

# The journey of stem cell transplantation in Bangladesh: a hike to the state of the art with collaboration between DMCH and MGH

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## Introduction

Bangladesh started the journey of hematopoietic stem cell transplantation (HSCT) in March 2014 with the first autologous stem cell transplant (ASCT) performed at Dhaka Medical College Hospital (DMCH), the first and the pioneer HSCT center in Bangladesh with the partnership collaboration program between the Bangladesh government and Massachusetts General Hospital (MGH). In 2011, the Ministry of Health and Family Welfare in Bangladesh committed to establish a modern transplant program at DMCH. Program development included: (1) formalizing a collaborative international partnership; (2) developing appropriate clinical, laboratory, and ancillary infrastructure; (3) human resource capacity building and clinical teamwork; and (4) financing. To date, 30 ASCTs have been performed successfully in this center without any treatment-related mortality (TRM) in the first 100 days, the most encouraging news for the personnel involved with this program.

## Methods

### Partnership MOU

To codify the scope and scale of collaboration, a memorandum of understanding (MOU) between the Ministry of Health and Family Welfare and MGH was signed.

### Developing appropriate clinical, laboratory, and ancillary infrastructure

The DMCH transplantation unit was built on the top floor of a new hospital building and includes 5 HEPA-filtered, private patient rooms, an apheresis unit, a stem cell processing laboratory, hematology laboratories, and a pharmacy room with a laminar flow biosafety cabinet.

### Human resource capacity building and clinical teamwork

- Multiple hematologists, laboratory technicians, and pharmacists from DMCH participated in clinical observerships at MGH.
- Clinicians and technicians from MGH also traveled to Bangladesh to train DMCH staff in different steps of transplantation.
- A comprehensive year-long training curriculum was developed and delivered by nursing faculty from MGH.

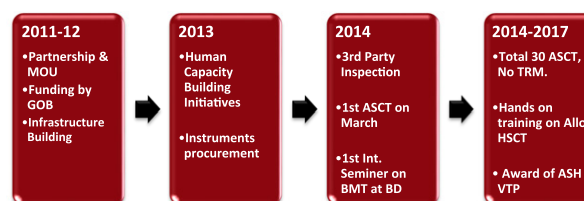


Figure 1. Timeline of development and outcome.

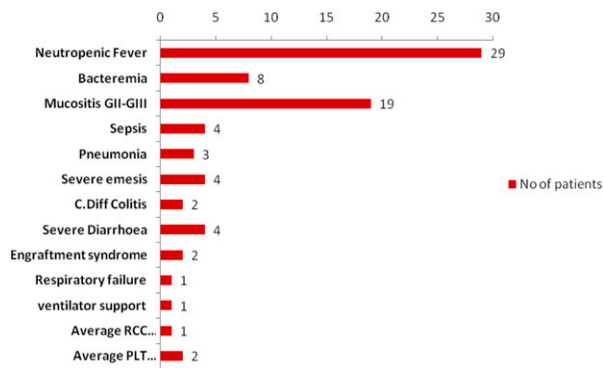


Figure 2. Transplant adverse events at DMCH. C.Diff, *Clostridium difficile*.

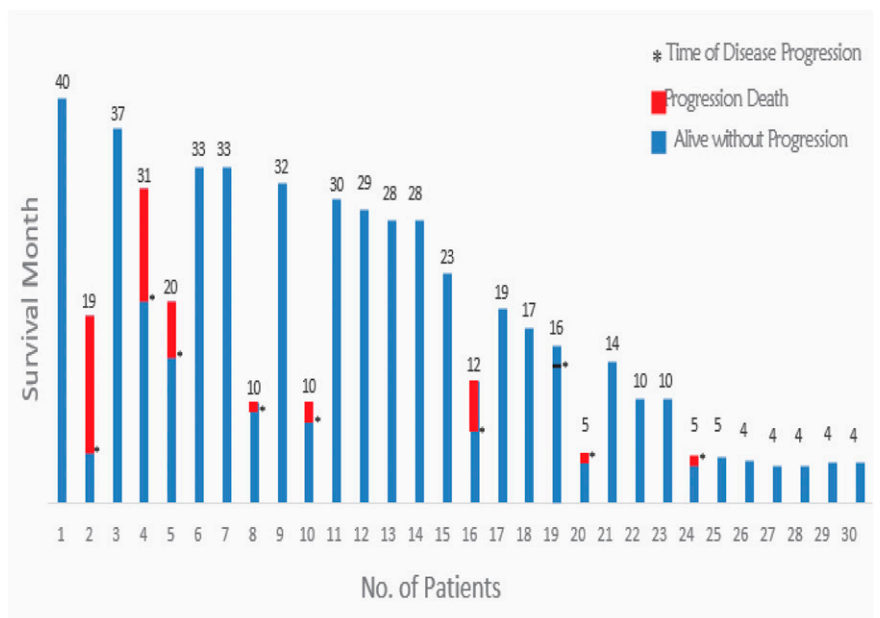


Figure 3. Survival curve.

## Financing

Financing for the construction, equipment, and ongoing maintenance of the DMCH unit and training for the staff was provided by the government of Bangladesh. MGH provided clinical observerships, curriculum development, and ongoing remote support.

## Outcome of capacity-building initiatives

- Development of skilled manpower (physicians, nurses, and technologist).
- Thirty ASCTs have been done for multiple myeloma and lymphoma successfully without TRM.
- The two-year progression-free survival rate was 70% over a median observation period of 18 months (1.7-40 months).
- The American Society of Hematology Visitor Training Program award on BMT for the first time was completed successfully in

2015-2016 to enhance the transplant program, and 2 more physicians are on the track.

Median age, y (range)	36.56 (16-58)		
Sex	26 males, 4 females		
Disease	n (%)	Salvage Rx/mobilization	Conditioning regimen
Multiple myeloma	11 (36.66)	VCD/RVD/+ Cy-GCSF	Melphalan
HD	6 (9.20)	ICE(05)/ GND(02)/ + GCSF	BEAM
DLBCL	5 (16.66)	RICE(05)/ + GCSF	BEAM
PTCL	4 (13.33)	ICE(04)/+ GCSF	BEAM
AML	3 (10)	HiDAC(03)/+ GCSF	Bu-Cy
Plasmablastic lymphoma	1 (3.33)	DA EPOCH + bortezomib/ GCSF	BEAM



Nursing training.



Press conference with health minister.

## Discussion

Undergoing a health transition, Bangladesh suffers a double burden of disease and the emergence of noncommunicable diseases, including hematological malignancies and thalassemia. Support from the government of Bangladesh has enabled the DMCH to run a sophisticated cancer treatment program in the largest national referral hospital at a relatively low cost (~\$7000 US dollars per patient). TRM has thus far been 0%, and we attribute this success to our serious commitment to performing Western world–standard operations that was successful via the collaborative efforts of the DMCH and MGH. Future activities will be focused on establishing a transplant center capable of performing allogeneic stem cell transplantation.

**Conflict-of-interest disclosure:** No competing financial interests declared.

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DOI 10.1182/bloodadvances.2017GS101643

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