LIFELine
St. Jude for Life
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ResearchUPDATE

Dear St. Jude Alumni,

Hormone deficiencies are common side effects of treatment for childhood cancer. In fact, one out of every two survivors will experience at least one hormone-related problem during his or her lifetime. These conditions include diabetes, thyroid disease, growth disorders, infertility, sexual dysfunction, and many others.

In this issue of LIFELine Dr. Wassim Chemaitilly, who has led several research studies on hormone-related problems, shares his findings and reflects on the implications of two common conditions: growth hormone deficiency in adults who were treated with brain radiation and premature menopause in young women who received pelvic radiation or high doses of "alkylator" chemotherapy drugs, such as cyclophosphamide, nitrogen mustard, and busulfan. We hope you find his thoughtful comments useful.

As always, thank you participants, for making this research possible. To your health!

Melissa M. Hudson, MD
Principal Investigator,
St. Jude Lifetime Cohort Study

Hormone deficiencies

Thanks to your commitment to the LIFE Study we are continuing to discover new information about the health of survivors—as seen in the results of two recent studies.

Study 1—Pituitary hormone deficiencies: Growth hormone

In 2015, we looked at 748 participants who received brain radiation to treat their childhood cancer. We expected to find many hormone problems because radiation can damage the pituitary gland, which produces hormones that control many organs and processes in the body. But we were surprised by how many previously undiagnosed problems were identified during the study evaluations.

There are effective treatments for the symptoms linked to growth hormone deficiency in adults.

This study revealed ***that almost half of the individuals treated with brain radiation had growth hormone deficiency.***

Growth hormone is produced by the pituitary gland and is needed for children to grow to their full adult height. Children who are deficient are usually given growth hormone supplementation in order to grow taller.

Adult growth hormone deficiency

Adults continue to produce a small amount of growth hormone and it plays a role in maintaining health. Growth hormone deficiency in adults is linked to abdominal obesity, a risk factor for heart disease. It is also linked to muscle weakness, low muscle mass, and low energy.

Not much is known about the possible benefits of growth hormone supplementation in adult survivors. We do know that it has some possible drawbacks. Supplementation is very expensive and must be given by a daily injection for an indefinite number of years. There is controversy about whether it may increase the risk of new (secondary) tumors. Fortunately, there are effective treatments, like diet, exercise, and commonly prescribed medications, for the symptoms linked to adult growth hormone deficiency. More information is needed to see if supplementation is safe and whether it would make a difference in overall health long-term.

(article continues on page 2)

Dr. Wassim Chemaitilly is the director of the Endocrinology Division at St. Jude

Citations

Chemaitilly W, Li Z, Huang S, et al. Anterior hypopituitarism in adult survivors of childhood cancers treated with cranial radiotherapy: a report from the St Jude Lifetime Cohort study. ***J Clin Oncol***. 2015 Feb 10;33(5):492-500.

Chemaitilly W, Li Z, Krasin MJ, et al, Premature ovarian insufficiency in childhood cancer Survivors: a report from the St. Jude Lifetime Cohort. ***J Clin Endocrinol Metab***. 2017 Jul 1;102(7):2242-2250.

Study 2—Premature ovarian insufficiency and hormone replacement therapy

In another study, we looked at the risk of premature ovarian insufficiency by reviewing the experiences of 921 women who completed the LIFE Study evaluation decades after their childhood cancer diagnosis. Premature ovarian insufficiency means that the ovaries stop producing the female hormone estrogen and menstrual cycles stop before the natural age of menopause. (Menopause occurs naturally around the age of 50.)

Premature ovarian insufficiency is suspected in young girls and adolescents with delayed or stalled puberty and in women whose menstrual cycles stop before age 40. For some individuals, the ovaries stop working during or shortly after cancer treatment and never recover. Others may start having menstrual periods again after treatment but then go on to experience menopause prematurely. ***Women who develop premature ovarian insufficiency lose the ability to have children just as those who undergo natural menopause do.*** More than one in 10 of the women in this study developed premature ovarian insufficiency. Half of these women were age 31 or younger.

Results of the study

We found that pelvic radiation and treatment with high-dose "alkylator" chemotherapy, such as cyclophosphamide and busulfan, were linked to the risk of premature ovarian insufficiency.

We also learned that even though almost 11 percent of the women in the study developed premature ovarian insufficiency, ***less than a third were on sex hormone replacement therapy.***

Why are so few survivors receiving hormone replacement therapy?

Premature ovarian insufficiency puts women at risk of osteoporosis and early aging, and may have a negative effect on heart health, so we wondered why only a minority of women in this study were were receiving hormone replacement therapy.

One reason could be that, as young survivors transition to community-based health care, their community providers may not be aware of their risk. It is also possible that medical providers are not comfortable prescribing hormone replacement therapy to survivors because of its known side effects. Treatment with estrogen increases the risk of blood clots, and may stimulate the development of certain "hormone-dependent" cancers, including breast cancer. Women who received radiation to the chest who know they already have an increased risk of breast cancer may be concerned that hormone replacement might add to this risk.

More research is needed to better understand the long-term risks and benefits of sex hormone replacement therapy for female survivors so that we can give them the best advice about how to stay healthy.

The inability to have children is one of the things survivors say they worry about the most.

Importance of fertility preservation

The inability to have children is one of the things survivors report that they worry about or regret the most. Knowing who is at risk of premature ovarian failure allows us to identify young women and girls who can use the opportunity to freeze and bank their eggs while they are still having menstrual cycles. And it helps us offer better counseling to survivors about their options as they plan their families.

The findings of both these studies of hormone deficiencies emphasize the fact that childhood cancer survivors benefit from lifelong follow-up like that provided by the St. Jude LIFE Study.

—Dr. Wassim Chemaitilly

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Facts about hormones

Hormones are chemical messengers that are produced by the glands of the endocrine system and carry information through the bloodstream to the body's cells and organs.

- Hormones regulate automatic things that happen in the body, like growth, puberty, energy levels, and digestion.
- The ***pituitary gland*** inside the brain is often called the master gland because it controls many other glands.
- The pituitary produces growth hormone to stimulate growth in children and maintain health in adults.
- The ***ovaries and testes*** produce the sex hormones—estrogen and progesterone in women, testosterone in men—that control sexual maturity and fertility.

Please stay in touch with us!

- Call us toll-free at **1-800-775-2167**
- Send us an email: **sjlife@stjude.org**
- Visit our website: **www.stjude.org/sjlife**

Thank you!
for participating in survivor research