



Cold comfort

Is storing the umbilical cord blood of your child worth the high cost? Elaine Yau investigates

The sales pitch of the blood bank is something first-time mother Mrs Leung couldn't ignore. When she gave birth to her son at Union Hospital last year, she was told her child's umbilical cord was rich with stem cells that may have the potential to treat Alzheimer's disease and traumatic brain injury in the future.

Tempted by the promise, she shelled out HK\$100,000 for the collection and storage of her umbilical cord and its blood, with private blood bank CordLife.

"Of course, I don't want to use the cord or cord blood in future," says Leung, a marketing manager. "But they might come in handy if, unfortunately, diseases related to blood or the immune system strike in future. There are cases of successful treatment of those diseases using them."

Increasingly, parents like Leung are using blood banks for collection and storage of cord blood. But doctors say the cases of using one's own cord blood for successful treatment are rare, and the lack of government regulation over the private blood bank industry leads to security concerns.

A government spokesman says

they do not have information on the number of companies that help people store umbilical cord blood. However, a Consumer Council study in 2010 listed six cord blood storage providers, whose cost of service ranged from about HK\$6,000 to more than HK\$30,000.

CordLife, a Singapore-listed blood bank which entered the local market in 2005, is among the major operators. Arthur Lau Yi-king, its senior project and quality assurance manager, says its services are popular with local and mainland parents. Another provider, HealthBaby, says it has more than 20,000 customers.

Cord blood is rich in haematopoietic (blood-forming) stem cells – called HSCs, which are primarily responsible for replenishing blood and regenerating the immune system. Typically, the umbilical cord blood is discarded after birth. For mothers who want the storage service, cord blood is retrieved from the umbilical cord and placenta after the baby is born and the umbilical cord is cut.

The blood is stored at minus 135 degrees Celsius for future use.

The first-ever successful transplant of stem cells from cord blood was in 1988. A six-year-old boy

You don't know when you will be struck by lymphoma. Will the cells last that long? Parents are buying hope, not insurance

TSE HUNG-HING, PAEDIATRICIAN

in Paris was afflicted with Fanconi anaemia, a blood disorder. Stem cells were used to regenerate blood and immune cells in the boy. Since then, stem cells in cord blood have been used to cure a series of diseases including blood cancers, solid tumours, and immunodeficiency and metabolic disorders. Recently, scientists at the Salk Institute for Biological Studies in California found a new way to convert cord blood cells into neuron-like cells that may prove valuable for the treatment of a wide range of neurological conditions, including stroke, traumatic brain injury and spinal cord injury.

One of the Salk study's researchers, Alessandra Giorgetti of the Centre for Regenerative Medicine in Barcelona, says cord blood cells have advantages over other types of stem cells: they are not embryonic and thus they are not controversial. They are more plastic, or flexible, than adult stem cells from sources like bone marrow, which may make them easier to convert into specific cell lineages.

Furthermore, the collection of cord blood cells is safe and painless and poses no risk to the donor, and they can be stored in blood banks for later use. Says Lau: "The HSCs

can be applied in treatment of over 200 diseases like type-one diabetes and systemic lupus erythematosus [a connective tissue disorder involving the immune system]."

HSCs are also found in bone marrow or peripheral blood that circulates through the body, and can be used to restore stem cells destroyed by chemotherapy or radiation therapy during cancer treatment. But Lau says cord blood stem cell extraction has advantages over bone marrow or peripheral blood extraction. "Patients receiving bone marrow transplants have to take immunosuppressants, whereas the incidence of developing graft-versus-host disease using cord blood is much lower as the patient is using his own stem cells. Using bone marrow or peripheral blood requires extensive donor search and a perfect match between donor and recipient. But [cord blood] is readily available when needed."

Cord blood stem cells come in handy in cases where a suitable bone marrow donor cannot be found. Medical surveys show about half of the patients requiring a bone marrow transplant will not find a suitable donor within a critical period.

Umbilical cord blood is stored at minus 135 degrees Celsius at the CordLife facility (left). The stem cells can be used for medical emergencies later in life.

Photo: K.Y. Cheng. Illustration: Corbis

It costs HK\$100,000 to store cord blood and cord for 18 years at CordLife, or HK\$36,000 for cord blood only. Since setting up in Hong Kong, Lau says, it has had one successful case of using cord blood. "Last year, the Queen Mary Hospital did a transplant on a two-year-old boy afflicted with neuroblastoma, a form of childhood cancer. The stem cells from the boy's cord blood stored at birth with us were infused back

into his body after chemotherapy." The medical benefits of cord blood are established. In the first large-scale study on treatment for childhood leukaemia, researchers at the Medical College of Wisconsin found that umbilical cord blood is more successful at treating cancer than a bone marrow transplant. The study, published in the medical journal *Lancet* in 2007, studied the survival rate of 785 leukaemia-afflicted children who

were treated with either cord blood or bone marrow. The use of cord blood stem cells was associated with a lower risk of rejection and patients given higher cell doses of cord blood had better survival rates.

However, local cord blood bank development is 20 years behind that in the West in terms of regulation and popularity, says a HealthBaby spokesman. "Cord blood bank storage is available in private hospitals only. We hope that it will soon change so that children with terminal illnesses like leukaemia will have different treatments at their disposal."

The only public cord blood bank in the city has been run by the Hong Kong Red Cross' Blood Transfusion Service since 1998. It stores about

3,600 cord blood samples and successful transplants have been done on some 40 patients, according to a spokesman.

Although cord blood is regarded as an "organ" under the Human Organ Transplant Ordinance, the collection and storage of it is not regulated in Hong Kong. Lau from CordLife says it does not need to register with the Pharmacy and Poisons Board.

"Only treatments using [stem cell] products are covered by the ordinances. They concern hospitals that carry out transplants using the products. But we, as the storage provider, are not covered," he says.

Former Public Doctors Association president and paediatrician Tse Hung-hing says the government should strengthen regulation of the sector. "If the blood products are not handled well and get contaminated, there could be severe consequences."

Tse says the medical claims made by private blood banks are overblown. "Stem cells are not a panacea. They are used mostly for treating genetic diseases related to blood or the immune system. If the patient suffers from congenital

diseases, the stem cells of the patient will contain the same genetic abnormality and can't be used.

"Cord blood for self-use is only possible for those who acquire blood or immunity related diseases after birth, such as leukaemia. There are few cases of transplant treatment using the patient's own cord blood."

In 2007, the American Academy of Paediatrics discouraged storing cord blood privately as "biological insurance" for a child without a known disease risk. It said that the chance of the child needing a transplant from cord blood stem cells was only one in 20,000.

The amount of stem cells stored at birth might not be enough for adult treatment, Tse adds. The clinical application of stem cells extracted from a standard collection of cord blood at birth is limited to patients weighing less than 40kg.

And the technology could change so much that cells stored now may not be needed if disease strikes later. Tse adds: "You don't know when you will be struck by lymphoma. Can the cells be stored for so long? Parents are buying hope instead of insurance."

But for Mrs Leung, the money is well spent. "Life is priceless," she says. elaine.yau@scmp.com