

Technique to preserve fertility in young women may be unsafe for patients with leukemia

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Although the use of ovarian tissue cryopreservation and transplantation has lead to 13 live births in women with lymphoma or solid tumors, this method of fertility preservation may be unsafe for patients with leukemia, according to a recent study published online in *Blood*, the journal of the American Society of Hematology. The method involves removing and freezing ovarian tissue before the patient undergoes aggressive chemotherapy and radiotherapy, and then reimplanting the tissue once the cancer has been brought under control. One major concern with leukemia patients is the risk that their frozen-thawed ovarian tissue might harbor malignant cells that could induce a recurrence of the disease after reimplantation.

"Our study provides clear evidence that [cancer cells](#) in women with acute and chronic leukemias can contaminate the ovaries," said Marie-Madeleine Dolmans, MD, professor at the Université Catholique de Louvain in Brussels and lead author of the study. "If this tissue is reimplanted in these women when they're ready to have children, there's a good possibility that the cancer will come back."

As most acute lymphoblastic leukemia (ALL) patients are diagnosed with the disease at a young age, consideration of the preservation of their fertility is especially important. In fact, according to the National Cancer Institute, 71 percent of those diagnosed with ALL are less than 35 years old, as are nearly 10 percent of those with chronic myelogenous

leukemia (CML)¹. In 2010, it is estimated that 2,180 women will be diagnosed with ALL and 2,070 with CML¹.

As aggressive [chemotherapy](#) and [radiotherapy](#) are damaging to the reproductive organs, the researchers wanted to examine the safety of using ovarian tissue cryopreservation to safeguard the fertility of patients with leukemia. In this study, researchers examined the implications of the technique in 12 women with ALL, a fast-growing cancer of the white blood cells, and six women with CML, a slowly progressing bone marrow cancer. The 18 patients included in this study were between 2 and 31 years of age when their ovarian tissue was cryopreserved (from 1999 to 2008). The mean age of the patients with ALL was 14.5 years and 24.7 years for those with CML.

Although initial microscopic examination did not reveal any cancerous cells in the ovarian tissue samples collected from each patient, by using a technique called real-time quantitative polymerase chain reaction (RT-qPCR), the scientists found cancerous cells in the ovarian tissue of 70 percent of the ALL patients and 33 percent of the CML patients. For further analysis, the researchers engrafted the ovarian tissue samples into 18 healthy mice for an observational period of six months. In the mice who received tissue from CML patients, the grafts looked normal and did not appear to contain any cancerous cells. In contrast, four of the mice who received ovarian tissue from ALL patients developed tumors. Through use of RT-qPCR and the mouse model, the researchers demonstrated the viability and malignant potential of leukemic cells present in the frozen [ovarian tissue](#), especially from ALL patients.

"Given our findings, further research is needed to develop safer options for fertility preservation in patients with acute and chronic leukemias," said Jacques Donnez, MD, professor at the Université Catholique de Louvain in Brussels and co-author of the study.

"[Leukemia](#) patients can benefit from fertility preservation techniques," added Brandon Hayes-Lattin, MD, the Director of the Adolescent and Young Adult Center at the Knight Cancer Institute in Portland, Oregon, "But the strategies offered must be both effective and safe. Among its other strengths, this work emphasizes that molecular methods can be successfully applied to assessments of safety."

More information: [bloodjournal.hematologylibrary ...
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