

MEDIA RELEASE

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IMPROVED STEM CELL TRANSPLANT OFFERS BLOOD CANCER PATIENTS GREATER CHANCE FOR CURE

Novel cell-selection technique allows nearly all blood cancer patients to receive life-saving blood stem cell transplant from previously non-suitable donors

Singapore — A team of haematologists from the National University Cancer Institute, Singapore (NCIS), together with clinicians from other local healthcare institutions, has developed a novel cell-selection technique for blood stem cell transplant.

The ‘Haplo-2017 protocol’ reduces transplant-related complications, such as transplant rejection and infections, and makes haploidentical (non-full matched) transplant a feasible treatment option for blood cancer patients who are unable to find stem cell donors with perfectly-matched human leukocyte antigen (HLA) markers. The first haploidentical blood stem cell transplant in Singapore using such technique was successfully performed at NCIS in January 2017.

Conventionally, blood stem cell transplantation requires a donor to have HLA markers that fully match the patient’s to lower the risk of transplant-related complications. However, matching HLA markers is more complex than blood group typing – each of the siblings will have one in four chance of being a match with the patient, while parents and children will always have half-matched HLA markers.

Generally, only three in 10 patients who need transplant would be able to secure a full-matched donor within the family. The remaining 70 per cent who are unable to do so will have to find a full-matched unrelated volunteer donor from local or international registries. The chances are lower for ethnic minorities to find a matched donor globally. Their population is smaller and minorities have more difficulty finding blood stem cell donors due to the lack of minority participation in most of the registries.

Associate Professor Koh Liang Piu, Senior Consultant at the Department of Haematology-Oncology at NCIS and Clinical Director of the NCIS Adult Haematopoietic Cell Transplant programme, who was instrumental in developing the Haplo-2017 protocol, said: “Since introducing the haploidentical blood stem cell transplant programme at NCIS in 2017, we have treated about 50 patients and the outcomes have been comparable to full-matched donor blood stem cell transplants. There is now good data in Singapore to show that haploidentical blood stem cell transplant is a viable treatment option for blood cancers, such as leukaemia and lymphoma, and many other bone marrow disorders.”

“For blood cancers such as acute leukaemia, time is of the essence. Early treatment often gives rise to better outcomes and any delay often results in disease progression and

complications. Advances in the field have greatly improved treatment where patients can still receive successful stem cell transplants without full-matched donors. Haploidentical blood stem cell transplant can be an option if no perfectly HLA-matched donor is found in a timely manner,” A/Prof Koh explained.

“Most importantly, with the Haplo-2017 protocol, nearly all patients will be eligible for a haploidentical stem cell transplant as almost everyone has a potential half-matched donor in their family. This is crucial because it would mean that the transplant can take place sooner as compared with getting an unrelated well-matched donor from the registries,” A/Prof Koh added.

Blood stem cell transplant for blood cancers and bone marrow disorders

Blood cancers are among the 10 most frequent cancers in men and women in Singapore, and many can be life-threatening if not treated early. Between 2015 and 2019, leukaemia and lymphoma are the top five cancers in males and females below the age of 30¹. NCIS sees about 60 new cases of leukaemia and about 200 new cases of lymphoma every year.

Blood stem cell transplantation is the only curative treatment for various types of blood cancers and bone marrow disorders, including leukaemia, myelodysplastic syndrome and lymphoma.

In conventional blood stem cell transplant, all harvested stem cells from a donor are transplanted into a patient. With the new Haplo-2017 protocol, only non-harmful stem cells harvested from the donor are retained, while those that are known to cause rejections are removed. Stem cells that can boost the patient’s immunity are also infused. This lowers the risk of life-threatening infections.

More than 100 haploidentical blood stem cell transplants using the Haplo-2017 protocol have been performed locally between 2017 and 2022. About 70 per cent of the patients had favourable outcomes, such that they had no more signs of cancer or did not experience transplant-related complications such as rejection. Patients also did not need to be on immunosuppressants that are known to cause side effects. Moreover, many patients did not require readmissions to hospital due to transplant-related complications.

Positive treatment outcome with haploidentical blood stem cell transplant

One patient who benefited from the haploidentical stem cell transplant is 59-year-old Madam Cynthia Tan, who was diagnosed with high-risk acute myeloid leukaemia in October 2019. She underwent three cycles of chemotherapy and achieved good response. However, as her disease has high risk of relapse without stem cell transplant, A/Prof Koh, who is also the haematologist treating Madam Tan, initially looked for a full-matched donor among her immediate family members, as well as from the local and international unrelated donor registries. When no full-matched donor was found, Madam Tan decided to go for haploidentical stem cell transplant in March 2020, with her 25-year-old son, Mr Keith Chan, as the half-matched donor for the transplant. Today, Madam Tan remains well and continues to be in remission without having to rely on immunosuppressants. She has also returned to work and her hobby of running in the park.

¹ Singapore Cancer Registry Annual Report 2019 published by the National Registry of Diseases Office, in February 2022 https://www.nrdo.gov.sg/docs/librariesprovider3/default-document-library/scr-2019_annual-report_final.pdf

Future work

The NCIS team plans to further refine the Haplo-2017 protocol, which includes optimising the treatment regimen and stem cell dose to be infused, to lower the risk of rejection and disease recurrence, so as to achieve the best haploidentical stem cell transplant outcomes for patients.

Chinese Glossary

National University Cancer Institute, Singapore (NCIS)	新加坡国立大学癌症中心 (国大癌症中心)
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About National University Cancer Institute, Singapore (NCIS)

The National University Cancer Institute, Singapore (NCIS) is a national specialist centre under the National University Health System (NUHS), and is the only public cancer centre in Singapore that treats both paediatric and adult cancers in one facility. NCIS (*n-sis*) offers a broad spectrum of cancer care and management from screening, diagnosis and treatment, to rehabilitation, palliative and long-term care. NCIS's strength lies in the multi-disciplinary approach taken by our clinician-scientists and clinician-investigators to develop a comprehensive and personalised plan for each cancer patient.

NCIS cancer services span across several acute hospitals: NCIS @ National University Hospital, NCIS @ Ng Teng Fong General Hospital, NCIS @ Alexandra Hospital, and the NCIS Radiation Therapy Centre @ Tan Tock Seng Hospital. We also deliver a range of cancer services for our patients' convenience at satellite clinics in the community, as well as in the comfort of their homes. For more information, please visit www.ncis.com.sg.