among a number of achievements advanced by the WBMT. We welcome more participation in our Standing Committees and in dialogue long after this Workshop.

The event’s chairs would like to express their gratitude and admiration to all colleagues who are involved in this congress, the organizing members and their dedicated staff.

We hope all the participants learn together, understand mutually and make this workshop a fruitful activity.

With best regards

Daniel Weisdorf
WBMT President

Meeting Chairs:

Mahmoud Aljurf
Dietger Niederwieser
Jeff Szer
Distinguished delegates and guests,

It is a great pleasure to welcome you all here to Casablanca, Morocco, to the first North African Symposium on Hematopoietic Stem Cells Transplantation, focusing on Emerging Countries in the continent.

The African Society for Blood and Marrow Transplantation (AFBMT) is very grateful to the Worldwide Network for Blood & Marrow Transplantation (WBMT) and the World Health Organization (WHO) for mentoring this important Symposium as it turns its focus to Africa. This hand on meeting aims to empower physicians and other health professionals to start designing transplantation programs in areas of need and also aims to assist those who have such facilities to improve outputs in their clinical programs.

World class experts will address practical topics and discuss clinical problems that are common in the area of stem cell transplantation and cellular therapies. We trust that the symposium will be of concrete utility to all participants and will help renew or establish professional associations around the continent.

We wish you a successful symposium and a pleasant stay in Casablanca.

Nicolas Novitzky, MD
President AFBMT

Alaa ElHaddad, MD
Vice-President

Nosa Bazuaye, MD
Secretary

Casablanca - Morocco
Dear Colleagues,

On behalf of the Moroccan Society of Hematology, we are pleased and honored to welcome you to, the First Meeting of African Blood and Marrow Transplantation Group, organized under the Patronage of Ministry of health.

The meeting will take place in the vibrant heart of Morocco, Casablanca city and will provide an exceptional educational experience and welcoming space for clinicians, biologists, nurses and NGO’s, involved in the field of blood and marrow transplantation.

We have an exciting and valuable program planned, which includes all different issues concerning the hematopoietic stem cell transplant (HSCT) and setting of blood and marrow facilities in low and middle income countries. Hence, we’ll have plenty of opportunities to connect and collaborate with peers and experts from all over the world.

Among our goals, create government policy-makers awareness about the value of HSCT in developing countries, promote HSCT within the Healthcare policies in Africa and adapt the basic ethical, medical and infrastructure requirements to healthcare systems in the african environment.

We hope to continue and consolidate our collaboration with the WHO, WBMT and all HSCT organizations to encourage the integration of this advanced and life-saving treatment within the healthcare systems in our continent and worldwide.

We wish you a very successful AfBMT meeting and a pleasant stay in Casablanca.

Abedellah Madani, MD  
SMH President

Asmaa Quessar, MD  
for the Local Organizing Committee
Date:
April 19th – 21st 2018

Congress language
The official language of the meeting is English. No simultaneous translation will be provided.

Venue:
Sheraton Hotel
Address: 100, Avenue des F.A.R., Casablanca, 20000, Morocco
Tel.: +212 5 22 43 94 94

Transportation:
Mohamed V airport (CMN) – Sheraton Hotel:
• By taxi
• By train: Casa-Port” train station

“Casa-Port” train station – Sheraton Hotel: 5 minutes walk or by taxi

The travel agency can arrange your transfers from/to the airport (see contact below)

Contact:
For international participants, please refer to the contact below:
Nadia Kasbi Belhadi (Sigmaco agency)
Tel.: +212 5 22 20 90 92/96
Mobile.: +212 6 61 45 58 37
Email: nadiasigmaco@gmail.com
Office hours: Monday to Friday
9 a.m to 6 p.m
Western European Summer Time (WEST), UTC +1

For local participants, please refer to the contact below:
Amina ATI (Secretariat)
Tel.: +212 5 22 22 78 05
Mobile.: +212 6 73 51 25 47
Email: medredaz@gmail.com
Office hours: Monday to Friday
8 a.m to 4 p.m
Western European Summer Time (WEST), UTC +1

For more useful information during your venue, please visit the following website:
http://wecasablanca.com
PROGRAM GOALS

1. Create awareness among government policy-makers about the value of Hematopoietic Stem Cell Transplantation (SCT) in developing countries

2. Promote SCT within the Healthcare policies of African countries

3. Adapt the basic ethical, medical and infrastructure requirements for providing SCT to healthcare systems in an African environment

4. Develop opportunities for collaboration and set up bridges between SCT centers

COMMITTEES

WBMT committee

Jose R. Nunez (Geneva, Switzerland)
Tapani Ruutu (Helsinki, Finland)
Dietger W. Niederwieser (Leipzig, Germany)
Daniel Weisdorf (Minneapolis, USA)
Yoshihisa Kdera (Nagakute, Japan)
Mickey Koh (London, UK)
Jeff Szer (Melbourne, Australia)
Mahmoud Aljurf (Riyadh, Saudi Arabia)
Hildegard Greinix (Vienna, Austria)

For more information, please visit: www.wbmt.org
AfBMT committee

Nicolas Novitzky  (Cape Town, South Africa)
Alaa Elhaddad  (Cairo, Egypt)
Nosakhare Bazuaye  (Benin, Nigeria)
Malek Benakli  (Algiers, Algeria)
Tarek Ben Othman  (Tunis, Tunisia)
Asma Quessar  (Casablanca, Morocco)

For more information, please visit: www.afbmt.org

Local Organizing Committee

Said Benchekron  (Casablanca)
Abdellah Madani  (Casablanca)
Mhamed Harif  (Casablanca)
Mohammed Khattab  (Rabat)
Nisrine Khoubila  (Casablanca)
Lahoucine Mahmal  (Marrakech)
Mohamed Mikdam  (Rabat)
Nicholas Novitzky  (Cape Town)
Nosa Bazuaye  (Benin)
Yasmina Benchekroun  (Casablanca)
Asmaa Quessar  (Casablanca)

Secretariat

Mrs Amina Ati
Hematology and Pediatric Oncology department, 20 August Hospital, University Hospital Ibn Rochd, Casablanca 20000 - Tel. +212 5 22 22 78 05 - Fax. _212 5 22 20 81 01 - Mobile. +212 6 73 51 25 47 - Email : medredaz@gmail.com
SCIENTIFIC PROGRAM
14h00-20h00  Registration

14h00-18h00  JACIE-FACT Workshop: Establishing accreditation program in low-middle income countries
*E. Mc Grath, P.W. Eldridge*
(Registration required)

18h30-19h30  Welcome addresses

Ministry of Health                     A. Doukkali
WBMT                                  D. Weisdorf
WHO                                   Dr Frank Konings
AfBMT                                  N. Novitzky
Lalla Salma Foundation                R. Bekkali
SMH                                    A. Madani

19h30-20h10  Inauguration Conference:

The role of WBMT worldwide
(*J. Szer, 20 min*)

Stem Cell Transplantation (SCT) in Africa: Where are we and what needs to be done?
(*A. Quessar, 20 min*)
Friday 20 April

07h30-20h00  Registration

08h30-10h00  S1

Chairs : D. Weisdorf, A. Quessar, J. Szer, N. Novitzky

Status of SCT in Africa

- Algeria  A. Bekadja M. Benakli  10 min
- Egypt  A. Haddad  10 min
- Morocco  L. Mahmal  10 min
- Nigeria  N. Bazuaye  10 min
- South Africa  N. Novitzky  10 min
- Tunisia  L. Toremane  10 min

10h00-10h30  Break/Poster session

10h30-12h15  S2

Chairs : Y. Kodera, M. Harif

Why is SCT not sufficiently established in Africa? A SWOT analysis
D. Niederwieser (20 min), Y. Kodera (15 min)

Panel Discussion on how to improve the current situation :
- M. Boudak
- O. Bouazza
- S. Sahraoui
- R. Belkhedim
- S. Osman Ahmed
- A. Waldmann

12h15-13h45  JAZZ Lunch symposium

Chairs : A. Madani, D. Niederwieser

Challenges and special considerations in setting up a transplant unit
A. Syed Osman, N. Bazuaye
14h15-15h30

S3

Chairs: D. Weisdorf, A. Bekadja

Technical aspects of SCT of graft sources and processing

M. Koh (20 min), T. Tbaksi (20 min)

Panel Discussion

- Y. Kodera
- N. Novitzky
- M. Aljurf
- N. Nourechafi
- A. Benbachir

15h30-16h45

S4

Chairs: J. Szer, N. Novitzky

Alternative donor SCT. Should an unrelated donor or UCB registry be established or should we go directly to haplo?

D. Weisdorf (40 min)

Panel Discussion

- M. Harif
- M. Benakli
- Y. Kodera
- E. Tshilaphoff
- M. Essakalli

16h45-17h15

Break / Poster session

17h15-17h45

Conf. 1

Chairs: W. Rasheed, L. Mahmal

Adapted, Affordable and Available conditioning regimens in Africa

N. Novitzky
Early post-transplant complications excluding infections
*T. Ruutu (20 min), W. Saber (20 min)*

Panel Discussion
- M. Aljurf
- J. Szer
- N. Bazuaye
- A. Haddad
- A. Madani
- E. Horwitz

Gala evening
PROGRAM

Saturday 21 April

07h15-18h30

Registration

7h30-8h30

Meet the expert

1. Practical issues of HLA typing
   A. Tbakhi
2. SCT in immune deficiency syndromes
   B. Neven
3. Transfusion in SCT
   D. Niederwieser
4. Building SCT program in a developing country
   L. Faulkner

8h30-9h15

Chairs: S. Kojima, M. Benakli

Infection control policy, isolation and prophylaxis in SCT
W. Rasheed (40 min)

Panel Discussion

• A. Haddad
• M. Ouhados
• L. Torjemane
• M. Lamchaheb
• W. Saber
• E. Horwitz

09h15-10h30

Chairs: S. Osman Ahmed, A. Haddad

Assessing the success of SCT
J. Szer (20 min), D. Weisdorf (20 min)

Panel discussion

• N. Aboussair
• J. El Bakkouri
• D. Niederwieser
• T. Ruutu
• Y. Kodera
10h30-11h00  Break/Poster session

11h00-12h00  S8
Chairs: T. Ruutu, A. Bekadja

Auto SCT in lymphoproliferative diseases
A. Sureda (lymphoma 20 min), D. Weisdorf (myeloma 20 min)

Panel Discussion
- M. Mikdam
- N. Bazauye
- L. Hessissen
- A. Bekadja
- W. Saber

12h00-13h15  S9
Chairs: N. Novitzky, N. Khoubila

SCT in bone marrow failure
S. Kojima (inherited, 20 min) / S. Osman Ahmed (acquired, 20 min)

Panel Discussion
- M. Benakli
- A. Quessar
- S. Corbacioglu
- D. Debenoth
- M. El Kababri

13h15-14h30  Lunch
Saturday 21 April

S10 14h30-16h30

**Chairs:** D. Niederwieser, M. Khattab

**SCT in Hemoglobinopathies**

**SCT in Sickle cell Anemia or alternatives**  
(*S. Corbacioglu, 20 min*)

**SCT for Thalassemia**  
(*L. Faulkner, 20 min*)

**Panel Discussion**

- S. Cherkaoui
- M. Khattab
- N. Bazuaye
- N. Novitzky
- M. Benajiba

16h30-17h00

**Break / Poster session**

S11 17h00-18h30

**Chairs:** T. Ruutu, K. Doghmi

**SCT in acute and chronic leukemias**

*D. Niederwieser* (AML), *Wael Saber* (CML)

**Panel Discussion**

- M. Qachouh
- D. Weisdorf
- J. Szer
- A. Haddad
- B. Oukkache

**Closing remarks**
Quality & Accreditation Workshop in Collaboration with JACIE and FACT

(Registration required)

**14h00-18h00**

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<th>Topic</th>
<th>Facilitator</th>
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<td>14:00-14:05</td>
<td>Opening</td>
<td>M. Aljurf / P.W. Eldridge / E. McGrath</td>
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<td>14:05-14:15</td>
<td>Quality Management Status in Morocco</td>
<td>M. Amrani / M. Harif</td>
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<td>14:15-14:40</td>
<td>Overview of accreditation for SCT</td>
<td>P.W. Eldridge / E. McGrath</td>
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<td>14:40-14:55</td>
<td>Exercise: what do we mean when we talk about quality?</td>
<td>E. McGrath</td>
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<td>14:55-15:25</td>
<td>Basic concepts of quality management in SCT</td>
<td>P.W. Eldridge</td>
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<td>15:50-16:10</td>
<td>Overview of the accreditation process</td>
<td>E. McGrath</td>
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<td><strong>16:10-16:30</strong></td>
<td>Break</td>
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<td>16:30-17:00</td>
<td>Standards 1</td>
<td>P.W. Eldridge</td>
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<td>17:00-17:20</td>
<td>Exercise: identify deficiencies</td>
<td>E. McGrath</td>
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<td>17:20-17:50</td>
<td>Standards 2</td>
<td>P.W. Eldridge</td>
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<td>17:50-18:00</td>
<td>Closing</td>
<td>P.W. Eldridge / E. McGrath / M. Harif</td>
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# Nursing Training and Development Workshop Sponsored by the EMBMT

Chair and speaker: Reguia Belkhedim, Transplant Clinical Nurse Specialist  
King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia

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<td>0830 – 0835</td>
<td>Introduction</td>
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<td>Transplant Clinical Nurse Specialist Job Description</td>
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<td>0845 - 0915</td>
<td>Acute Leukemias</td>
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<td>0915 - 0930</td>
<td>Hematopoiesis &amp; SCT: an introduction</td>
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<td>0930 – 1000</td>
<td>Pre-Stem Cell transplant preparation</td>
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<td>1000 - 1030</td>
<td>Management of Central Venous Catheters (CVC)</td>
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<td>1030 - 1200</td>
<td>Open forum/Q&amp;A</td>
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<td>1200 – 1400</td>
<td>Lunch Break</td>
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<td>1400 – 1425</td>
<td>Conditioning: Preparative Regimens, Stem Cell Collection, Mobilization, and Harvest</td>
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<td>1425 – 1450</td>
<td>SCT: Types, Sources &amp; Indications</td>
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<td>1450 – 1510</td>
<td>Infusion of Hematopoietic Stem Cell</td>
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<td>1515 – 1535</td>
<td>Transplant Phase: Nursing Implications</td>
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<td>1535 – 1600</td>
<td>Major Drugs Used in SCT</td>
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<td>1605 – 1630</td>
<td>Gastrointestinal Complications: Nausea and Vomiting</td>
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<td>Oral Mucositis</td>
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<td>1700 – 1730</td>
<td>Open forum/Q&amp;A</td>
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<td>Time</td>
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<tr>
<td>0830 - 0900</td>
<td>Veno-Occlusive Disease (VOD) of the Liver OR Sinusoidal Obstruction Syndrome (SOS) in the BMT Setting</td>
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<td>0900 - 0930</td>
<td>Hemorrhagic Cystitis</td>
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<td>0930 - 1000</td>
<td>Nursing care of SCT Patients after discharge</td>
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<td>1000 – 1030</td>
<td>Break</td>
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<tr>
<td>1035 – 1105</td>
<td>Basics of supportive care in GVHD</td>
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<td>Survivorship: Life after SCT</td>
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<td>1135 – 1200</td>
<td>Open forum/Q&amp;A</td>
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<td>1200</td>
<td>Lunch Break (end of the workshop)</td>
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NGOs workshop: Role of Nongovernmental organizations in promoting Hematopoietic stem cells transplantation program

10h30 – 12h30  Chairs: Rachid Bekkali, Said Benchekroun

Topics:
- Improving patient quality of life during hospitalisation and at home
- Financial support (drugs, blood tests, rent, transport, etc.)
- Patient and family information and therapeutic education
- Public awareness campaigns on the vital character of BMT
- Advocacy for BMT with governmental decision-makers

NGO presentations (10 minutes each)
- Association Agir: S. Benchekroun
- Association Lions Club les Iris: T. Kadiri
- Association Hajar: AA. Bousfiha
- Association Noujoum: C. Sebti
- Association l’Avenir: A. Serghini Idrissi/F. Chraibi
- Association A.M.T.D: S. El Yamani/ H. Hachimi
# LIST OF SPEAKERS

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<td>Eoin McGrath</td>
<td>(Barcelona, Spain)</td>
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<tr>
<td>Paul Eldridge</td>
<td>(Chapel Hill, USA)</td>
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<td>Daniel Weisdorf</td>
<td>(Minneapolis, USA)</td>
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<td>Frank Konings</td>
<td>(Cairo, Egypt)</td>
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<td>Nicolas Novitzky</td>
<td>(Cape Town, South Africa)</td>
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<td>Rachid Bekkali</td>
<td>(Rabat, Morocco)</td>
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<td>Abdallah Madani</td>
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<td>Jeff Szer</td>
<td>(Melbourne, Australia)</td>
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<td>Asmaa Quessar</td>
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<td>Mohamed-Amine Bekadja</td>
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<td>Malek Benakli</td>
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<td>Lamia Torjemane</td>
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<td>Yoshihisa Kodera</td>
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<td>Mhamed Harif</td>
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<tr>
<td>Dietger Niederwieser</td>
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<td>Syed Osman Ahmed</td>
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<td>Mickey Koh</td>
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<td>Abdelghani Tbakhi</td>
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<td>Walid Rasheed</td>
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<td>Mohamed Mikdame</td>
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<td>Tapani Ruutu</td>
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<td>Wael Saber</td>
<td>(Milwaukee, USA)</td>
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<td>Mahmoud Aljurf</td>
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<td>Benedictce Neven</td>
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<td>Lawrence Faulkner</td>
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<td>Seiji Kojima</td>
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<td>Anna Sureda</td>
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<td>Selim Corbacioglu</td>
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<td>Reguia Belkhedim</td>
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ABSTRACT BOOK
1. HEMATOPOIETIC STEM CELLS TRANSPLANT IN HIGH-RISK NEUROBLASTOMA

A. Laaraje¹, M. El Kababri¹, L. Hessissen¹, A. Kili¹, A. Koraichi², A. Bentahla², S. Bougar³, O. Atouf³, I. Lemsahli⁴, N. Amraui⁴, K. Hajjout⁴, S. Echcherif-Elkettani², N. Nourichafi³, M. Benajiba⁴, M. El Khorassani¹, M. Essakalli³, M. Khattab¹.

(1) Pediatric Hematology and Oncology Center, Transplant Unit (Rabat), (2) Pediatric intensive care unit (Rabat), (3) Immunology and blood transfusion Center (Rabat), (4) Regional blood transfusion Center (Rabat), (5) Regional blood transfusion Center (Casablanca)

Introduction :

Neuroblastoma is the most frequent extra-cerebral malignant tumor of young children. In Morocco, neuroblastoma comes fourth after leukemias, lymphomas and Wilms tumors. Hematopoietic stem cell transplant is used to support the restoration of hematopoiesis after intensification with high-dose chemotherapy. The objective of this work is to report the experience of peripheral hematopoietic stem cell transplant in the treatment of high-risk neuroblastoma.

Patients and methods :

A retrospective study was conducted at the transplant unit of the Pediatric Hematology and Oncology Center (CHOP) at the Children’s Hospital of Rabat (HER) over a period of 3 years and 4 months (November 2014 - March 2018). Twenty-five children with high-risk neuroblastoma were grafted using peripheral hematopoietic stem cells during this period.

Results :

25 patients benefited from an Autologous hematopoietic stem cell transplant during the period of the study. The average age was 4 years 4 months with extremes going from 11 months to 12 years. There were 14 boys and 11 girls, a sex ratio of 1.3. The site of the primary tumor was abdominal in 20 cases (80%), thoracic in 2 cases (8%), cervical in 1 case (4%) and double localization in 2 cases (8%) of which: a mediastinal and left adrenal and the other pelvic and left adrenal. 23 children had metastases at the time of diagnosis: bone marrow in 20 children, bone in 18 children, hepatic in 03 children, pulmonary in 01 child, the kidney was invaded in 02 children.

The amplification of the N-MYC was sought in 11 children, 6 children had an amplified N-MYC. All patients were treated according to the protocol of High-Risk neuroblastoma (HR-NBL 2010) which consists of induction chemotherapy, surgery, high-dose chemotherapy followed by transplant, radiotherapy and maintenance treatment by retinoic acid.

In our study, the infectious complications are dominated by mucositis and febrile neutropenia, two patients presented as a complication a veno-occlusive disease of the liver (or sinusoidal obstruction syndrome) which evolved well under symptomatic treatment and ursodeoxycholic acid in a patient with death of the other patient.

Hematologic reconstitution was highly variable depending on the richness of the graft: between 11 days and 41 days for the white lineage and between 13 and 45 days for the platelets. The evolution was marked by complete remission in 04 children, relapse in 02, 07 patients continue the treatment according to the protocol and 13 children died including 08 by tumor progression, 04 by toxicity of chemotherapy and 1 by venous occlusive disease.

2. AUTOGRAFTING OF HEMATOPOIETIC STEM CELLS IN HIGH-RISK NEUROBLASTOMA (4 CASES REPORT)


Hematology and Pediatric Oncology Department, 20 August 1953 Hospital, Casablanca

Introduction :

Neuroblastoma is the most common extracranial solid tumor in children, constituting 6%-10% of all childhood cancers. In Morocco it comes fourth after leukemia, lymphomas and nephroblastoma. The course of this disease varies, depending on the biologic features of the tumor. Treatments adapted to risk stratification have improved survival outcomes in patients with neuroblastoma. Autologous hematopoietic stem cell transplantation (ASCT) is used to support the restoration of hematopoiesis after intensification with high-dose chemotherapy in high risk neuroblastoma.

The aim of this work is to report the transplantation experience of peripheral hematopoietic stem cells in the treatment of high-risk neuroblastoma in Hematology and Pediatric Oncology unit at Casablanca.

Patients and methods :

This is a retrospective and descriptive study of all children with high-risk neuroblastoma who
underwent ASCT over a period of 2 years (2016-2017). All patients were treated according to the national high-risk neuroblastoma regimen (HR-NBL 2010) which consists of induction chemotherapy, surgery, high-dose chemotherapy followed by autograft, radiotherapy and maintenance treatment by retinoic acid. Peripheral stem cells were collected after mobilization with G-CSF and conditioning consisted of busufan and melphalan.

**Results :**

Four children with high-risk neuroblastoma were transplanted using peripheral hematopoietic stem cells during this period, with a mean age of 4 years and extremes ranging from 2 to 7 years, with a sex ratio 3 M / 1 F. The primary tumor site was abdominal. Metastases were noted in 3 children (bone, bone marrow and lymph nodes). Amplification of the oncogene NMYC could not be sought unfortunately in our patients. At the end of induction therapy, one patient achieved complete response, with 1 achieved very good partial response, two patients were refractory.

In our study infectious complications were mainly mucositis and febrile neutropenia. Hematologic reconstitution was highly variable depending on the richness of the graft: between 11 days and 17 days for the WBC and between 13 and 22 days for the platelets. The evolution was marked by a continuous complete remission in 3 cases and a failure in a patient who was lost sight of.

**Conclusion :**

This short series shows the feasibility of the approach in our setting. Larger number of patients and longer follow-up are needed to confirm these preliminary results.

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**3. HEMATOPOIETIC STEM CELL TRANSPLANTATION : EXPERIENCE OF PEDIATRIC HEMATOLOGY AND ONCOLOGY CENTER (RABAT, MOROCCO)**


*(1) Pediatric Hematology and Oncology Center, Transplant Unit (Rabat), (2) Pediatric intensive care unit (Rabat), (3) Immunology and blood transfusion Center (Rabat), (4) Regional blood transfusion Center (Rabat), (5) Regional blood transfusion Center (Casablanca)*

**Introduction :**

Thanks to the progress in immunology, bone marrow transplantation and hematopoietic stem cells have emerged as a very effective treatment in addition to chemotherapy in tumor pathology or as a curative treatment in certain pathologies such as immune deficiency and medullary aplasia. The aim of this study is to report the experience of the transplant unit of the hematology and pediatric oncology center at the Children’s Hospital of Rabat.

**Patients and methods :**

This work represents a retrospective study conducted at the level of the transplant unit of the Pediatric Hematology and Oncology Center (CHOP) at the Children’s Hospital of Rabat (HER) over a period of 3 years and 4 months of November 2014 until March 2018. Thirty-three children were grafted during this period.

**Results :**

33 children were grafted during labor, 25 children had high-risk neuroblastoma (75.75%), 7 children had lymphoma (21.21%) (6 Hodgkin’s disease and 1 Burkitt’s lymphoma) and 1 child had severe combined immune deficiency (SCID) (3.03%). The average age of our patients was 5 years and 8 months with extremes ranging from 9 months to 16 years. There were 21 boys and 12 girls being a sex ratio of 1.75.

Hematopoietic stem cell autograft was performed in 32 children. The indication for high dose chemotherapy intensification followed by ASCT was high risk neuroblastoma in 25 cases and lymphoma 7 cases. Allografting was performed at DICS, it represents the first experience in the service and there is no need for conditioning.

In our study, the infectious complications are dominated by mucositis and febrile neutropenia, two...
patients presented as a complication a veno-occlusive disease of the liver (or sinusoidal obstruction syndrome).

Hematologic reconstitution was highly variable depending on the richness of the graft: between 11 days and 41 days for the white lineage and between 13 and 45 days for the platelets.

The evolution was marked by complete remission in 9 children (27.2%) (4 neuroblastoma, 5 lymphoma), relapse in 4 (12.1%), 7 patients continue the treatment according to the protocol and 13 children died (39.3%) including 8 by tumor progression, 4 by toxicity of chemotherapy and 1 by venous occlusion disease.

4. OUTCOME OF PEDIATRIC PATIENTS UNDERGOING AUTOLOGOUS STEM CELL TRANSPLANTATION (ASCT) IN CASABLANCA (MOROCCO)


Hematology and Pediatric Oncology Department, 20 August 1953 Hospital, Casablanca

Introduction:
Refractory/relapsed Hodgkin and non-Hodgkin lymphoma and high risk neuroblastoma are the primary indication of autologous stem cell transplantation for pediatric patients. Access to ASCT in pediatric patients is difficult in developing countries.

Objective
The aim of this study is to determinate outcome of pediatric patients undergoing ASCT and highlight the difficulties which occur during this procedure.

Methods:
A retrospective study was conducted from January 2005 to December 2017, including all children < 18 years who underwent ASCT.

Results:
20 pediatric patients (12 (60%) Hodgkin lymphoma, 4 (18%) neuroblastoma, 2 (10%) Burkitt lymphoma, 1 (5%) diffuse large B cell lymphoma and 1 (5%) cutaneous T lymphoma) were included with median age 16.5 years (3-18) and M/F sex ratio 1.2. One neuroblastoma patient was in complete remission 1, eight were in 2nd complete remission, one in 3rd complete remission. The mean of peripheral stem cells mobilization was 4 days and the mean number of CD34 cells infused was 7.2 10^6/Kg (4-13.9). The conditioning was done by busulphan and melphalan for patient with neuroblasto and by the BEAM regimen for all the others. The median time for aplasia was 12 days (5-30). There were seven patients in complete remission, two in partial remission, and one failure one patient died.

Conclusion:
ASCT offers a longer overall survival. However, in pediatric patient, this procedure still been difficult to be conducted in our context.

5. AUTOLOGOUS STEM CELL TRANSPLANTATION IN MULTIPLE MYELOMA USING NON-CRYOPRESERVED PERIPHERAL BLOOD STEM CELLS: A SINGLE EXPERIENCE CENTER


Hematology and Pediatric Oncology Department, 20 August 1953 Hospital, Casablanca

Introduction:
High-dose chemotherapy followed by autologous stem cell transplantation (ASCT) is the standard first-line therapy in patients with multiple myeloma. However, this is a costly technique considering the need for freezing hematopoietic stem cells (CSH) collected to preserve their viability until reinjection. Hence the interest of developing an ASCT without cryopreservation especially in centers with limited resources. In Morocco, this activity started in the Hematology department of the university hospital of Casablanca in January 2014.

Patients and methods:
It’s a descriptive retrospective study conducted at the transplant unit of the Hematology and Pediatric oncology department of Casablanca University Hospital over a period from January 2014 to June 2017. We included 93 patients diagnosed with multiple myeloma, treated with induction chemotherapy protocol and eligible for ASCT. Stem cells were mobilized with 4-5 days of G-CSF, collected by apheresis, then stored in a conventional blood bank refrigerator at 4°C for 2-3 days before infusion. High dose Melphalan was administered at a median dose of 200mg/m2 on Day -1. After infusion (Day 0), all patients were observed for toxicities and febrile complications managed as per standard guidelines and institutional protocol.
Results:
Over a period of 42 months, 93 patients were collected. The median age at diagnosis was 57 years [30-68], the sex ratio M/F was 1.7. Patients were classified according to the Durie and Salmon classification in 97.8% and stratified according to ISS score in 73%. The cytogenetic study was done in 26 patients (27.9%), 3 patients had t(4,14) and 3 del17p. The karyotype was normal in 12 patients, not completed by FISH. Induction chemotherapy was CTD-based in 77 patients (82.7%), and VTD-based in 9 patients (9.6%). The global response after induction therapy (CR+VGPR) was 72%.

The duration of mobilization by G-CSF was 4 days in 65 patients (69.9%), and 5 days in 28 patients (30.1%). The median number of mononuclear and CD34+ cells transfused were 8.8x10^6 CD34/Kg [2-38 x 10^6 CD34/Kg]. The median duration of aplasia was 9 days [5-30]. The median time to neutrophil engraftment was days (range, - days), and for platelet engraftment was days (range, - days). There was no graft failure in this group study.

All patients had transfusion requirements with a median transfusion in platelets of 12 units, and in packed red blood cells of 1. No patient presented an allergic incident at the reinfusion. Diarrhea was present in 46 patients (49.4%). All grades of mucositis were noted in 55 patients (59%). A fever episod (documented or not) was noted in 67 patients (72%).

At day 100 of ASCT, the evaluation showed a global response (CR+VGPR) of 83.8%, and transplant-related mortality was 4.3%. The median overall survival was 35.7 months.

Conclusion:
Many studies especially in developing countries showed that ASCT without cryopreservation remains a safe, simple and low cost method for multiple myeloma with equivalent results. However, this technique has disadvantages including the inability to store a part of the collection and reserving it for a second transplant.

6. AUTOLOGOUS HEMATOPOIETIC STEM CELL TRANSPLANTATION (ASCT) WITHOUT CRYOPRESERVATION IN MULTIPLE MYELOMA: A BI-CENTRIC RETROSPECTIVE STUDY.


*Department of Clinical Haematology, Military Hospital of Instruction Mohamed V, Rabat, Morocco
**Al-Madina Medical Clinic in Casablanca

Introduction:
For younger patients under 65 years of age, induction followed by high-dose chemotherapy with Autologous Stem Cell Transplantation (ASCT) is the standard treatment in eligible patients with multiple myeloma (MM). There is limited experience with non-cryopreserved ASCT. We report the experience of two Moroccan centers in ASCT without cryopreservation and assess its efficacy and safety.

Patients and methods:
We evaluate retrospectively the efficacy and safety of ASCT without cryopreservation in 43 adult multiple myeloma patients eligible to ASCT, followed in Clinical Hematology Department of the Military Hospital Mohamed V in Rabat and the Al-Madina Medical Clinic in Casablanca, that had ASCT for MM from April 2015 to August 2017. All patients received inductions based on novel agents and the ASCT was performed either in first line or at relapse.

Results:
The median age at ASCT was 57 [range, 37-67], with a sex ratio of 1.38. 12(27.90%) patients were in CR, 24(55.81%) patients in VGPR and 7(16.27%) patients in PR. None of our patients received a double autograft or a tandem transplant. Autologous stem cell was mobilized using G-CSF alone (10 µg/kg/ day for 5 days). Leukopheresis to harvest stem cells were performed on day -1. The grafts were kept in a conventional blood bank refrigerator at +4°C until reinfusion on day 0. The conditioning regimen consisted of Melphalan 200 mg/m2 in all patients.

34(79.06%) patients have had a single session of cypherapheresis and 9 patients had two. The median harvested CD34+ cell count was 4.5x10^6/kg [range, 2-12.2]. All patients had neutrophil engraftment on the median of day 7 [range, 5-13], and platelet transfusion independence on the median of day 10 [range, 0-17].There was no graft failure. The median duration of hospitalization from day 0 was 15 days [range, 10-30]. Mucositis grade 3/4 was seen in 4(9.30%) patients, vomiting in 2(4.65%) patients,
one patient had severe diarrhea and 2(4.65%) patients neurological toxicity. The median follow-up time for patients was 17 months. 3 patients died: one death related to septic shock (TRM at 2.32%) and 2 (4.65%) patients died following the evolution of the myeloma.

Conclusion:
Our study suggests that cryoconservation is not necessary for most multiple myeloma patients eligible for autologous transplantation. High dose chemotherapy and ASCT without cryopreservation is a safe and effective method for MM with equivalent results, and adapted to countries with limited therapeutic resources.

7. COST OF AUTOLOGOUS STEM CELL TRANSPLANTATION IN MULTIPLE MYELOMA USING NON-CRYOPRESERVED PERIPHERAL BLOOD STEM CELLS

B. Houssou, R. Farhane, M. Rachid, M. Harif, A. Quessar
Department of Clinical Hematology and Pediatric Oncology, Hospital August 20, Casablanca, Morocco

Introduction:
High-dose chemotherapy and autologous stem cell transplantation (ASCT) using non cryopreserved stem cells are increasingly used in the management of patients with multiple myeloma (MM) in developing countries. The cost of autologous stem cell transplantation in multiple myeloma using cryopreserved peripheral blood stem cells in Morocco is 25,000 €.

The objective of this work is to evaluate the cost of ASCT using this procedure in patients with MM at the Department of Hematology and Pediatric Oncology of the Hospital August 20, 1953, in Casablanca.

Patients and method:
Between January 2014 and June 2017, we collected retrospectively 93 patients treated for MM who received haematopoietic stem cell peripheral blood using G-CSF mobilization. Leukapheresis to harvest stem cells was performed on day and when necessary on the second day. The grafts were stored in a refrigerator at the hospital’s central pharmacy at 4 °C until reinjection at day 0. The conditioning regimen consisted of 200 mg/m2 of melphalan in patients with no comorbidities. The myeloablative post-chemotherapy phase was managed with growth factors and supportive care as needed. The evaluation of the cost took into account the biological analyzes, the radiological explorations, the mobilization of CSH, the cytaphèrese, the conditioning, the post-transplant growth factors, the anti-infectious agents used, the solutes, the platelet and globular pellets, the fees of caregivers and the cost of hospitalization.

Result:
During the study period of 93 patients in care, there were 59 men and 34 women. The median age was 57 (35-68). The median number of CD34 + cells harvested was 9.7 x 10^6 /kg [2x10^6; 25x10^6]. The median durations of engraftement was 9 days [5 days; 30 days]. Patients had a median 3 days fever [0 days; 27 days] and 8 days for the use of antibiotics [0 days; 21 days]. The median cost of antibiotics is 1,080 €. The median number of platelet units is 12 (0 to 82) and the number of red blood cells is 1 (0 to 8 red blood cells) with a median cost of labile blood products at 486 € (0 to 3400 €). The cost of ASCT using non-cryopreserved stem cells is 21,200, 15% less than ASCT using cryopreserved.

Conclusion
ASCT using non-cryopreserved remains an efficient less expensive treatment standard in the management of patients followed for MM.

8. AUTOLOGOUS STEM CELL TRANSPLANTATION IN MULTIPLE MYELOMA USING NON-CRYOPRESERVED PERIPHERAL BLOOD STEM CELLS: INTERNATIONAL UNIVERSITY HOSPITAL CHEIKH KHALIFA EXPERIENCE (CASABLANCA – MOROCCO)

L. Loukhmas, M. Ahnach, N. Bouanani, S. Daghri, N. Belmoufid
Department Of Hematology, International University Hospital CheikhKhalifa, Casablanca, Morocco.

Background:
Autologous hematopoietic stem cell transplantation (auto-HSCT) without cryo-conservation is an interesting procedure in our context because of the insufficient cryopreservation centers and the long waiting list of patients. In multiple myeloma, conditioning with high-dose melphalan which has a short half favors the use of stem cells without cryopreservation.

Patients and Methods:
Twenty-eight patients with MM were enrolled in this study during a period from May 2016 to March 2018. All had undergone auto–HSCT in bone marrow transplantation unit of International University Hospital CheikhKhalifa, in Casablanca. Patients were treated by different protocols depending on renal function: VCD (2 cases), VTD (15 cases), CTD
(6 cases), VD (2 cases) and association VTD+CTD (3 cases). They were mobilized by G-CSF during 4 to 5 days, and median 4.16×10⁶/kg of CD34 were collected and then stored at 4°C during 60 hours before reinfusion. The conditioning was based on Melphalan (100 to 200 mg/m²).

**Results:**

The median age of the patients was 57 years (range 30-69) with sex ratio M/F at 1.8. Thirteen patients (46%) received 4 courses of chemotherapy before auto-HSCT and six (21%) had six courses. The main comorbidities of patients were arterial hypertension (n: 8), Diabetes (n: 4), Renal failure (n: 3). Full dose Melphalan were given in 25 patients. Melphalan dose were 140 mg/m² in 2 patients because of moderate renal failure, 100 mg/m² in 1 patient because of renal failure needing dialysis.

Median time to neutrophil (> 500/mm³) and platelet (> 20,000/mm³) engraftment were 11 days (range 8-14 days). During aplasia period, consumption of blood products is 191 platelet units (PU) and 85 concentrates of red blood cells (RBC), with an average of 6.8 PU and 3 RBC per patient. Complications were marked by lung infection (n: 2), urinary infection (n: 1), bacteremia (n: 1), mucositis grade 1 (n: 27), and grade 2 (n: 1). There was no graft failure.

**Conclusion:**

We conclude that high-dose chemotherapy in auto-HSCT with non-cryopreserved is a practical, effective, and safe method for MM, It reduces the cost of transplant in developing country with limited resources.

9. **AUTOLOGOUS HEMATOPOIETIC CELL TRANSPLANTATION FOR MULTIPLE MYELOMA PATIENTS WITH RENAL INSUFFICIENCY**

N. Bouanani, M. Ahnach, N. Belmoufid, S. Daghri, L. Loukhmas

*International University Hospital CheikhKhalifa, Casablanca, Morocco.*

**Background:**

Renal insufficiency (RI) is a common complication of multiple myeloma (MM) present in approximately 20-50% of patients, 5% are dialysis-dependent. Renal dysfunction at presentation is considered a risk factor for early death and has been associated with an unfavorable prognosis. Therefore, therapeutic management is challenging as autologous stem cell transplantation (ASCT) is often not considered as a valuable strategy, mainly due to toxicity concerns. The aim of study is to assess the efficacy outcomes and toxicities of this strategy.

**Methods:**

We performed a retrospective study from June 2016 to March 2018, which included 3 patients with MM and renal insufficiency. Peripheral blood stem cells (PBSC) were mobilized and collected following granulocyte colony-stimulating factor (G-CSF) alone. Conditioning was based on melphalan 100-140 mg/m² followed by ASCT. All patients received G-CSF 5 µg/kg/day from day +5 until the absolute neutrophil count was 0.5 × 10⁹/l for 2 consecutive days. Renal function was determined and staged at the time of transplantation by estimated glomerular filtration rate (GFR); patients were grouped by GFR using the modification of diet in renal disease (MDRD) equation at AHCT as normal/mild ≥ 60 ml/ min, moderate (30-60) and severe RI< 30. Significant improvement in renal function, defined as an increase in glomerular filtration rate (GFR) by 25% above baseline.

**Results:**

The median age of the patient was 52 years (range 51–54 years), all are female. The patients had been previously treated with VTD protocol (4 cycles). Serum creatinine was 18 mg/l, 60 mg/l, and 35 mg/l and creatinine clearance was 49 ml/min, 7 ml/min, and 20 ml/min respectively before ASCT. Hemodialysis was administered for one patient. The period of aplasia was marked by grade 1 of mucositis. Median time to neutrophil >500/mm³ and platelet >20,000/mm³ engraftment was 11 days (range 11-13 days). Two out of 3 patients (severe and moderate RI) treated with 140 mg/m² of melphalan improved their GFR by 25% and 30% respectively as compared to baseline, while the patient with terminal stage RI treated with 100 mg/m² did not show a >25% improvement.

**Discussion:**

Patients generally are treated with dose reductions of melphalan, 100-140 mg/m². Further studies used high dose melphalan at 200 mg/m² and concluded that it had an acceptable toxicity in patients with moderate RI. In the literature, patients with moderate RI appear to benefit from melphalan 200 mg/m² with a significant improvement in 5-year progression free survival (PFS) and the treatment was not associated with an increase in toxicity. Some studies report that post-transplant therapies improve outcomes with a proportion of patients achieving dialysis-independence.
Conclusion:
Auto HSCT can be offered to patients with MM and concomitant renal insufficiency with acceptable toxicity and a significant improvement in renal function in the transplanted patients. In this analysis, a melphalan dose of 140 mg/m² was not associated with an increase in toxicity for all patients and an improvement in GFR for severe and moderate patients.

10. CONTRIBUTION OF AUTOLOGOUS HEMATOPOIETIC STEM CELL TRANSPLANTATION IN PATIENTS WITH NON-HODGKIN’S LYMPHOMA: EXPERIENCE OF THE HEMATOLOGY DEPARTMENT OF CASABLANCA
H. Bencharef, M. Camara, M. Qachouh, M. Lamchahab, S. Cherkouaui, N. Khoubila, M. Rachid, A. Madani, M. Harif, A. Quessar
Hematology-oncology pediatric department 20th August 1953 Hospital, Casablanca, Morocco

Introduction:
Relapses and induction failures in aggressive non-Hodgkin’s lymphomas (NHL) have a very poor outcome, with less than 10% of prolonged disease-free interval using conventional salvage regimens. To improve these results, high-dose chemotherapy (HDCT) regimen with autologous hematopoietic stem cell transplantation (ASCT) have been introduced and the survival advantage is proven. In general, the results are much less favourable when a partial or complete response could not be achieved before ASCT. Thus, increasing early response rates appears fundamental for better outcome.

We report retrospectively our experience in patients with NHL autografted from 2005 to 2017 in a single institution.

Patients and methods:
Single center retrospective study during the period from January 2005 to June 2017, included all patients aged over 16 years , who had undergone ASCT for refractory or relapsed NHL, and also in first complete remission in mantle cell lymphoma (MCL).

The clinical and epidemiological data were collected from patients’ medical records. The mobilization was carried out with G-CSF at the dose of 15µg / kg / day for 5 days and the conditioning therapy was BEAM type.

Results:
32 patients were included, autograft of NHL accounted for 37.4% of all transplant activities in our structure. The median age at diagnosis was 42 years [16 - 67 years] with a clear male predominance (M/F ratio at 3).

The status of patients before autograft was as follows: 6 (18.7%) patients were in CR1, 12 (37.5%) in CR2, 1 (3.1%) in CR3, 3 (9, 4%) refractory and 10 (31.2%) in PR. Median duration of aplasia was 13 days (5-47 days). One patient died during ASCT procedure. 16 (56.25%) patients are in continuous complete remission, 3 patients relapsed after autograft, 10 (31.2 %) are lost to follow-up and 1 patient died. The ASCT complications were mainly: Infectious in 24 (75%) of the cases most often of fever of indeterminate origin in 13 cases, followed by mucositis in 17 (53.1%) cases including 6 grade I-II, 6 grade III and IV and digestive grades in 14 (43.7%) of the cases.

Discussion and conclusion:
These study results confirm that Patients with relapsed aggressive NHL, who obtain at least a partial response after salvage chemotherapy, may benefit from the consolidation with the ASCT procedure. However, a larger multi-center study is needed to confirm these results.

11. EFFICACY OF CROPRESERVATION AT -80°C OF HEMATOPOIETIC PROGENITOR CELLS WITH LOW PERCENT DIMETHYL SULFOXIDE AS CRYOPROTECTANT IN AUTOLOGOUS STEM CELL TRANSPLANT FOR LYMPHOMA
M. Ahnach, N. Bouanani, N. Belmoufid, S. Daghri, L. Loukhamas
Department Of Hematology, International University Hospital CheikhKhalifa, Casablanca, Morocco.

Background:
Autologous stem cell transplantation (auto-HSCT) is a critical approach for treatment strategy of
lymphoma. The protocol consist on the collect of stem cell progenitors, freezing with dimethyl sulfoxid (DMSO) and subsequent thawing before re-infusion. A variety of cryopreservatives have been used with storage at -80°C in mechanical freezers but actually the recommendatio of optimal storage condition is -196 °C in liquid nitrogen. But in country with centers at high transplant activity with limited resources the mechanic freezing below -80°C is very interesting. The aim of this study is to evaluate the efficacy of this type of cryopreservation during auto-HSCT of patient with lymphoma at the international university hospital Cheikhkhalifa.

Methods:
During a 2 years period (from may 2016 to march 2018). From 46 consecutive patients schedule for auto-HSCT, 10 patients with relapse and refractory lymphoma have been mobilized for harvesting stem cell and the graft was cryopreserved. The patients underwent mobilization with GCSF after polychemotherapy (4 cases), GCSF alone (1 case) cyclophosphamide (4 cases) and one with plerixafor. A systematic control of the level of CD34 cells in the peripheral blood and in the pockets of the graft was realized before and after thawing. Stem cells were cryopreserved according to mechanical freezers at -80, using less than 5 percent of DMSO as cryoprotectant. Four patients eligible for transplant received a conditioning based on protocols BEAM in one case, Bendamustine-EAM in 2 cases and one case of cerebral lymphoma received busulfan/ etoposide. Written consents were obtained from all patients participating in the study.

Results:
The median age of the patient was 54.5 years (range 37–66 years) with Sex ratio M/F at 1.5, diagnoses were high risk or relapsed T-NHL (2 cases), cerebral NHL (1 case), intestinal NHL (1case), B-NHL (4 cases), follicular lymphoma (1 case) and HL (1 case). These patients had been previously treated with multiple lines of chemotherapy an average of 10 cycles (4-17cycles), in two cases the bone marrow biopsy was infiltrated. After mobilization, the median number of CD34 cells in a gratf was 4.5 10€ per kg and median storage time was 3.1 months. 4 patients had auto-HSCT and the total number of transplanted CD34+ cells after thawing found a loss on average of 23.5%.White blood cells were engrafted at a mean of 16 days. Period of aplasia was marked by two cases of pulmonary infection and three cases of grade 2 of mucositis.

Discussion:
Some patients can be grafted immediately as myelomas diagnosis but in lymphoma, transplant should be scheduled after the end of treatment, and therefore require long-term preservation. The cells viability decreased progressively with the length of time from cryopreservation, actually the gold standart of protocol cryopreserved with high % of DMSO, liquid nitrogen under -196 C because prevention of metabolic pathways and to avoid damage cells. However this technic can be complicated, associated with toxic reactions such as vomiting, cardiac dysfunction, anaphylaxia and acute renal failure. Cryopreservation with lower DMSO concentrations would be expected to reduce the toxicity and mechanic freezing below -80°C was is pratical and less expensive.

Conclusion:
Our experience confirms the feasibility of the procedure for patients who require a transplant usually within a short time.

12. AUTOLOGOUS STEM CELL TRANSPLANTATION IN HEMATOLOGICAL MALIGNANCIES AND SOLID TUMORS: REPORT OF A SINGLE CENTER
R. Farhane, M. Rachid, M. Mouayad, M. Aniba, W. kadouri, N. Chellakhi, M. Qachouh, M. Harif, A. Madani, A. Quessar
Hematology and Pediatric Oncology Department, 20 Août 1953 Hospital, Casablanca

Introduction:
Autologous stem cell transplantation (ASCT) after high dose chemotherapy (HDC) is indicated in first remission or in relapsed or refractory hematological malignancies and solid tumors.

The transplant activity is a challenging therapy in developing countries. In Morocco, ASCT has been started since 2004 in Hematology and pediatric Oncology department at the university hospital of Casablanca. The aim of this study is to report the whole activity in the transplant unit.

Patients and methods:
From July 2004 to June 2017, 267 ASCT were performed at our center and concerned all ages patients with: Hodgkin lymphma (HL), Non-Hodgkin lymphoma (NHL), Multiple myeloma (MM), and solid tumor. Peripheral blood stem cells (PBSC) were collected by leukapheresis after mobilization with 4-5 days of G-CSF, then cryopreserved or not. The conditioning regimen consisted on the BEAM regimen (BICNU, Etoposid, Cytarabin,Melphalan)
high dose Melphalan (HDM), Busulfan-Melphalan or CBV regimen (Cyclophosphamid, BICNU, VP16). All patients were monitored for toxicities and infectious complications that were managed according to guidelines and adapted to the ecology of the service.

**Results:**

Over the 13 years of the study, we collected 267 patients. 160 patients (60%) were diagnosed with MM, 66 patients (24.7%) with HL, 34 (12.7%) with NHL, 4 (1.5%) patients with neuroblastoma, 1 (0.37%) with ewing sarcoma, 1 with ALL Phi+ and 1 with Waldenstrom.

Median age at diagnosis was 48 years (range, 3-69 years), sex ratio M/F was 1.78. The evaluation before ASCT showed: 45 (16.8%) patients were in complete remission (RC), 54 (20.2%) were in very good partial remission (VGPR), 58 (21.7%) were in partial remission (PR), and 14 (5.2%) were in stable or refractory disease.

The number of ASCT per year increased from 1 in 2004 to 46 in 2016. This is essentially due to the start of autologous stem cell transplantation without cryopreservation since 2014.

The mobilization of PBCS was made by G-CSF for 4-5 days. The median number of CD34 cells transfused were 8x10^6/kg (range, 2-38). We performed 64% of ASCT with cryopreservation and 36% without cryopreservation. Conditioning regimen was BEAM-based in lymphoma, HDM in MM, Busulfan, Melphalan in solid tumors and CBV regimen in ASCT of lymphoma without cryopreservation.

The median duration of aplasia was 10 days (range, 4-95 days), median time of hematological recovery was 13 days (range, 9-102 days). All the patients required transfusions in platelets with a median of 13 units, and in packed red blood cells with a median of 2. The median duration of hospitalization was 25 days. Allergic incident was noted in 11 patients. The most common toxicity were mucositis and diarrhea with respectively 52% and 51% of patients, and 72.2% presented a febrile episode (documented or not). Transplant related mortality was 6.7%.

Remission statues after transplant were: CR in 54.7%, PR in 10.5%, VGPR in 5.5%, stable or progressive disease in 3.5%, relapse in 16.5%, of the 199 evaluable patients.

**Conclusion:**

The use of high dose chemotherapy with autologous stem cell transplantation remains very important in the treatment of MM and relapsed or refractory lymphoma. However, the results remains insufficient, hence the interest of the use of novel agents in first line, in salvage therapy or in maintenance.

### 13. AUTOLOGOUS HEMATOPOETIC STEM CELL COLLECTION IN THE IBN SINA UNIVERSITY HOSPITAL IN RABAT, MOROCCO

**A. Drissi Bourhanbour**, S. Bougar, O. Atoufi, C. Bricka, S. Ouadghiri, I. Yakhlef, M. Essakalli

**A- Department of Immunology and Transfusion, CHU Ibn Sina, Rabat, Morocco**

**B- UPR of Immunology, Faculty of Medicine and Pharmacy, University Mohamed V Souissi, Rabat, Morocco**

**Purpose of study:**

Hematopoietic stem cell transplantation has become an increasingly important therapy for patients with hematologic malignancies, solid tumors and abnormalities genetic. Since the discoveries of the potential of Peripheral Blood Progenitor Cells (PBPC) in the hematopoietic reconstitution, the PBPC gradually replaced bone marrow as the preferred source of stem cells. In this study, we report the results of the current activity (collection, cryopreservation and thawing of hematopoietic stem cell) between January 2017 and March 15, 2018 in adult patients and children. In Morocco, we are the only center that collects stem cells from children.

**Patients and methods:**

During this period we received 70 patients. The collection of hematopoietic stem cells was done with the spectra Optia™ system. Stem cell pools had been expanded by rhGM-CSF. CD34 in peripheral blood and apheresis samples were quantified by flow cytometry. The cryopreservation was done by a programmable freezer (Cryo Med controlled Rate Freezer, ThermoScientifiqueTM) and the storage in vapor nitrogen.

**Results:**

Ninety-nine apheresis were performed for 70 patients (50 adult patients and 20 children). The average age was 56 (15-69) years for adults and the median age was 3 (1-12) years for children. Median values of pre-apheresis peripheral CD34+ cells were 28/ul and a median number of 4x10^6 CD34+ cells/ kg (0.4–9.6) were collected per adult patient. In children, median values of pre-apheresis peripheral CD34+ cells were 39 /ul and a median number of 6x10^6 CD34+ cells/ kg (0.7–16.5) were collected. Mobilization failure was seen in nine cases. During this period we thawed 38 stem cell grafts and the average loss was estimated at 35%.
Conclusion:

94% of our patients had a graft with at least 2 × 10^6 CD34+ cells/ kg which is the minimum needed for successful engraftment, and 31% had up to 5 × 10^6 CD34+ cells/ kg which is the optimum number for faster engraftment and decreased red blood cell and platelet transfusion. Autologous stem cell collection in adults and children, are nowadays routine in our young center.

14. RESULTS OF HEMATOPOIETIC STEM CELL TRANSPLANTATION IN HODGKIN’S LYMPHOMA TREATMENT : EXPERIENCE OF THE HEMATOLOGY DEPARTMENT OF CASABLANCA

H. Bencharef, M. Camara, M. Qachouh, M. Lamchahab, S. Cherkaoui, N. Khoubila, M. Rachid, A. Madani, M. Harif, A. Quessar

Hematology-oncology pediatric department
20th August 1953 Hospital, Casablanca, Morocco

Introduction:

Hodgkin’s lymphoma (HL) is largely a curable disease with excellent prognosis but 30% of them are refractory or relapse after first line therapy. The standard of care in those patients is salvage chemotherapy followed by an autologous stem cell transplantation (ASCT). This approach can cure an additional of 50-55% of relapsing patients. The purpose of this study is to analysis the Results of ASCT in the Treatment of refractory Hodgkin’s Lymphoma.

Patients and methods:

Single center retrospective study from January 2005 to June 2017, including all patients aged over 16 years, who had undergone ASCT for refractory or relapsed HL, in hematolgy-oncology pediatric department of Casablanca. The clinical and epidemiological data were collected from patients’ medical records. The mobilization was carried out with G-CSF at the dose of 15ug / kg / day for 5 days and the conditioning therapy was BEAM ou CBV type regimen.

Results:

61 patients were included, ASCT of Hodgkin lymphoma accounted for 65.6% of all lymphomas transplanted into our structure. The median age at diagnosis was 48 years [17 - 65 years] with a male predominance (M/F ratio at 1.3). 51 (83.6%) of the patients had an advanced stage of Ann Arbor (III-IV), 18 (29.5%) had an initial bulky disease, the patients received between 1 and 3 lines of chemotherapy before transplantation with CR in only 24 (39.3%), ASCT was performed with cryopreservation of stem cell in 60 (98.3%) cases after BEAM conditioning and one case with non-cryopreserved stem cell with CBV conditioning. The median duration of aplasia was 10 days (6-31 days). At 3 months of ASCT, 25 (40.9%) patients were on CR, only 1 patient was failing and 2 relapsed after a median of 14 months. 6 died, 17 patients were lost to follow-up. ASCT complications were mainly: Infectuous in 55 (90.1%) cases, followed by mucositis in 53 (86.6%) cases.

Discussion and conclusion:

These results show that relapsing HL is carrying a bad prognosis in our context. The low number of patients in CR after salvage therapy is probably the main cause of these less good expected results.

15. FACTORS AFFECTING HEMATOPOIETIC STEM CELL MOBILIZATION FAILURE

M. Ahnach, N. Bouanani, N. Belmoufid, S. Daghri, L. Loukhmas

Department Of Hematology, International University Hospital CheikhKhalifa, Casablanca, Morocco.

Background:

Autologous hematopoietic stem cell transplantation hasct is an important and necessary saving treatment for lymphoma and myeloma. To rescue hematopoiesis after high-dose chemotherapy depends on sufficient harvesting of stem cell. Mobilization failure occurs at a rate of 10%-40% with traditional strategies, many factors can affect the success of mobilization: age, cytopenia, regimens of chemotherapy, prior radiotherapy, type of disease and bone marrow cellularity. The aim of this study was to analyze factors associated with failure mobilization for hsct on group of patient with lymphoma and myeloma in our unit.

Methods:

We performed a retrospective study in bone marrow transplantation unit of International University Hospital CheikhKhalifa in Casablanca during two years from 2016 to march 2018. During this period 46 patients with myeloma and relapse or refractory lymphoma underwent stem cell mobilization. From 46 patients, 8 patients presented failure mobilization. All this patients received high doses of GCS-F in steady state, 5 patients were mobilized by chemotherapy with high dose of cyclophosphamide and one patient received plerixafor.
Results:
The median age of patients was 49 years (range 28–63) and 75% were females. The study group included 5 cases with Non-hodgkin lymphoma, 2 patients with Hodgkin lymphoma and one case of myeloma. The majority of patient were at an advanced stage with cytopenia in all cases. Each patient received on average 10 cycles of treatment and two patients had radiotherapy. The harvesting of all cases was unsuccessful with rate less than 7 CD34 cells/mm³ in peripheral blood. Two cases required the second-line with plerixafor, and one with high dose of cyclophosphamide in association with G-CSF. As we have shown in the present study, cytopenia, multiple lines of polychemotherapy with or without radiotherapy lead to mobilization failure. The use of combined growth factor mobilization by adding plerixafor can increase the number of CD34+ cells, making mobilization possible in selected cases.

Conclusion:
In view of the impact of these parameters on the feasibility of the graft, it is therefore essential to evaluate these factors by a simplified scoring. Recent studies have been able to establish a predicted poor mobilize score. This score should be used for our patients and can allow to choose an alternative strategy for highly mobilization, especially concerning the plerixafor which is not available in Morocco.

Patients and Methods:
Data of 267 patients (161 multiple myeloma, 66 Hodgkin lymphoma, 35 Non-Hodgkin lymphoma, 4 neuroblastoma, 1 Ewing sarcoma) undergoing PBSCT between 2005-2017 were retrospectively analyzed. All patients received granulocyte colony-stimulating factor, and prophylaxis with ciprofloxacin (500 mg/12 hours PO) and fluconazol (200 mg/12 hours PO). The variables analyzed were: duration and intensity of neutropenia, presence of mucosa chemotherapy-induced damage, number of blood cultures, microbiological documentation and evolution under treatment.

Results:
193 (72%) febriles neutropenia with 31 (16%) bacteremia were recorded. The median age of patients was 44 years (3-69 years). The sex ratio (M/F) was 1.78. The median neutrophil count was 0.58 G/L (0.15-1G/L). The median duration of aplasia was 11, 6 days (4-95 days). 139 (52%) patients had presented mucositis [40 grade IV (28.7%), 37 grade III (29.4%), 41 grade II (29.4%), 21 grade I (15.3%)]. The median number of blood culture was 3.2 (1-8). 11 (35%) gram negative bacteria [1 Acinetobacter baumanii, 2 Bacillus spp, 4 Escherichia coli, 1 Klebsiella pneumonia, 3 Pseudomonas aeruginosa] and 20 (65%) gram positive bacteria [1 Enterococcus faecalis, 9 Staphylococcus coagulase negative, 2 Staphylococcus aureus, 3 Streptococcus mitis, 1 Streptococcus morbillium, 4 Streptococcus pneumonia] were isolated. 6 (19%) infections associated to indwelling central venous catheters were recorded. Three patients died due to septic shock.

Discussion - Conclusion:
The incidence of febrile neutropenia episodes associated to PBSCT in our patients is similar to those previously reported. Therefore we have observed higher incidence of gram positive pathogens infections.

Key words:
PBSCT-Febrile Neutropenia-Bacteremia-Casablanca
17. INVASIVE FUNGAL INFECTIONS IN PATIENTS UNDERGOING AUTOLOGOUS PERIPHERAL BLOOD STEM CELL TRANSPLANTATION IN CASABLANCA (MOROCCO)


Department of Hematology and Pediatric Oncology, 20 August 1953 Hospital Casablanca

Introduction:
Invasive fungal infections (IFIs), is a leading cause of death among hematopoietic stem cell transplant (HSCT).

Objective:
The aim of this study is to determine the incidence and outcome of IFIs in patients undergoing PBSCT in Casablanca Department of Hematology and Pediatric Oncology.

Patients and Methods:
Data of 267 patients (161 multiple myeloma, 66 Hodgkin lymphoma, 35 Non Hodgkin lymphoma, 4 neuroblastoma, 1 Ewing sarcoma) undergoing PBSCT between 2005-2017 were retrospectively analyzed. All patients received granulocyte colony-stimulating factor prophylaxis after stem cell infusion, prophylaxis with ciprofloxacin (500 mg/12 hours PO) and fluconazol (200 mg/12 hours PO). The variables analyzed were: duration and intensity of neutropenia, presence of mucositis 

Results:
193 (72%) febrile neutropenia with 17 (8.8%) IFIs were recorded. The median age of patients was 39 years (8-67 years). The sex ratio (M / F) was 1.4. The median neutrophil count was 0.5 G / L (0.15-0.9G/L). The median duration of aplasia was 15, 47 days (5-31 days). 8 (47%) patients had presented mucositis [4 grade IV, 2 grade III, 1 grade II, 1 grade I]. The median number of blood culture was 4.1 (1-8). 5 (29%) invasive aspergillosis, 5 (29%) candidemia with Candida parasilosis, 5(29%) candidemia with Candida albicans, 1 (6%) infection due to Candida Krusei and 1 (6%) due to Candida glabrata were recorded. Two patients died due to IFIs.

Discussion-Conclusion:
IFIs represent a common complication of HSCT. Their incidence in our patients is higher to those previously reported. Aspergillus, candida albicans, candida parasilosis are the three more frequent pathogens isolated in our patients.

Key words:
PBSCT- Invasive fungal infections -Casablanca

18. PULMONARY COMPLICATIONS IN PATIENTS UNDERGOING AUTOLOGOUS PERIPHERAL BLOOD STEM CELL TRANSPLANTATION IN CASABLANCA (MOROCCO)


Department of Hematology and Pediatric Oncology, 20 August 1953 Hospital Casablanca

Introduction:
Patients suffering from hematological diseases frequently undergo autologous peripheral blood stem cell transplantation (PBSCT). Pulmonary infectious complications are a cause of morbimortality, reported in the literature with an incidence of 40 to 60%, and a mortality up to 30%. Risk factors are also described in the literature, such as allogenic transplant, acute GVHD, and extensive chronic GVHD.

Objective:
The aim of this study was to determine the prevalence of pulmonary complications in patients undergoing PBSCT in the Departement of Hematology and Pediatric Oncology of Casablanca.

Patients and Methods:
Data of 267 patients (161 multiple myeloma, 66 Hodgkin lymphoma, 35 Non Hodgkin lymphoma, 4 neuroblastoma, 1 Ewing sarcoma) undergoing PBSCT between 2005-2017 were retrospectively analyzed. Patients received prophylaxis with ciprofloxacin (500 mg/12 hours PO) and fluconazol (200 mg/12 hours PO). They also received granulocyte colony-stimulating factor. The variables analyzed were: duration of stay and aplasia, presence of mucosa chemotherapy-induced damage, number of blood cultures, microbiological documentation and evolution under treatment.

Results:
21 pulmonary infections were recorded, that is to say a prevalence of 7.8%. The average age at diagnosis was 40,5 years. The sex ratio (M / F) was 1.3. The average duration of aplasia was 18 days. The average duration of stay was 35,14 days. 12 patients presented mucositis grade III-IV. Cough was the initial symptom.
symptom in 15 patients. All of the 21 patients were febrile. There were 6 probable aspergillosis and 1 confirmed tuberculosis. 14 were non-documented. The treatment was Voriconazole, Levofloxacine. The patient with tuberculosis had antibacillaries. Three patients died due to septic shock with respiratory distress.

**Discussion-Conclusion:**
The prevalence of pulmonary complications is lower than the literature. The diagnosis could be more accurate with bronchoscopy, allowing samples for the microbiological evidence.

19. **GEMELLA MORBILLORUM IN THE IMMUNOSUPPRESSED: ABOUT FIVE CASES**

H. Wafik, M. Lamchahab, H. Bienvenu, R. Farhan, K. Zerouali*, Scherkaoui, M. Quachouh, N. Koubila, M. Rachid, A Madani, M Harif, AQuessar

Hematology and Oncology Pediatric Department 20 August 20 hospital.

* Laboratory of bacteriology virology and hospital hygiene CHU Ibn Rochd Casablanca

**Introduction:**
Gemellamorbillorum is a commensal bacterium present in the normal flora of the human oropharynx, genitourinary system, and the gastrointestinal system. This germ can be responsible for serious infections in immunosuppressed and immunocompetent patients. We report five clinical cases of gemellamorbillorum diagnosed, in patients followed in the Hematology Department 20 August, Casablanca.

**Observations:**

**Case (1):**
Man of 32 years
Follow-up at the service for acute myeloblastic leukemia, intermediate group.
Hospitalized for retreat cure (FLAG IDA) after the relapse of leukemia
The patient had a febrile peak at 38.3. 5 days post-chemotherapy aplasia with a blood culture, isolating the germ gemellamorbillorum (on 31/12/17), the patient was put on imipenems with good results evolution

**Case (2):**
38 years old woman
Follow-up at the service for acute myeloblastic leukemia (AML 3)
Hospitalized for his third course of chemotherapy
The patient had a febrile peak at 38.5 at 9 days post-chemotherapy aplasia, with a blood culture isolating the same germ (on 01/02/18), the patient was put glycopeptides, with a good evolution.

**Case (3):**
Man of 30 years
Follow-up at the service for acute myeloblastic leukemia, favorable group.
Hospitalized for induction II.
The patient had a febrile peak at 39, 5. 7 days post-chemotherapy aplasia, with a blood culture, isolating the germ (on 28/02/18), the patient was put on glycopeptides, with good results evolution.

**Case (4):**
50 years old women.
Follow-up at the service for AML, intermediate group.
Hospitalized for induction I.
Day 14 of aplasia, she had a febrile, with a blood culture, isolating the germ (march, 2th, 2018), the patient was put on imipenems, with good results evolution. In antibiogram the germ was sensitive to Clindamycin; chloramphenicol, vancomycin, and levofloxacine.

**Case (5):**
17 years old woman
Follow-up at the service for Hodgkin lymphoma.
Hospitalized forallogenic transplant.
Day 6 of allograft, she had a febrile, with a blood culture, isolating the germ (25/03/18), the patient was put on ceftazidim, with good results evolution. In antibiogram the germ was sensitive to Clindamycin; chloramphenicol, vancomycin, levofloxacain, and erythromycin.

**Discussion and Conclusion:**
G morbillorum is a commensal germ of the oropharyngeal, genitourinary, and gastrointestinal mucosa, diagnosed for the first time in our structure in neutropenic patients, which requires monitoring with action plan if isolation of new cases.
20. BLOOD AND PLATELET UTILIZATION IN PATIENTS UNDERGOING AUTOLOGOUS PERIPHERAL BLOOD STEM CELL TRANSPLANTATION IN CASABLANCA (MOROCCO)


Department of Hematology and Pediatric Oncology, 20 August 1953 Hospital Casablanca

Introduction:
Patients undergoing autologous peripheral blood stem cell transplantation (PBSCT) require currently blood and platelet transfusion. Access to platelet and red cells transfusion is difficult in developing countries and there is little data on their cost during PBSCT procedure.

Objective:
The aim of this study is to determined the cost of blood and platelet transfusion in patients undergoing PBSCT in Casablanca Departement of Hematology and Pediatric Oncology.

Patients and Methods:
Data of 267 patients (161 multiple myeloma, 66 Hodgkin lymphoma, 35 Non Hodgkin lymphoma, 4 neuroblastoma, 1 Ewing sarcoma) undergoing PBSCT between 2005-2017 were retrospectively analyzed. Red cell (CG) transfusion was systematic when hemoglobin was < 8g / dl or untolerated anemia. Platelet (UP) transfusion was systematic when platelet count < 10 G / L (< 20 G / L when the patient was febrile) and in case bleeding. The evaluation of the cost was made according to Casablanca Regional Transfusion Center (1 CG = 360 dhrs, 1 UP = 298 dhrs).

Results:
257 (96%) patients were transfused in platelet and 204 (76%) patients were transfused in red cells during PBSCT procedure. The median platelet transfusion per patient was 23 UP (3-160) and the median red cell transfusion per patient was 2.3 (1-20). The median cost of platelet transfusion was 6854 dhrs (894-47680). The median cost of red cells transfusion was 828 dhrs (360-7200).

Discussion - Conclusion:
PBSCT requires significant transfusion support. It is therefore necessary to have a good organization to facilitate access and rational use of red cells and platelet during the procedure.

Key words:
PBSCT-Transfusion-Cost-Casablanca

21. MORTALITY RELATED TO AUTOLOGOUS HEMATOPOIETIC STEM CELL TRANSPLANTATION

S. Laajouri, M. Harif, A. Quessar

Department of Hematology and Pediatric Oncology, Hospital August 20, 1953, UHC Ibn Rochd, Casablanca, Morocco

Introduction:
Autologous hematopoietic stem cell transplantation (HSCT) after therapeutic intensification is considered a standard in the management for several malignant hematological diseases. The reinfusion of a sufficient number of HSC associated with the use of hematopoietic growth factors significantly reduced the duration of medullary aplasia induced by intensive conditioning and the supportive care reduced the mortality of procedure below 3%. The purpose of this work is to analyze the mortality related to the procedure and to define the main causes of death.

Materials and methods:
Retrospective study of patients who benefited of autologous HSCT and died following the procedure, collected in the hematology department over 11 years and half between the first of January 2005 to the 31st of June 2017. Data was collected from medical records of patients.

Results:
During the study period, 268 CSH autografts were performed in our department, 11 (4.10%) patients were died in post-autograft, the median age of these patients was 42 years, with sex -right H / F: 1,2. 5 patients were followed for multiple myeloma, 5 for Hodgkin lymphoma and one patient for DLBCL. Autograft was done with freezing in 8 patients. Autograft conditioning chemotherapy was dependent on the pathology treated, with high-dose of Melphalan generally used in myeloma, and BEAM chemotherapy (Carmustine, Etoposide, Cytarabine, Melphalan) in lymphoma. The median duration of aplasia after chemotherapy was 13 days, the cause of death was a state of septic shock in 5 patients, a state of hemorrhagic shock in 3 patients, 1 of whom died from cerebral hemorrhage, one case of encephalopathy, one case of diabetic ketoacidosis, and one case of hydro-electrolytic disorder.
Conclusion:
Through this work, we note that few patients die as a result of the autograft procedure and that the most common cause is infection which pushes us to improve the quality of supportive care especially; use of antibiotics and blood products.

22. BILAN D’ACTIVITÉ DE L’UNITÉ DE GRÉFFE DE MOELLE OSSEUSE DU CHU MOHAMMED VI DE MARRAKECH

R. Tissir, I. TaziL, Mahmal
Service d’Hématologie et d’Oncologie Pédiatrique
Hôpital Mohammed VI, CHU de Marrakech

Introduction:
La greffe de moelle osseuse est une technique thérapeutique qui consiste à injecter au patient des cellules souches (CSH) capables de reconstituer une hématopoïèse déficiente. Il existe trois sources de CSH : la moelle osseuse, le sang périphérique et le sang de cordon ombilical. Et deux types de greffons :
- Autogreffe : les cellules souches sont prélevées chez le sujet lui-même.
- Allogreffe : consiste à remplacer une moelle malade par une moelle saine du donneur. C’est une procédure lourde et coûteuse, nécessitant une prise en charge multidisciplinaire.

Patients et méthodes :
Nous avons réalisé une étude rétrospective descriptive et analytique utilisant le logiciel SPSS au sein de l’unité de greffe du CHU Med VI de Marrakech, étalée sur 6 ans, et excluant tous les patients ayant présentés une contre indication à la greffe ou décédés avant la procédure.

Résultats :
Nous avons colligé 68 patients entre janvier 2012 et février 2018 avec 49 autogreffe et 19 allogreffe. La moyenne d’âge pour les autogreffés et les allogreffés était respectivement de 49 ans et 12 ans. Le sex-ratio était égal à 2 pour les autogreffes et à 1 pour les allogreffes. 61,12% des patients bénéficiaient d’une couverture sociale type RAMED. 41,7% des patients étaient de Marrakech. Pour les autogreffes 81,66% (40 cas) des patients étaient traité pour MM, 6,2 % (3 cas) LNH, 12,2% (6 cas) LH. Pour les allogreffes 36,8% (7 cas) avaient une AM, 21% (4 cas) SCID, 15,8% (3 cas) LMC, 10,5% (2 cas) LAM, 10,5% (2 cas) béta-thalassémie. 5,4%(1 cas) LAL. La durée moyenne d’hospitalisation des patients autogreffés était de 16,62 jours et de 50 j pour les allogreffés. La durée moyenne de neutropénie était de 7,8 jours pour les autogreffes et de 26 j pour les allogreffés. Les principales complications étaient la GvH (58,3%) et la MVO (33,3%) chez les patients allogreffés. Seulement 12,5 % des patients autogreffés ont nécessité une transfusion par CG. Tous les patients allogreffés ont été transfusés par des CG avec une moyenne de 7,17. Pour l’autogreffe 75% des patients ont reçu des UPS avec une moyenne de 11,4 unités plaquettaire et 25% ont été transfusés par 1 pool de plaquette de cytophérèse. Pour l’allogreffe 70% était transfusé par des UPS avec une moyenne de 67 UP et 30% était transfusé par plusieurs pools de plaquettes de cytophérèses. Pour l’autogreffe 91,3 % étaient en RC avec un taux de 8,7 % de rechute dont un décès et un en 2ème RC après chimiothérapie. Il n y a aucun décès toxique lié à l’autogreffe. Pour l’allogreffe seulement 33,3 % étaient en RC contre 50% de décès et 16,7% de rejet.

Un seul décès lié à la progression de la maladie hématologique (MM) a été noté dans notre série, soit un taux de 4,16% à 09 mois post –greffe. 6 décès d’origine toxique ont été notés. Et 2 décès d’origine infectieuse.

Conclusion :
La greffe de moelle osseuse a révolutionné la prise en charge thérapeutique de nombreuses pathologies. Nous estimons que nos résultats sont encourageants et nous espérons élargir les indications de cette technique et également démarrer l’activité de la greffe du sang du cordon.

23. ALLOGENEIC STEM CELL TRANSPLANTATION (ASCT) IN HEMATOLOGICAL PATHOLOGIES :
A SINGLE CENTER EXPERIENCE
R. Farhane, N. Chellakhi, M. Rachid, M. Harif, A. Quessar
Hematology and Pediatric Oncology Department,
20 August 1953 Hospital, Casablanca

Introduction :
Hematologic malignancies and stem cell disorders are the main indications for ASCT. This activity has been recently developed in Morocco. We report the series of the patients in our structure.

Patients and methods :
From May 2016 to March 2018, 10 allogeneic SCT geno-identical have been performed at the transplant unit of Hematology and Pediatric Oncology of the University Hospital of Casablanca, and concerned patients diagnosed with : severe idiopathic aplastic anemia and acute myeloid leukemia (AML). The conditioning regimen was based on cyclophosphamide-thymoglobulin for aplastic anemia and on busulfan-fludarabin for AML patients. Bone marrow was the source of stem cells in all cases. All patients were
Results:
Over a period of 22 months, we proceeded to 10 geno-identical allogeneic SCT. Median age at diagnosis was 27 [12 ; 59], sex ratio M/F was 4.6. 6 patients were diagnosed for severe aplastic anemia: 2 received thymoglobulin and ciclosporin, 2 received ciclosporin and 2 had supportive care. 4 patients were diagnosed for AML: all of them received chemotherapy. The median age of the donor was 26 [8 ; 50], the sex ratio M/F was 2.3. There was a major ABO incompatibility between the donor and the recipient in 3 cases: we proceeded to red cell reduction in 2 of them, while the third one received donor incompatible blood transfusion as a procedure to prevent hemolysis of the graft.

The conditioning regimen was based on thymoglobulin-cyclophosphamid in aplastic anemia patients, and on busulfan-fludarabin in AML patients. Only one patient (age : 59 y) received a reduced conditioning regimen (RIC). The median number of nuclear cells transfused were 3x10^8/kg [2.05 ; 3.77]. The median duration of aplasia was 27 days [4 ; 40], and the median time to hematological engraftment was 20 days, with a median duration of hospitalization of 41.5 days. Most of the patients had transfusion requirements with a median transfusion of platelets of 89 Units, and in red blood packed cells of 7.5. Infectious complications were noted in 9 patients dominated by blood stream infection (8/9), and the most common toxicity was mucositis all grades in 7 patients, 5 patients had diarrhea, and 7 patients had bleeding complications, and only one presented veno-occlusive disease.

In this series, 2 patients died: one of them had hypovolemic shock secondary to hemorrhagic syndrome, the second had cerebral hemorrhage.

Chimerism was done at day 30, 60, and 100 in all patients: it was 100% of the donor in 2 patients at day 30 and mixed for the rest.

Overall, 8 patients are alive and in complete remission, and none of them present acute or chronic Graft-versus-host disease (GVHD).

Conclusion:
These preliminary results are encouraging and shows that BMT is feasible in our context.
seraient indiquées dans les hémopathies malignes quand elles sont disponibles.

La cytaphérèses permet de recueillir un plus grand nombre de cellules (cellules souches CD34+, lymphocytes, monocytes) contrairement au prélèvement médullaire. Le nombre de cellules CD34+ injectées par kg de receveur est multiplié, en moyenne, par un facteur de 3 à 6 dans un greffon de CSP par rapport à un greffon médullaire, ce qui modifie la durée d’aplasie post greffe qui devient courte, le nombre de lymphocytes T est multiplié par 10 environ, donc un effet de réaction du greffon contre la maladie (GVL) plus important. Il existe un intérêt certain à l’utilisation d’un greffon très riche en cellules souches CD34+ pour les greffes comportant un risque accru de GVH, telles que les greffes à conditionnements non myéloablatifs, les greffes déplétées en lymphocytes T et les greffes en situation partiellement HLA-incompatibles.

Autres avantages de la cytaphérèse consistent à la maniabilité du geste de prélèvement et le cout mais l’inconvénient majeur reste la fréquence de la GVH)

Conclusion : Nos cas illustre la première expérience au Maroc de la greffe geno-identique des cellules souches hématopoïétique par cytaphérèse. Nous espérons élargir le champs des indications pour d’autres pathologies.

25. PREMIÈRE THALASSÉMIE TRAITÉE PAR ALLOGREFFE AU CHU MOHAMED VI DE MARRAKECH

K. Khalil, R. Tissir, L. Mahmal

Service d’Hématologie et d’Oncologie Pédiatrique
Hôpital Mohammed VI , CHU de Marrakech

Il s’agit de l’enfant A. O., agée de 8 ans, issue d’un mariage consanguin de 1er degré, cadette d’une fratrie de trois, ayant une mutuelle publique (Ramed), originaire et résidente à Laayoune (Sud du Maroc). La patiente était suivie depuis l’âge de 7 mois pour beta thalassémie homozygote révélée par : un syndrome anémique, un ictère, une SPM et un retard pondéral et confirmée par l’électrophorèse de l’hémoglobine : HgF : 98.4% et HgA : 1.6%. L’étude génétique est non faite. Le traitement était basé sur des transfusions d’un CG / 15 j avec une mauvaise chélation de fer . En Décembre 2014, une allogreffe géno-identique a été indiquée vu le score PESARO à 3.Le bilan pré-greffe a révélé une incompatibilité ABO majeure. Le conditionnement était à base de Thiothepa, Bisulfan et Fludarabine et la prophylaxie de la GVH par Ciclosporine et Méthotrexate. L’évolution a été marquée par une hémolyse aigue, et une GVH aigue à J120, le chimérisme avait montré 100% donneur en faveur d’une réussite de la greffe. Actuellement la patiente n’a plus besoin de transfusion avec un hémogramme correct.

26. ALLOGENEIC STEM CELL TRANSPLANTATION (ASCT) IN IDIOPATHIC APLASTIC ANEMIA : A MULTICENTER EXPERIENCE

R. Farhane, R. Tissir*, N. Chellakhi, M. Rachid, Mahmal*, M. Harif, A. Quessar

Hematology and Pediatric Oncology Department, 20 August 1953 Hospital, Casablanca
*Hematology Department, University Hospital, Marrakech

Introduction :

Allogeneic bone marrow transplantation is the standard treatment for 40 years or less old patients diagnosed with Idiopathic aplastic anemia, and leads to long-term survival in the majority of patients. Allogeneic SCT is recently developed activity in Morocco.

Patients and methods :

This is a retrospective descriptive multicentric study from 2012 to 2018 including patients diagnosed with idiopathic aplastic anemia and treated with geno-identical allogeneic SCT at the transplant unit of Hematology and Pediatric Oncology department at the University Hospital of Casablanca and Hematology Department at the University Hospital of Marrakech. The conditioning regimen was based on thymoglobulin and cyclophosphamide. Bone marrow was the source of stem cells in all cases. All patients were observed for toxicities and infectious complications and managed according to conditions and ecology of our unit.

Results :

We proceeded to 12 geno-identical ASCT in patients diagnosed with idiopathic aplastic anemia. Before ASCT, 7 patients received Ciclosporine ,1 patient received Thymoglobulin with cyclosporine , and 4 patients were on symptomatic treatment. Median age at diagnosis was 18 [3 ; 39], sex ratio M/F was 4. The median age of the donor was 22 [5 ; 33], sex ratio M/F was 4. There was a major ABO incompatibility between the donor and the recipient in 4 cases: 1 of them was managed by red cells reduction and the other with a procedure based on donor group incompatible blood transfusion.

The conditioning regimen was based on thymoglobulin-cyclophosphamide. The median number of nuclear cells transfused was 3.03x108/
The median duration of aplasia was 28.5 days \([18 ; 110]\), and the median time to hematological engraftment was 22 days \([18 ; 88]\), with a median duration of hospitalization of 44 days. All patients required transfusions, with a median transfusion in platelet units of 89 and in packed red blood cell of 7.5.

The most common toxicity was bleeding complications leading to death in 1 patient. Diarrhea was noted in 5 cases, and mucositis occurred in 7. All patients had infectious complications mainly blood stream infection in 6 cases.

Chimerism was done at day 30, 60, and 100 in 6 patients: it was 100% of the donor in 1 patients at day 30 and mixed chimerism for the rest of the patients.

Overall, 9 patients are alive and in hematologic recovery, 1 patient died from cutaneous acute graft-versus-host disease (GVHD), 1 patient had a graft failure, and none of them present chronic GVHD.

**Conclusion:**

Allogeneic SCT is the first line treatment of idiopathic aplastic anemia in children and young adults (<40 years old), and should be initiated as soon as possible to avoid the infectious and haemorrhagic complications. These preliminary results in our centers are encouraging.

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27. **ALLOGENIC HEMATOPOIETIC STEM CELL TRANSPLANTATION IN THE TREATMENT OF APLASTIC ANEMIA : ABOUT 6 CASES**


Department of Clinical Haematology, Military Hospital of Instruction Mohamed V, Rabat, Morocco

**Introduction:**

Aplastic anemia is defined as peripheral pancytopenia caused by bone marrow failure. The aim of this study is to evaluate the results of the treatment of aplastic anemia by allogenic hematopoietic stem cell transplantation.

**Patients and methods:**

This is a retrospective study of 6 patients followed at the Mohammed V Military Training Hospital (Rabat-Morocco) from December 2009 to March 2018 presenting an aplastic anemia and treated with allogenic hematopoietic stem cell transplantation in Percy military hospital (Clamart-France) and followed up in our department.

**Results:**

The median age of the patients is 20.5 years \([15, 49]\), the sex ratio M / F was 1. Aplastic anemia was severe in 67% (4) cases, non-severe in 33% (2) cases. The median interval between diagnosis and treatment was 106 days \([62; 336]\). All patients had a human leukocyte antigen (HLA) matched related donor. On a median follow-up of 5.4 years \([1.7; 8.1]\), the response was obtained in 6 patients (100%) (complete response in five patients (83%) and partial in one patient (17%)). The overall survival rate is 100%.

**Conclusion:**

Despite the small size of the series, allogeneic hematopoietic stem cell transplantation (HSCT) from a HLA matched related donor is the preferred treatment of young patients. We must work on the improvement of the access to this procedure in our country and in Africa.

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28. **FIRST BONE MARROW ALLOGRAFT AT CHEIKH KHALIFA HOSPITAL IN CASABLANCA**

Dr. J. Toughza¹, Dr. L. Loukhmas¹, Pr. M. Harif²

1- Hôpital Universitaire Cheikh Khalifa, Casablanca, Morocco
2- Centre Hospitalier Ibn Rochd, Hôpital 20 Août -1953- Casablanca, Morocco

**Introduction:**

Bone marrow (BM) is a tissue in the bone where hematopoietic stem cells (HSC) are produced. Cells are taken from the donor (Bone marrow, peripheral blood, or umbilical cord blood). In the case of an allograft, the hematopoietic stem cells of a quasi-identical HLA donor is used, genotypically identical in priority, then phenotypically identical, hence the necessity of constitution of the national and international registers of voluntary donors. In the month following the transplant, the new immune system will develop. The graft-versus-host reaction or GVHD may develop post-transplant, and will be prevented by immunosuppressive therapy. In Morocco, this therapy is innovative, and allows medical teams in Marrakech and Casablanca to take care of patients who were previously destined to European referral centers.

**Material and methods:**

Anas, 11 months old, has severe combined immune deficiency (SCID), treated with immunoglobulin infusion every three weeks. He received in March an allograft of Bone marrow in the CheikhKhalifa Hospital of Casablanca. The donor is his sister, 6 years old, identical HLA. Bone marrow was taken under
general anesthesia at the operating room. He was placed a central path under general anesthesia. He did not receive conditioning according to the classical protocols. The transfusion of the graft occurred on the day of collection. He was put on immunosuppressant, antibiotic and antiviral, and hospitalized in a sterile room.

Results:
The patient contracted on day 18 of the transplant a Klebsiella septicemia with urinary starting point. Antibiotic therapy was initiated with withdrawal from the central lane. The patient presented a good clinical and biological evolution.

Discussion - Conclusion:
In Morocco, medical teams carry out geno-identical allografts. In the absence of a related donor, pheno-identical transplants should be considered. National registries of voluntary donors should be established, as well as stem cell and cord blood banks at the national level. This will make it possible to find a potential donor, even in extremely rare HLA groups. The therapy offering the greatest chance of success for SCID is immune reconstitution by MO graft.

29. BONE MARROW TRANSPLANTATION: SINCE THE FIRST EXPERIENCE IN THE HEMATOLOGY AND ONCOLOGY PEDIATRIC CENTER OF RABAT

1. Pediatric Hematology and Oncology Center, Transplant Unit (Rabat)
2. Pediatric 1 Unit (Rabat)
3. Pediatric intensive care unit (Rabat)

In severe combined immunodeficiency disease (SCID), both T and B cell functions are diminished or absent and affected usually succumb to overwhelming infection within the first year of life. Severe combined immunodeficiency (SCID) carries a poor prognosis without definitive treatment by hematopoietic stem cell transplantation. We describe a case of a 9 month-old male infant diagnosed with severe combined immune deficiency. Youngest of seven siblings, from a consanguineous marriage. In his family history his three brothers expired due to dyspnea and cutaneous infection before diagnosis of SCID at 3, 2 and 1 month of age respectively. He was vaccinated until 5 months (DTCP+BCG+Hib+vit a,Vit D) without any complications.

He was admitted to the hospital at 6 months because of cough, dyspnea and diarrhea. The diagnosis of SCID T-B- NK+ was performed. Our infant with severe combined immunodeficiency received bone marrow transplantation with HLA-identical donor (from his sister aged 18 years) at Children Hospital of Rabat (Pediatric Hematology and Oncology Center). He did not receive chemotherapy before transplantation. Prophylaxis against graft-versus-host disease was given (Cyclosporine). He received anti prophylaxis with Isoniazide-Ethambutol and CMV prophylaxis.

30. ALLOGENEIC HEMATOPOIETIC STEM-CELL TRANSPLANT COST IN CASABLANCA, MOROCCO

S. Kadouri, B. Houssou, M. Harif, A. Quessar
1. Pharmacy intern at the faculty of medicine and pharmacy Casablanca
2. Pediatric Hematology-Oncology service 20 Aout Casablanca

Introduction:
Allogeneic hematopoietic stem-cell (HSC) transplant is a useful therapeutic tool for treating patients in hematology. Its practice is real a challenge in developing countries. Since 17 May 2017, the pediatric hematology-oncology service of 20 aout Hospital of Casablanca started the HSC allogeneic transplantation (HSCT). The objective of this study is to evaluate the cost of HSCT.

Patients and method:
From December 2017 to March 2018, 4 patients (2 men, 2 women, 2 acute myeloid leukemia, 2 aplastic anemia) receiving allograft, were followed throughout the process as soon as they were eligible until the first 100 days. We had calculated the cost of allograft including laboratory analyzes, radiological explorations, conditioning, reinjection, transfusions of red blood cells and platelets, antibiotics, immunosuppressive drugs, hospitalization and infusion solutions.

Results:
The average cost of caring for our patients was dominated by analyzes 29 500 € [23 400; 34 700], followed by the cost of hospitalization of 20 000 €, then the cost of drugs (antibiotics, antimitotics, immunosuppressive drugs, anticoagulants...) 16 900 € [16 900; 24 100]. The average overall cost per patient was 67 028 € [58 292; 79 768].
Conclusion:
The cost of the allograft is high. To improve the accessibility of this treatment, an effort should be made in selecting less expensive approaches.

31. CHRONIC GRAFT VERSUS HOST DISEASE: EXPERIENCE OF A MOROCCAN CENTER


Department of Clinical Haematology, Military Hospital of Instruction Mohamed V, Rabat, Morocco

Introduction:
Allogeneic hematopoietic stem cell transfer (HSCT) can act as a powerful immunotherapy and is a treatment for many malignant hematologic diseases. However, development of graft versus host disease (GVHD) remains as a major complication after HSCT, and can affects numerous organs.

Aim of this work:
Report our experience in management of chronic graft-versus-host disease

Materials and methods:
It's a retrospective study. Between 2013 and 2018, including seven patients, transplanted in the military hospital Percy in Paris, that presented with chronic graft versus host manifestations and were managed and followed in the Mohamed V Military Hospital of Rabat.

Results:
In this study of 07 patients with a mean age of 33 years, 04 patients were transplanted for acute leukemia including 03 AML, 02 chronic MPN (CML, PMF) and 01 patients with T-lymphoma. 85% had an HLA identical sibling donor and one was transplanted from a 10/10 volunteer donor. Peripheral stem cells were used in all patients. Busulfan / Cyclophosphamide conditioning in 57% and Busulfan / Fludarabine in the rest. The Methotrexate / Ciclosporin protocol for prophylaxis against GVH was administered to all patients. Acute GVH was reported in 58% of cases, all of them had cutaneous type with a satisfactory response to corticosteroids. All types of chronic GVHD were present at different grades, cutaneous and oral (71%), pulmonary (58%), ocular (58%), hepatic (28%), muscular (28%), digestive and gynecological (14%), immunosuppressive therapy (ciclosporin) and corticosteroids were used in all patients in first line therapy with a sustained response in less than 30%, although in second line therapy rituximab were used in 71% of patients, TKI in 28%, and extracorporeal photopheresis in one patient. The median duration of follow-up was 29.5 months, with 02 deaths due to chronic respiratory insufficiency and recurrent hospitalizations in 70% of patients.

Conclusion:
Management of GVHD is challenging and evaluation of therapeutic options is complicated by the heterogeneous nature of the patient group. Clearly there is a need for large systematic randomized studies to assess the efficacy and side effects of second-line therapies in GVHD management.

32. TREATMENT OF CHRONIC GVHD BY EXTRA CORPOREAL PHOTOPHERESIS: A CASE REPORT


* Department of Clinical Haematology, Military Hospital of Instruction Mohamed V, Rabat, Morocco
** Cheikh Khalifa Hospital, Casablanca

Introduction:
Chronic GVHD affects approximately 30% of donors with related donors and up to 70% of recipients whose HLA-compatible donors are unrelated. It's a frequent cause of late morbidity and death after bone marrow transplantation (BMT). GVHD is treated in the first line with Corticosteroids with or without Calcineurin inhibitors. About 40% of patients will not respond to this treatment. Second line chronic GVHD isn’t codified, extra-corporeal phototherapy (ECP) is one of the steroid sparing tool used in the treatment of cGVHD. We report here, the first case of cGVHD treated by ECP.

Case report:
Our patient is 32 years transplanted from an HLA identical sibling donor after a second remission from an acute myeloid leukemia relapsed at 2 years. The patient received a geno-identical Allograft 10 / 10, with conditioning by Endoxan + Busulfan. He had presented a stage 1 cutaneous grade GVH that occurred at day 22, treated with corticosteroid 1mg/kg/day, and a significant mouth lichen GVH. At day +190, the patient presented a hepatic cytolysis secondary to hepatic GVHD confirmed by the liver biopsy puncture, requiring the introduction of systemic corticosteroids, with good evolution at day 15. At day 280 of the graft and when the corticosteroids were tapered to 25 mg, the patient presented with extensive chronic GVHD with generalized cutaneous pigmentation, muscular hypertrophy limited upper limbs joints mobility, increased CPK at 20-fold normal,
and worsening of hepatic cytolysis. The patient was treated with Rituximab 375 mg/m^2 followed by extracorporeal phototherapy (PEC). After 3 sessions of PEC an improvement of the cutaneous lesions was noted, with disappearance of the muscular pain and a decrease of the CPK of 50% with improvement of the hepatic evaluation. The PEC allowed us a fast and effective regression of the steroids, and a complete remission of skin and muscle GVHD. The patient received 21 sessions at the rate of one session per week and no adverse effects were reported.

**Conclusion:**
PEC has resulted in a reduction in corticosteroid doses and immunosuppressive pharmacological therapies with a high toxicity profile necessary to control the chronic GVHD response. The PEC has improved the survival and quality of life of patients with chronic GVHD reaction hence the interest of facilitating access to this technique in emerging countries.

### 33. EXTRACORPOREAL PHOTOPHERESIS PROCEDURE: THE EXPERIENCE OF INTERNATIONAL UNIVERSITY HOSPITAL CHEIKH KHALIFA

**N. Bouanani, M. Ahnach, L. Loukhmas**

*International University Hospital Cheikh Khalifa, Casablanca, Morocco.*

**Background:**
Extracorporeal photopheresis (ECP) is an immunomodulant treatment for erythrodermic cutaneous T cell lymphoma, acute and chronic GVHD with an excellent safety profile. The purpose of our study was to review our one year experience with open ECP system at International University Hospital Cheikh Khalifa.

**Methods:**
Here we present our experience regarding open ECP. It was done using the photopheresis extracorporeal exposure of peripheral blood mononuclear cells to 8-methoxypsoralen and ultraviolet light in an apheresis procedure and subsequent reinfusion of the treated cells back into the patient’s circulation.

**Results:**
3 men patients were treated by ECP, 2 erythrodermic cutaneous T cell lymphoma and 1 chronic GVHD. The age of patients was 70, 26 and 37 years old. Patients received an average of 15 cycles at two sessions per week. All patients tolerated ECP well, without significant side effects with a favourable clinical response.

**Conclusion:**
ECP is an attractive option for patients with GVHD and erythrodermic cutaneous T cell lymphoma. The procedure has an excellent safety profile and it would be an ideal option for those who are unable to tolerate higher doses of corticosteroids or are refractory to steroid treatment, but its use is influenced by patient access due to the lack of specialized center availability (two medical centers in Morocco), the cost of treatment, as well as the rarity of clinical studies in Morocco.

### 34. SINUSOIDAL OBSTRUCTION SYNDROME/ VENO-OCCCLUSIVE DISEASE (SOS/VOD) DURING HEMATOPOIETIC STEM CELL TRANSPLANTATION: A REVIEW OF THE LITERATURE


*Hematology and Pediatric Oncology Department, 20 August 1953 Hospital, Casablanca*

**Introduction:**
Veno-occlusive disease (VOD), also known as sinusoidal obstruction syndrome (SOS), is a potentially life-threatening complication of hematopoietic stem cell transplantation (HSCT). The diagnosis of VOD is primarily based on clinical criteria defined almost 20 years ago, including the triad of painful hepatomegaly, jaundice and fluid retention. In the literature, the highly variable incidence of VOD is reported, ranging from 8% to 14%. SOS/VOD usually occurs within 20-30 days after HSCT. However, few cases of late-onset VOD have been reported.

**Objective:**
The objective of our work is to make a review with literature and highlight guidelines for diagnosis and management of this pathology.

**Materials and methods:**
This is a literature review based on a Pubmed search with the following keywords: “veno-occlusive disease”, “hematopoietic stem cell transplant”, “identification”, “management”, “guidelines”. Articles have been selected in the period from September 2013 to February 2018. Due to the lack of randomized studies, some recommendations are based on literature reviews and a consensus of expert opinions.
Results:
Our review of the literature concerned 30 articles, and the pathogenesis of VOD is not completely understood. Recognition of potential risk factors of VOD is a key point for early diagnosis and prompt therapeutic intervention. The diagnosis is based on knowledge of clinical and biological criteria. The treatment is based on defibrotide (adult and pediatric population) which is a polydisperse oligonucleotide with local antithrombotic, anti-ischaemic and anti-inflammatory activity. The defibrotide can be used both as a prophylactic and curative medication. It is an IV medication prescribed at a recommended dose of 6.25 mg/kg body weight every 6 hrs (25 mg/kg/d), over a 2 hrs infusion. The recommended final concentration of defibrotide is 4–20 mg/mL. High-dose methyl-prednisolone can be an alternative, used alone or combined with defibrotide, given the high cost of treatment.

Discussion and Conclusion:
Teamwork is essential in the management and supportive care of this pathology and thus improve the survival of patients. In our context, the lack of knowledge of this pathology in addition to the cost of its treatment explain the fact that these cases remain under-diagnosed.

35. MATERNAL T-CELL INTERFERES WITH HLA TYPING IN PRIMARY IMMUNODEFICIENCY PATIENT.
K. Ouazzani1, H. Mghinia1, Z. Mahyaoui1, I. Benhsaien2,3, B. Farouqi1, J. El Bakkouri1,3
1. Immunology Laboratory, Ibn Rochd University Hospital, Casablanca, Morocco,
2. Clinical Immunology Unit, P1, Children’s Hospital Abderrahim Harouchi, Ibn Rochd University Hospital, Casablanca, Morocco,
3. Laboratory of Clinical Immunology, Allergy and Inflammation (LICIA)- Faculty of Medicine and Pharmacy Casablanca, Hassan II University, Morocco

Objective:
To report the interference of human leukocyte antigen (HLA) typing by engraftment of maternal T cells in an infant with severe combined immunodeficiency (SCID) awaiting hematopoietic stem cell transplantation (HSCT).

Case:
The clinical presentation of a 6-month-old boy was suggestive of primary immunodeficiency, which was supported by the laboratory findings at admission. Of note, natural killer (NK) cells (CD16+/CD56+) were very; T cell counts were low but not under 200/mm3; B cell count was within normal range but immunoglobulins were low. These findings are consistent with severe combined immune deficiency (T-B+ NK-). The T cells were suspected to be of maternal origin especially with a high rate of memory T cell (CD45RO). The plan was made to pursue emergent HSCT for the patient using his brother as a genetic idental donor. HLA typing was performed with sequence-specific oligonucleotide (SSO) on peripheral blood leukocytes from the patient and peripheral blood leukocytes from his parents and brother.

HLA typing of the patient’s peripheral blood leukocytes using the SSO method was unable to resolve the genotypes at HLA loci due to a hybridization pattern that could not be accounted for by one or two alleles. The hypothesis of the presence of circulating maternal lymphocytes was confirmed by a study of chimerism (XX / XY) by FISH which showed a presence of 40% of maternal cells (XX). An HLA typing is planned from the child’s buccal cells in order to solve this interference problem.

Conclusions:
Maternal T-cell engraftment may interfere with HLA typing in patients with SCID. Selection of the appropriate specimens is critical for accurate HLA typing and gic assessment before allogeneic hematopoietic stem cell transplantation.

36. SUCCESSFUL TREATMENT OF MAJOR ABO INCOMPATIBILITY PURE RED CELL APLASIA AND CHRONIC GVHD WITH RITUXIMAB
Department of Clinical Haematology, Military Hospital of Instruction Mohamed V, Rabat, Morocco

Introduction:
Due to the fact that the HLA system is inherited independently of the blood group system, approximately 40-50% of all HSCTs are performed across the ABO blood group barrier Pure red cell aplasia (PRCA) is a complication after major ABO-mismatched HSCT and occurs in up to 29% of patients with a major ABO-mismatched donor.

Observation:
A 26 years old woman with CML with the T315I mutation, underwent HLA-matched related allogeneic HSCT from a genetic donor with a major ABO-mismatch blood types between the donor (B+) and the recipient (O+) after myeloablative conditioning, at D + 165 of the stem cell transplantation, the patient’s
The hemoglobin level suddenly decreased from 12.3 g/dl to 5.3 g/dl. She showed no evidence of GVHD and hemolysis. Diagnosis of pure red cell aplasia as a complication of major ABO incompatibility was confirmed. We started erythropoietin treatment but there was no improvement in her anemia. In parallel, she showed elevated aspartate transaminase (AST) and alanine transaminase (ALT), and chronic graft-versus-host disease (GVHD) was confirmed by a liver biopsy. Then we started rituximab 375 mg/m² once weekly for four weeks for both (PRCA and GVH). There were no adverse reactions to rituximab treatment. Currently, the patient has no transfusion requirement and her hemoglobin level has remained as high as 13.2 g/dl. Later on, the patient presented with a CMV retinitis that was stabilised by IV Galacyclovir.

**Conclusion:**
We report the case of spectacularly rapid recovery from PRCA and a chronic hepatic GVHD with Rituximab. To our knowledge, the use of rituximab for the treatment of PRCA following major ABO-matched allogeneic HSCT is exceptionally reported. Rituximab seems to be a promising therapeutic option for patients with PRCA following ABO-matched and ABO-mismatched allogeneic HSCT. But still it could lead to serious infectious complications.

**Method:**
We used EasySep Human Whole Blood CD3 and CD33 CD66b positive selection. A total of 35 subjects were analyzed that includes 10 healthy individuals, 19 post-allogeneic HCT recipients (between day 18 and 674 post-transplant) and 6 Proficiency testing samples. Native biological DNA was extracted primarily from the separated lymphoid (myeloid and DNA) concentrations were measured and the engraftment analysis was performed on them. Results of Full chimerism in WB study showed 100% concordance with those obtained in myeloid lineage however, two samples out of the thirteen who demonstrated full chimerism in WB showed 90% and 89% (mixed chimerism in the lymphoid lineage, these two cases were from patient having ALL and there were lymphopenia in both of them so the WB chimerism overestimated the results of chimerism while lineage study was more sensitive to pick early reduction in donor component in the lymphocyte population. The eleven WB samples with mixed chimerism demonstrated mixed chimerism in nine out of them in both lineages with variable proportion of donor components. One PT sample with WB 4% chimerism result demonstrated 4% chimerism in both populations by lineage study indicating excellent concordance in detecting relapse and mixed chimerism. The two samples of mixed chimerism by WB (47%, 7%) demonstrated (5% & 1%) mixed chimerism respectively in the myeloid lineage but full and mixed chimerism in lymphoid population (96%, 93% respectively) indicating split chimerism. Both these two cases were a plastic anemia in relapse clinically with profound neutopenia. These results indicate that WB chimerism may miss early relapse and not sensitive enough to detect the real status and early decline in donor components particularly if there is severe reduction in one of the lineage, only lineage chimerism would be able to pick early reduction of donor components and help better to manage patient accordingly.

**Conclusion:**
Cell subset separation and enrichment are reliable and yield acceptable purity. Excellent concordance of chimerism results are obtained when peripheral blood revealed full chimerism or mixed chimerism and there is normal proportion of both lineages. Lineage chimerism is more sensitive in detecting relapse by demonstrating split chimerism when PBL has marked reduction of one lineage over the other lineage.
38. RELAPSE OF PRIMARY MYELOFIBROSIS AFTER ALLOGENEIC STEM CELL TRANSPLANTATION WITH 100% DONOR CHIMERISM
N. Hasnaoui, EM. Mahtat, S. Jennane, H. El Maaroufi, K. Doghmi, M. Mikdame
Department of Clinical Haematology, Military Hospital of Instruction Mohamed V, Rabat, Morocco

Introduction:
Allogeneic hematopoietic stem cell transplantation is the only potentially curative treatment at the cost of significant morbidity and risk of rejection of the graft. The recurrence of myelofibrosis in the presence of 100% donor cell chimerism is an unusual situation, calling into question the role of chimerism in predicting relapse.

Clinical case:
We report the case of a 43-year-old female patient, followed for primary myelofibrosis diagnosed with cytopenia: anemia (at 8 g/dl) and thrombocytopenia (at 30 G/L), without splenomegaly. JAK2 in the blood returned weakly positive at 2% and the BCR-ABL transcript was negative. The patient was classified as intermediate risk 2 with a high DIPSS + score with transfusion dependence in red blood cells and platelets. Treatment with thalidomide, prednisone and erythropoietin was initiated but failed to achieve transfusion independence with a worsening thrombocytopenia. In the presence of an HLA compatible sibling donor, an allogenic transplantation of peripheral stem cells was performed in Hematology Unit of Percy Hospital in France. The patient received a RIC regimen that consisted of Fludarabine, Busulfan, and SAL (F5B2S3). Prophylaxis of graft-versus-host disease was based on ciclosporin A alone. Aplasia was marked by a veno-occlusive disease with favorable evolution under Defibrotide. The conditioning was well tolerated with hematologic recovery at day 25 for neutrophils and at day 35 for platelets. A reactivation of CMV occurred at day 17 and was spontaneously resolving. No acute GvH was noted. The evaluation at 6 months post transplant showed satisfactory engraftment with 100% donor chimerism. Medullary fibrosis was regressed with a grade 1 appearance on the bone marrow biopsy. No evidence of acute or chronic GvH was noted. After 15 months from the transplantation, the patient presented with a cytopenia (anemia and thrombocytopenia) without transfusion requirements. The bone marrow biopsy returned in favor of a grade 3 myelofibrosis. JAK2 PCR on blood was weakly positive at 0.4%, with chimerism, on peripheral and medullary blood, at 100% donor cells.

Conclusion:
We report the case of atypical relapse of primary myelofibrosis after allogeneic stem cell transplantation with 100% donor cell chimerism and a positive JAK2 PCR at low levels. Would the medullary microenvironment be involved in the pathogenesis of myelofibrosis in this patient?

39. RÔLE INFIRMIER DANS LA PRISE EN CHARGE DU SYNDROME DE LYSE TUMORALE
B. El Maknasi, Dr. R. Tissir, Pr. I. Tazi, Pr. L. Mahmal
Service d’Hématologie et d’Oncologie Pédiatrique Hôpital Mohammed VI, CHU de Marrakech

Le syndrome de lyse est la conséquence de la destruction massive de cellules tumurales. Il constitue une situation importante d’urgence diagnostique et thérapeutique onco-hématologique.

Il peut être spontané dû à la maladie elle-même, comme il peut résulter de l’action de la chimiothérapie ou de la radiothérapie, il survient principalement chez les patients ayant une forte masse tumorale, une maladie à temps de doublement rapide, un traitement par chimiothérapie ou radiothérapie, et une insuffisance rénale préexistante. Le tableau biologique associe une hyperphosphatémie quasiment constante, une hypocalcémie, une hyperuricémie, et une hyperkaliémie. Le tableau clinique comporte une insuffisance rénale qui est la manifestation clinique la plus fréquente, des troubles du rythme ou de conduction et des convulsions qui surtont.

Cette destruction massive des cellules tumorales donne lieu à des troubles biologiques et cliniques importants pouvant mettre en jeu le pronostic vital, d’où la nécessité d’une surveillance étroite et d’une prise en charge multidisciplinaire.

L’infirmier joue un rôle de premier plan dans la prise en charge du syndrome de lyse notamment dans la surveillance clinique et biologique, certes ce rôle repose sur trois volets : rôle dans la surveillance, rôle dans le traitement et celui d’IEC.

En somme le syndrome de lyse tumoral constitue une urgence diagnostique et thérapeutique qui fait appel à une collaboration des différents intervenants en vue de mieux gérer les complications et améliorer la qualité de prise en charge de ce syndrome.
40. MUCORMYCOSE D’ÉVOLUTION FATALE CHEZ UN PATIENT EN ATTENTE D’ALLOGREFFE.

I. Sebbane, R. Tissir, L. Mahmal
Service d’Hématologie et d’Oncologie Pédiatrique
Hôpital Mohammed VI, CHU de Marrakech

Introduction :
Les mucormycoses sont des infections fongiques relativement rares, survenant habituellement dans les compartiments pulmonaires ou rhino-cérébrales des sujets immunodéprimés ou diabétiques. Nous rapportons le cas d’un enfant suivi pour aplasie médullaire présentant une mucormycose cutanée à RhizopusOryzae.

Observation :
Un enfant de 11 ans présentait 2 lésions cutanées du dos de la main droite évoluant rapidement sur un mode inflammatoire et nécrotique. Le patient a été traité depuis 2 mois pour une aplasie médullaire en attente de greffe. Les examens histologiques et mycologiques de la biopsie cutanée de la lésion révélaient la présence d’un champignon filamenté, R.Oryzae. L’évolution était fatale malgré le traitement par l’amphotéricine B.

Discussion :

Conclusion :
R. oryzae est une espèce fongique marginale, rarement isolée en clinique. Ce cas clinique rappelle la gravité de l’infection par ce champignon.

41. EVOLUTIVE PROFILE OF PATIENTS FOLLOWED FOR MYELOID ACUTE LEUKEMIAS WITH MONOSOMY OF 7

Department of Hematologist and Pediatric Oncology, Hospital August 20, 1953, * Laboratory of Hematologie, UHC Ibn Rochd, Casablanca, Morocco

Introduction :
Approximately 50% to 60% of patients with acute myeloid leukemia (AML) have cytogenetic abnormalities. AML associated with a monosomal karyotype is a group of patients with adverse prognosis, monosomy 7 is the most common complex karyotype.

Object :
To study the evolutionary profile of patients treated for acute myeloid leukemia with monosomy 7 in the hematology department.

Patients and methods :
Retrospective study conducted over a period of 16 years from 01 January 2002 to 31 December 2017 of descriptive type based on cytogenetic data and medical records of patients followed for an AML who benefited at the diagnosis of a spinal karyotype.

Results :
During our study, we identified 29 patients with acute myeloid leukemia with a monosomy of 7. The median age of these patients was 40 years (1-64) with sex ratio H / F at 1, 9. 3 patients had myelodysplasia (MDS) in their medical history, AML was found to have anemic syndrome in 25 (83%) cases, tumor syndrome in 10 (34.48%) cases, 17 (58.62%) of our patients were hyperleucocytic at diagnosis, cytologically AML 2 was found in 10 (34.48%) of cases, AML / MDS in 5 (17.24%) cases. Monosomy 7 was isolated in 21 (72.41%) cases. Therapeutically, 4 (13.79%) patients were lost to follow-up and 3 (10.34) died, induction was started in 18 (62.06%) patients with treatment failure in 12 patients, complete remission (CR) in 3 patients (maintained in one) and 3 deaths. Palliative treatment was indicated immediately before the advanced age, the general state of the patient and the transformation of MDS to AML in 4 (13.79%) patients. The median survival was 4.7 months (143 days).

Discussion and conclusion :
The prognosis of AML in association with monosomy...
7 is very unfavorable. Ultimately the therapeutic indications in this group of patients should be well defined, however the transplantation of hematopoietic stem cell should be indicated at the first CR in order to improve the survival of our patients.

42. NUTRITIONAL STATUS EVALUATION AND NUTRITIONAL HISTORY OF PATIENTS DURING ALLOGENEIC STEM CELL TRANSPLANTATION (SCT) ALLOGRAFT UNIT AT PEDIATRIC ONCOLOGY HEMATOLOGY SERVICE AT THE HOSPITAL AUGUST 20, 1953, CASABLANCA


* Dietitian; Hôpital 20 Aout 1953 ; CHU Ibn Rochd Casablanca
** Service d'Hématologie et d'Oncologie Pédiatrique ; Hôpital 20 Aout 1953 ; CHU Ibn Rochd Casablanca

Background:
Allogeneic hematopoietic stem cell transplantation is the only potentially curative treatment for specific hematological disease involves administration of toxic chemotherapy and infusion of marrow cells. It is well known that after treatment, patients can develop mucositis, anorexia, and gastrointestinal failure, leading to malnutrition. To prevent this, nutritional support is offered upon admission of the patient.

Objectives & Design:
Through this study, we aim to evaluate and compare the nutritional status of ten patients from May 2016 and March 2018 at the admission and exit of the unit, using body mass index, weight loss percentage and Buzby’s index; The second aim is to study nutritional history of each patient during his hospital stay, in fine, we will compare results with the recent recommendations.

Results:
The median age at the transplant was 27.5 years (13-59 years); the median total hospital stay is 43 days (14 - 56 days); four (40%) had a hematological malignancy. At admission, six (60 %) patients were normal, three (30%) were underweight, and one were overweight; According to the percentage of weight loss, one (10%) was a severely malnourished, Three (30%) patients moderately malnourished and 60 % were low malnourished; According to Nutritional risk index a total of 50% of our participants had not malnourished risk opposite to 50% having a moderate risk of malnutrition; At discharge of Unit two patients were lost, Six (60%) had a normal body size, one (10%) was underweight, and one overweight; Total of 70% patients had not malnourished risk. According to nutritional story all patients take Neutropenic diet, Enteral nutrition was given to eight patients for a median of 10days (0–24days) using nasogastric tube feeding, all patients did take oral nutrition enriched with a hyperprotid dietary supplement during their stay at the Allo-HSCT unit for a median of 4 days (0-34days), Three patients needed to take parenteral nutrition for a median of 3 days (3-10days), Most patients (80%) were able to eat every day during their hospital stay, whereas (20%) patients were not able to eat anything (no oral intake) for a median of 4 days (3–10 days). The median weight loss percentage for patients who had EN is 3.53% and 9.62% for patients who had oral and PN during all their hospital stay; Recent guidelines published by professional European and US nutritionists’ societies as well as the European Society for Blood and Marrow Transplantation (EBMT) on nutritional support for patients undergoing stem cell transplantation favor EN over PN and Screening for malnutrition focus on patients’ body weight and Nutritional Risk Score.

Conclusion:
Nutritional support plays a key role to avoid malnutrition and we need more adherence to current practice guidelines.

43. DONOR CELL MYELODYSPLASTIC SYNDROME: A MOROCCAN CASE REPORT

S. Loubnan, M. Elhaddad, S. Jennane, E. Mahtat, H. El Maaroufi, K. Doghmi, M. Mikdame

Department of Clinical Haematology, Military Hospital of Instruction Mohamed V, Rabat, Morocco

Introduction:
Donor cell derived myelodysplastic syndrome and acute leukemia are rare poor prognostic complications of allogenic hematopoietic stem cells transplantation. The 5-Azacytidine is the most used drug in myelodysplasic syndrome and acute leukemia in relapse after the allograft stem cell transplantation; its efficiency has not been proven in derived donor MSD/AL.

We describe the case of a middle-age man with donor cell myelodysplastic syndrome after allogeneic stem cell transplantation responding to donor lymphocyte infusion.

Case report:
Our patient is a 50 years old man, with no previous medical history. Diagnosed since March 2007 with
multi-lineage dysplasia, without blasts excess. Classified as an intermediate risk 2 according to the IPSS (the International Prognostic Scoring System); and high risk according to R-IPSS. The first assessment showed a pancytopenia, 4% of bone marrow blasts, and multiple lineage dysplasia. The karyotype found the following abnormalities: 11q-, and t (1; 15) with complete trisomy of 1q in 15 mitosis of 20. The FISH (Fluorescence in situ hybridization) found no MLL rearrangement.

In March 2009, the patient received a reduced intensity conditioning by Fludarabine (30mg/m² at J-9,J-8,J-7) and Busulfan (0,8mg/Kg/6h from J-6 to J-3); followed by an allogeneic transplantation from the marrow blood of his sister (35 years old). Ciclosporin and anti lymphocytic serum (ALS) were used as prophylaxis of the GVH (graft-versus-host) reaction. 6 months after, the patient was in complete remission according to the IWG criteria. The blood account was normal and the bone marrow aspiration showed neither signs of dysplasia nor blasts excess. The karyotype was normal; 46, XX [20, 20], with 100% chimerism of donor.

Since May 2012, the patient presented a progressive worsening thrombocytopenia; associated to neutropenia. The bone marrow showed a multi lineage dysplasia, with blasts excess (8% of marrow blasts in march then 11% in September) .The karyotype was normal (46,XX), 88 % chimerism of donor. The donor had a normal peripheral blood account. The diagnosis of derived donor MDS was confirmed; based on; obvious signs of myelodysplasia, female cytogenetics; and majority of donor chimerism.

The patient received 5-azacitidine (75mg/m² during 7 days each 28 days). After 18 cycles, we obtained a partial response (PR), with 95%-chimerism of donor. However no side effects were noticed and no hematotoxicity neither.

Unfortunately the patient’s cytopenias recurred, manifesting initially with a progressive thrombocytopenia. In November 2016, the patient was given a DLI from his sister with a 1x10e7 /kg. Following the DLI, the patient’s peripheral counts were normal and he is in complete hematological and cytogenetic remission.

Conclusion :
The MDS microenvironment impact on the donor cells is limited and rare. There are no markers that could help recognize the patients that would develop donor cell MDS. Using post-transplant azacytidine in those patients is a path we should look out.

44. IDENTIFICATION OF SHORT TELOMERES AS A PART OF THE ASSESSMENT FOR GENO-IDENTICAL ALLOGENEIC STEM CELL TRANSPLANTATION IN APLASTIC ANEMIA
1. Clinical Hematology Department of of the Military Hospital Mohamed V-Rabat

Introduction :
About one-third of patients with acquired aplastic anemia also have short telomeres, which in some cases is associated with TERT or TERC mutations. We report a family that was diagnosed with a hereditary thelomeropathy with a rare TERT mutation discovered during the pre-transplant assessing for an idiopathic aplastic anemia in one of the siblings.

Presentation of the case :
We report the case of a 21-year-old patient, with no medical history, followed since October 2014 in the Clinical Hematology Department of of the Military Hospital Mohamed V in Rabat for an idiopathic aplastic anemia, without PNH-clone, with a normal karyotype, revealed by a hemorrhagic syndrome. The initial complete blood account showed a bicytopenia (platelet count <20 x10³/µl, neutrophil level at 800/mm3 and reticulocytes > 50x10³/µl). The etiological investigations revealed that both donor and recipient had an abnormal shortening of the telomeres (homozygous mutation in gene TERT p.P1121L). Geno-identical allogeneic bone marrow transplant was therefore canceled and the patient underwent anti-lymphocyte serum perfusion as an alternative. No response was obtained. The patient is now treated by danazol at a dose of 800mg per day.

Conclusion :
Identification of short telomeres should be systematic in assessing young aplastic anemia patients that are candidates to a familial allogenic bone marrow transplant.
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POUR LA VIE.

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06 73 51 25 47 / agir@menara.ma / www.agir.strikingly.com