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Success of an International Learning Healthcare System in Hematopoietic Cell Transplantation: the American Society of Blood and Marrow Transplantation Clinical Case Forum

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Abstract

The ASBMT Clinical Case Forum (CCF) was launched in 2014 as an online secure tool to enhance interaction and communication among hematopoietic cell transplantation (HCT) professionals worldwide through the discussion of challenging clinical care issues. After 14 months, we reviewed clinical and demographical data on cases posted in the CCF from 1/29/2014 to 3/18/2015. A total of 137 cases were posted during the study period. Ninety-two cases (67%) were allogeneic HCT, 29 (21%) autologous HCT and in 16 (12%) the type of transplant (auto vs. allo) was still under consideration. The diseases most frequently discussed included non-Hodgkin lymphoma (NHL; n = 30, 22%), acute myeloid leukemia (AML; n = 23, 17%) and multiple myeloma (MM; n = 20, 15%). When compared with the US transplant activity reported by the US Department of Health and Human Services, NHL and acute lymphoblastic leukemia cases were overrepresented in the CCF while myeloma was underrepresented ($P < 0.001$). A total of 259 topics were addressed in the CCF with a median of two topics/case (range 1-6). Particularly common topics included whether transplant was indicated (n = 57, 41%), conditioning regimen choice (n = 44, 32%), and post-HCT complications after day 100 (n = 43, 31%). The ASBMT CCF is a successful tool for collaborative discussion of complex cases in the HCT community worldwide and may allow identification of areas of controversy or unmet need from clinical, educational and research perspectives.

Keywords

autologous stem cell transplant; allogeneic hematopoietic stem cell transplant; case discussions

INTRODUCTION

Hematopoietic cell transplantation (HCT) is a life-saving procedure for patients with high-risk malignant or non-malignant hematologic disorders, or solid tumors. However, HCT carries significant risk of treatment-related morbidity and mortality (TRM) (1).

There are multiple opportunities for highly complex clinical decision-making along the HCT trajectory, from patient selection (e.g. interpretation of disease and patient-related factors influencing candidacy for HCT), to HCT approach (e.g. conditioning regimen, graft source

and manipulation, donor selection), or HCT complications (e.g. management of graft-versus-host disease [GVHD], organ toxicity, infections, relapse, late effects). HCT-related technology and practice are continually evolving and improving, adding additional complexity to clinical decisions (2). Although numerous clinical guidelines and evidence-based consensus statements have been published on these and other topics (3-13), cases featuring unique characteristics emerge every day in clinical practice. Not surprisingly, previous research has documented significant variation in clinical decision-making among transplant health care professionals, including patient referral to transplant centers, supportive care practice and management of immunosuppression to prevent and/or treat GVHD (14-17). Additionally, evidence-based reviews and other published treatment guidelines are inherently limited by lags in time to publication, which may result in months to years from conception to dissemination following peer review and editing.

Because HCT is a field characterized by significant risk of procedure-related morbidity and mortality, significant resource utilization, and variation in practice among trained professionals (18, 19), it represents an ideal environment for application of a learning healthcare system. As defined by the Institute of Medicine, “A learning healthcare system is [one that] is designed to generate and apply the best evidence for the collaborative healthcare choices of each patient and provider; to drive the process of discovery as a natural outgrowth of patient care; and to ensure innovation, quality, safety, and value in health care” (20, 21). While several resources within the field of HCT already exist to support a learning healthcare system, such as the Center for International Blood and Marrow Transplant Research (CIBMTR), the National Marrow Donor Program (NMDP), the American Society for Blood and Marrow Transplantation (ASBMT) and the Foundation for the Accreditation of Cellular Therapy (FACT), there are relatively few widely available resources to assist in daily decision making in clinical practice, and help the HCT community learn continuously from the experience of other clinicians in a relatively real-time fashion.

We hypothesized that a secure, online forum for discussing challenging clinical care issues within the field of HCT would be significantly utilized by the global HCT community, and that discussions within this forum would reflect variation among HCT professionals’ approaches to clinical care issues. In addition, discussions on the forum could potentially identify areas of controversy or areas of unmet need, not only in the clinical sense but also from an educational perspective. We also hypothesized that this forum would allow relatively real-time discussion and dissemination of contemporary practice patterns, without the delays associated with more formal and traditional publications. We now describe the experience of the ASBMT Clinical Case Forum (hereafter referenced as “the CCF” or “the ASBMT CCF”), a secure, online forum for the discussion of challenging HCT cases.

METHODS

Clinical Case Forum Development

ASBMT, through the Committee on Education and the Subcommittee on Web-based Learning, developed a secure, online forum for discussion of challenging clinical care issues (www.asbmt.medting.com). The forum was named the ASBMT Clinical Case Forum (ASBMT CCF). The software for the ASBMT CCF was made available through

collaboration with Best Doctors (Boston, MA), a company that specializes in remote medical consultations. The ASBMT CCF contains several features that facilitate secure and informative case submission and discussions. Participants must login securely prior to accessing site content. Once granted access to the site, participants may submit a case, read others' cases and comments, and submit new comments on cases. To submit a case, participants enter a title and free text clinical data into a submission dialog box, in addition to optional inclusion of de-identified pathology slides, radiological images (supported through the integrated MedViewer imaging platform), photographs (e.g. dermatologic lesions), and other ancillary data (Supplementary Figure 1). The site is monitored for uploading of any information that has not been de-identified. Participants can also assign cases to one or more topic groups, enabling cases to be easily searched using keywords. Once posted, cases may receive subsequent comments from other CCF participants, with comments appearing sequentially, directly below the case submission (Supplementary File 2). The CCF software supports translation to other languages, allowing global participation and facilitating the development of the CCF into an international initiative. This feature is particularly important in transplantation, as a global transplant community provides a platform for users in less-developed countries with less mature transplant programs to connect with more experienced transplant teams.

In February 2014, coincident with the annual BMT Tandem Meetings, the ASBMT CCF was launched as an ASBMT member benefit. For the first 6 months, access to the CCF was also granted to non-members who had attended the annual meeting. In the year that followed, the CCF has been available to physicians, nurses, advanced practitioners, pharmacists, and trainees for case posting and commentary.

Data abstraction and definitions

After the ASBMT CCF was open for approximately a year, the ASBMT Committee on Education reviewed the data associated with cases and comments posted through 3/18/2015. IRB approval was obtained to conduct this minimal-risk research. One data abstractor (WAW) summarized the case topic and assigned the case to one or more categories associated with the HCT process. A second data abstractor (PB) reviewed these determinations and additionally determined the urgency of the case and dates of comments. Urgency was determined based on clinical information posted and was defined as a case needing an answer in < 72h, based on the opinion of the reviewers. A third investigator (MAP) reviewed all information and was available to adjudicate in case of any discrepancies. US transplant activity for the year 2013 reported in the Health Resources and Service Administration of the US Department of Health and Human Services (http://bloodcell.transplant.hrsa.gov/RESEARCH/Transplant_Data/US_Tx_Data/Data_by_Disease/national.aspx) was used to compare the distribution of diseases in the CCF with the actual HCT activity across the country.

Objectives and Statistical Analysis

The primary objective of the study was to describe the cases reported to the CCF during the study period. A secondary objective was to identify areas of unmet needs and controversial topics that would potentially benefit from future educational or consensus approaches.

Fisher's exact test was used to compare both the disease frequency and the frequency of each transplant type in the CCF compared with the US transplant activity reported by the US Department of Health and Human Services. All other statistics were descriptive.

RESULTS

Demographics

Demographic and disease information are summarized in Table 1. As of March 18, 2015, 137 cases had been posted on the ASBMT CCF (Figure 1). Most cases (n = 92, 67%) referred to allogeneic HCT (allo-HCT), while 29 (21%) concerned autologous HCT (auto-HCT). In 16 additional cases, the type of transplant was still under consideration. When we compared the distribution of the 121 CCF cases where the HCT approach was defined with the 2013 US HCT activity, allo-HCT was overrepresented in the CCF (76% in the CCF vs. 43% in the US transplant activity). Consequently, auto-HCT was less present in the CCF than in the US HCT activity (24% vs. 57%, respectively; overall p value < 0.001).

Median age at HCT for the whole cohort was 53 years (range 3-82). The vast majority of the cases (n = 131, 96%) referred to adult patients, mostly to patients aged 41-60 (n = 49, 36%). Only 6 cases of patients aged 18 or younger were posted. Most transplantable diseases were represented, though relatively few cases referenced non-malignant conditions or solid tumors, again reflecting the common etiologies in adult patients. The most commonly represented diseases were non-Hodgkin lymphoma (NHL; n = 30, 22%), acute myeloid leukemia (AML; n = 23, 17%) and multiple myeloma (MM; n = 20, 15%). When compared with the US transplant activity, NHL and acute lymphoblastic leukemia (ALL) cases were overrepresented in the CCF while MM was underrepresented (overall P < 0.001) (Figure 2).

Regarding transplant topics, 259 topics were addressed in the CCF with a median of two topics/case (range 1-6). Particularly common topics included whether transplantation was indicated (n = 57, 41%), conditioning regimen choice (n = 44, 32%), and post-transplant complications after day 100 (n = 43, 31%).

Cases in most frequent diseases

Detailed information on transplant topics according to underlying disease is summarized in Table 2. Supplemental Table 1 includes synopses of the 137 cases submitted to the ASBMT CCF as of March 18, 2015.

Acute leukemias—A total of 23 cases (17%) including patients with AML were posted, all but one of them regarding allo-HCT. AML cases addressed 43 topics with a median of 1 topic/case (range 1-6). The most frequent topics in AML were conditioning regimen (n = 11, 48%) and whether transplantation should be recommended (n = 9, 39%). For ALL, 19 cases (14%) were posted in the CCF. In contrast to AML, the most frequent questions were about post-transplant relapse (n = 10, 53%), either its prevention (n = 5), treatment (n = 3) or both (n = 2).

Of the 12 cases about conditioning regimen in acute leukemias, six were related to the intensity of the regimen (myeloablative conditioning [MAC] vs. reduced intensity

conditioning/nonmyeloablative conditioning [RIC/NMA]) in patients with advanced age or comorbidities. Of note, all but one of the cases about conditioning regimen in acute leukemia concerned patients with AML.

Five of the 20 cases (25%) about relapse in leukemia discussed the use of post-transplant therapy either for relapse prevention or in the setting of minimal residual disease. Most of them referred to the use of tyrosine kinase inhibitors in Philadelphia chromosome positive (Ph+) ALL, but the use of prophylactic donor leukocyte infusion (DLI) and hypomethylating agents in AML were also discussed.

When comparing CCF data with the US transplant activity in 2013, the proportion of AML cases in the CCF was similar to the actual transplants performed (17% vs. 16%, respectively), whereas, when we examined allo-HCT cases specifically, the proportion of AML cases in the CCF was lower than that of actual transplants performed (24% vs. 36%, respectively). For ALL, there were proportionally more cases discussed in the CCF than actual cases in the registry (14% vs. 6%, respectively). Similarly, for allo-HCT, the activity for ALL in the CCF was slightly higher (17% in the CCF vs. 13.5% in the US registry).

Lymphoid malignancies—Thirty-eight cases (28%) included patients diagnosed with lymphoid malignancies. The most common histologies were diffuse large B cell lymphoma (n = 9, 24%), mantle cell lymphoma (n = 6, 16%), Hodgkin lymphoma (n = 5, 13%) and follicular lymphoma (n = 4, 10%), although 11 other histologies were represented. Sixteen cases (42%) referred to allo-HCT and 12 (32%) to auto-HCT. In 10 cases (26%) the choice of auto-HCT or allo-HCT was still under consideration.

The most frequent topics in lymphoid malignancies were related to the selection of conditioning regimen (n = 18, 48%), with most queries arising in the allo-HCT setting (n = 15). Fourteen cases (37%) addressed questions about whether transplant should be recommended. Most of these cases questioned whether allogeneic or autologous transplantation should be used as upfront consolidation therapy in high-grade NHL or in heavily pretreated low-grade NHL.

When comparing CCF data with the US transplant activity in 2013, the proportion of Hodgkin lymphoma cases in the CCF was similar to that of actual transplants performed (4% vs. 5%, respectively), whereas for NHL, the activity in the CCF was slightly higher (22% in the CCF vs. 18% in the US registry). For Hodgkin lymphoma and NHL, there was a similar proportion of allo-HCT cases in the CCF when compared to the US transplant activity (0% vs. 2%, and 12% vs. 11%, respectively).

Multiple myeloma and amyloidosis—Twenty cases (15%) included patients diagnosed with MM and amyloidosis, with 12 of them (60%) being cases of auto-HCT, although this percentage also reflects a higher number of questions about allo-HCT than one would expect based on practice patterns. The most frequent topic discussed in this group of patients was whether to recommend HCT (n = 12, 60%), followed by relapse (n = 9, 45%), either its prevention (n = 2, 10%), treatment (n = 4, 20%) or both (n = 3, 15%). There was a

lower proportion of HCT cases for MM and amyloidosis in the CCF when compared to the US transplant activity (15% vs. 34%, respectively).

Urgent cases: Twenty cases (14%) were considered to require a response within 72 hours based on the reviewers assessment and were classified as urgent (Table 3). Eighteen of these cases (90%) discussed allo-HCT patients. The most frequent diseases included AML (n = 6, 30%), ALL (n = 3, 15%) and NHL (n = 3, 15%). The majority of these urgent cases (n = 14, 70%) referred to post-transplant complications, either early (n = 9, 64%) or late (n = 5, 36%) complications. Neurological symptoms and impaired consciousness accounted for at least 5 of these urgent cases. Interestingly, hemophagocytic lymphohistiocytosis syndrome (HLH), a rare complication after HCT, was the topic of 3 cases. The typical reason for urgency was the unstable medical condition of the patient.

DISCUSSION

The ASBMT CCF was launched in February 2014 to provide a secure, online forum for the discussion of challenging HCT cases. In the first year, 137 cases have been posted and commented on in the CCF. Based on the types of cases posted, a few general observations can be made. First, the ASBMT CCF appears to be successful in meeting a need in the HCT community for collaborative discussion and informed decision making regarding complex cases. The utilization of the ASBMT CCF has been significant, with the case and comment volume through March 2015 exceeding the pre-launch expectations of the ASBMT Committee on Education. Second, a review of the cases highlights specific diseases and questions that are recurrent throughout the posted cases and could represent topics for further development of clinical guidelines and learning tools. As expected by the higher level of complexity, cases on allo-HCT were more common than auto-HCT, in contrast to the incidence of the two procedures in usual practice. Importantly, in 12% of the cases, the recommended transplant approach itself (auto- vs. allo-HCT) was the topic, perhaps reflecting lack of consensus in the field for certain indications, or that specific cases do not necessarily fit well within existing guidelines. From a disease perspective, a wide range of the most common transplantable diseases was present in the CCF. However, there were some slight variations when compared with the US transplant activity. For instance, in the allo-HCT setting, ALL was overrepresented in the CCF whereas AML was underrepresented. The questions also differed between AML and ALL, with more questions about HCT indication and conditioning regimen in AML, while relapse was the main topic in ALL. These observations may highlight areas for further study and intervention regarding usual practice in these diseases.

Several interesting trends were also identified in the cases that did not involve acute leukemias, with many questions also related to HCT indication and conditioning regimen. Post-transplant complications were also found in a high number of cases (48%). However, only a few of them referred to the most common causes of TRM in the allo-HCT setting: prevention and/or treatment of GVHD and diagnosis or management of opportunistic infections. In contrast, rare complications such as HLH or autoimmune hemolytic anemia (AIHA) were the topic of several cases. This finding highlights areas in which there is either a lack of data or knowledge, or both. Whereas multiple guidelines, courses and on-line

resources exist for the management of GVHD and infections for example, little is available for less frequent complications such as HLH. The ASBMT CCF may thus fill an important need for low-frequency and urgent complications following transplant.

Moving forward, we anticipate enhancements to the ASBMT CCF as well as secondary projects related to activity on the ASBMT CCF that can further our goal of leveraging the ASBMT CCF to foster a learning healthcare system within the field of HCT. First, while the ASBMT CCF has been well utilized in a short period of time, we recognize that a large segment of the HCT provider community, including expertise in many of the topics represented on the CCF, remains untapped. Furthermore, our review identified at least 15% of cases that required an answer in less than 72 hours, mostly due to the unstable medical condition of the patient or because they involved drug changes or dose adjustments that needed to be done almost in real time. While the ASBMT CCF does not intend to take the place of direct and timely consultation with appropriate experts, it is clear that timely responses will not only have a potential impact on patient outcomes, but also more importantly, as a learning tool foster greater engagement within the HCT community. To this end, we plan to develop a panel of case discussants with expertise in different areas of HCT who would be able to respond within 48 hours of a case being posted. The goal is to ensure that each case submitted receives prompt, robust, and substantive discussion, while maintaining the transparent and community-oriented environment that has been the hallmark of the ASBMT CCF to date.

Furthermore, by performing ongoing analyses of the types of cases posted to identify areas of unmet need, we hope to foster collaborations among CCF participants and potentially generate new research efforts or publications within the HCT community. Additional secondary applications of the ASBMT CCF are also envisioned. Data from the CCF may be used to develop surveys for the transplant community about current practices or preferences in particular areas of transplantation. Where substantial practice variation or controversy is found to exist, ASBMT may consider developing topical guidelines, consensus statements, reviews, or other educational efforts to assist the transplant community with these clinical challenges. ASBMT CCF cases may also be used as the basis for peer-reviewed “Ask the Expert” style case discussions in the transplant literature, or as the basis for oral case presentations and panel discussions at annual BMT Tandem meetings. As an example, the above mentioned differences in particular topics in AML and ALL should be taken into account when designing future guidelines and learning tools. Similarly, the identification of infrequent but relatively highly commented complications such as HLH and AIHA could serve as a starting point for the development of these tools. Several of these ideas are currently under consideration by the ASBMT Committee on Education.

In a broader sense, we hope that ASBMT CCF cases lead to further efforts towards systematic data collection and critical, evidence-based scrutiny of usual care practices within HCT. Additionally, areas of clear and prevalent controversy without any acceptable evidence basis could be used to inform ideas for future institutional or multicenter protocols, or CIBMTR studies.

Though the ASBMT CCF has only been open for about a year, utilization has been significant and continues to increase. We plan for improvements to the CCF to further enrich the participant experience. Most importantly, there are multiple opportunities in the future to leverage the ASBMT CCF to foster a learning healthcare system within the field of transplantation.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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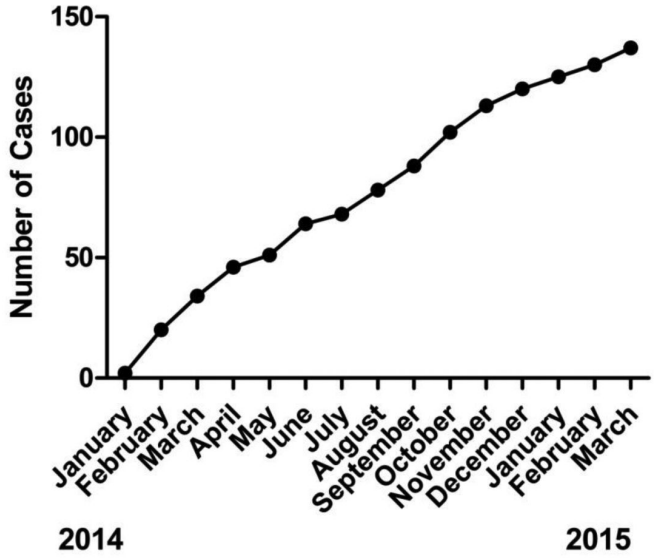

Figure 1.
Cumulative number of cases posted on the ASBMT CCF

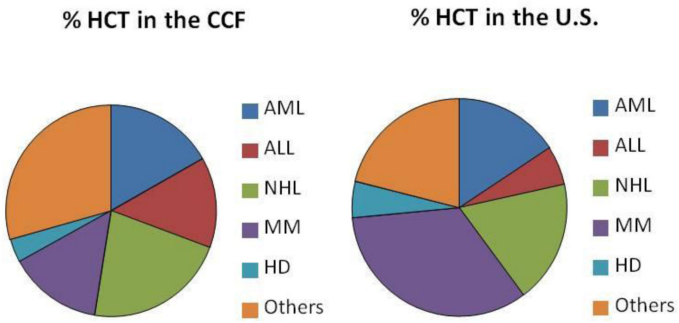

Figure 2.
Distribution of diseases in patients undergoing HCT reported in the CCF and in the US (2013)

Table 1

Demographic and disease information for cases presented on the ASBMT CCF.

Case characteristic	Total n (%)	Auto-HCT n (%)	Allo-HCT n (%)	Transplant approach not defined n (%)
TOTAL NUMBER OF PATIENTS	137 (100)	29 (21)	92 (67)	16 (12)
Age, years (%)				
≤ 18	6 (4)	0 (0)	6 (7)	0 (0)
19-40	37 (27)	7 (24)	27 (29)	3 (19)
41-60	49 (36)	7 (24)	30 (33)	12 (75)
>60	34 (25)	11 (38)	23 (25)	0 (0)
Unknown/not provided	11 (8)	4 (14)	6 (7)	1 (6)
Disease , n (%)				
Acute myeloid leukemia	23 (17)	1 (3)	22 (24)	0 (0)
Acute lymphoblastic leukemia	19 (14)	1 (3)	16 (17)	2 (13)
Myelodysplastic syndrome	14 (10)	1 (3)	13 (14)	0 (0)
Non-Hodgkin lymphoma	30 (22)	12 (41)	11 (12)	7 (48)
Hodgkin lymphoma	5 (4)	0 (0)	3 (3)	2 (13)
Multiple myeloma and amyloidosis	20 (15)	12 (41)	4 (4)	4 (25)
Chronic myeloid leukemia	10 (7)	0 (0)	10 (11)	0 (0)
Other[a]	10 (7)	1 (3)	8 (9)	1 (6)
Not provided	6 (4)	0 (0)	6 (7)	0 (0)
Transplant topic, n (%)[b]				
Indication for transplantation	57 (41)	16 (55)	35 (38)	6 (38)
Conditioning regimen	44 (32)	9 (31)	25 (27)	10 (63)
Graft source	19 (14)	1 (3)	5 (5)	13 (81)
Donor choice	27 (20)	0 (0)	15 (16)	12 (75)
GVHD prophylaxis	11 (8)	0 (0)	11 (12)	0 (0)
Relapse prevention (including pre-HCT chemotherapy)	33 (24)	8 (28)	21 (23)	4 (25)
Early (< D+100) post-transplant complications	25 (18)	5 (17)	20 (22)	0 (0)
Late (≥ D+100) post-transplant complications	43 (31)	4 (14)	38 (41)	1 (6)
Post-transplant infection[c]	*5 (4)*	*2 (7)*	*3 (3)*	*0 (0)*
Post-transplant GVHD[c]	*5 (4)*	*0 (0)*	*5 (5)*	*0 (0)*
Post-transplant relapse[c]	*28 (20)*	*2 (7)*	*25 (27)*	*1 (6)*
Other post-transplant toxicity / complication[c]	*33 (24)*	*5 (17)*	*28 (30)*	*0 (0)*

Abbreviations: n, number; Auto, autologous; Allo, allogeneic; GVHD, graft-versus-host disease; HCT, hematopoietic cell transplantation.

Footnotes:

[a]: "other" includes: Myelofibrosis (n=2), Diamond Blackfan Anemia(n=1), aplastic anemia (n=1), germ cell tumor (n=1), osteopetrosis (n=1), chronic lymphocytic leukemia (n=1), B- and T- cell prolymphocytic leukemia (n=1, each), donor (n=1);

[b]: Since one case may address more than one topic, the total number of topics exceeds the number of patients;

[c]: specific subtypes of early and late post-transplant complications. Since some cases had questions about more than one subtype, the total number of comments may exceed the number of comments on the topic ‘Early / Late post-transplant complications’.

Table 2

Questions addressed in the forum in the most common underlying diseases

Main question	AML (n=23)	MDS (n=14)	ALL (n=19)	MM & Amyloidosis (n=20)	Lymphoid malignancies (n=38)	All patients (n=137)[a]
Indication for transplantation	9 (39)	7 (50)	8 (42)	12 (60)	14 (37)	57 (42)
Conditioning regimen	11 (48)	3 (21)	1 (5)	5 (25)	18 (48)	44 (32)
Graft source	1 (4)	0 (0)	2 (11)	4 (20)	10 (26)	19 (14)
Donor choice	3 (13)	3 (21)	3 (16)	2 (10)	10 (26)	26 (19)
GVHD prophylaxis	1 (4)	2 (14)	1 (5)	2 (10)	1 (3)	11 (8)
Relapse prevention (including pre-transplant chemotherapy)	7 (30)	1 (7)	7 (37)	5 (25)	8 (21)	33 (24)
Early (< D+100) post-transplant complications	4 (17)	2 (14)	3 (16)	6 (30)	2 (5)	25 (18)
Late (≥ D+100) post-transplant complications	7 (30)	7 (50)	8 (42)	6 (30)	8 (21)	41 (30)
Post-transplant infection	*1 (4)*	*0 (0)*	*0 (0)*	*2 (10)*	*1 (3)*	*5 (4)*
Post-transplant GVHD	*1 (4)*	*0 (0)*	*0 (0)*	*0 (0)*	*2 (5)*	*5 (4)*
Post-transplant relapse	*3 (13)*	*3 (21)*	*5 (26)*	*7 (35)*	*3 (8)*	*26 (19)*
Other post-transplant toxicity or complication	*8 (35)*	*6 (43)*	*4 (19)*	*3 (15)*	*6 (16)*	*34 (25)*

Abbreviations: n, number; GVHD, graft-versus-host disease; AML, acute myeloid leukemia; MDS, myelodysplastic syndrome; ALL, acute lymphoblastic leukemia; MM, multiple myeoma.

Footnotes: Since one case may address more than one topic, the total number of topics exceeds the number of patients.

[a]: since only the most frequent diseases are listed in this table, the totals for each topic may be less than the numbers given for the all the cases. For abbreviations, see footnote in table 3.

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Table 3

Cases posted to ASBMT-CCF that required an urgent response (n=20)

#	Disease	Type of donor / transplant	Transplant topic*	Reason urgency	Suspected diagnosis or main question
2	Hodgkin lymphoma	MMUD/ allo	Early (< D+100) post-HCT complications	Acute vision loss and clinical instability	PRES
8	ALL	MRD/ allo	Late (≥ D+100) post-HCT complications	Lower extremity spasticity and clinical instability. Demyelination on MRI.	Questions about diagnosis and further tests.
28	MM	NA/Auto	Early (< D+100) post-HCT complications	Joint paint, elevation of LFTs, fever.	Questions about diagnosis and further tests.
44	Good risk AML	NP/Pre-allo	Transplant indication	Prolonged (45 days) neutropenia after consolidation	Indication of allo in good risk AML in aplasia after consolidation
47	NHL	NP/ NMA allo	Early (< D+100) post-HCT complications	Steroid refractory acute GVHD. Clinical instability	Therapy for steroid refractory acute GVHD
52	AML	NA/allo considered	Relapse prevention	AML at diagnosis with leukocytosis. Postpartum abnormal cardiac function.	Type of AML induction therapy in postpartum female
60	NP	Haploidentical sibling / allo	Early (< D+100) post-HCT complications	Sepsis	Granulocyte infusions in septic allo HCT patients
62	T cell NHL	NA/ Auto considered	Relapse prevention	High burden disease. Low KPS	Initial chemotherapy and role of auto in CR1 in hepatosplenic gamma delta T cell lymphoma
72	CML	Haploidentical son/allo	Early (< D+100) post-HCT complications	Suspicion of HLH. Clinical instability	Diagnosis and management of HLH
75	NP	Haploidentical sibling / allo	GVHD prophylaxis	Uncertain about exact timing of post-transplant cytoxan	Management of post-transplant cyclophosphamide
84	NP	MRD / RIC allo	Early (< D+100) post-HCT complications	CNS hemorrhage and high unconjugated bilirubin	GVHD suspected. Questions about diagnosis and management
85	CML	NP/ allo	Early (< D+100) post-HCT complications	Tacrolimus related TMA	Role of plasma exchange and resuming tacrolimus
90	ALL	MMUD/ allo	Post-transplant relapse	CNS ALL relapse	Management of ALL relapse after allo
95	AML	CBT/ allo	Early (< D+100) post-HCT complications	Primary graft failure (D +36)	Timing of second transplant. Haploidentical HCT proposed.
112	AML	MUD/MAC allo	Post-transplant relapse	AML relapse shortly after allo	Therapy and indication of second HCT for relapsed AML
122	AML	MUD/ TCD allo	Late (≥ D+100) post-HCT complications	Pulmonary insufficiency with patchy infiltrates.	Diagnosis and management of pulmonary infiltrates with negative

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#	Disease	Type of donor / transplant	Transplant topic*	Reason urgency	Suspected diagnosis or main question
				Microbiology studies negative.	microbiology.
126	NHL	MUD/ NMA allo	Late (≥ D+100) post-HCT complications	Myocarditis of uncertain etiology	Role of myocardial biopsy in myocarditis.
127	ALL	MUD/RIC allo	Late (≥ D+100) post-transplant complications	Suspicion of HLH. Clinical instability	Diagnosis and management of HLH
128	AML	Haploidentical /RIC allo	Early (< D+100) post-transplant complications	Suspicion of HLH. Clinical instability	Diagnosis and management of HLH
136	MDS	MRD/ MAC allo	Late (≥ D+100) post-transplant complications	Severe AIHA refractory to 3 previous therapies	Management of AIHA

Abbreviations: auto, autologous; allo, allogeneic; MRD, matched-related donor; MUD, matched-unrelated donor; MMUD, mismatched-unrelated donor; CBT, cord blood transplantation; CML, chronic myelogenous leukemia; GVHD, graft-versus-host disease; AML, acute myeloid leukemia; ALL, acute lymphoblastic leukemia; DLBCL, diffuse large B cell lymphoma; MM, multiple myeloma; MAC, myeloablative conditioning; NMA, non-myeloablative; RIC, reduced-intensity conditioning; TCD, t-cell depleted; PRES, posterior reversible encephalopathy syndrome; MRI, magnetic resonance imaging; LFT, liver function tests; KPS, Karnofsky performance status; CNS, central nervous system; TMA, transplant-associated microangiopathy; HLH, hemophagocytic syndrome; AIHA, autoimmune hemolytic anemia; NA, not applicable; NP, non-provided.