Dietary factors contributing to risk or prevention of childhood cancer

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For many years, fruit and vegetables have been thought to be protective against various forms of adult cancers and, more recently, a number of studies have investigated specific micronutrients, particularly those taken in their supplemental form. A similar trend has been seen in research into the aetiology of childhood cancers, about which little is known despite decades of research. There has been a growing interest in maternal nutrition during pregnancy, and in the child’s nutrition between birth and diagnosis.

Leukaemia – particularly acute lymphoblastic leukaemia (ALL) – is the most common childhood malignancy, and a variety of dietary factors have been investigated. A Western Australian study reported a protective effect of maternal folate supplementation during pregnancy against ALL, but this has not been replicated in subsequent studies. Several other studies have reported a protective effect of multivitamin use around the time of conception. Maternal or child fruit and vegetable intake has been shown to be protective in several studies, and child’s intake of bean curd in one study. Other studies have shown foods containing DNA topoisomerase II inhibitors to increase the risk of infant acute myeloid leukaemia. Evidence for an increased risk of childhood acute leukaemia has been reported for cured or smoked meat and/or fish, and an increased risk of ALL for maternal coffee drinking during pregnancy.

Brain tumors are the second most common childhood cancer, and a number of studies have investigated possible associations with intake of cured/processed meats and other food containing N-nitroso compounds; ten studies have looked at these foods in the maternal diet and seven at the child’s diet. Some studies have provided support for an increased risk with maternal intake, but results for the child’s intake have been less consistent. Maternal multivitamin use and intake of fruit and vegetables during pregnancy have been found to be protective for some childhood brain tumors. In addition, one study reported a protective effect of maternal vitamin C supplementation during pregnancy against medulloblastoma or primitive neuroectodermal tumour, while maternal intake of fatty foods appeared to increase the risk.

Less research has been conducted into dietary factors in relation to the rarer childhood cancers; of these, two studies have reported a protective effect of maternal multivitamin intake against neuroblastoma and another reported a similar finding for retinoblastoma.

This presentation will summarize the evidence regarding associations between maternal diet during pregnancy, the child’s diet and risk of childhood cancer, and discuss some possible underlying biological mechanisms. Mention will also be made of the methodological challenges in investigating the relationship between dietary factors and risk of childhood cancer.