Women exposed to radiation therapy as children prone to stillbirths

July 22 2010

Thanks to advances in medicine, many children and adolescents who were diagnosed with cancer years ago are now surviving to adulthood and wanting to start families themselves. But how does exposure to radiation used to treat cancer early in life affect the chances of that person's own baby being stillborn or dying very soon after birth? These questions are answered in an Article published Online First and in an upcoming *Lancet*, written by Dr John Boice, and Dr Lisa B Signorello, both of the International Epidemiology Institute, Rockville, MD, USA, and Vanderbilt University, Nashville, TN, USA, and colleagues.

Although unproven, radiation-induced damage of human germ cells might be transmitted to the offspring of patients, which could have adverse effects on reproduction and the health of offspring. This damage could also have implications for those who are exposed to radiation and chemicals in occupational or other settings, such as nuclear power plants.

In this new study, the authors took data from the Childhood Cancer Survivor Study (CCSS), which covered 25 US institutions and one in Canada. The risk of stillbirth and neonatal death among the offspring of men and women who had survived childhood cancer was calculated. All patients in CCSS were younger than 21 years at initial diagnosis of an eligible cancer and had survived for at least 5 years after diagnosis.

Among the 1148 men and 1657 women who had survived childhood cancer, there were 4946 pregnancies. Irradiation of the testes (men), pituitary gland (women), and use of alkylating chemotherapy drugs (both

sexes) were not associated with an increased risk of stillbirth or early baby death. Uterine and ovarian irradiation significantly increased (by nine times) the risk of stillbirth and neonatal death across all age groups combined, when doses greater than 10•00 Gy were used. For girls treated before puberty, irradiation of the uterus and ovaries at doses as low as 1•00-2•49 Gy increased the risk of stillbirth or neonatal death by almost five times; when doses over 2.5 Gy were used, the risk was increased 12 times.

The authors say: "High-dose pelvic irradiation can permanently impair growth and blood flow to the uterus and results in a reduced uterine volume, and these effects of radiation are likely to be dependent on age. Whether these types of effects on the uterus increase the risk of placental or umbilical-cord anomalies or other factors already linked to stillbirth, or whether they operate through different mechanisms needs clarification."

The authors also note that even if men who suffered radiation exposure had suffered permanent transmissible damage, it would be difficult to detect in all but the largest and most heavily exposed populations because paternal influences on the risk of stillbirth are outweighed by maternal and external (eg, prenatal care) factors. They say: "No effect was noted in this cohort of men exposed to testicular irradiation at levels far higher than would be expected from background exposure, diagnostic medical, or occupational settings."

They conclude: "For men exposed to gonadal irradiation, there does not seem to be an increased risk of stillbirth or neonatal death among their offspring, which is reassuring not only for male survivors of childhood cancer but also for men exposed to ionising radiation in occupational or other settings. For women, however, high-dose uterine or ovarian radiation does seem to have important adverse effects, which are most likely to be attributable to uterine damage. Therefore, careful

management is warranted for pregnant women treated with high-doses of pelvic irradiation before they have reached puberty."

Provided by Lancet